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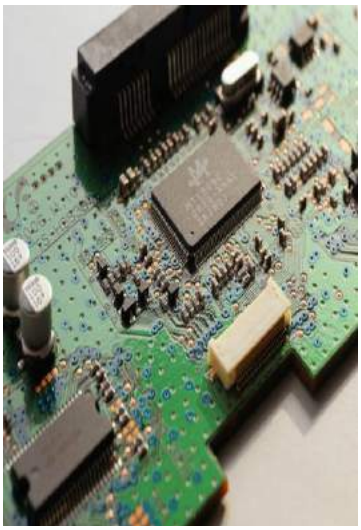


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Content

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Measuring the Impacts of E-Learning on Students' Achievement in Learning Process: An Experience from Tanzanian Public Universities

Titus Tossy
Computing Science Studies
Faculty of Science and Technology, Mzumbe University
Morogoro, Tanzania.

***Abstract*— This paper is located within the 21st century global debates about the impact of e-learning as one of the ICT on students' achievements in teaching and learning process in universities. From the perspectives of Tanzania, this paper provides a model for measuring the impact of e-learning on students' achievements in universities. The rationale for the investigation stems from the notion that despite the hundreds impact studies, the impacts of e-learning on student's achievements remain difficult to measure and open too much reasonable debate. This raised contradiction and elusive findings on the conclusion based on the impacts of e-learning systems on student's achievement. A Mixed method research methodology involving survey and interviews was employed in the collection of data for building the model. Multiple regressions technique was used to analyze the hypothesized relationships conceptualized in the research model. The model was built and validated using structural equation modeling and Delphi technique respectively. Measuring e-learning impact on student's achievements, indicators such as student engagement, student cognitive, performance expectancy, student control, student satisfaction, continue using, student motivation, student self-esteem, student confidence on e-learning system have positive significance relationship with students' achievement. The model has the potential to policy makers, universities and other stakeholder to understand the impacts of e-learning after implementation in order to justify the total investment based on that technology. The novelty of this research lies in the extension of the findings in literature with constructs such as frequency use and intention to use e-learning in learning context.**

Keywords- E-learning, learning process, impacts of E-learning, Tanzania Universities, Public Universities

I. INTRODUCTION

Information and Communication Technologies (ICTs) have influenced the landscape of education sector by changing the way various education activities are being conducted. The creative development of information technology, aided to the access to efficiency of learning processes in universities (Lwoga and Komba, 2015), as a results, there is a leading to improved students' achievements. This associated academic career achievement provides the promise for meaningful employment of graduates as well as movement towards a knowledge-based economy and rapid national economic growth (Olson et al., 2011). As a result, both governments and higher learning institutions in developed countries have invested in e-learning systems. As such, electronic learning systems (e-learning systems) have become a major phenomenon in recent years (Tossy, 2012) as transforms teacher-centered teaching and learning system into a student-centered one (Truncano, 2005). Further, this transformation enables students to develop their problem-solving abilities; information reasoning and communication skills; improves creativity and other higher orderly-thinking skills (Rosenblit et al., 2005). The e-learning system indeed changes the way in which learning of education activities are conducted (Tossy, 2012; Lwoga and Komba, 2015); offers efficient use of time and ease sharing of educational materials between students and staff (Shivaraji et al., 2013) and improves the quality of teaching and learning (Kahiigi et al., 2008; Jones, 2011).

Despite these notable attributes of utilization of e-learning in learning, its impact on student's achievements remain difficult to measure and open to debate as there are few conclusive statements (Truncano, 2005; Rosenblit and Gros, 2011). Others argue that there is a contradiction on the conclusion on the impacts of e-learning systems on student's achievement (Hilz et al., 2001; Trancore, 2005). It is also argued that data to support the perceived benefits from e-learning technologies are limited and evidence of effective impact is elusive (Eurydice, 2011; Bocconi et al., 2013; Pandolfini, 2016). In developing countries, there is paucity of information about the relationship between e-learning technologies and student's achievement (Rosenblit et al., 2011). There is thus a need to carry out more research, notably to develop useful indicators and methodologies that need to be used in measuring the impact of e-learning in teaching and learning in developing countries including Tanzania in order to guide policy formulation. This is important because developing countries including Tanzania are still at very basic stage of e-learning technology adoption. Tanzania needs to tap into

experiences of universities in developed countries that have long experience of using e-learning so as to formulate innovative corrective measures.

II. E-Learning

Wentling et al. (2000:5) define e-learning as:

"The acquisition and use of knowledge distributed and facilitated primarily by electronic means. This form of learning currently depends on networks and computers but will likely evolve into systems consisting of a variety of channels (e.g. Wireless, satellite), and technologies (e.g. Cellular phones,etc.) as they are developed and adopted. E-learning can take the form of courses as well as modules and smaller learning objects. E-learning may incorporate synchronous or asynchronous access and may be distributed geographically with varied limits of time." (Wentling et al., 2000:5).

From the definition above, E-learning imprisonments a wide range of terms (Albert & Mori, 2001) referred to as *'labels'* which have been used to describe the concept of e-learning. These labels include, but are not limited to Web Based Learning (WBL), Web Based Instruction (WBI), Web Based Training (WBT), Internet Based Training (IBT), Online Resource Based Learning (ORBL), Advanced Distributed Learning (ADL), Tele-Learning (T-L), Computer-Supported Collaborative Learning (CSCL), Mobile Learning (M-learning or ML), Nomadic Learning, Off-Site Learning [Collis, 1996; Khana, 2005; Yieke, 2005; Bates, 2001; Dam, 2004; Goodear et al., 2001; Pegler & Littlejohn, 2007; Dabbagh et al., 2000; Barbara, 2002, 2004; Cramer et al., 2000; Salzbert & Polyson, 1995; Schreiber, et al., 1998; Schank, 2001; Howard, 2003; and Singh, 2003]. The e-learning term is used interchangeably with other related terms such as online learning, virtual learning, and web-based learning (Twaakyondo, 2004).

Tossy (2012) argues that while The use of e-learning has the added value of flexibility ("anywhere, anytime, anyplace"), E-learning facilitates both learner engagement and the engaging of experiences (Uys, 2004; Meyen, 2000; 2002). Meyen (2002) demonstrate how e-learning helps to overcome the traditional barriers to education delivery. These barriers include lack of physical infrastructure, lack of qualified teaching staff, absence of adequate education budgets, and the failure of traditional pedagogy and curricula. East African countries are characterised by these barriers (Ndume et al, 2008). The failure of the government's efforts in building physical classrooms has created an opportunity for innovative education delivery via e-learning (Yieke, 2005). As Alavi and Leidner (2001) argues that e-learning's importance will grow right across the educational spectrum from primary to HEIs, the e-learning implementation in Tanzania HEIs is taking place despite the various outlined barriers. The e-learning implementation differs from one HEI to another.

III. Tanzania Higher Education Status

According to TCU (2010), the education sector in Tanzania has grown drastically for the past fifty (50) years; this has been due to an increase in the number of Higher Education Institutions (HEIs). The students' enrolment has increased tremendously since independency. As MoEVT (2011) states that the number of students enrolled in HEIs increased drastically. In 1961, Tanzania had 1,737 students enrolled in 4 HEIs, while in 2011 a total of 244,045 students in 358 HEIs (MoEVT, 2011). This emanated from free markets which encourages establishment of both private and public HEIs, backed by various government policies on education sector such as Vision 2025, ICT Policy and Higher Education Master Plan (HEMP), which enhance the establishment of both private and public HEIs (Maliyamkono, 2006:396-445). Despite the fact that the number of HEIs has increased since 1961, the pace of increase of students compared to overall national population growth doesn't match the enrolment offered by these institutions (Maliyamkono, 2006). This is due to limitation on enrolment capacity, geographical constraints, cost of education, lack of enough infrastructures, lack of qualified personnel and lack of innovative ideas (Chiemelie, 2012). In the light of those challenges, e-learning is sought to be the ultimate solution in which the enrolment does neither depend on the infrastructure nor geographical locations (Noe, 2005). As MoEVT (2011) argues that the HEIs should deploy e-learning for their day to day training activities, in order to minimize training cost and to remain competitive in the market. Furthermore, while MoCT(2003) articulates the need for harnessing ICT opportunities to meet the vision 2025 goals by blending strategic ICT leadership; ICT infrastructure; ICT Industry through Human Capital, MoEVT (2007) stipulates that Tanzania needs national e-learning sensitization by stressing the effort on applications such as distance education, e-learning, m-learning and blended learning.

IV. E-Learning At Heis In Tanzania

Dr. Gajaraj Dhanarajan (2001:9), President of the Commonwealth of Learning, argued that:

"One would be foolish to question the importance of the internet and www for education in this new decade; at worst it has the ability to connect communities of learners and teachers and at its best it could very well be the tool that education has been waiting for these past thousands of years; its promise is only limited by the imagination and capacity of the people who can apply and benefit from it".

This kind of vision of a future electronically driven and inclusive education has been a driving force for HEIs in Tanzania and has provided the spur to implement e-learning. As is the case with other African countries, the rate of implementation of e-learning platforms in Tanzania is still very

slow despite the potential opportunities provided by open source technology and the conducive environments created by the respective governments. There have been some initiatives on the part of governments to develop ICT policies as a way forward in the implementation of e-learning. In addition there have been different round table conferences and the formation of the Tanzania Commission of Universities (TCU) has fostered a debate on a common education delivery. For example, Tanzania has abolished all taxes related to computers and related equipment and reduced licence fees and royalties payable by the telecommunication operators (Morrison & Khan, 2003 and McPherson & Nunes, 2008). The more established public and private HEIs have managed to implement e-learning platforms in Tanzania. They are implementing these using either open source or customized platforms such as WEBCT, Blackboard, Moodle, Joomla, etc. Other universities in the Tanzania have started the basic process of ICT infrastructure expansion to include local area network implementation, Internet, computer labs and other facilities, as a way forward to the establishment of e-learning (Sife, et al., 2007).

V. E-Learning Market And The Drivers Of Change In Tanzania

E-learning is not a new phenomenon in the developed world. However, may be new to some developing countries including Tanzania. Its market is rapidly increasing globally. While Merrill Lynch (2003) argues that the e-learning is the fastest growing sector in the developed countries, Many developing countries (including Tanzania) are striving to implement e-learning in HEIs. Doughty et al. (2001) and Saint (1999) have documented the rise of the virtual university in Africa (including Tanzania). There are many e- learning initiatives in progress in Tanzania, such as Schoolnet, e-learning centres, and African Virtual University (Ndume, et al., 2008; Sife et al., 2007). The increase in the demand for higher education is one of the driving forces for implementing e-learning. Higher population growth, lower education costs, increased access to education, and higher participation rates in higher education changes the way firms organize work and cost-effectiveness and are factors driving the implementing of e-learning in Tanzania (Ndume et al., 2008).

VI. Methodology

A. *Conceptual Model and Research Hypothesis Development*

The research model for this study was formulated based on the concept of information system (IS) success model adapted from DeLone and McLean (1992). The model is consists of three dimensions each consists three constructs as illustrated in Figure 1. This paper therefore uses this conceptual model to underpin the measurement of the impact of e-learning system on student's achievement in Tanzania universities.

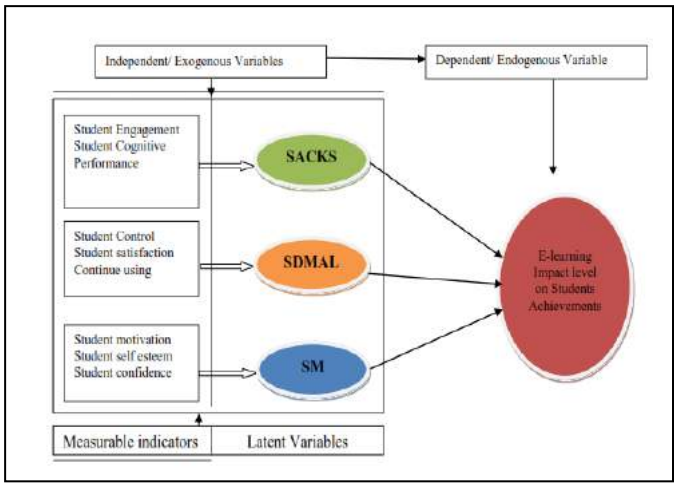

Figure 1: Conceptual Model Adapted from (DeLone and McLean, 1992)

Based on the conceptual model depicted in Figure 1, the following hypotheses were proposed:

Students' acquisition of knowledge and skills (SACKS)

H1. Students' engagement on using the system has a significant positive relationship with their achievements

H2. Students' performance expectancy has a significant positive relationship with students' achievement

H3. Cognitive learning using e-learning system has a significant positive relationship with students' achievement

Students' development maturity as autonomous learner (SDMAL)

H4. Students control on using e-learning system has positive relationship with students' achievement

H5. Students continue using e-learning system has positive relationship with students' achievement

H6. Students' satisfaction on e-learning system has positive relationship with students' achievement

Students Motivation (SM)

H7. Student's motivation on using e-learning system has positive relationship with students' achievement

H8. Students self esteemed on e-learning system has positive relationship with students achievement

H9. Students' confidence on e-learning system has positive relationship with students' achievement

The study used a survey design, involving 4 universities with long ICT experience. These were thus purposively selected amongst 30 universities in Tanzania. Three hundred and fifty

(350) respondents used in this study, thereby 306 respondents equal to 87.5% representing the planned respondent pool. The survey questionnaire consisted of five point Likert scales (Likert, 1932) was employed. The in-depth interview was employed to collect qualitative data from ICT experts during model validation. The data was then analyzed quantitatively and qualitatively respectively to identify different indicators and aspects relating to the measure of the impact of using and not using e-learning systems on students' achievements. The empirical data were analyzed using multiple regressions and structural equation modeling (SEM) using Statistical Package for Social Science (SPSS). The multiple regressions were used in analyzing hypothesized relationships conceptualized in the research model. In order to validate the model, the Delphi Technique was employed (Harold and Murray, 1975) and a new model was developed accordingly (Rowe and Wright, 1999).

VII. Results And Discussion

A. E-Learning Experience and Awareness

The study revealed that 75% of the respondents were exposed to e-learning systems based on whether one had ever used it for learning; attended a course on e-learning (9.5%); heard about it from a colleague of other institutions or seen a colleague using it (2%). It was further evident that 79% of students were aware of the use of e-learning frequently in their day-to-day learning activities, while 65% were found to have intention of using e-learning methods in their academic career. These results match with those of previous studies by Alexander (2008) and Mazman and Usluel (2009) which found that the more a person is involved in Internet or Web activities, the more they are likely to use e-learning. It is therefore more likely that, in developing countries particularly Tanzania, use rate of e-learning methods is likely to increase if university can afford to embrace them in institutional operations.

B. Indicators of the impact of e-learning

The results of the multiple regressions are shown in Tables 1, 2 and 3.

Table 1: SACKS indicators of Students' achievements

Students Achievement (Measure)	Indicators	β	t-value	Significance	Tolerance	VIP	R^2
SACKS	(Constant)	.412	2.304	.012			.513
	SE	.268	.886	.271	.926	1.079	
	SC	.618	7.854	.000	.641	1.560	
	PE	.596	7.617	.000	.641	1.679	

The results in Table 1 show that indicators such as student's engagement (SE), student cognitive learning using e-learning methods (SC) and the performance expectance (PE) on e-learning had positive relationship with the student's achievement.

TABLE 2: SDMAL INDICATORS OF STUDENTS' ACHIEVEMENTS

Students Achievement (Measure)	Indicators	β	t-value	Significance	Tolerance	VIP	R^2
SDMAL	(Constant)	.412	2.304	.012			.684
	SCO	.191	.092	.244	.807	.931	
	SS	.730	8.181	.000	.641	1.560	
	CU	.592	6.211	.000	.641	1.559	

The results [Table 2] further show that indicators such as students' control on using e-learning (SCO), students' satisfaction (SS) and continued use of e-learning had positive relationship with the students achievement.

TABLE 3: SM INDICATORS OF STUDENTS' ACHIEVEMENTS

Students Achievement (Measure)	Indicators	β	t-value	Significance	Tolerance	VIP	R^2
SM	(Constant)	1.106	6.88	.000			.896
	SSE	.323	4.409	.000	.641	1.560	
	MT	.545	7.191	.000	.641	1.679	
	CON	-.069	.881	.257	.903	1.108	

Table 3 indicates that students' self-esteem on using e-learning (SSE) and student motivation (SS) had positive relationship with the students' achievement with the exception of students' confidence on using e-learning.

C. A Model for Measuring E-Learning Impact on Student Achievement

The previously hypotheses were tested using SEM. Of the nine relationships, eight were statistically significant (Table 4). These were student's engagement (SS) (β = .268, p < .01); performance expectance (β =.596, p < .01); student cognitive learning (SC) (β = .618, p < .01) control on using e-learning (β = .191, p < .01); continued use of methods (β = .592, p < .01); satisfactions (β = .730, p < .01); motivation (β = .545, p < .01); self-esteem (β = .323, p < .01) and confidence on e-learning (β = -.069, p < .01). Only student confidence on using e-learning in learning context was not supported.

TABLE 4: SUMMARY OF HYPOTHESES TESTED

	Hypotheses	Accepted/Rejected	β, p < .01
H1	Students' engagement on using the system has a significant positive relationship with their achievements	Accepted	.268
H2	Students' performance expectancy has a significant positive relationship with students' achievement	Accepted	.596
H3	Cognitive learning using e-learning system has a significant positive relationship with students' achievement	Accepted	.618
H4	H4**.** Students control on using e-learning system has positive relationship with students' achievement	Accepted	.191
H5	H5. Students continue using e-learning system has positive relationship with students' achievement	Accepted	.592
H6	Students' satisfaction on e-learning system has positive relationship with students' achievement	Accepted	.730
H7	Student's motivation on using e-learning system has positive relationship on students' achievement	Accepted	.545
H8	Students self esteemed on e-learning system has positive relationship students' achievement	Accepted	.323
H7	Students' confidence on e-learning system has positive relationship on students' achievement	Rejected	-.069

With the latent variables presented in the conceptual model, Structural Equation Modeling (SEM) approach (Bollen, 1998; Hoyle and Panter, 1995) was used to determine the cause-effect relationships among the latent variables with their indicators and the e-learning on students' achievement in education. Three regression models were developed and used to determine the value of dependent variables. The regression models were developed for Students' acquisition of knowledge and skills (SACKS); Students' development maturity as an autonomous learner (SDMAL) and Motivation (SM). SACKS indicators were student engagement (SE); cognitive capacity (SC) and Performance expectancy (PE). It was further apparent that SDMAL measurable indicators were student control (SCO); satisfaction (SS); continued use (CU) and the measurable indicators for SM were student motivation (MT); self-esteem (SSE) and confidence (CON).

Based on the findings, the initial regression models were as follows:

SACKS = 0.268SE + 0.596PE + 0.618SC R^2 = 0.513…….. (1)

SDMAL = 0.191SCO + 0.592CU + 0.730SS R2 =0.684…….. (2)

SM = 0.545MT + 0.323SSE - 0.069CON R2 = 0.896…… (3)

Where:

SE = Student Engagement: SC = Student Cognitive: PE = Performance expectancy

SCO = Student Control: SS = Student satisfaction: CU = Student Continue Using

CON = Confidence: MT = Student Motivation: SSE = Student Self Esteem

The entire model was found to have a significant fit for the study, as all the three regression models had R^2 > = 0.5 (Hoyle and Panter, 1995). All hypotheses from H1 up to H8 were found to have significant positive relationship with the student's achievement. However, on the hypothesis (H9), the study revealed that students' confidence on e-learning system had a negative relationship with students' achievement. However, this was contrary to the findings of the study conducted by Olson et al., (2011).

Further from the findings above, it is clear that, student engagement, student cognitive capacity, performance were the key indicators of the latent variable which is ***students' acquisition of knowledge and skills (SACKS)*** for one to realize how e-learning impacts on student teaching and learning achievement. In addition students' control, satisfaction and continued use of e-learning strategies were indicators of the latent variable, which is ***Students' development maturity as an autonomous learner (SDMAL) which is known to have an*** influence on student's teaching and learning achievements. The findings further show that self esteem and motivation were indicators of the latent variable which is ***Students Motivation (SM)*** that had positive significance on students' teaching and learning achievement. In exception the study shows that student's confidence on e-learning had a negative impact on student's achievement. These findings agree with those of Olson et al. (2011) and The McGraw Hill report (2011).

D. Model Validation

The model was validated using the Delphi Technique based on the assumptions that a group expert judgment is better than an individual judgment (Amiresmaili et al., 2011). Therefore, two different groups composed of panels of ICT experts were formed with the view to discuss and evaluate the model. The experts were technical personnel; lecturers specialized in e-learning and consultants of e-learning. All relevant determinant factors obtained from Section 2 were critically discussed by panelists and compared. The expert judgments arising were then used to test the validity of the model, which was then refined using inputs from the workshop. The model finally established was a function of Students' acquisition of knowledge and skills (SACKS), development maturity as an autonomous learner (SDMAL), Motivation (SM) and Behavioral Intension (BI) as latent variables, each with measurable variables as presented in section 3. This relation is depicted mathematically as follows:

$$\textbf{\textit{Measurement Model} = f (SACKS, SDMAL, SM, BI) + e}$$

This further shows that the model had the potential to improve the measurement of e-learning impact on student's achievement in order for the management at an institutional level to make decision based on the impact. This is envisaged to help to realize the net benefit to justify the total investment.

VIII. Conclusion And Recommendation

This study shows that developed model [Figure 2] has the potential to be used in measuring the impact of e-learning on students' achievements in universities and other institutions. Results obtained through a mixed research method approach revealed that Student Engagement (SE), Cognitive capacity (SC), Performance expectancy (PE), Control (SCO), Continued use (CU), satisfaction (SS), Confidence (CON), Motivation (MT), Self Esteem (SSE) are important measurable indicators of the model. In particular, intention to use (IU) and the Frequency of using (FU) e-learning are measurable variable from behavioral intension (BI) which are of particular importance in evaluating its impact on students' achievement. These are novel additions indicators to measure e-learning technology utilization impacts using the developed model. These results call for more research that focuses on evaluating the impact of e-learning systems on students' achievement in teaching and learning using the developed model in this study. The developed model as a result of this paper is important as it help policy makers, university managements and other stakeholder to measure the impact of e-learning in order to understand the status of e-learning for justifying the total investment in learning context.

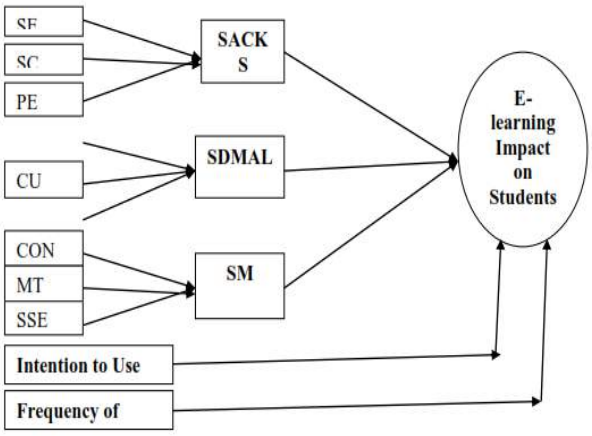

Figure 2: A final model for Measuring the Impact of e-learning on Students Achievement

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AUTHOR PROFILE

Dr. Titus Tossy is a lecturer of information systems at Mzumbe University, Faculty of Science and Technology in the department of Computing Studies. Dr. Tossy has 13 years of teaching experiences in higher learning institutions in Africa and UK.

Dr. Tossy's main research interest is in understanding the uses of ICT for national Development as well as how people, span organizational, professional, and cultural and other boundaries in the process of building and using new technology. He uses qualitative and quantitative methods and a range of social and organizational theories in his work including classic grounded methodology. He currently studies Data sciences and its impact on national development, and impact of e-learning in education in Africa. In 2007, he received a SPIDDER grant to establish national e-learning at the open university of Tanzania. In 2009-2010, He received the University of Cape Town award to study the main concern of e-learning providers working in east Africa. In 2012, he was a founding director of Tanzania Business School. Before joining Polytechnic of Namibia, Prof. Tossy worked as the founder of various postgraduate studies and research initiatives in various universities, such as MBA in Information Technology Management, MSc in IT security, MSc in computer applications and MSc in Software Engineering. He also developed strong research, and training collaborations with various universities. Dr. Tossy received his Bsc (Hons) in Computer Science and Statistics from university of Dar es salaam and MBA in Information Technology Management from Coventry University. He received her Doctor of Philosophy in Information Systems from University of Cape Town.

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An HCI Principles based Framework to Support Deaf Community

Fazal Qudus Khan
Department of Information Technology
FCIT, King Abdulaziz University
Jeddah
Saudi Arabia

Asif Irshad Khan
Department of Computer Science
FCIT , King Abdulaziz University
Jeddah
Saudi Arabia

Mohammed Basheri
Department of Information Technology
FCIT, King Abdulaziz University
Jeddah
Saudi Arabia

Abstract*— Sign language is a communication language preferred and used by a deaf person to converse with the common people in the community. Even with the existence of the sign language, there exist a communication gap between the normal and the disable/deaf person. Some solutions such as sensor gloves already are in place to address this problem area of communication, but they are limited and are not covering all parts of the language as required by the deaf person for the ordinary person to understand what is said and wanted? Due to the lack of credibility of the existing solutions for sign language translation, we have proposed a system that aims to assist the deaf people in communicating with the common people of the society and helping, in turn, the disabled people to understand the healthy (normal people) easily. Knowing the needs of the users will help us in focusing on the Human Computer Interaction technologies for deaf people to make it further more a user-friendly and a better alternative to the existing technologies that are in place. The Human Computer Interface (HCI) concept of usability, empirical measurement and simplicity are the key consideration in the development of our system. The proposed Kinect System removes the need for physical contact to operate by using Microsoft Kinect for Windows SDK beta. The result shows that the It has a strong, positive and emotional impact on persons with physical disabilities and their families and friends by giving them the ability to communicate in an easy manner and non-repetitive gestures.

Keywords- Human Computer Interaction, Design, Human Factors, Deaf, Sign Language Synthesis, Kinect Devic.

I. INTRODUCTION

It has been noticed that deaf person face many difficulties when they try to communicate with their community by sign language especially in public places like hospitals, hotels, and markets. That is what usually forces them to accompany individuals to help them to get their needs. For this reason, this research focuses on suggesting an HCI based solution using technology that may give them a chance to depend on themselves and get out from their solitude. This research work target for people with disabilities (deaf people). Al-Amal Institute that deals with such cases were contacted to test the proposed system and study the impact of the application on deaf people. A system which is based on HCI Framework is proposed to help the deaf community people to understand and use it easily. This system would provide:

- Easy-to-use user interfaces activated by hand motions.
- An economical IT solution for deaf and dumb people rather than accompanying individuals to help them get their needs.
- An efficient IT solution rather than other IT technologies and solutions such as the sensor gloves that are used in translating sign language. KTDP system can work in any public place at any time as well as it can recognize the motion of the head, arms, hands, and fingers.[9]

The proposed solution for the previous problem is developing a system consists of Kinect device as shown in figure 1, PC, and a database. Kinect is Microsoft‟s motion sensor add-on for the Xbox 360 gaming console. The device provides a natural user interface (NUI) that allows users to interact intuitively and without any intermediary device, such as a controller in the middle [1,3].

The database contains a set of images that represent a dictionary for the sign language; each image is stored with a particular meaning. By programming the Kinect device, it will be responsible for capturing and detecting the motion of the deaf then sending the captured scene or image to the PC.

The PC then will compare between the captured image and the images in the database using the appropriate matching algorithm. After matching the images, the PC will show the text of the captured image. Subsequently, this system is considered as a

mediator between healthy people and those of special needs. As mentioned previously, we called this system Kinect Technology for Deaf People (KTDP).

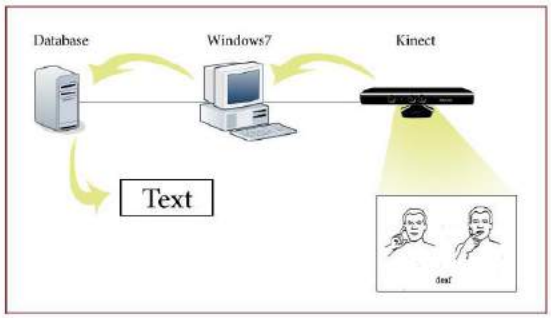

Figure 1. Shows how the system works.

This paper is organized as follows: section I introduction of the paper, sections II discusses the related work, section III the proposed Framework, section IV result of implementation and testing of the framework, and lastly section V the conclusion and future work.

II. Related Work

Michelangelo in one of his famous brainy quote said "If people only knew how hard I work to gain my mastery, it would not seem so wonderful at all" from this saying we realize that hard work makes us prepared to face adverse situations. Hard work helps any student to become extraordinary. It's the key to success. Hence, we believed that we need to keep working patiently and hardly till the goal of our project is achieved. To us, we need to "see a little further into the sea" that we had to search efficiently, read deeply a lot of scientific websites and books of different fields and topics to get the best information and reference required for the project to keep going on.

Yasir Niaz Khan and Syed Atif Mehdi in their article describe the use of a device known as the Sensor gloves. This device is made of cloth attached with sensors.While they suggest that the utilization of a device called ""the data glove" is a better choice over the utilization of a traditional camera, the reason being that the user has the flexibility of free movement which is dependent on the length of wire connecting the glove to the computer. However, when the camera is used, the user should stay in position in front of the camera. The gloves performance is not affected by any disturbing factor i.e. electromagnetic fields, the light or any other disturbances.[8]

In total seven (7) sensor glove of 5DT Company were used in their system out of which five (5) sensors are used for the fingers and thumb. While among the two sensors left, the sixth sensor is used to measure the tilt motion of the hand and the seventh or the last sensor is used for the rotation motion of the hand. While the flexure of the fingers is measured by the Optic fibers which are placed on the gloves.[8]
The project under discussion uses only postures because of the reason that the glove can only capture the shape of the hand and not the skeleton/shape or motion of any other part of the body. Among the Signs, there are two letters for which the signs are ignored and those are for letters "j" and "z" because they involve moving gestures. Only Two special signs i.e. Space between words ( ) and Full stop (.) were added to the input set. There was no compulsion in doing so but they have been added as to perform Basic English sentence writing functionality.[8]
Among the problems mentioned by the authors of the article, One of the problems was that some letters were left out of the domain of the project as they involved dynamic gestures and may not be recognized using this glove. The use of two sensor gloves was not tested out and another problem was that some gestures require the use of both hands which was not discussed in the project.[8]

The article "Multiperspective Thermal IR and Video Arrays for 3D Body Tracking and Driver Activity Analysis" by Shinko Y. Cheng, Sangho Park, Mohan M. Trivedi focused on the body part movement for driver alertness. They develop the system to determine the used multi-perspective (i.e. four camera views) multimodal (i.e., thermal infrared and color) video-based system for robust and real-time 3D tracking of important body parts and to track some other things like head and hand motions during the driving. So their focus was on tracking in a noisy environment to avoid accidents while adopting the said system for the sign language is not a cost effective solution, as many sensors and furthermore, a lot of image processing is involved, which makes the system more complicated and less efficient.[11]

A. *Comparing methods to find information First approach; using the internet*

Strength

- The availability of internet all the time (24 hours a day, 7 days a week). [2]
- Cheap resource.
- A resource that has a huge amount of rich and useful information.
- The existence of search engines helps us a lot.
- Getting latest and up-to-date of information.

Weakness

- We face some difficulties to find the information that we need especially when we are looking for a small point.[3]
- There is much wrong information on the internet so we cannot trust everything we read on the internet.
- We must verify the reliability of information source before using them.

B. Second approach: using the interviews

Strength

- Making interviews help us to get information from experts.
- The ability to get more details in specific knowledge area or field.

Weakness

- Facing difficulties to make appointments with some responsible people.[3]
- Hiding some correct information could happen during the meeting from some people.[3]

III. THE PROPOSED FRAMEWORK

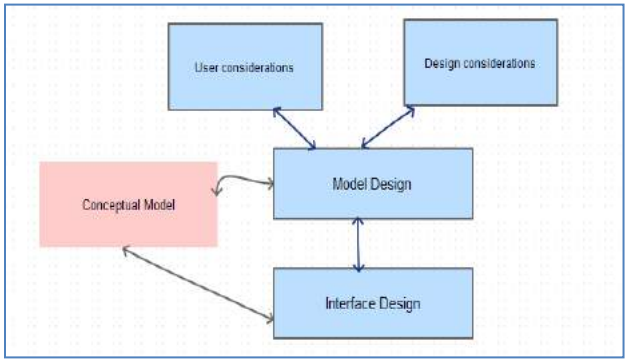

Figure 2 HCI Principles based Framework for the proposed system.

The proposed system as shown in figure 2 is based on the HCI Principles theories exist relating different design and user consideration. The user requirements consideration of the system is based on how the user communicate with the Kinect device and how it is interpreted? Here we consider Several elements that influence the way the model is developed, tested and maintained. At the Deaf users' side: their understanding of the sign language, as they will give input to the system. At the Normal Person users' side: their understanding of the Arabic language, who will see the interpretation of the gestures.

Design considerations:

This system is developed for the especially needed person, a user-friendly application is proposed that should help the users to form the correct productive rational interpretation on the screen of the given gesture by the deaf person. Common design methods that are considered in our design include the following factors:

- *Simplicity in Gestures interpretation:*

Frequently and commonly used gestures by the deaf person are to be focused so that the interpreted function should be easily readable and understandable by a normal person. commonly used simple gestures by the deaf person will be considered for interpretation rather than asking the deaf person to memorize a new gesture for the system requirement, So that the system should be easy to understand and simple to use and transparent enough for the user to concentrate on the actual meaning or message of the sign that is used.

- *Familiarity with the sign language*:

As this framework is built upon concrete requirement determination, it is very important to use this fact in designing a system. Relying on sign language the deaf people are familiar, this system is designed in such a way so that the familiarity factor within our system must be addressed and prioritized.

- *Availability of options:*

Since recognition is always better than remembering of the options available, Our system is efficient enough in terms of the user friendly interface and the options that we are providing, that it always suggest help in the form of animations and visual elements to ease the user to recall the functionality of the system.

- *Flexibility:*

The user will be able to use any hand, in the same sequence that the sign language use and the system will be flexible enough to handle it, at any time.

- *System Feedback:*

The Kinect device reads the movement of the gestures continuously and gives feedback through the system, through the action/hands movement of the deaf user. We understand that the prompt feedback helps to assess the correctness of the sequence of actions and that is the reason this feature is of high priority to us in our proposed framework.

3.1 SYSTEM DETAILS

A. Managing the database

Description: This system is mainly depending on its database in which it is impossible to accomplish the main functionality of the system without it. After creating the database, the administrator must be able to add, delete, and manage the elements of the database.
Priority: this function has a very high priority due to its role in the system.

Requirements:
1- Database to store the data.
2- Enough storage capacity.
3- Administrator to manage the database.

B. Making gestures

Description: special needs person has to stand in front of the Kinect device and make some motions or gestures that can be translated to text according to sign language rules.
Priority: this function has a high priority because it is considered as an essential pillar of our system as well.
Requirements:
1- Special needs person to make the motions.
2- Kinect device to detect the motion.
3- A program to translate the motion into text.

C. Reading gesture translation

Description: after detecting a motion by Kinect device, the appropriate text will appear on the screen to show the meaning of that motion to normal people.
Priority: this function has a moderate priority because the system can work and accomplish its main functionality without the existence of the normal people to read.

Requirements:
1- Kinect device to detect the motions.
2- A program to translate the motion into text.
3- PC screen to show the translated text.
4- Normal people to read the translated text.

As shown in Figure 3, the use case diagram of the system, there are three main actors / stakeholders of the system, the Deaf person can make a gesture which is translated by the system into a plain English text and the normal person (with whom the disable person wish to communicate) can see the message on the screen. The developer of the system can add more gestures in future to enhance the system. Currently, only few gestures with basic needs are programmed.

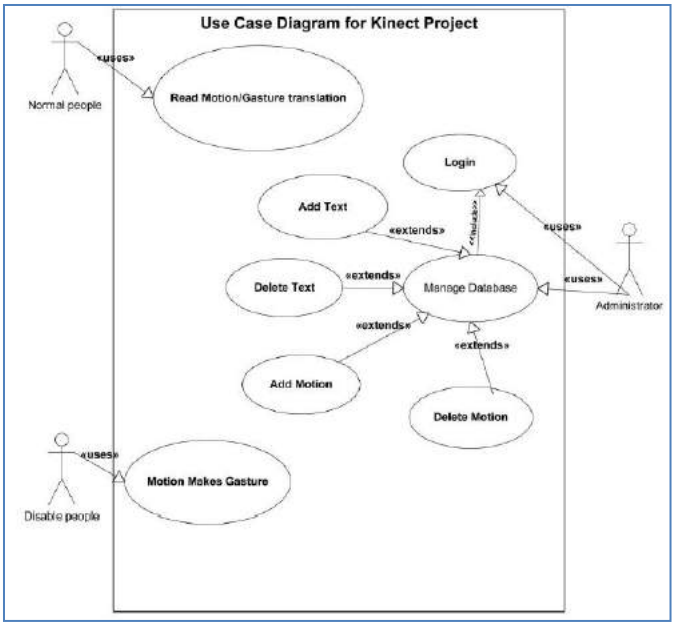

Figure 3. Shows high view of the main system requirements.

3.2 NON-FUNCTIONAL REQUIREMENTS

The non-functional requirements are not fundamental like functional requirements. They represent the qualities of our system. The KTDP system requires the following non-functional requirements to be filled in:
- Modifiability: the admin need to add more gestures, so modifiability is required as to enhance the system in future. We will make admin rights for the code to be modified.
- Usability: the system is useful if it can help the Deaf community, For usability, the device need to be installed with the modifications that we do in the using the Kinect SDK.
- Response time: a quick response time is required, this can be achieved if the device is in range.

A. Data requirements

After making several meetings with instructors and doctors that have a good experience in our project fields, and after looking in similar projects and literature searches, our team concludes what data should be stored in the database. The database should include the following data:
- The Sign Language gesture's data.
- The Meanings of each gesture's data.
- The Administrator's data to add and delete gestures and its meaning.

3.3 DESIGN AND METHODOLOGY OF GESTURES RECOGNITION

A. Methodology of Gestures Recognition

Gesture recognition in our system as shown in figure 4, can be explained in three steps; getting joints positions, comparing the position of some joints with the other joints positions, and generating a value for each gesture depending on the comparison step. [4]

Using the skeleton tracking feature that the Kinect device provide, we can track up to 20 joints in the user body who stands in front of the Kinect. In our system, we are interested in 14 joints which are in upper half of the body. [9]

By tracking these joints, we can get the position of each one as X, Y, and Z coordinates. After that, the system will go through 25 conditions (IF statements) that we built in the code to compare the positions of right hand, left hand, right elbow, and left elbow with each other and with the rest of the 14 joints. Each condition will result in one bit (1 or 0) and add it to a variable, let us call it "*value_word*". [7, 10]

Finally, the *value_word* variable will be a bit pattern consists of 25 ones and zeros, and this pattern could not be repeated for more than one gesture as each gesture differs at least in one joint position from others. This value is converted from binary to decimal before being saved in the database. By this way, the system can recognize up to 2 different gestures. Each gesture represented by one unique value. The following figure(figure 8.1.1) shows how the system compares joints positions then generates a value for the gesture. [7, 10]

For adding a new gesture to system purpose, we only need to store the generated value in the database as primary key with its title and id. On the other hand, recognizing the gestures and showing their meanings after they being added can be done by comparing the values generated while the deaf user is making gestures with the stored values in the database. If one value produced by deaf user gesture matches one stored value, then the title will appear on the screen.

3.4 ANALYSIS DONE FOR THE REQUIREMENT

There are many useful ways to collect data from different sources. One of them is making interviews and meetings with experienced persons who could give us valued information about our project. Besides, questionnaires could also be necessary to get feedbacks and opinions from large samples of different classes of the society. As well, searching and browsing the internet is a very important technique that makes us able to find huge amounts of both practical and theoretical information that is useful for our project. This way of collecting information could be much better in saving efforts, time, and money than going to libraries and searching for specific books.[2]

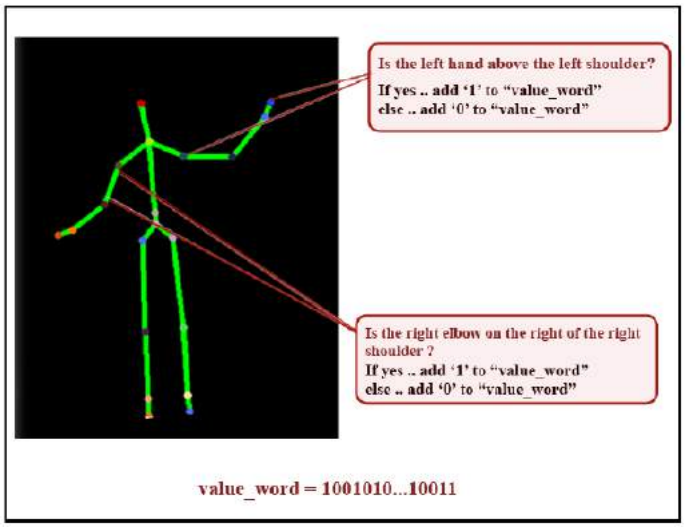

Figure 4. Gesture recognition

A. Questionnaire Analysis

a survey was conducted online, and the results were analyzed. In the following section, we list the requirements confirmation based on the questionnaire results.

Results of main questions:

As can be seen in figure 5, the statics of questionnaire showed good result that prove the importance of our project i.e. 94% of normal people don't understand the sign language. Also, 89% of them think that deaf people live in isolation of the society. Based on the previous percentages, we have verified on the importance and the benefits of our system for the society.

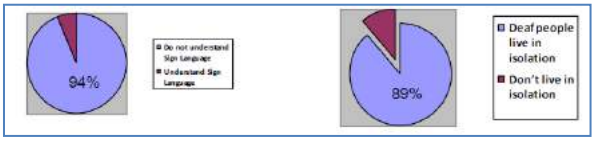

Figure 5. Statics of the questionnaire

as can be seen in figure 6, shows that the most of the respondents i.e. about 72% of people see it 's hard to communicate with deaf people and 89% of them prefer to use the technology in translating the sign language so that it could be a moderator between them and deaf people.

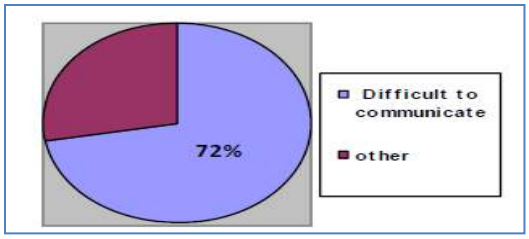

Figure 6. Statics of the questionnaire

B. Interview Analysis

Results of main questions:

The following is a list of the most important points that we conclude from the conversation with him:

- Deaf people live in isolation everywhere they go in their community.
- The Arabic Sign Language has not unified completely yet.
- The most of the sign language gestures can be made by only one hand.
- Deaf people can read and understand simple words. On the other hand, they cannot read or write long, complex sentences and paragraphs.
- Al-Amal Institute will help us anytime we need help even if we need a sign language translator to work with us.

3.4 MODELING OF THE SYSTEM

The static model (class modelling) of the proposed system is shown in figure 7.

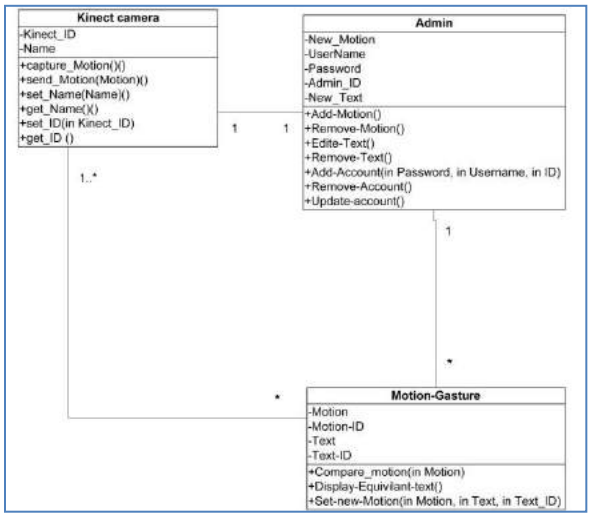

Figure 7. Shows class diagram of the system

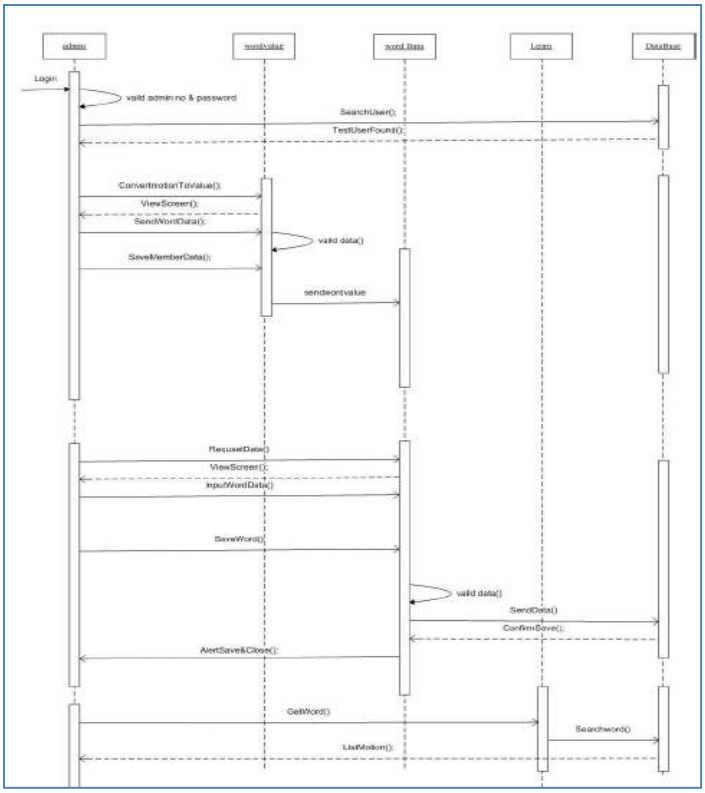

Figure 8. Shows sequence diagram of the system

The sequence diagram is necessary to show the sequence of steps that occurs while using the system. In the generic sequence diagram illustrated in figure 8, first, the registration and login process take place to confirm whether the user is a normal user or an admin. The Administrator can add gestures and its subsequent meaning in the system. While once the normal user is logged into the system after that different gestures that are performed by the disabled person are translated and delivered to the screen where the normal user can see them in plain English text.

While the HCI based User Interface is shown in figure 9.

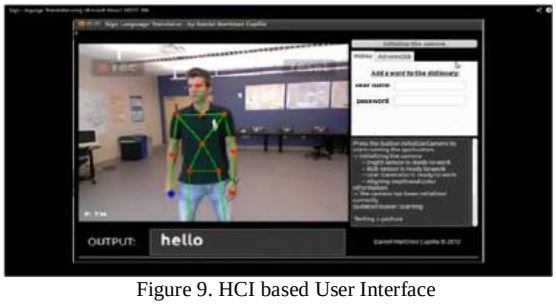

Figure 9. HCI based User Interface

IV. IMPLEMENTATION AND TESTING RESULTS

After implementing the system, the following are the interfaces that the user will interact with:

The main interface

When the user runs the program, the following interface as can be seen in figure 10, appears

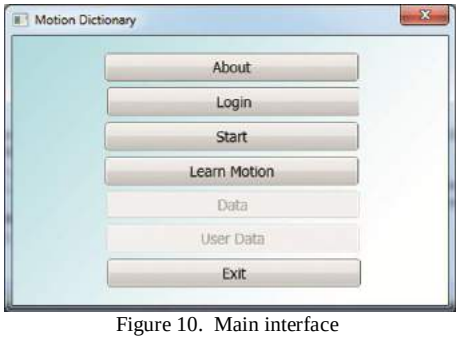

Figure 10. Main interface

It contains 7 buttons. As default, 5 buttons of them are enabled and the other two are disabled. The buttons are :

- ***About*** button**:** This button moves the users to another window which show information about the authors who builds the system. This button is enabled for all users as default. If the users press this button the following window will appear
- ***Login*** button**:** This button is used by admins to login to the system as admin user. This button is enabled for all users as default. After clicking on this button another window will appear that asks the user to enter the username and password to authorize the admins. After clicking the ***Login*** button the following window as shown in figure 11, appears

Figure 11. Admin Log-In interface

If the user is successfully authorized, the system will move the user to the main interface again but all buttons will be enabled as can be seen in figure 12 below.

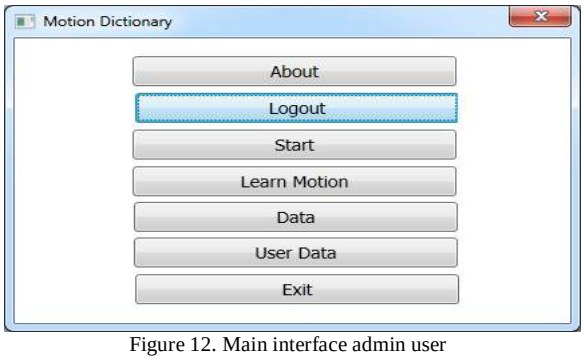

Figure 12. Main interface admin user

- Start button : This button is used to start recognizing the gestures made by the deaf user. This button is enabled for all users as default. After clicking on this button, another window will appear that contains Title ID, Title, and Word value fields that will show the id of the gesture, the text meaning of the gesture, and the value generated by that gesture respectively. Also, the window contains two squares. The left one used to show the skeleton of the user and the other one shows the complete sentence of group of gestures. After clicking the Start button the following window figure 13, appears [5,6]

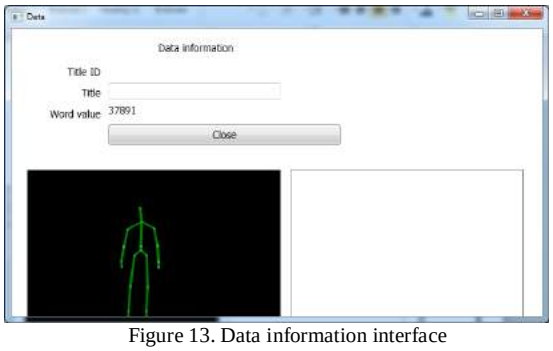

Figure 13. Data information interface

- ***Learn Motion*** button**:** This button moves the user to the system dictionary which has the gestures titles and their photos. This dictionary helps the users to learn how to make gestures. In the dictionary window, the user can search for a certain gesture by its title. This button is enabled for all users as default. After clicking on this button, another window will appear that contains a list of gestures and their values as well as an area for showing the photos of the gestures. After clicking the ***Learn Motion*** button the following window figure 14, appears

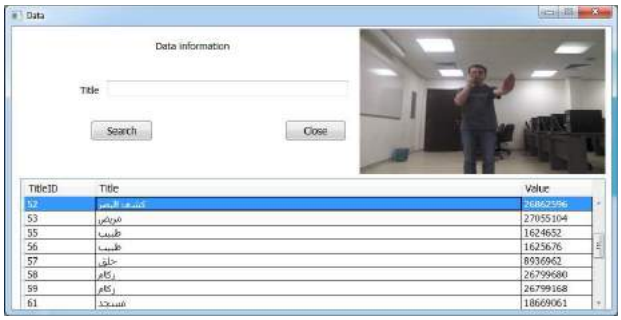

Figure 14. Dictionary interface

- ***Data*** button**:** This button is enabled only for admins after logging in the system. This button moves the admin to the window that makes him able to add, update and delete gestures. After clicking on this button, another window will appear that contains buttons, text fields, gestures list, area for skeleton view, and area for normal camera view. After clicking the ***Start*** button, the following window appears (Figure 15).

The ***Clear*** button clears the texts fields. ***Add***, ***Update, Delete*** buttons are used to add, update, and delete system's gestures. ***Start*** button starts the skeleton view. ***Close*** button closes the window. ***Find Value*** button shows the value of a gesture. ***Select Image*** is used to choose an image for a gesture to be added to the dictionary. The rest two button are ***Take Photo, and Capture***.

The first one shows the standard camera view, and the second one used to capture a photo using the camera. When the admin wants to add a new gesture, he should go through some steps respectively.

Figure 15. Data information(Admin interface)

First he should press the ***Start*** button. Then he should fill the text fields. After that, he has to select an image for the gesture. Finally, he can add the gesture to the database by clicking on ***Add*** button.

- ***User Data*** button**:** This button is enabled only for admins after logging in the system. This button moves the admin to the window that makes him able to add, update and delete admin users. After clicking on this button, another window will appear that contains a list of admin users and their information, some buttons, and some text field to enter admin data. After clicking the ***User Data*** button the following window figure 16, appears.

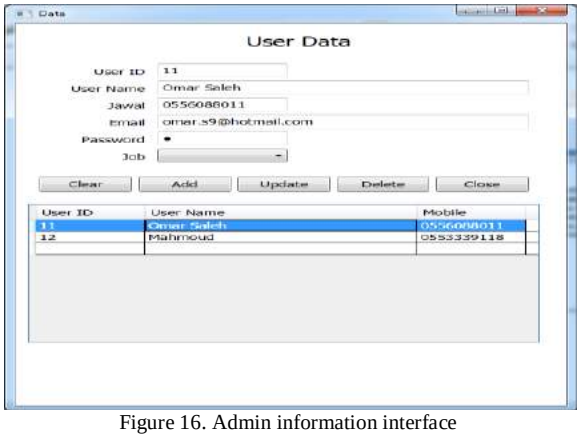

Figure 16. Admin information interface

- ***Exit*** button**:** This button is used to close the system.

TESTING THE SYSTEM

In testing the recognition of the system, we selected Ten (10) gestures randomly to be tested by some people and us.

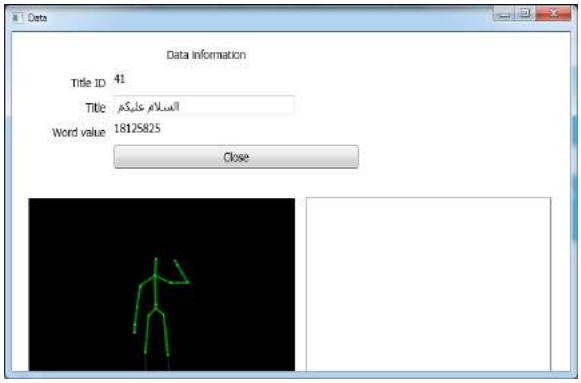

Figure 17. Gesture recognition testing(1)

The gestures are shown below Figure 17 till figure 26, with their skeleton views:

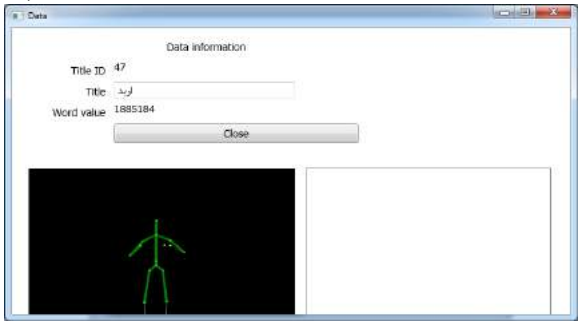

Figure 18. Gesture recognition testing(2)

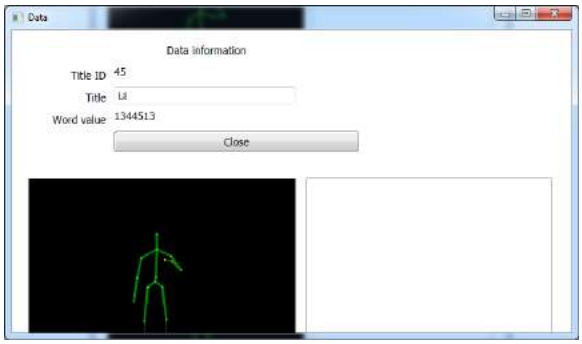

Figure 19. recognition testing(3)

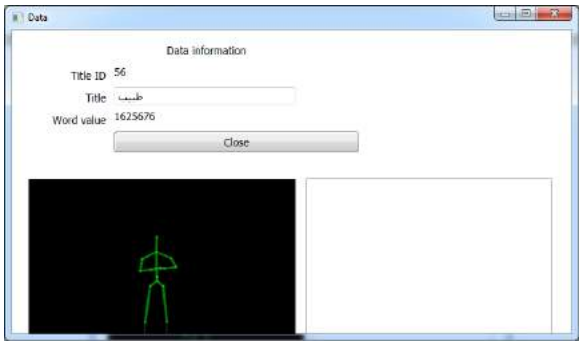

Figure 20. Gesture recognition testing(4)

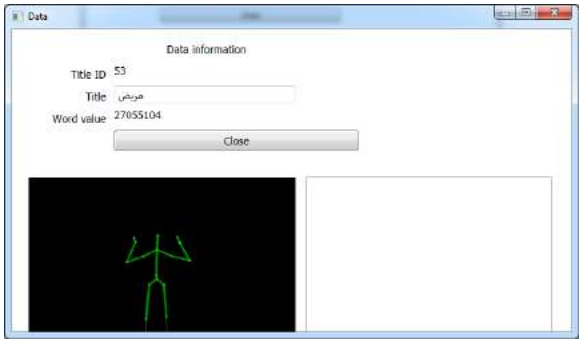

Figure 21. Gesture recognition testing(5)

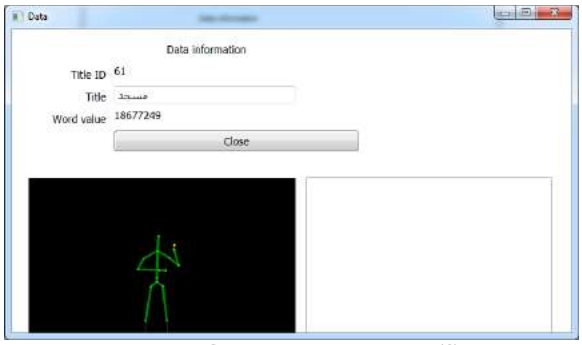

Figure 22. Gesture recognition testing(6)

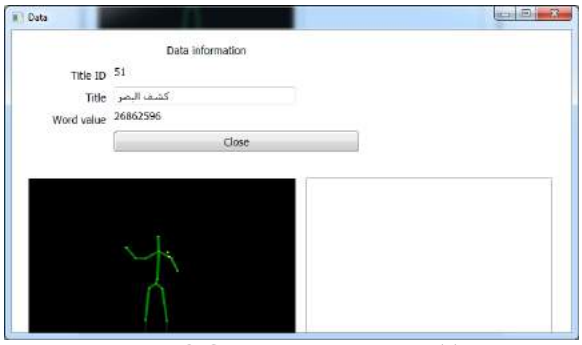

Figure 23. Gesture recognition testing(7)

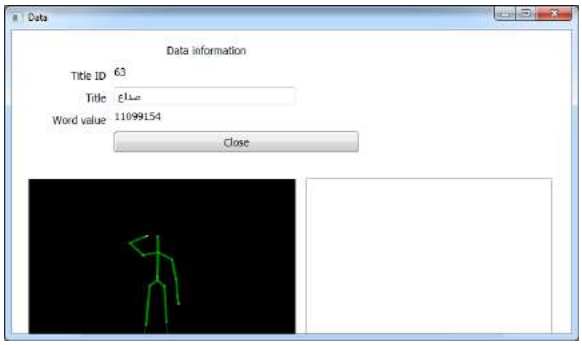

Figure 24. Gesture recognition testing(8)

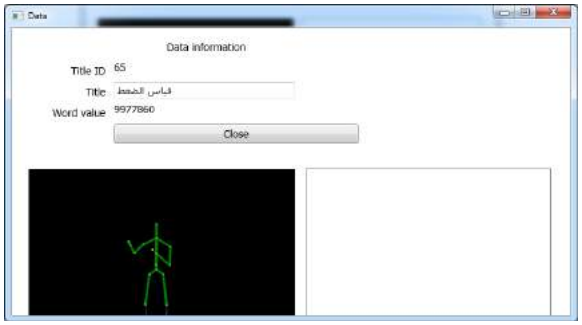

Figure 25. Gesture recognition testing(9)

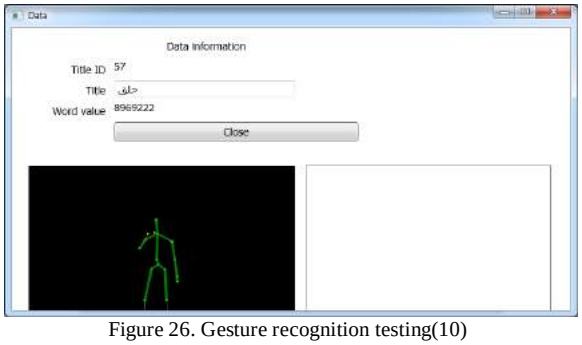

Figure 26. Gesture recognition testing(10)

Three other persons have tested this system. Each gesture of the ten gestures has been repeated five times by each. Appendix shows This system has been tested by 3 other persons. Each gesture of the 10 gestures has been repeated 5 times by each person.

V. Conclusions And Future Work

The aim of this research study is to support and help deaf persons in communicating with their community by using a KTDP system. The system translates the body gestures made by deaf users into text.

The system has a manual for the gestures that can be recognized. Also, the system gives the admin the ability to add new gestures easily.

The HCI concept of usability, empirical measurement and simplicity are the key consideration in the development of our system. In future, the research will focus to include finger recognition to make it able to translate the whole official sign language gestures.

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AUTHOR'S PROFILE

Fazal Qudus Khan, M.Sc, is working as a faculty member in the department of Information Technology, FCIT, King Abdulaziz University, Jeddah, Saudi Arabia. He has over eleven years of experience (Two years Industrial experience with more than nine years in academia and research). Mr. Khan is currently a Ph.D. candidate at the University of Kuala Lumpur, Malaysia. He has received M.Sc. in Computer and Network Engineering from Sheffield Hallam University, Sheffield, UK & Bachelor degrees in Information Technology from NWFP Agricultural University, Peshawar, KPK Pakistan. He has published several research articles in leading journals and conferences; his current research interest includes Software Engineering with a focus on Component Based and Software Product Line Engineering. He can be reached at fqkhan@kau.edu.sa.

Asif Irshad Khan, Ph.D., is working as a faculty member in the department of Computer Science, FCIT, King Abdulaziz University, Jeddah, Saudi Arabia. He has thirteen years of experience as a professional academician and researcher. Dr. Khan received Ph.D. in Computer Science and Engineering from Singhania University, Rajasthan, India, and Master & Bachelor degrees in Computer Science from the Aligarh Muslim University (A.M.U), Aligarh, India. He has published several research articles in leading journals and conferences. He is a member of the editorial boards of international journals, and his current research interest includes Software Engineering with a focus on Component Based and Software Product Line Engineering. He can be reached at aikhan@kau.edu.sa.

Mohammed Basheri, Ph.D., is an Assistant Professor and the Chairman of Information Technology Department at the Faculty of Computing and Information Technology in King Abdulaziz University, Saudi Arabia. He has fifteen years of experience as a professional academic. Dr. Basheri received PhD in Computer Science from the School of Engineering and Computer Science at Durham University, UK. He received Master of Information Technology from Griffith University, Australia and Bachelor in Computer Education from King Abdulaziz University, Saudi Arabia. His current research interest is in HCI and E-learning. He can be reached at mbasheri@kau.edu.sa.

Appendix: The following are the tests summaries

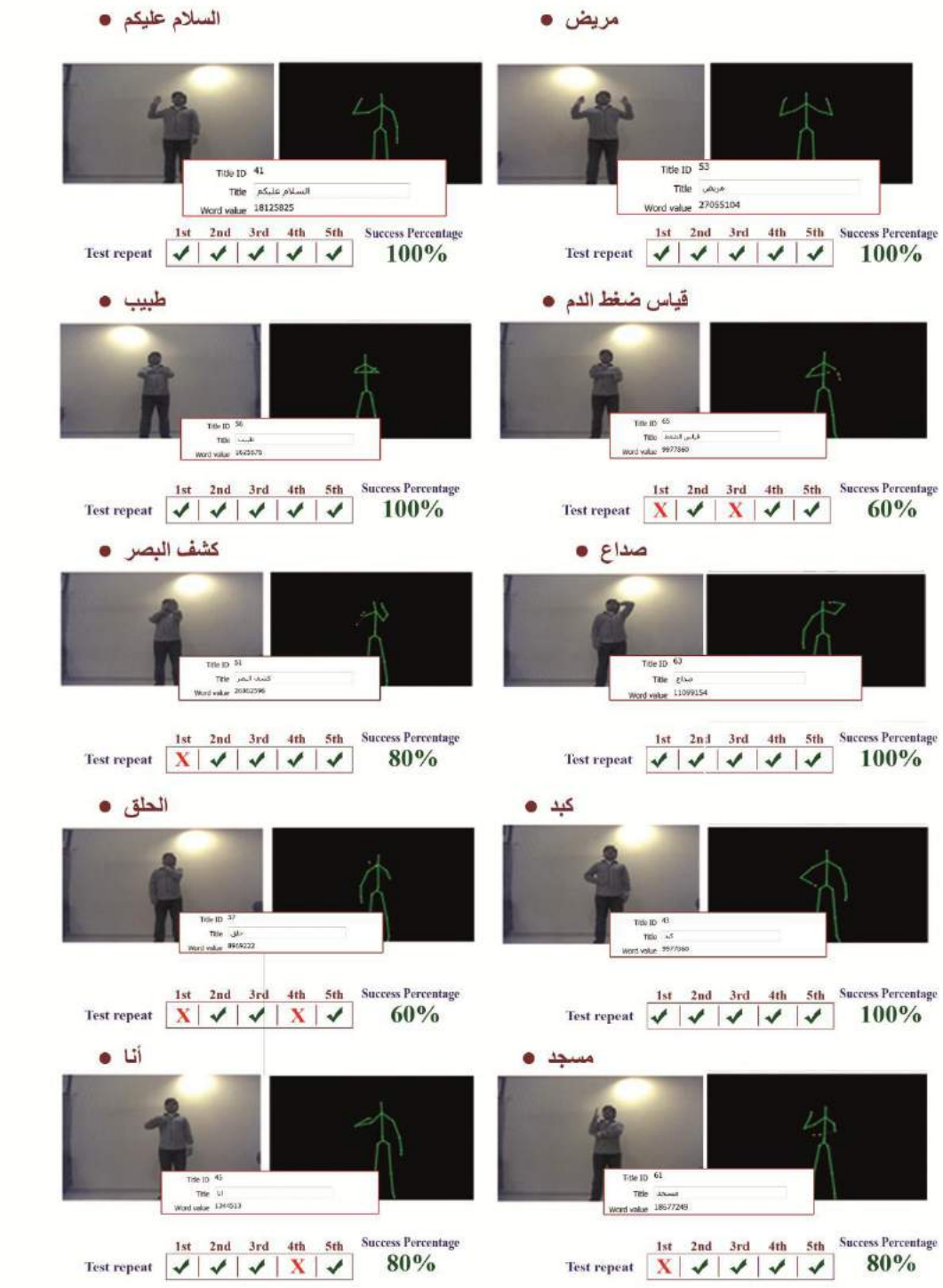

Fig. The first test

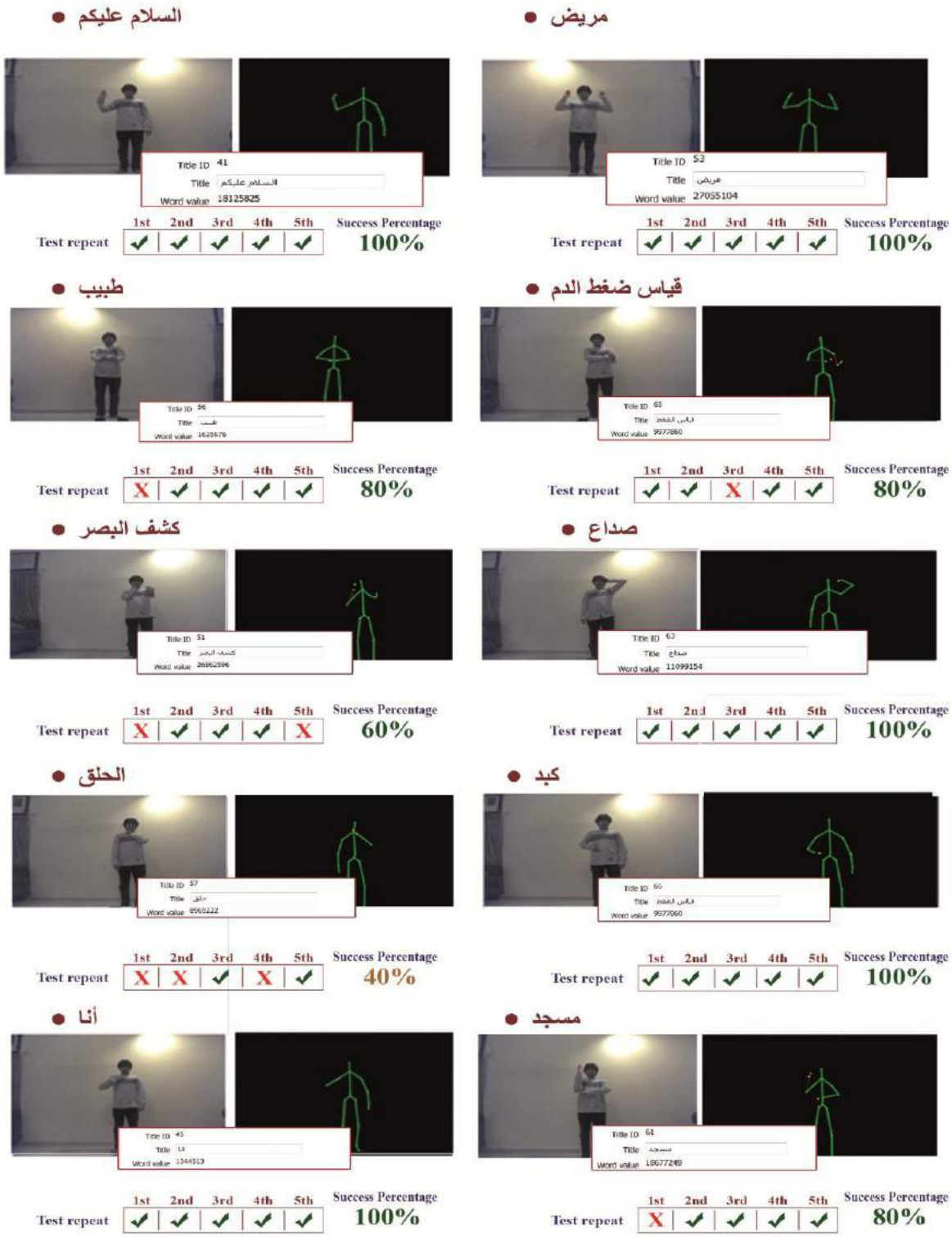

Fig. The second test

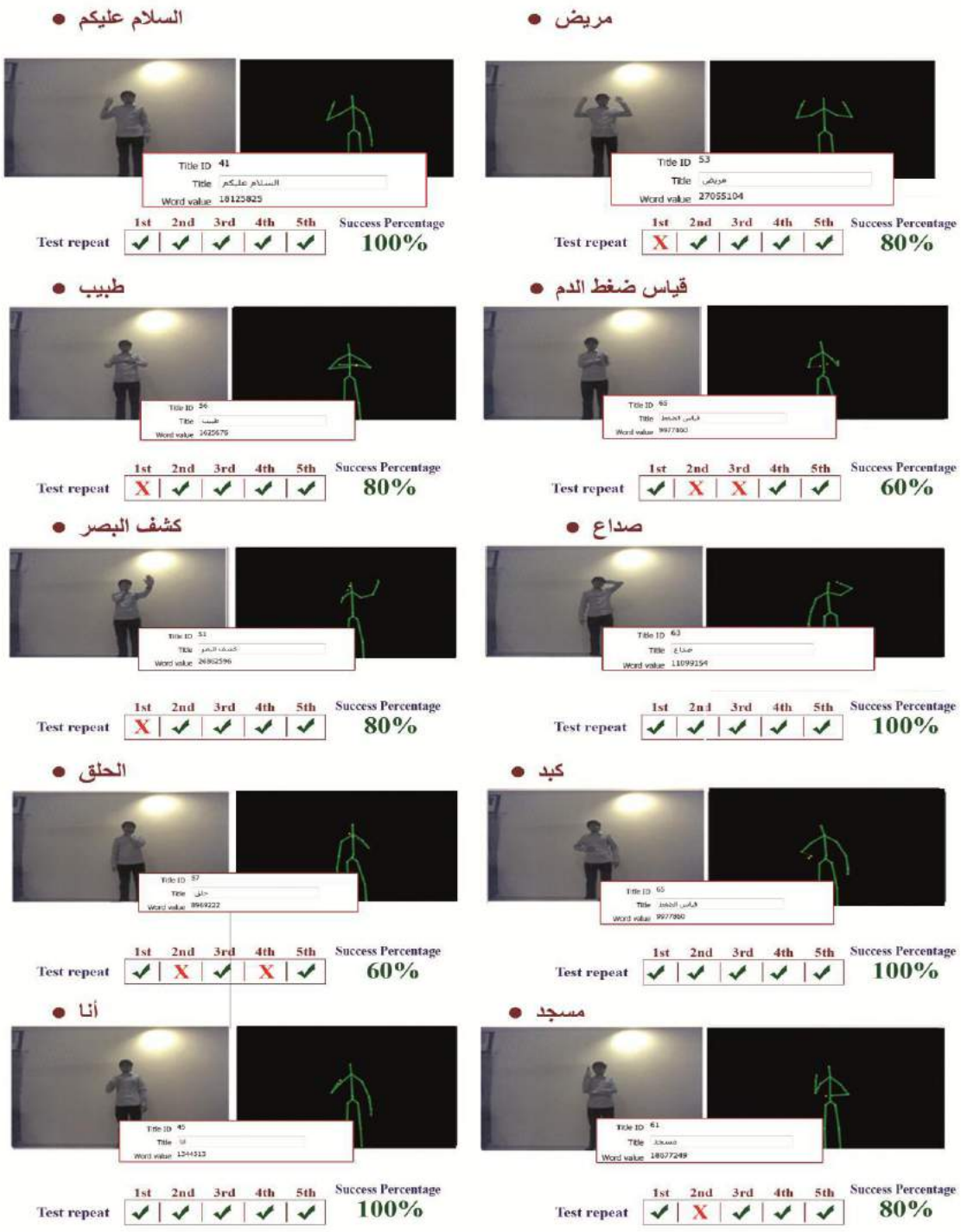

Fig. The third test

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The Approach on Influence of Biasing Circuit in Wideband Low Noise Amplifier to Evaluate Robustness Performance

Kishor G Sawarkar [1], Kushal Tuckley[2]
[1] Research Scholar at MCT's RGIT
[2] Adjunct Professor at IIT, Bombay
[1,2] Mumbai, Maharastra, India

Pramod K B [3], Kumaraswamy H.V [4]
[3]Ph.D. Student of Jain University
[3]Assistant Professor at MCT's RGIT
[4] Department of Telecommunication
[4]R. V. College of Engineering, Bangalore, India

***Abstract*—This proposed work investigates the effects of biasing circuit in the ultra-wideband microwave low noise amplifier which operates between 3GHz to 10GHz. The complete circuit is visualized the importance of every component in the design with respect to linear measurements like Gain, Noise Figure, Return loss under unconditionally stable condition. The design and realization are made by using Hybrid Microwave integrated circuit in AWR microwave office. The thing that is absolutely necessary and frequently the difficult step in the design of an LNA is 'biasing circuit design'. The difficulty situation arises because traditional methods LNA by using S-parameters data files in EDA tools provides almost all linear measurements. Hence a number of time consuming iterations of different biasing circuits with optimization methods may be required to reach targeted specifications with the fixed operating point at the desired points in the load line. Considering this behavior, various alternate biasing circuit schemes are prepared and founded the results associated with it. Furthermore, this paper unmistakably clarifies the impacts of the biasing circuit by utilizing intermodulation and harmonics distortion technique for portrayal characterization. Different cases and sorts of the biasing circuits with various biasing focuses have been tested and given clear perspective of the biasing ideas.**

Keywords- PHEMT, Biasing Networks, AWR microwave office, Impedance matching, HMIC and LNA

I. INTRODUCTION

Advancing in the wireless communication networks it has been arise the set of circumstances found that design of Microwave circuits should meet various parameters at a time with good performance. In case of LNA the parameters like Bandwidth, Gain, Noise figure and return loss should all meet the specifications at the same time eventually all those parameters with not work with each other favors. To meet at the specifications with the help of theoretical equations and majorly the tuners in the commercial software EDA tools like AWR Microwave office, ADS, HFSS etc. are made quite easier for microwave circuit designing.

[5] In contrast, hybrid MIC circuits using discrete components and distributed elements occupy more area and dissipate more power. However, hybrid MIC technologies provide a shorter design time, capabilities of customization and fine tune of fabricated circuits. Also, Optimization of the variables becomes quite easy.

In this paper, authors present effects of biasing in the LNA which includes design optimization and analysis of matching networks and various bias circuits and variation of their effects in primary circuit are explained. [6] To satisfy high gain, LNA is designed by using cascade topology and to achieve maximum power transfer, impedance matching is essential for proper gain and NF with VSWR. Some of network to build impedance matching uses lump element, micro strip line or combination of such elements. Many design of LNA have been conducted and proposed to satisfy high gain and good impedances matching network using lump element or micro strip line and some of characteristic design has been obtained at the defined frequency and application. For all circuit design the industrial standard AWR microwave office tool is used, also to optimize micro strip line and impedance matching to determine trade off value of gain, Noise Figure, return loss and voltage standing wave ratio (VSWR).

This paper is organized as follows. The research background which is composed of recently published articles with respect to biasing circuits in microwave is described in Section II, the design of the low-noise amplifier with different bias circuit is presented in Section III, the LNA performance under limited set exposures with results are discussed in Section IV and finally the conclusive remarks are drawn in the last section.

II. RESEARCH BACKGROUND

This segment examines distributed data about biasing circuit in microwave circuits, additionally, their estimations techniques and investigation. [7] In their work, presented a balun low noise amplifier (LNA) in which the noise figure (NF) and power consumption are reduced by using a feedback

biasing structure. The circuit was based on a conventional wideband balun LNA with noise cancellation. In which they replaced the typical current source of the CG stage by a transistor that established a feedback loop in that stage. [8] introduced linearity change of a 10 W GaN HEMT PA utilizing a dynamic entryway biasing procedure for smoothing an exchange period of the PA as indicated by the quick information power. Zhang, Ma, Yu, & Li, [9], exhibited a dynamic biasing circuit was inserted in the chip which mitigates the deviation of biasing point, enhances the solidness and consistency of execution. Both noise and small signal measurements are performed on-wafer. Ghosh & Srivastava, [10] , gave the symmetric design biasing system, which makes the structure polarization uncaring not at all like which was accounted for active frequency-selective surface(AFSS). Harzheim, Heuermann, & M. Marso,[11], displayed a versatile biasing strategy for step recuperation diode based brush generators which was controlled by a product schedule. The point was to give the most extreme conceivable consonant yield power for a given arrangement and diverse information frequencies amid info power variety.

A. Hypothesis behind the Biasing Circuits

With the thought of practical bias ways for inclination of transistors. Contrasted with design practice at lower frequencies, fitting biasing expressions are more constrained RF and microwave since it is hard to keep the biasing circuit's parasitic from connecting with the signal path way at microwave frequencies [12-14].

B. Bias Circuits and its Instabilities

Once the microwave LNA is composed, it stays to give the dc bias voltages and currents required for the dynamic active device. This is no straightforward issue, as the courses of action to present the biases can aggravate the microwave circuit. By and large, high impedance miniaturized micro strip follows can be utilized as decoupling inductors, yet alert must be practiced not to make a low frequency oscillator circuit in the predisposition bias network system.

A typical reason for inconvenience is the utilization of an inductor with a huge bypass capacitor, which can make a resonator in the GHz region that can bolster oscillation of the active components, which will have high gain at lower frequencies.

Bias-circuit instabilities are a common source of problems in amplifiers and other active circuits. These for the most part result from the utilization of inductors and capacitors in the Bias-circuit without respect to resonances or circumstances where 180° stage movement can happen.

III. LNA DESIGN AND ANALYSIS

LNA parameters are mainly depend on S parameters which varies with respect to frequency. Also Γin depends on Zin and Γ_L, Γ_L depends on Z_L and Γ_{IN} . Zin and Z_L will be different for different biasing components. Effects of biasing components is also frequency dependent.

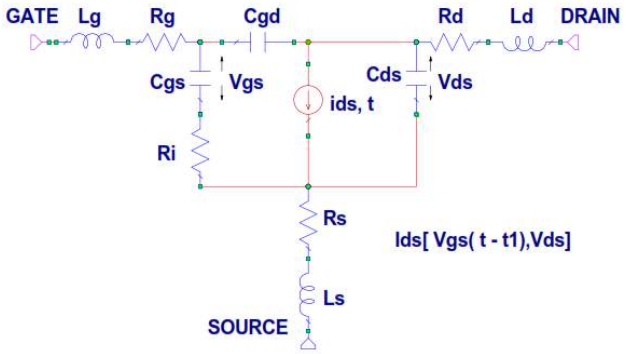

Figure 1. The small signal model of a pHEMT

Cgs and Cgd depends on the biasing voltage because the depletion region changes with the bias .

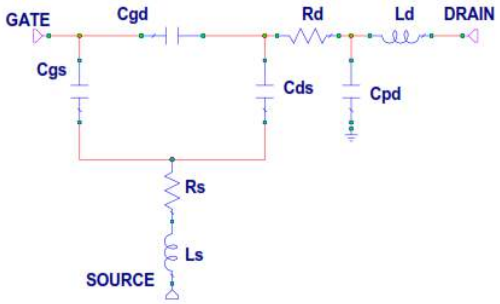

Figure 2. The small signal model of a pHEMT at zero drain bias and gate voltage below pinch-off

The three capacitances Cg, Cs and Cd are given by triangle-star transformation as given below

$C_g = C_{gs} + C_{gd} + [(C_{gs} * C_{gd})/ C_{ds}]$ (1)
$C_s = C_{gs} + C_{ds} + [(C_{gs} * C_{ds})/ C_{gd}]$ (2)
$C_d = C_{ds} + C_{gd} + [(C_{gd} * C_{ds})/ C_{gs}]$ (3)

Input port and output port impedances can be expressed using

$Z_{11} = R_g + R_s + j * [\omega(L_g + L_s) – (1/ \omega) \{ (1/C_g)+ (1/C_s)\}]$ (4)
$Z_{22} = R_d + R_s + j * [\omega(L_d + L_s) – (1/ \omega) \{ (1/C_d)+ (1/C_s)\}]$ (5)

Input reflection coefficient and output reflection coefficient

$\Gamma_{in} = (Z_{in} – Z_0)/(Z_{in} + Z_0)$ (6)
$\Gamma_L = (Z_L – Z_0)/(Z_L + Z_0)$ (7)

Equivalent input and output impedances can be expressed in terms of two port Z parameters.

$Z_{in} = Z_{11} – [(Z_{12} * Z_{21})/(Z_L + Z_{22})]$ (8)
$Z_L = Z_{22} – [(Z_{12} * Z_{21})/(Z_G + Z_{11})]$ (9)

On the premise of the above arrangement numerical conditions unmistakably reliance of Γin and ΓL furthermore Zin and ZL on Cg, Cs and Cd which changes because of progress in biasing conditions.

A. Case 1: With Ideal Bias

Case 1 which incorporates the circuit schematic in figure 3 arranged by using the S-Parameters .S2P documents or mdiff

files of the transistor ATF36163 from Avago technologies. For the simulations and results got depend on the S-parameters investigation without real biasing circuit (real circuit on PCB format). For this case the matching circuit has been set up to accomplish most ideal consequences of the general circuit regarding GAIN, NF, RL for the total bandwidth from 3-10GHz

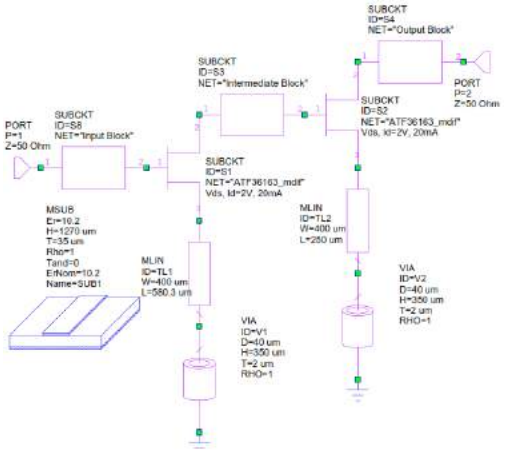

Figure 3. Complete Block

The above figure 3 is of the complete block of the circuit in which it is comprised of three sub blocks called "Input Block" which is displayed in figure 4 in detail, "Intermediate Block" figure 5 and "output block" figure 6. All this blocks are prepared for the best possible results to make transistor to behave has LNA.

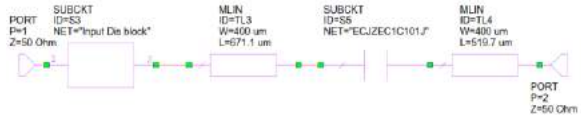

Figure 4. Input Block

The "input block" which is intended for the input matching and mainly it consists of capacitor and one more sub block called "Input Dis Block" which is appeared in figure 7.

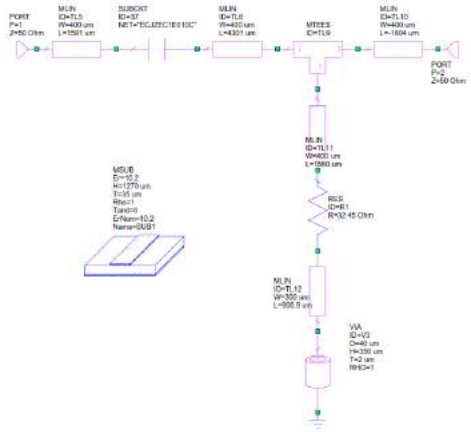

Figure 5. Intermediate Block

The above block figure 5 is designed for intermediate matching between two transistors in cascaded topology.

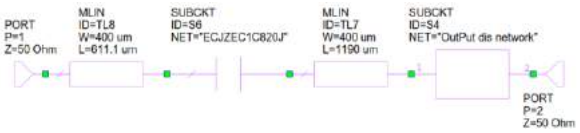

Figure 6. Output Block

The "Output block" figure 6 which is intended for the output matching and mainly it consists of capacitor and one more sub block called "Output Dis Block" which is appeared in figure 8.

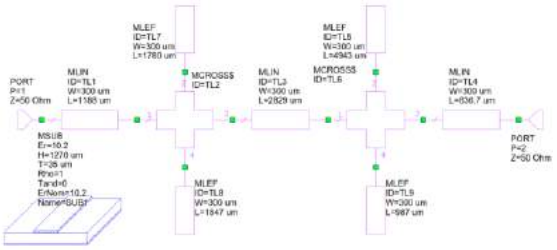

Figure 7. Input Dis block

There are two sub blocks called "Input Dis Block" figure 7 and "Output Dis Block" figure 8 are set up by utilizing just microstrip lines to give great return loss performances at input and output.

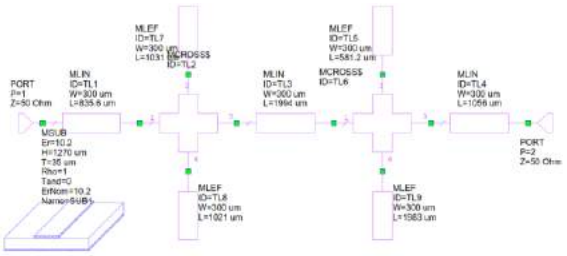

Figure 8. Output Dis network

Case 1 which incorporates the circuit schematic in figure () arranged by using the S-Parameters .S2P documents or mdiff files of the transistor ATF36163 from Avago technologies. For the simulations and results got depend on the S-parameters investigation without real biasing circuit (real circuit on PCB format). For this case the matching circuit has been set up to accomplish most ideal consequences of the general circuit regarding GAIN, NF, RL for the total bandwidth from 3-10GHz.

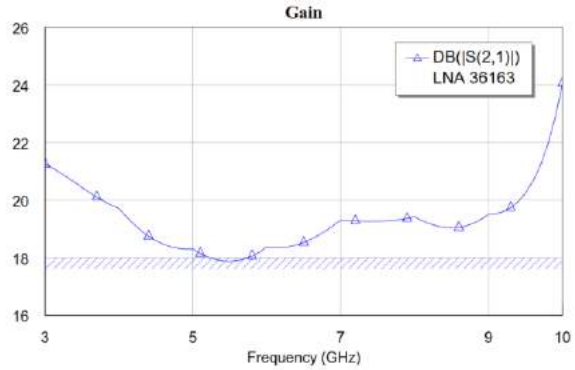

Figure 9. Transducer Gain response over 3-10GHz for the Ideal bias Circuit.

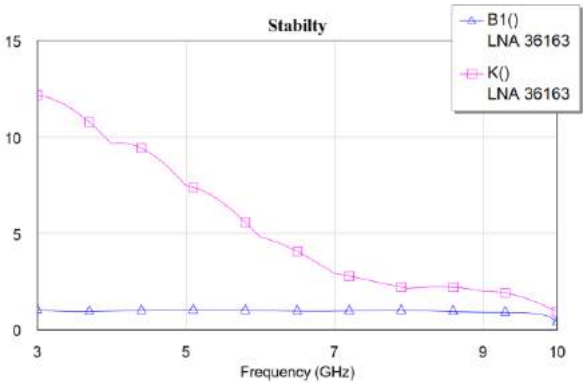

Figure 10. Stability Factors response over 3-10GHz for the Ideal bias Circuit.

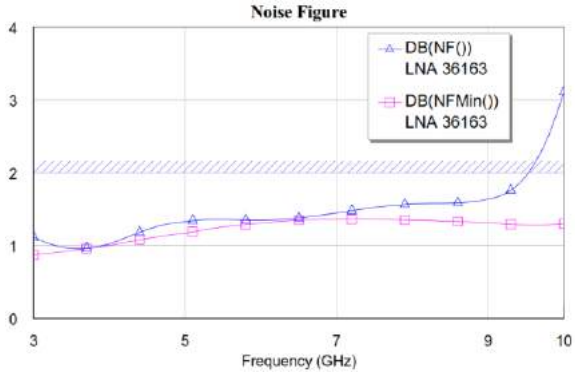

Figure 11. Noise Factors response over 3-10GHz for the Ideal bias Circuit

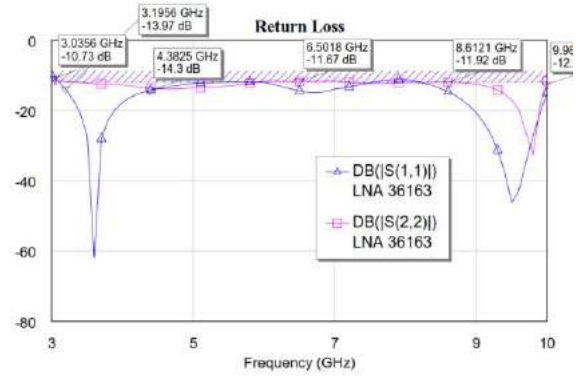

Figure 12. Return Loss response over 3-10GHz for the Ideal bias Circuit

The above simulation results found from the case 1 schematic which is improved to most ideal results concerning return loss satisfying not exactly - 10dB with the acquire gain more than 18dB and Noise figure under 2dB.

TABLE I. CHANGE IN LNA PARAMETERS WITH RESPECT TO VARIATION IN IDEAL BIAS POINTS

Band width	Bias Points (VDS, ID)	Gain in dB	Noise Figure in dB	Return Loss (S11, S22) in dB
3-10	1.5V, 10mA	17-20.5	<1.5	<-11 , <-12
3-10	1.5V, 15mA	17.5-20.8	<1.5	<-11.5, <-13
3-10	1.5V, 20mA	17.7-20.9	<1.6	<-11.5, <-13
3-10	2V, 10mA	17.4-20.7	<1.531	<-10.5, <-12
3-10	2V, 15mA	17.7-21	<1.5	<-11, <-12
3-10	2V, 20mA	17.9-21.21	<1.6	<-11, <-13

The above table portrays the vigour, robustness of the designed circuit, for the varieties of the bias points which has influenced immaterial changes in the Gain, Noise figure and return loss which is plainly depicted in the table.

B. Case 2: with inductive drain bias and resistive gate bias

For this situation, the biasing circuits are built to a similar circuit which is utilized as a part of case 1 which is inductive drain and resistive bias. Microwave Inductors are used has biasing circuit at Drain as showed up in the above Figure(?). They give high Impedance at designed band frequencies in this way it won't usually give up transducer GAIN. In any case, the biasing circuits will reliably have their resonances. It is essential to plan and enhance the entire LNA design circuit with Inductor equivalent circuit show in order to anticipate the circuit execution is to be exactly.

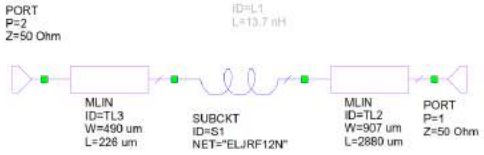

Figure 13. Drain Bias with Inductor

Figure 14. Gate Bias with resistor

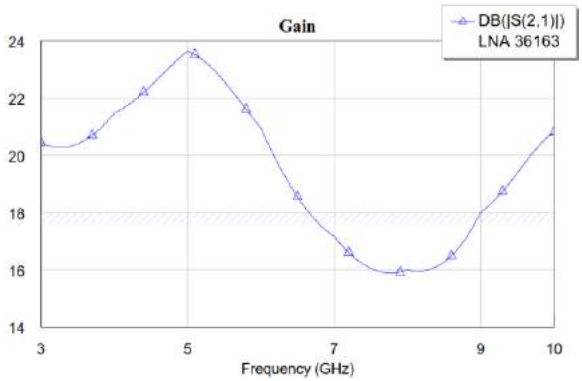

Figure 15. Transducer Gain response over 3-10GHz for the inductive drain bias and resistive gate bias circuit.

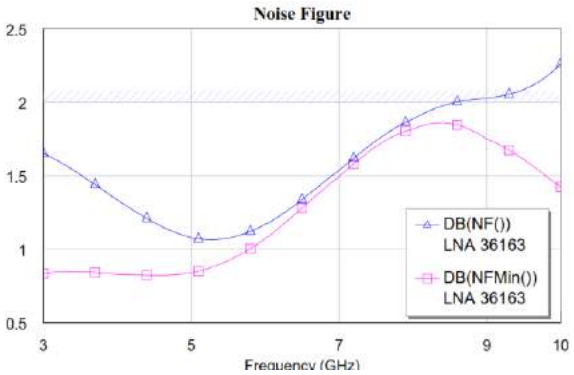

Figure 16. Noise Factors response over 3-10GHz for the inductive drain bias and resistive gate bias circuit.

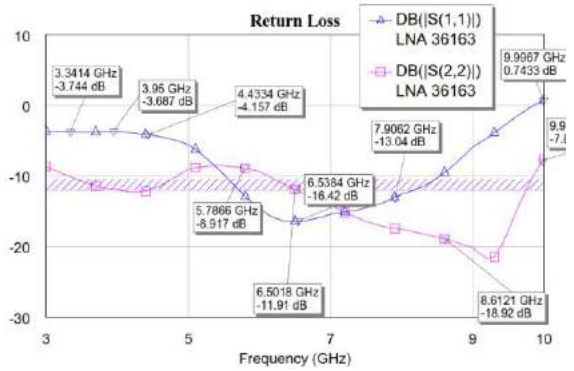

Figure 17. Return Loss response over 3-10GHz for the inductive drain bias and resistive gate bias circuit

For the same designed circuit for the case 1, by only expansion of the inductive drain and resistive gate bias circuit to has made its own resonance and carried variety of the outcome as for frequency and obviously appeared in the above figures.

TABLE II. CHANGE IN LNA PARAMETERS WITH RESPECT TO VARIATION OF BIAS POINTS FOR INDUCTIVE DRAIN AND RESISTIVE GATE BIAS

Band width	Bias Points (V_{DS}, I_D)	Gain in dB	Noise Figure in dB	S11 in dB	S22) in dB
3-10	1.5V, 10mA	15.5-23	<1.5	< (-3 to -15)	< (-9 to -20)
3-10	1.5V, 15mA	15.9-23.2	<1.5	< (-3.5to -15.7)	< (-9 to -18)
3-10	1.5V, 20mA	16-23.2	<1.6	< (-3.6 to -16)	< (-9 to -22.5)
3-10	2V, 10mA	15.5-23.4	<1.5	<(-3.6 to -15)	< (-9 to -20)
3-10	2V, 15mA	15.81-23.5	<1.5	<(-3.6 to -16)	< (-9 to -21)
3-10	2V, 20mA	15.92-23.62	<1.6	<(-3.7 to -16)	< (-9 to -21)

By the insertion of the inductive drain and resistive gate bias circuit the gain has diminished by 2dB and gain flatness additionally got aggravated. Because of resistive gate bias Noise figure got expanded to 2dB and discovered return loss some enormous variations and it has been found the circuit bandwidth has decreased to 3-9GHz.

C. Case 3: with single pair LC

In this case, biasing circuit is prepared using a set of inductor and capacitor at both drain and gate side. Each extra Inductance with parasitic (resistance, capacitance) in arrangement with the capacitor grounded, whether of parasitic source" inside" the capacitor brought about by design or development, diminishes the adequacy of the bias circuit. The pair of LC circuits creates its own resonance and disturbs LNA parameters. Long connections between the capacitor and ground are extra undesirable arrangement inductance – regardless of to whether the inductance originates from the interfacing legs of the capacitor, the conductor tracks or dashes on the component group installation. Designers and layout specialists are regularly confronted with apparently practically insoluble issues in such manner, as limitations, for example, the space accessibility inside the component group and so on.

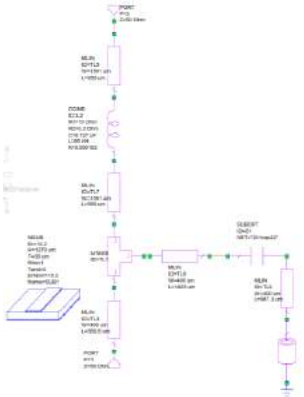

Figure 18. Drain Bias

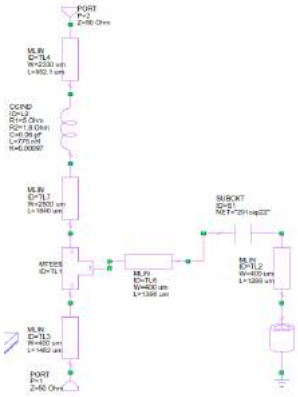

Figure 19. Gate Bias

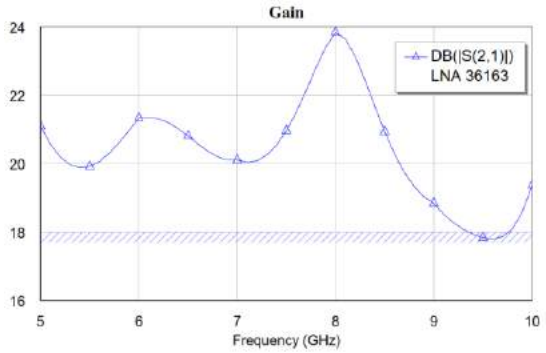

Figure 20. Gain response over 5-10GHz for the single pair LC bias circuit

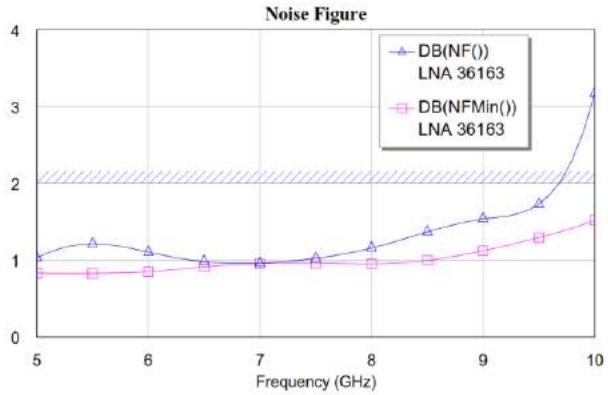

Figure 21. Noise Figure response over 5-10GHz for the single pair LC bias circuit

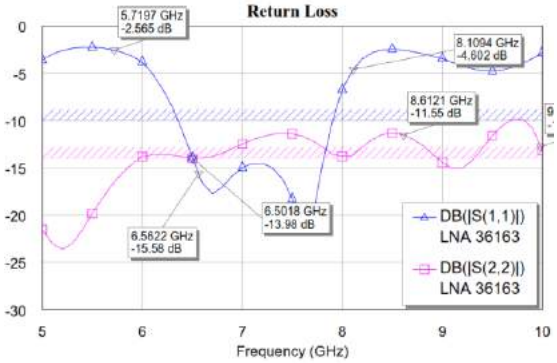

Figure 22. Return Loss response over 5-10GHz for the single pair LC bias circuit

the above simulated results are from case 3 circuit which has not affected gain or noise figure but created the resonance and disturbed the input return loss in its own band between 6-8GHz.

TABLE III. CHANGE IN LNA PARAMETERS WITH RESPECT TO VARIATION OF BIAS POINTS FOR LC BIASING CIRCUIT

Band width	Bias Points (VDS(V), ID(MA))	Gain in dB	Noise Figure in dB	S11 in dB	S22) in dB
3-10	1.5, 10	16.8-23	<1.5	< -2.8 to -20	< -11 to -20
3-10	1.5, 15	17.5-23	<1.5	< -2.7 to -20	< -11 to -23
3-10	1.5, 20	17.7-23	<1.5	< -2.6 to -22	< -11 to -23
3-10	2, 10	17-23.5	<1.4	<-2.7 to -20	< -11 to -23
3-10	2, 15	17.5-23.7	<1.4	<-2.6 to -21	< -11 to -23
3-10	2, 20	17.8-23.7	<1.4	<-2.6 to -21	< -11 to -23

the above table describes the variations of the parameters with respect to the different biasing points. It is observed the best result found for this case at bias point 2V, 20mA.

D. Case 4: with double pair LC

In this case 4 which is designed for the same case 1 circuit by adding double pair LC at both drain and gate of the transistors. This case is prepared to show the double LC pair will creates its own resonance with increase in the bandwidth. Only biasing circuit will be optimized to best result possible.

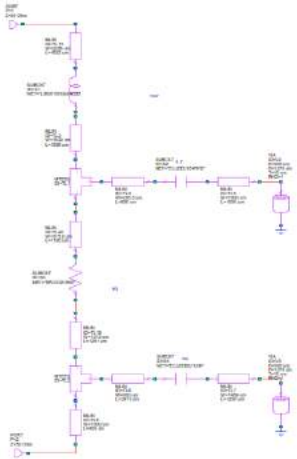

Figure 23. Drain Bias

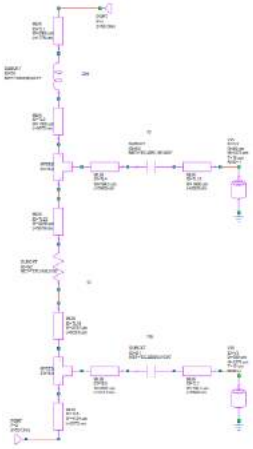

Figure 24. Gate Bias

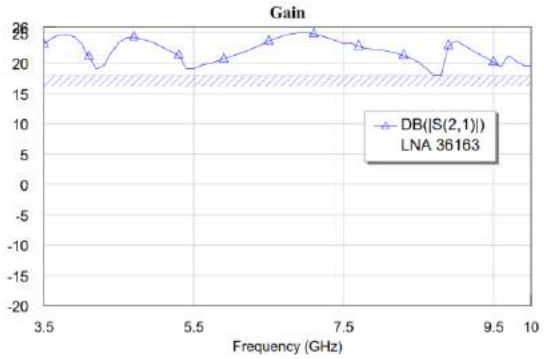

Figure 25. Gain response over 3.5-10GHz for the double pair LC bias circuit

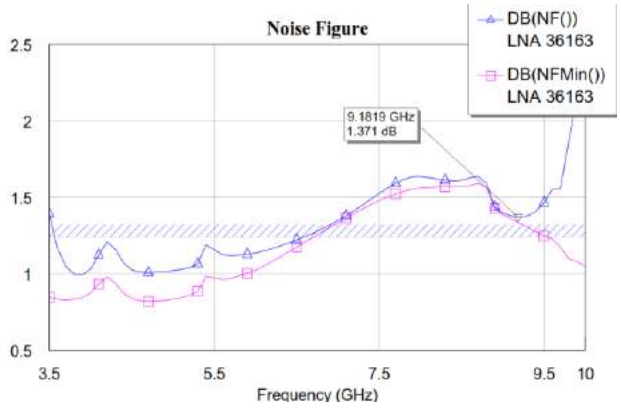

Figure 26. Noise Figure response over 3.5-10GHz for the double pair LC bias circuit

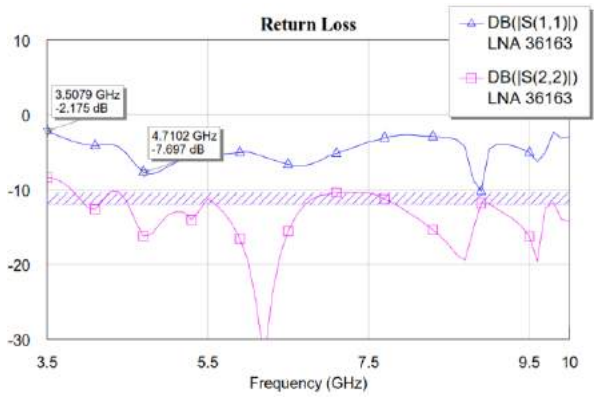

Figure 27. Return Loss response over 3.5-10GHz for the double pair LC bias circuit

By using double pair LC as biasing circuit has improved gain and input return loss with minor increase of noise figure.

TABLE IV. CHANGE IN LNA PARAMETERS WITH RESPECT TO VARIATION OF BIAS POINTS FOR DOUBLE BIASING CIRCUITS

Band width	Bias Points (VDS(V), ID(MA))	Gain in dB	Noise Figure in dB	S11 in dB	S22) in dB
3-10	1.5, 10	16.8-23	<1.6	< -1.7 to -10	< -9 to -20
3-10	1.5, 15	17.5-23	<1.6	< -1.8 to -10	< -9 to -20
3-10	1.5, 20	17.7-23	<1.6	< -2 to -10	< -9 to -20
3-10	2, 10	17-23.5	<1.6	< -2 to -10	< -9 to -20
3-10	2, 15	17.5-23.7	<1.5	< -2 to -10	< -9 to -20
3-10	2, 20	17.8-23.7	<1.6	< -2 to -10	< -9 to -20

IV. BIASING CIRCUIT EFFECTS ON NON-LINEAR CHARACTERISTICS

In this section, illustrations and clarifications of LNA Design Circuit as for biasing Circuit will be given. [15-16] The effects of Biasing circuit are explained by insertion of single tone sinusoidal voltage wave (V sin(ωt)) to the non-signal voltage results in

$v_{gs} = V_{GSQ} + V \sin(\omega t)$

vgs will be the function of Vds and Id biasing point of the transistor which has already been tabulated for the multiple cases and discussed. Then the harmonic distortion KF is

$$KF = \frac{Relative\ value\ of\ second\ harmonics}{Relative\ value\ of\ fundamental\ harmonics} \quad (10)$$

$$KF = \frac{V}{4(Vgs - Vp)} \quad (11)$$

Where V is maximum amplitude of the signal.

Noted: Distortion Factor approaches to its minimum as Vgs tends to 0

Cross modulation (Intermodulation) produced when two sine wave signals are amplified at the same time.

$v_{gs} = V_{GSQ} + V_1 \sin(\omega t) + V_2 \sin(\omega t)$ (12)

Since the output current includes the sum and difference components of the two sinusoidal waves in which intermodulation results in

$$IM = \frac{Relative\ value\ of\ cross\ modulation\ components}{Relative\ value\ of\ fundamental\ harmonics}$$

$$IM = \frac{V_1 * V_2}{\sqrt{2}(V_{GSQ} - V_p)(\sqrt{V_1^2 + V_2^2}} \quad (13)$$

In this case, also it has been clearly examined that distortion factor decreases as bias is brought closer to V_{GSQ}=0. These two-distortion factor will exist in biased circuit which will deteriorate performance of the designed circuit.

V. SUMMARY

The experimented results of this work can be summarized as following in the preferences of cases:

Case1: Ideal Bias LNA circuit intended for the best reasonable estimations of Gain, NF and Bandwidth (3-10GHz) which is utilized to correlate for the remaining three biasing strategies likely Drain Inductance and gate resistance bias, LC bias and double LC bias.

Case 2: Drain Inductance and gate resistance bias is recommended for the LNA design whose bandwidth is up to 4GHz. The performance in this case linearly Gain decrease and NF increases and stability will not be affected at any cost.

Case 3: LC bias is suggested for the LNA design for the smaller bandwidth generally around 2GHz. The LNA performance with respect to Gain and NF will be great and results will keep up flatness over small bandwidth.

Case 4: Double LC is proposed for the wideband and ultra-band with the viable cost on return loss, Gain and NF won't be highly influenced.

A. Confinement of the Biasing Circuit Design

1) the main cause of the distortion or the variations of the results with various cases of the biasing circuit is the non-linearity in the transfer characteristics of the overall circuit with micro strip line

2) Distortion is also caused by the output conductance gd related to operating point and drain voltage Vds.

B. Conceivable Solution

1) By applying the feedback to the circuit both distortion factor and bandwidth can be improved.

2) It is possible to have wideband amplifier with low distortion factor by initially designing the amplifier for the high gain and tuning the gain to its optimum level by using feedback.

VI. CONCLUSION

In this work the effect of biasing circuit on LNA performance. The effect of three different biasing strategies, namely; Drain Inductance and gate resistance bias, LC bias and double LC bias are compared with the ideal bias characteristics of the LNA design. The parameters in each of these approached are re-enacted, Simulated and optimized in AWR microwave office. The importance of the biasing techniques as far as bandwidth, Noise Figure, Gain and return Loss. Every case has been breaking down with criticalness of the segments utilized as a part of analysis in component level of the design and corresponding impacts on overall circuit have been introduced. This work is expected to contribute in LNAs for satellite communications transmissions, Wi-Fi devices and weather radar systems.

The proposed work given examination, comparison of different biasing techniques and also clarified with small signal equivalent circuit model. Moreover, it is obviously presumed that LNA performances is altogether influenced by the biasing circuit strategies. The authors are extended their clear reasonable view and summarized about the effects of different biasing strategies as for BW, Gain and NF.

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AUTHORS PROFILE

K. G. Sawarkar is working towards Ph.D. as Research Scholar at MCT's Rajiv Gandhi Institute of technology, Mumbai University. Currently working as Head of Electronics & Telecommunication Engg Dept. RGIT, Mumbai and. His Area of Interest is Design of analog circuits, design of RF circuits and systems He has done his BE in Electronics under Amravati University and M.E from Mumbai University.

Dr. Kushal R. Tuckley is currently working as Adjunct Professor, IIT Bombay, also Chairman and Director R&D, AGV Systems Pvt.Ltd. His research area interest Radars, Microwave systems and wireless Industrial instrumentation. He has B. Tech, M.Tech and PhD from IIT Bombay. He had a 25 years long career as a scientist in Society for Applied Microwave Electronics Engineering and Research (SAMEER), a premium research institute in microwave systems engineering. He has significant contribution in many of the prestigious projects commissioned by the Govt. of India. He had a stint at Astra Microwave Products Ltd.

Mr. Pramod K B was born in Mysore, Karnataka, India in 1989. He is currently working as Assistant Professor in MCT's RGIT, Mumbai and also working towards PhD degree at JAIN University, Bangalore in Electronics Engineering. He received his B.E degree in Electronics and Communication from Dr.Ambedkar Institute of Technology, Bangalore Visvesvaraya Technological University in 2010, M.Tech degree in R F Communication from Jain University, Bangalore, in 2012 and He worked as R F Design trainee at Icon Design and Automation Pvt Ltd and as visiting research scholar at University of Concordia, Montreal, Quebec, Canada. His research includes Design, Characterization And Optimization Of RF Passive Devices, Board Level Tuning And Optimization Of Matching Networks, Low Noise Amplifier, Power Amplifier, Circuit Linearization And High-Efficiency Design Techniques, Circuit Instability and Strategies.

Prof. Dr. Kumaraswamy H.V is currently working as Professor & HOD in the Dept of Telecommunication Engineering, RVCE, and Bangalore. His research interests are Digital Signal Processing, Adaptive Signal Processing and Communication. He has got PhD from Visvesvaraya Technological University for the research work on Smart Antenna System using Dielectric lens. He is the author of the book titled "Signals & Systems" Published by: SciTech Publication, Chennai, ISB No.8188429260.

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Cloud Computing Issues and Countermeasures

Nazish Fatima
Computer Science & Software Engineering Department
University of Hai'l
Hai'l, KSA

Zahida Parveen
Computer Science & Software Engineering Department
University of Hai'l
Hai'l, KSA

***Abstract*— Cloud computing is an arrangement of Information Technology administrations offered to clients over the web on a leased base. Such administrations empower the associations to scale-up or downsize their in-house establishments. By and large, cloud administrations are given by an outside supplier who has the game plan. Cloud computing has numerous focal points, for example, adaptability, productivity, versatility, combination, and capital lessening. In addition, it gives a progressed virtual space for associations to convey their applications or run their operations. With dismissal to the conceivable advantages of Cloud computing administrations, the associations are hesitant to put resources into Cloud computing chiefly because of security concerns. Security in Cloud computing is an essential and basic angling that upset the development of Cloud computing, and has various issues and issue identified with it. Cloud administration supplier and the cloud administration purchaser ought to ensure that the cloud is sufficiently sheltered from all the outer dangers so that the client does not confront any issue, for example, loss of information or information burglary. There is likewise a probability where a noxious client can infiltrate the cloud by mimicking a real client, along these lines tainting the whole cloud and influences numerous clients who are sharing the contaminated cloud. This paper firstly records the parameters that influence the security of the cloud then it investigates the cloud security issues and issues confronted by cloud administration supplier and cloud administration customer, for example, information, protection, and contaminated application and security issues. It likewise plates a few tips for handling these issues.**

Keywords- Cloud computing; issues; security; parameters

I. INTRODUCTION

A couple of years prior, unique states of cloud were utilized to mean the web and the internet. A while later the cloud has been used to speak to a more particular thought, which is the Cloud Computing. The extension and development of the electronic administrations requires constant change as far as foundation. Cloud computing offers a moderately minimal effort adaptable other option to in-house infrastructure, both in equipment and programming [1]. The fundamental thought of cloud computing is to convey both programming and equipment as administrations .People and associations have been thinking about administrations over the cloud to cut the expenses of use, with no pay in using late advances. Nevertheless, using administrations over the cloud is gone with numerous questions generally about security issues.

II. ISSUES IN CLOUD COMPUTING

This paper discusses issues of cloud computing with respect to technique and also services.

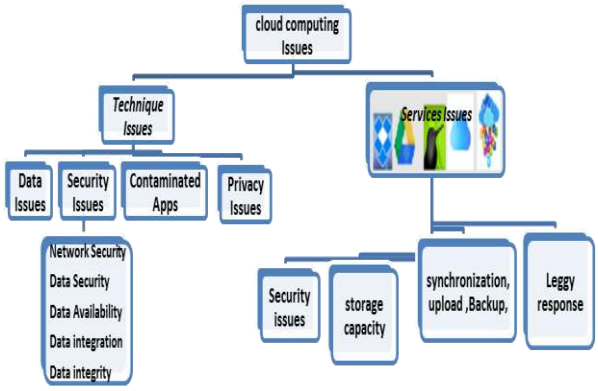

Figure 1. Cloud computing issues

A. *Issues In Cloud Computing Technique*

The cloud administration supplier for cloud ensures that the client does not confront any issue, for example, loss of information or information robbery. There is likewise plausibility where a noxious client can enter the cloud by imitating a true blue client, there by contaminating the whole cloud [6]. This prompts influences numerous clients who are sharing the tainted cloud. There are four sorts of issues raise while talking about security of a cloud [7].

1. Data Issues
2. Privacy issues
3. Contaminated Application
4. Security issues

Data Issues: touchy information in a distributed computing environment rise as real issues with respect to security in a cloud based framework. Firstly, at whatever point information is on a cloud, anybody from anyplace

whenever can get to information from the cloud since information might be regular, private and touchy information in a cloud. So in the meantime, numerous distributed computing administration purchaser and supplier get to and alter information. Consequently there is a need of a few information uprightness techniques in distributed computing. Also, information taking is a one of major issue in a distributed computing environment. Numerous cloud administration suppliers don't give their own particular server rather they procure server from other administration suppliers because of it is cost emotional and adaptable for operation and cloud supplier. So there is a much likelihood of information can be stolen from the outer server. Thirdly, Data misfortune is a typical issue in distributed computing. In the event that the distributed computing administration supplier close down his administrations due some money related or lawful issue then there will be lost information for the client. Additionally, information can be lost or harm or ruined because of miss event, normal catastrophe, and flame. Due to above condition, information may not be accesses able to clients. Fourthly, information area is one of the issues what requires center in a distributed computing environment[4]. Physical area of information stockpiling is vital and vital. It ought to be straightforward to client and client. Merchant does not uncover where every one of the information's are put away.

Privacy Issues: The cloud figuring organization supplier must guarantee that the customer singular information is particularly secured from various suppliers, and customer. As most of the servers are outside, the cloud organization supplier should guarantee who is getting to the data and who is keeping up the server with the objective that it enables the supplier to secure the customer's near and dear information.

Contaminated Application: cloud processing organization supplier should have the finish access to the server with all rights with the ultimate objective of checking and upkeep of server. So this will keep any vindictive customer from exchanging any defiled application onto the cloud which will truly impact the customer and dispersed processing organization.

Security issues: cloud computing security must be done on two levels. One is on supplier level and another is on the customer level. Circulated processing organization supplier should guarantee that the server is particularly secured from all the outside perils it may go over [10]. Regardless of the way that the circulated processing organization supplier has given a better than average security layer to the customer and customer, the customer should guarantee that there should not be any loss of data or take or adjusting of data for various customers who are using the same cloud due to its movement. A cloud is awesome exactly when there is a fair security gave by the organization supplier to the customer [11].

B. Parameters Influencing Cloud Security

There are different security issues in cloud computing as it conceals various advances including systems, databases, working structures, virtualization, resource booking, the trade organization, stack modifying, concurrent control and memory administration[9]. The accompanying graph demonstrates the parameters that impact cloud security.

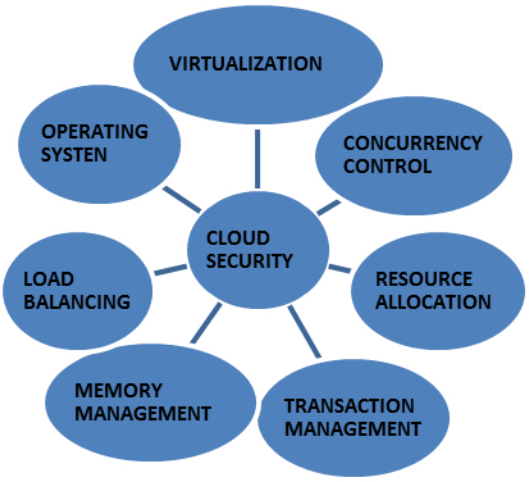

Figure 2. Parameters that influenced clouds security

Security issues for countless structures and headways are material to distributed computing [3]. For example, the framework that interconnects the systems in a cloud must be secure. In addition, virtualization perspective in distributed computing brings about a couple security concerns. Case in point, mapping the virtual machines to the physical machines must be finished securely. Data security incorporates encoding the data and furthermore ensuring that fitting game plans are actualized for data sharing. In like manner, resource parcel and memory organization figuring's must be secure. Finally, information mining strategies may be germane to malware acknowledgment in mists.
Cloud Computing Security major Issues are described briefly below [12].

1) Access to Servers & Applications

In cloud administrative access steered via Internet that is the main security threat which is intern related to security policies.

2) Data Transmission

In processing time more than 70% data is not encrypted, this unencrypted data is a serious threat to secure data transmission.

3) Virtual Machine Security

The dynamic nature of Virtual Machines and the possibility of making the clones and copies is a big hurdle in maintaining consistency and security.

4) Network Security

In cloud the network security problem is consist of reused IP address, attacks on DNS and attacks of different kinds of Sniffers.

5) Data Security

The enterprise data is warehoused out of the boundary of the enterprise at Service provider premises. Therefore, the service provider must implement added security checks to guarantee data security.

6) Data Privacy

Another key concern in cloud security is privacy as all the Data in the cloud is distributed globally that open the concerns about influence, privacy and data exposure

7) Data Integrity

Clouds usually store the generated data in cloud computing, this method open the way for lose control over data from users point of view.it is also a fact that Data sleaze can happen with any type of media and at any level of storage.

8) Data Location

Data location is again a big issue in concern with security as there are many users and huge type of data that need to be available locally within the user promises, as in cloud user is not aware of the exact location of their data so it can also create problem.

9) Data Availability:

Data Availability is one of the major apprehensions of undertaking and security precarious organizations. When storing data at distant systems, users can suffer from system failures. Data will not be available when cloud stops working.

10) Data Segregation

The storage is shared by the data from different users and as discussed earlier the encryption is not easy to implement in cloud so there arises a big threat of data Segregation.

11) Security Policy and Compliance

The cloud services provider companies need to be have a clear and strict policies for security provision to the end user. Enterprises need to demonstrate acquiescence with security standards.

12) Patch management

Patch management is a type of systems management that includes getting, checking, and installing patches (code changes) to a controlled computer system. In cloud patch management is done on user promises so open the risk of security.

C. Issues In Cloud Computing Services

Here we will discuss about the major services of cloud computing having some major problems. A survey report of specialized bolster site FixYa demonstrates that clients of the main five cloud storage services are most worried about limit, security and missing documents. FixYa got some information about the main five issues cloud storage clients have with Dropbox, Google Drive, Sugar Sync, iCloud and Box.[5]

I. Dropbox

Dropbox is a standout amongst the most famous storage service administrations. FixYa reviewed about Dropbox and picked the following concerns which are mentioned in the fig-3 below .FixYa clients who depend on Dropbox for individual substance, for example, photographs, music or amusement, aren't disheartened by the security issues, FixYa noted.

"Notwithstanding, individual clients using Dropbox to store individual money related data or comparative things that would represent a security hazard ought to stay away," FixYa said. "The same goes for medium sized organizations searching for a simple approach to share bank explanations or exclusive business data."

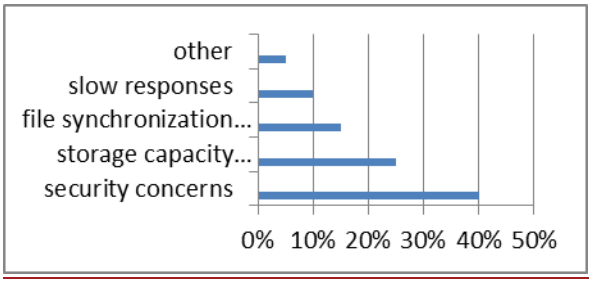

Figure 3. Issues in Dropbox Service

II. Google Drive

When it came to Google Drive, missing, issues with synchronizing records, automatic conversion unknown errors are major issues of the customers of Google drive. "Despite the fact that security concerns are not as conspicuous amongst FixYa clients contrasted with other cloud gadgets, Drive still encounters some broad ease of use issues that should be tended to," FixYa said. "Generally, be that as it may, these issues can be understood rapidly. "See fig-4 below.

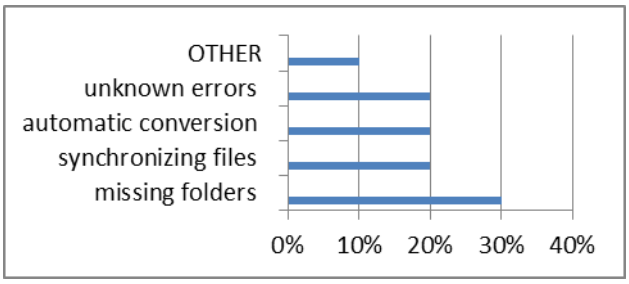

Figure 4. Issues in Google Drive Service

III. SugarSync

The absence of QuickBooks bolster finished the worries clients had with Sugar Sync. QuickBooks is a business bookkeeping programming for organizations .Since Sugar Sync doesn't bolster QuickBooks; it is an extreme offer for monetary clients. Some of storage ,file syncing,iTune file problem. Here is the brief issues of SugarSync in Fig. 5.

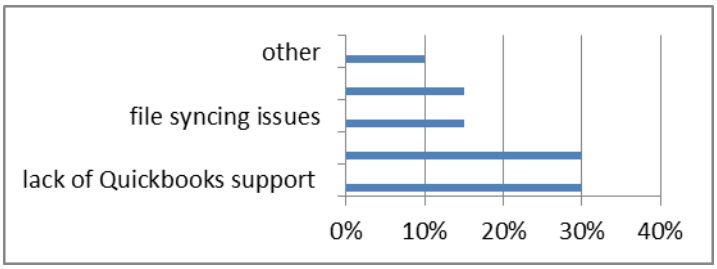

Figure 5. Issues in SugarSync Service

IV. iCloud

Apple's iCloud storage administration took a hit after clients overhauled to OS X Mountain Lion, as indicated in the survey by FixYa. "Whether it be agreeing to the administration, synchronizing the "Notes" application between gadgets, or moving down records and different applications, iCloud on the new Mountain Lion is not impeccable by any methods." FixYa prescribed that clients encountering issues with matching up Notes attempt Evernote. Moreover, the powerlessness to adjust documents with non-Apple gadgets in iCloud was noticed in survey. other file syncing ,note syncing and security issues are measured in Fig. 6.

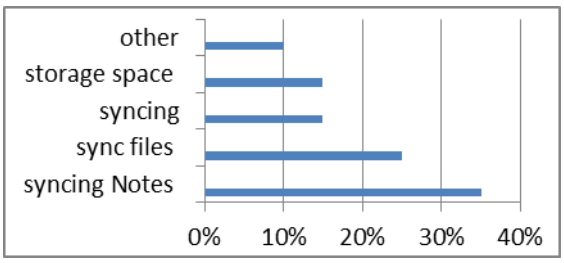

Figure 6. Issues in icloud Service

V. Box

Box, a cloud storage benefit that is most well-known with little organizations due to its local security abilities and administration components, was pounded on the issue of security and transferring issues. A quarter century of overview respondents picked "security concerns"; another picked "transfer issues." While security issues don't seem, by all accounts, to be an issue for extensive scale business accounts, FixYa clients have reported worries with security for their free individual records". While FixYa can't take care of the security worries with Box, it recommended that clients experiencing difficulty transferring documents ought to restart their PCs and clear the program store before attempting again. Also leggy response and upload issues were noticed with the following ratio in Fig. 7.

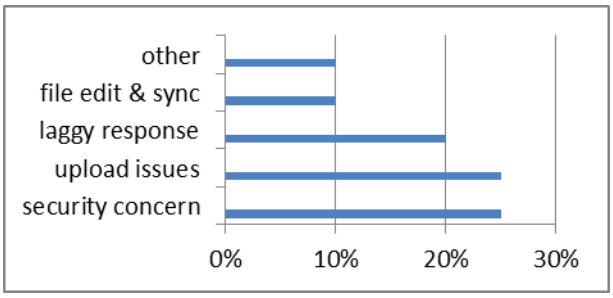

Figure 7. Issues in Box Service

In cloud the issues in services point of view as discussed above one can easily conclude that each service has its on issues and concerns the whole findings can be summarize in the following given table 1.1.

TABLE 1.1: SUMMARY OF CLOUD SERVICES ISSUES

SERVICE	PEAK ISSUE	%
DROP BOX	SECURITY	40%
GOOGLE DRIVE	MISSING FOLDERS	30%
SUGAR SYNC	STORAGE SPACE	30%
I CLOUD	SYNCING NOTE	35%
BOX	SECURITY	25%

III. COUNTERMEASURES FOR CLOUD ISSUES

There are a few tips and traps that cloud security arrangement suppliers ought to remembered when they conveys their support of cloud administration buyer in an open cloud arrangement[2].

Confirm the entrance controls: Set up data to get control with rights and after that check these passage controls by the cloud organization supplier at whatever point data is being used by cloud organization client. To complete get to control methods for client side, the cloud organization supplier must depict and assurance that the principle endorsed customers can get to the customer or buyer's data.

Control the customer access gadgets: Be sure the buyer's passage devices or centers, for instance, Personal Computers,

virtual terminals, papers, handouts and cell phones are adequately secure. The loss of an endpoint get to contraption or access to the device by an unapproved customer can scratch off even the best security traditions in the cloud. Make certain the customer handling contraptions are directed fittingly and secured from malware working and supporting impelled acceptance highlights.

Screen the Data Access: cloud organization suppliers need to ensure about whom, when and what data is being gotten to for what reason. Case in point various site or server had a security protestation regarding snooping practices by various people, for instance, listening to voice calls, scrutinizing messages and individual data etcetera.

Offer requested records and Verify the information cancellation: If the customer or customer needs to report its consistence, then the cloud organization supplier will share charts or whatever other information or give audit records to the buyer or customer. Furthermore affirm the most ideal deletion of data from shared or reused devices. Various suppliers don't suit the most ideal degaussing of data from drives each time the drive space is left. Request an ensured cancelation get ready and have that method made into the assertions.

Security check occasions: Ensure that the cloud organization supplier gives enough bits of knowledge about fulfillment of ensures, break remediation and reporting probability. These security events will portray commitment, certifications and exercises of the circulated figuring organization supplier.

IV. CONCLUSION

Cloud computing has been a surpassing shift so far in terms of using the present innovations. The pattern of having cloud administrations as a feature of an association appears to be increasing more significance. Particularly in this time the cycle of presenting more mechanical advancements is getting shorter. For some reasons, including the decrease of capital consumptions, associations need to consider using cloud administrations as a fundamental piece of their establishments. All things considered, different difficulties are precluding the accomplishment of tremendous arrangement and acknowledgment levels. The principle disadvantage of the current cloud administration executions is their powerlessness to give an authorized high-security level. In addition, security certification requirements to cover the transmission channels which may incorporate an outsider. Both the cloud administration supplier and the client ought to ensure that the cloud is sufficiently protected from all the outer dangers, so there will be a solid and common comprehension between the client and the cloud administration supplier. The biggest crevices between cloud-security practice and cloud-security research hypothesis lie in the way that the suppositions in the exploration forget some imperative contrasts between real cloud security and virtual machine security. Examination ought to focus on these crevices and contrasts and its evacuation. One of the bits of the structure may build up an approach to screen the cloud's administration programming, and another may be an advancement of segregated preparing for particular customers' applications. Individuals' conduct can be followed and checked for case whether individuals let the robotic fixing programming to run, or redesigning hostile to infection programming definitions, or whether individuals see how to solidify their virtual machines in the cloud.

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AUTHORS PROFILE

Nazish Fatima is M.Sc. in Computer Science (MSCS) fellow of Virtual University of Pakistan. She has completed Master in Computer Science (MCS) from University of Karachi and Master in Islamic Studies with Computer Technology from Sheikh Zayed Islamic Centre, University of Karachi, Pakistan. She passed PGD (Post Graduate Diploma) in Mathematics from University of Karachi Pakistan. She has eleven years of teaching experience at graduate and post graduate levels courses, currently working as lecture of computer science in University of Ha'il, Saudi Arabia form year 2010. Her

research interest includes cloud computing, network security, mobile and pervasive computing and big data.

Zahida Parveen has completed MCS (Master in Computer Science) NUML Islamabad, Islamabad, Pakistan. B.Sc (Computer) Punjab University, Punjab, Pakistan. She is currently working as lecturer of computer science in University of Ha'il from year 2010. Her research interests are Cloud Computing, Programming Languages, Software Engineering and Big Data.

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Improved Deadlock Prevention Algorithms in Distributed Systems

Mahboobeh Abdoos
Electrical and Computer Engineering Department
Qom Islamic Azad University, Qom, Iran.

***Abstract*—Distributed systems deadlock is similar to single-processor system deadlock, but is worse. It is harder to avoid, prevent or detect and is harder to cure, when it is tracked down because all the relevant information is scattered over many machines. In some systems, such as distributed database systems, it can be extremely serious, so it is important to understand how it differs from ordinary deadlock and what can be done about it. Two important deadlock prevention algorithms in distributed systems are wait-die and wound-wait. Their problem is that they just attend to the time stamp of processes, but not priority of them. In a real operating system, attending to priority of processes is very important. The proposed improved algorithms are attending to both priority and time stamp of processes.**

Keywords —Deadlock Prevention; Distributed Systems; Algorithm; Process.

I. INTRODUCTION

During the last decade computing systems have undergone a rapid development, which has a great impact on distributed operating systems. While commercial systems are gradually maturing, new challenges are imposed by the world-wide interconnection of computer systems. This creates an ever growing need for large-scale enterprise distributed solutions. In future, distributed operating systems will have to support hundreds or even thousands of sites and millions of clients and, therefore, will face tremendous scalability challenges with regard to performance, availability and administration. One of the challenges that we must solve it in this area is deadlock problem. Deadlock also is one of the most serious problems in multitasking concurrent programming systems.

The rest of the paper organized as follow. In Section 2 it is briefly described the deadlock and its scope in distributed operating systems, there is an overview of distributed systems deadlock prevention algorithms. Section 3 presents improved deadlock prevention algorithms. Finally we summarize at section 4.

II. DISTRIBUTED SYSTEMS DEADLOCK

A deadlock is an undesirable situation where members of a set of processes that hold resources are locked indefinitely from access to resources are blocked indefinitely from access to resources held by other members within the set. No member of the set can release its own resources before completing its tasks. Therefore the deadlock will last forever, unless a deadlock resolution procedure is performed. If the involved processes in a deadlock are spread out in a network of computers or in a distributed computer system. The situation is known as distributed deadlock.

An approach for handling the deadlocks is to prevent them from occurring in a system. The basic idea behind a deadlock prevention algorithm is that it ensures at least one of the conditions necessary for deadlock to occur can not hold. A common technique is to prevent processes from waiting for each other in a circular manner. [1]

As already mentioned, a simple approach to deadlock prevention is to refuse the request of process (by aborting the process) for a resource which is currently held by another process. This approach requires a transaction mechanism which ensures that the result of a process is either complete or has no effect, even in the presence of failures (i.e. Interrupted by accident or aborted deliberately by a system). For the rest of the paper we use transactions instead of processes as units of execution.

This condition is called deadlock. Deadlock has four conditions:

1. Mutual exclusion: Each resource can only be assigned to exactly one resource.
2. Hold and wait: Processes can hold resources and request more.
3. Non preemption: Resources can not be forcibly removed from a process.
4. Circular wait: There must be a circular chain of processes, each waiting for a resource held by the next member of the chain.

A. Deadlock Problem Solving Approaches

There are four techniques commonly employed to deal with deadlocks:

1. Ignore the problem
2. Deadlock detection
3. Deadlock prevention
4. Deadlock avoidance

Ignoring deadlocks is the easiest scheme to implement. Deadlock detection attempts to locate and resolve deadlocks. Deadlock avoidance describes techniques that attempt to determine if a deadlock will occur at the time a resource is requested and react to the request in a manner that avoids the deadlock. Deadlock prevention is the structuring of a system in such a manner that one of the four necessary conditions for deadlock cannot occur [8]. Each solution category is suited to a specific type of environment and has advantages and disadvantages. In this paper, we focus on deadlock prevention which is the most commonly implemented deadlock solution. Deadlock prevention in distributed systems includes two algorithms named wait-die and wound-wait.

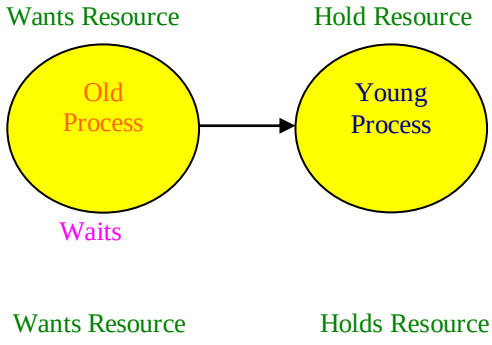
B. Wait-Die Algorithm

Transactions are ordered by timestamps. A transaction is stamped at its creation. Ordering between different transactions is identical on all execution nodes. Let Ti and Tj be two transactions marked with time stamps TS(Ti) and TS(Tj).

In this algorithm if the old process is waiting for the young process it can wait, else if the young process is waiting for the old process, the young process will die and restart again with the same time stamp. This algorithm just attends to the time stamp of processes and not the priority of them. Fig.1 shows the wait-die algorithm [3].

wait-die:

Ti ----- > Tj
if TS(Ti)<TS(Tj)
(Ti is older than Tj) then Ti is allowed to wait
otherwise (Ti younger than Tj) Ti is aborted and is restarted later with the same timestamp



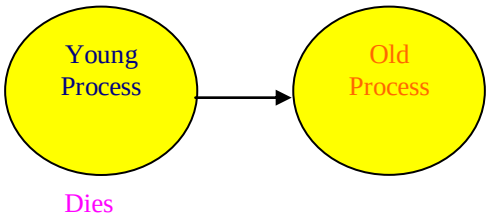


Figure 1. Wait-Die Algorithm

C. Wound-Wait Algorithm

Here like the before algorithm, each process has an individual time stamp. And two processes have not the same time stamp. In this algorithm, if the old process is waiting for the young process, it can wound the young process [7] and get its resources. If the young process is waiting for the old process, it can wait. Fig.2 shows the wound-wait algorithm.

wound-wait:

Ti ----- > Tj
if TS(Ti)<TS(Tj)
(Ti older than Tj) then Ti wounds Tj and get its resources.
Otherwise (Ti younger than Tj)Ti is allowed to wait

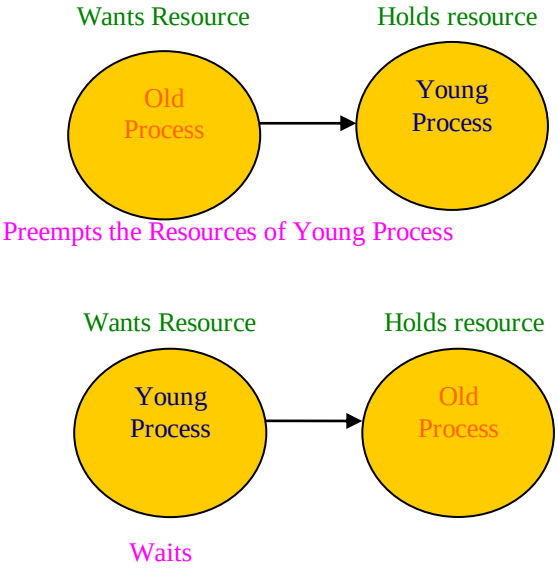


Figure. 2 Wound-Wait Algorithm

III. PROPOSED ALGORITHMS

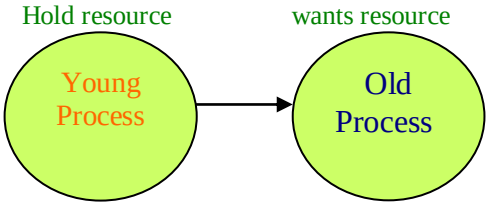
Proposed-wait-die:
Ti ----- > Tj
If TS(Ti)<TS(Tj) (Ti is older than Tj) then Ti is allowed to wait .
If TS(Ti)>TS(Tj) (Ti younger than Tj) and (priority(Ti)<priority(Tj)) then Ti is aborted and is restarted later with the same timestamp.
if TS(Ti)>TS(Tj) (Ti younger than Tj) and (priority(Ti)>priority(Tj)) then it is allowed to wait.

Proposed-wound-wait:
if Ts(Ti)<TS(Tj)
(Ti older than Tj) and (priority(Ti)>priority(Tj))
then Ti wounds Tj and get it's resources.
if (Ti older than Tj) and
(priority(Ti)<priority(Tj)) then the old process continues to wait.
If TS(Ti)>TS(Tj) (Ti younger than Tj) Ti is allowed to wait

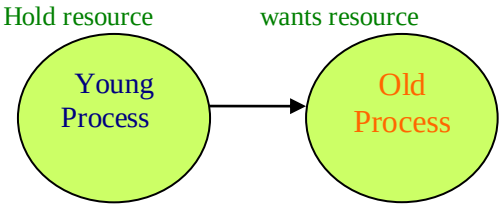
One important problem of wait-die and wound-wait algorithms is that they do not attend to the priority of processes. Figures 3, 4 show the proposed algorithms.

In the proposed wait-die algorithm, if the old process is waiting for the young process it can wait and if the young process is waiting for the old process and the priority of young process is lower than the priority of old process then the young process will die and restart again with the same time stamp. If the young process is waiting for the old process and the priority of the young process is higher than the priority of the old process, then the young process continues to wait.

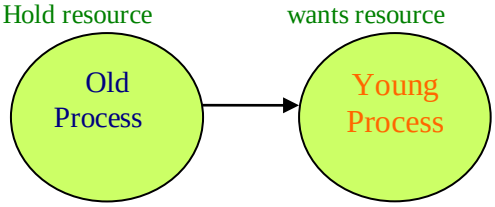
In the proposed wound-wait algorithm if the old process is waiting for the young process then if the priority of old process is more than the priority of young process then the old process kills the young process and preempts its resources. If the old process is waiting for the young process and the priority of young process is higher than the priority of old process then the old process is allowed to wait. These proposed algorithms attend to both priority and time stamp of processes.



(a) The young process dies. (If the priority of young process is lower than the priority of old process)

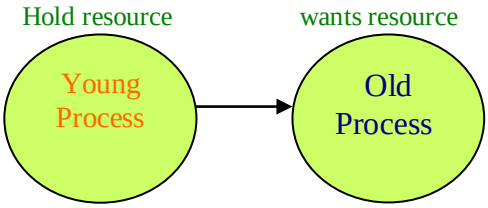


(b) The young process can wait. (If the priority of young process is higher than the priority of old process)

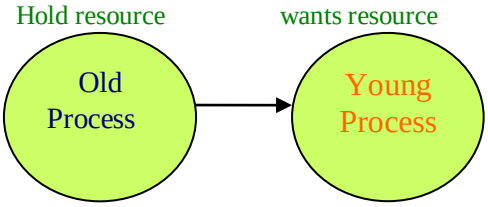


(c) The old process waits.

Figure 3. The proposed wait-die algorithm

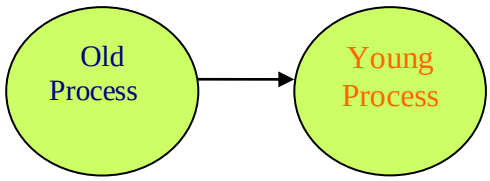


(a) The young process waits.



(b) The old process preempts the resources of the young process. (If the priority of old process is higher than the priority of young process)

Hold resource wants resource



(c) The old process waits. (If the priority of old process is lower than the priority of young process)

Figure 4. The proposed wound wait algorithm

IV. CONCLUSION

In this paper, it is considered to the deadlock problem in distributed systems and reviewed the approaches like wait-die and wound wait algorithms. One important problem of wait-die and wound-wait algorithms is that they don't attend to the priority of processes. In the proposed wait-die algorithm, if the old process is waiting for the young process it can wait and if the young process is waiting for the old process and the priority of young process is lower than the priority of old process then the young process will die and restarts again with the same time stamp. If the young process is waiting for the old process and the priority of the young process is higher than the priority of the old process, then the young process continues to wait. In the proposed wound-wait algorithm if the old process is waiting for the young process then if the priority of old process is more than the priority of young process then the old process kills the young process and preempts its resources. If the old process is waiting for the young process and the priority of young process is higher than the priority of old process then the old process is allowed to wait. These proposed algorithms attend to both priority and time stamp of processes.

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AUTHOR PROFILE

Mahboobeh Abdoos received the B.S and M.S degrees in computer engineering from Azad University, Ghazvin, Iran, in 2002 and 2007 respectively. She is now the Ph.D. research student of Islamic Azad university, Qom, Iran. She has taught at Islamic Azad and Payam Nour Universities from 2005 til now. She has been the referee of some conferences. Her current research interest includes position based routing protocols in mobile ad hoc networks, QOS and security based routing protocols in mobile ad hoc networks, cloud computing and data base.

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The Influence of Solvent on the Solvolysis of Ethyl Cinnamate in Water Acetone Mixed Solvent System

A.K. Singh
Department of Chemistry
Teerthanker Mahaveer University, Moradabad, India.

***Abstract*— The kinetic of alkaline hydrolysis of Ethyl Cinnamate was investigated at different percentage of aqua-organic solvent mixture with Acetone (30 to 70% v/v) over the temperature range of 20o C to 40 o C. The specific rate constant was found to be decreased with increasing proportion of solvent (Acetone) at all the temperature range. The Iso-composition Activation energy (EC) was also evaluated which decreases with solvent composition in (water-Acetone) system. The number of water molecule associated with the activated complex is found to be increase (0.7003to 0.786) in water-Acetone system. The Thermodynamic Activation Parameter such as Enthalpy of Activation (□H*), Entropy of Activation (□S*) and Gibb's free energy of activation (□G*) were also calculated.**

***Keywords*—Solvolysis; Solvent-solute interaction; Iso composition Energy; Activated complex; Activation parameters.**

I. INTRODUCTION

Although the solvent effect on the rate and mechanism of the various type of reaction has been reported [1-3] but very little attention has paid towards the study of the solvent effect on the Thermodynamic Activation Parameter and the solvent-solute interaction, particularly for an ion-dipolar reaction. In order to highlight the above noted idea, it has been proposed to make the kinetic study of the solvent effect on the alkali catalyzed hydrolysis of ethyl Cinnamate.

II. EXPERIMENTAL

All the chemical used were either of BDH (Analar) or Merck (CD) grades. The water used was doubly distilled. The specific rate constant value was calculated using second order reaction and tabulated in Table-I & II the Iso composition Activation energy (EC) were evaluated and tabulated in Table-III. The number of water molecule evaluated by the slope of plot of logk and log(H2O) and inserted in Table-V. Thermodynamic Activation Parameter was also calculated inserted in Table VI.

III. RESULT AND DISCUSSION

A. Solvent Effect on Rate of Reaction

From table I&II (Fig. 1), it is clear that specific rate constant values of the reaction go on decreasing with increasing organic co-solvent in the solvent (Acetone). From the plot of logk with mole% of organic co-solvent, it was observed that plots follows trend at all temperature. From the plot (Fig. 1) it is also apparent that the decrease is regular and follows linear trend at all the temperature in solvent. The trend of variation in the values of specific rate constant may be discuss in light of the Hughes and Ingold [4] theory. According to the theory of increase in dielectric constant values of the reaction media result in increase in the rate when there is concentration of charges on the transition state and cause a decrease in the rate when there is diffusion or destruction of charges on transition state. Acetone being poor anion solvater their increase in aqueous medium will facilitate the desolvation of ions already solvated by water molecule. Since initial and transition state (both being anions differing in size and charge) cannot be equally desolated, the rate will be affected by such specific salvation changes. Depletion in the rate of the reaction in different reaction with change temputcture and constants of acetone of reaction media portly partly due to dielectric effect and partly due to salvation change to different degree in the initial and translated of reaction. Our interpretation has also been supported recently by Singh A. K. [5].

TABLE - I

Specific rate constant k x10^3(dm)^3/mole/mint]values of alkali catalyzed Hydrolysis of Ethyl-Cinamate in water-Acetone

Temp in °C	% of ACETONE				
	30%	40%	50%	60%	70%
20°C	15.66	11.22	10.00	8.12	6.45
25°C	20.89	16.59	13.48	10.59	8.49
30°C	27.54	21.87	16.98	13.64	10.83
35°C	38.01	30.19	23.17	18.62	14.62
40°C	45.70	36.30	27.86	22.38	17.74

TABLE - II

variation 3 + Logk Value against 10^3/T, Water- Acetone System.

Temp in °C		3 + Logk				
	10^3/T	30%	40%	50%	60%	70%
20°C	3.412	1.195	1.095	1.000	0.910	0.810
25°C	3.355	1.320	1.220	1..130	1.025	0.929
30°C	3.300	1.440	1.340	1.230	1.135	1.035
35°C	3.247	1.580	1.480	1.365	1.27	1.165
40°C	3.195	1.665	1.560	1.445	1.350	1.249

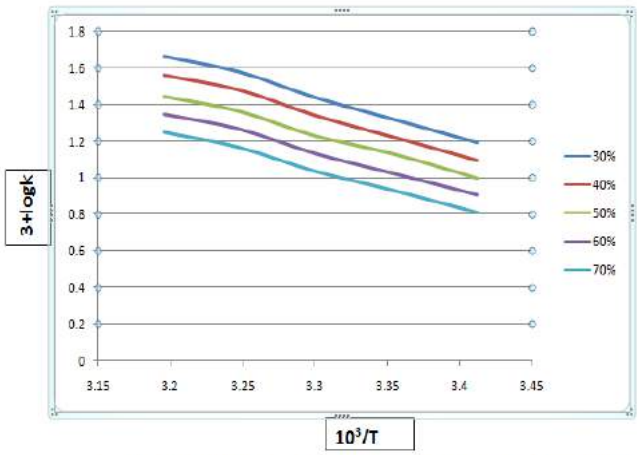

Fig.1: Variation of 3 + logK value with 10^3/T (water-Acetone media)

B Effect of Solvent on Activation Energy (Iso-composition) of the reaction

From Tab III and fig-2, it is found that the value of Iso-composition Activation Energy is goes on decreasing trend with gradual addition of organic content In case of Acetone the value of Activation Energy decrease from 41.64 to 37.39Kj/mole with increase proportion of Acetone in water-acetone media.

The depleting trend in the E_{exp} values can be explained by any of the following three situations.

(i) The transition state is less desolvated than the initial state.

(ii) The initial state is less solvated than the transition state.

(iii) The initial state is desolvated and the transition state is solvated.

Out of three situation the third factor seems to be operative as both ΔH^* and ΔS^* values of the reaction were found with decreasing with increasing concentration acetone in water-Acetone media. Our this inference has also been in favors of the finding of Singh A. K. [5].

On the basis of depletion (water-Acetone) media, it is inferred that acetone has the solvating power to solvate the initial state and to desolated the transition state. Our this finding is also supported by Singh A K [6].

TABLE - lll

Values of Iso-composition Activation Energy (water-Acetone) media

% of ME-OH	30%	40%	50%	60%	70%
E_{exp} in KJ/mole	41.64	41.28	39.81	38.73	37.39

C. Effect of solvating power on the number of water molecules associated with the Activated complex and on mechanistic path of the reaction

The effect of water concentration [H_2O] of water-Acetone media on rate and mechanism of alkaline hydrolysis of ethyl cinnamate has been studied in light of guideline and observation render by Tommil-E [7] Lane-C.A.[8] Elsmongy et al[9] they have established an idea of the number of water molecule associated with the Activated complex has been determined by plotting logk against by [H_2O].According to the relation proposed by Robertson[10].

$$\log k = \log_0 + n \log[H_2O]$$

Here, n is the salvation number which tells about the criteria for studying about the mechanism of reaction.

It is obvious from the plots of logk versus log[H_2O] that at all the five temperature at which kinetics were studied, straight lines fig-2 From the value of slope as mention table-V, (Fig.2) the number of water molecules associated with Activated complex varies from (0.700to 0.786) in case of water-Acetone media with rise of temperature.

From the above values of slope mention in table III it is inferred that equilibrium shifted from dense form (d) of water to bulk form (b) in case of water-Acetone media, with rise of temperature.

$$[H_2O]_d \leftrightarrows [H_2O]_b$$

In the light of finding of Robertson [10] and .Singh A K.[11] and from above noted trend, it is concluded that solvating power of Acetone change the mechanism of the reaction from bio-molecular to unimolecular, The resent report of Singh A K[12]has been support of our finding

Table-IV

Variation of 3+ Log k with log[H_2O] (water – Acetone) at different temperature

% of Acetone	% of H_2O	Log [H_2O]	3 + Log k				
			20^{0}c	25^{0}c	30^{0}c	35^{0}c	40^{0}c
30%	70%	1.5690	1.170	1.260	1.440	1.520	1.642
40%	60%	1.5229	1.130	1.220	1.3360	1.470	1.590
50%	50%	1.4437	1.030	1.140	1.280	1.390	1.510
60%	40%	1.3468	0.940	1.050	1.180	1.300	1.140
70%	30%	1.2218	0.820	0.920	1.060	1.170	1.280

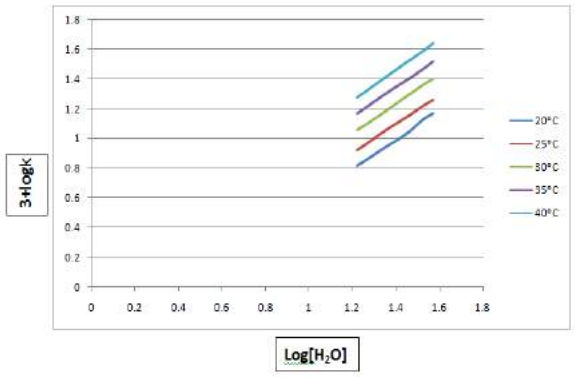

Fig.2: Variation of 3 + logk value with Log[H_2O] (water-Acetone media)

Table-V

The value of slope of plot of log k verses log[H_2O] of reaction in water-Acetone media

Temp^{0}C	20^{0}c	25^{0}c	30^{0}c	35^{0}c	40^{0}c
Slope	0.700	0.732	0.746	0.759	0.786

D.Thermodynamic Activation Parameters

Table-VI

Thermodynamics Activation Parameters of the Reaction in Water- Acetone Media ($\Delta H^*$and ΔG^* in KJ/Mole, ΔS^*in J/K/Mole)

% of Me-OH	Mole %	ΔH^* in Kj/Mole	20^{0}C		25^{0}C		30^{0}C		35^{0}C		40^{0}C	
			ΔG^*	$-\Delta S^*$	ΔG^*	$-\Delta S^*$	ΔG^*	$-\Delta S^*$	ΔG^*	$-\Delta S^*$	ΔG^*	$-\Delta S^*$
30%	16.03	65.15	89.82	84.19	90.43	84.83	90.96	85.18	91.42	85.29	91.92	85.52
40%	22.90	62.75	90.49	94.67	91.12	94.20	91.57	95.11	91.87	96.78	92.64	95.49
50%	30.82	62.06	91.06	98.97	91.80	99.78	92.30	99.80	92.75	99.64	93.30	99.80
60%	40.06	61.84	91.70	101.91	92.38	102.48	92.91	102.54	93.35	102.30	93.96	102.61
70%	50.97	61.15	92.24	106.10	92.98	106.81	93.52	106.83	93.94	106.46	94.53	106.64

IV. CONCLUSION

The result of this work indicate that the rate of hydrolysis of Ethyl cinnamate decreasing trend at all temp which appear that depletion in rate of reaction with change in temperature and concentration is probably due to dielectric effect and partly due to salvation change to different degree in transition state of reaction. Decrease in value of activation energy with gradual increasing proportion of acetone indicates that initial state is desolveted and transition state is solvated. The number of water

molecule associated with Activated complex indicates the solvating power of acetone change the mechanism of reaction from bimolecular to unimolecular.

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