DEVELOPING AND EVALUATING A MULTIPLE-TASK ARABIC E-DICTIONARY FOR ARAB DEAF PERSONS

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Abstract-: Idea and motivation towards this research work have been created after publishing many papers in this domain (e-Learning and multimedia for hearing impaired persons) , for more details , kindly consider the related references. However the author accomplished those papers among the previous five years, but all of them deal with English script. The author tried since many years to develop such effective dictionary for Arab Deaf persons. Finally the author completed this dictionary . But still this dictionary is not traditional product. It is successfully works as an academic research work. Idea of research, Deaf person can submit any word individual or complete text to the dictionary,   the dictionary can translate the word into its corresponding sign language. However simultaneously the word under translation is displayed with different color , size and underlining . Thus the deaf person can trace process of translation . Besides effects on the word under process , the corresponding meaning in English language is displayed too. As research work the author tested the system on hundred words and sentences , they all work successfully. After completing some selected cases , the dictionary was tested by some experts who followed their valuable feedback. Finally conclusion show the benefit of this work on training and practicing on sign language as well as the importance of learning reading skills in English language. Sign language is only considered as mode of communication because lip movement is difficult in Arabic language not all words could be displayed through lip movement as well as the author did not find Arabic e-Lip movement vocabulary. About finger spelling same reason the author did not find Arab- finger spelling vocabulary. The author prepared round 3000 video cuts for sign language vocabulary. The author used only hundred for translating into their corresponding Arabic Script. Visual Basic with effective multimedia components have been used. The author displayed via this paper some selected case study of run-out screen and describe the needful details so as to explain the mechanism of the dictionary .

Key words : Arabic e-Dictionary , visual Multimedia , Sign language , deaf

I.   INTRODUCTION

According to the author's survey little work has been done on this specific area " e-Dictionary for Arab Deaf". About English sentences and words there are a lot of work. Arab deaf mostly communicate each other using sign language. Other modes of communication are rare used like finger spelling (one hand or two hands). Lip movement is also rare because Arab letters accent are not totally by lip movement. Thus the author concentrated his orientation towards sign language because sign language is universal round the world. The author prepared   3000 video cuts from the Indian dictionary . *The problem of this research could be summarized in many items , How could the author translate each cut in English manuscript into its corresponding Arabic manuscript , Also how could the author start translation from right sentence instead of left like English.* The author faced many difficulties to accomplish those tasks. If the author found an Arabic vocabulary the problems were solved easily. The big challenge here is how to develop the coding to mange those two tasks (translating and displaying the text under process from right) also the word in the sentence under translation process is displayed in different color bigger font size as well as underlining . The author succeeded in trail 100 Arabic words. This is limitation of this research work. To develop full dictionary you need to translate round 40000 words of Arabic into their corresponding meaning in English. In this paper six print-out screens of run forms have been explained with some required details. After completing the trial dictionary four   experts have tested it then feedback by them have been considered for conclusion.

II.   LITERATURE REVIEW

Two previous researches   were considered as related works but they deal with English script , according to the author survey , there is no related Arabic Dictionary at current time.

1- Hussein , Karim Q. & Al-Bayati , Maha A. "Visual Multimedia System Enhancing Spelling skills of English Reading for Deaf Students, supported by case study ″

This research aims at developing an e- spelling system via e-learning module (eLM) supported by multimedia technique of sign language and finger spelling. However the aimed system should enhance the hearing disability for the Deaf so he can enter his desired paragraph then the spelling process could be accomplished in two stages, the fist stage is the word spelling which translates each word into the corresponding sign language video clip. Then stopping message appears asking the Deaf to move to the second stage of translating. The second stage is the letter spelling which translates the current translated word (in sign language) into

finger spelling letter by letter in sequence. Both stages of spelling are controlled by the Deaf. After completing translation of that word into alphabets finger spelling (letter spelling), the next word would be translated into the corresponding sign language video clip. As final result it is expected that the Deaf can improve their skills in English reading when they practice, drill and repeat the translating and spelling process of various English sentences and words. One hand ASL (American Sign Language) alphabets is used for letter spelling and Indian Sign Language Dictionary is used for word spelling.

2 - Hussein , Karim Q. & Abo-Darwish , Muna & Al-Atiat , Khalid , "Evaluating an e-Dictionary for Hearing Impaired Persons Through Case Study (The Effective Role of Speech Visualization Multimedia)"

This paper presents an applied e-dictionary which translates online any text or paragraph into multiple modes of communication (sign language with lip movement and finger spelling). This e-dictionary would support Hearing Impaired (HI) persons to practice and improve their skills in sign language , lip movement as well as finger spelling (alphabets letter by letter in sequence). As result of such practicing and improvement of skills of communication, we expect real progress in their learning skills in instructional material. Also we expect improving their skills in the day-to-day life activities, communication forms the frame knowledge and experience of human. Therefore the decision of the authors is to develop such e-dictionary (analysis, design, coding and evaluation). Such stages ask for systematic research work by sequence steps so that the input of each stage leads to the output of next stage. To evaluate the dictionary a case study of real HI students used this dictionary, many sessions were held in school of deaf and dumb and a valuable feedback obtained from these experiments.

III. OBJECTIVE OF RESEARCH

This research work aims at :

1- Developing an Arabic e-Dictionary for Arab Deaf , However this Dictionary presents multiple jobs , translating Arabic sentence into its corresponding sign language work by word. Also displaying corresponding meaning of word under translation in English language. Visual Multimedia is strongly used by video cut for the word and manuscript of the word in Arabic and English.

2 - Evaluating the dictionary by valuable comments and feedback of experts to modify and improve the dictionary , some comments which are hard to realize in the current time , those would be considered as future work.

IV. IMPORTANCE OF RESEARCH *:*

Importance could be summarized into the following items
1- Little work has been done on this specific domain.
2- This dictionary could be used any time anywhere , it is important to the Deaf to practice day-to-day activities regarding sign language .
3 - The Deaf can enhance his reading skills of English language. Also he will improve his reading skills in Arabic language.

V. LIMITATIONS AND TOOLS OF RESEARCH :

Limitations and tools considered are :
1. Mode of communication with Deaf : sign language
2. Software : Visual Basic with multimedia components
3. No. of video cuts : 100 trial English with their corresponding manuscript in Arabic
4. Data Base : Data files coding via Visual Basic are used.
5. No. of experts : Four experts who trailed the dictionary
6. Tools of evaluation : Interview with experts individually has been used after testing the dictionary
7. Criteria of evaluation : Mostly concentrating on day-to-day activities and the friendly learning tools in the system.
8. Category of Deaf : Deaf who can hear but cant talk . Such deaf uses sign language mostly.
9. Indian Dictionary for Deaf : This Dictionary consists of five DVDs , produced by Ramakrisha Mission Vidyalya Coimbator , India . However the author separated it into 3000 individual video cuts using Video Cutter Software.

VI. PRESENTATION THE E-DICTIONARY :

The mechanism of dictionary and its stages of translation could be explained in the next five figures. The submitted sentence is :

"نحن نرى القمر في السماء"

Fig1. Shows the interface screen after the deaf submitted the Arabic sentence. This run-out form before translation process

Fig.2 displayed the word " نحن " the run-out of the form shows how it was translated into "we' the corresponding word in English.

Fig.3 displayed the word " نرى " . The word was translated into its corresponding English word "see"

Fig.4 displayed the word " القمر " . The word was translated into its corresponding English word "moon"

Fig.5 displayed the word " في " . The word was translated into its corresponding English word "in"

Fig.6 displayed the word " السماء " . The word was translated into its corresponding English word "sky"

Fig1. Explains the interface form as shown includes 8 objects. Form object , Text1 to submit the desired sentence , Text2 to display the corresponding meaning in English language for Arabic word under translation , label1to guide the Deaf student to submit the sentence , Picture1 which displays the video cut of sign language for word under translation , command1 to guide the deaf for next task of learning process , command2 to start translation process , command3 to start new sentence.

The deaf student is asked to submit the desired sentence in order to translate it into corresponding sign language video cut. When translating process the dictionary will start from right hand because it is Arabic script (word by word) . The word under translation is displayed in bigger size , underlined and different color so the deaf can recognize the word and trace the translation to whole script.

The next five figures show stages of translation , However the author captured the translation of sentence in each stage and make print-out screen to that stage.

The deaf submitted sentence for translation "نحن نرى القمر في السماء"

نحن نرى القمر في السماء

enter sentence for
translation⟶

next   start translate   start new text

Picture object
which displays
video cut

Text object
which displays
meaning of
Arabic word in
English

Label to guide
the student to
enter Arabic
sentence

Command to
quit
translation

Command to
start
translation
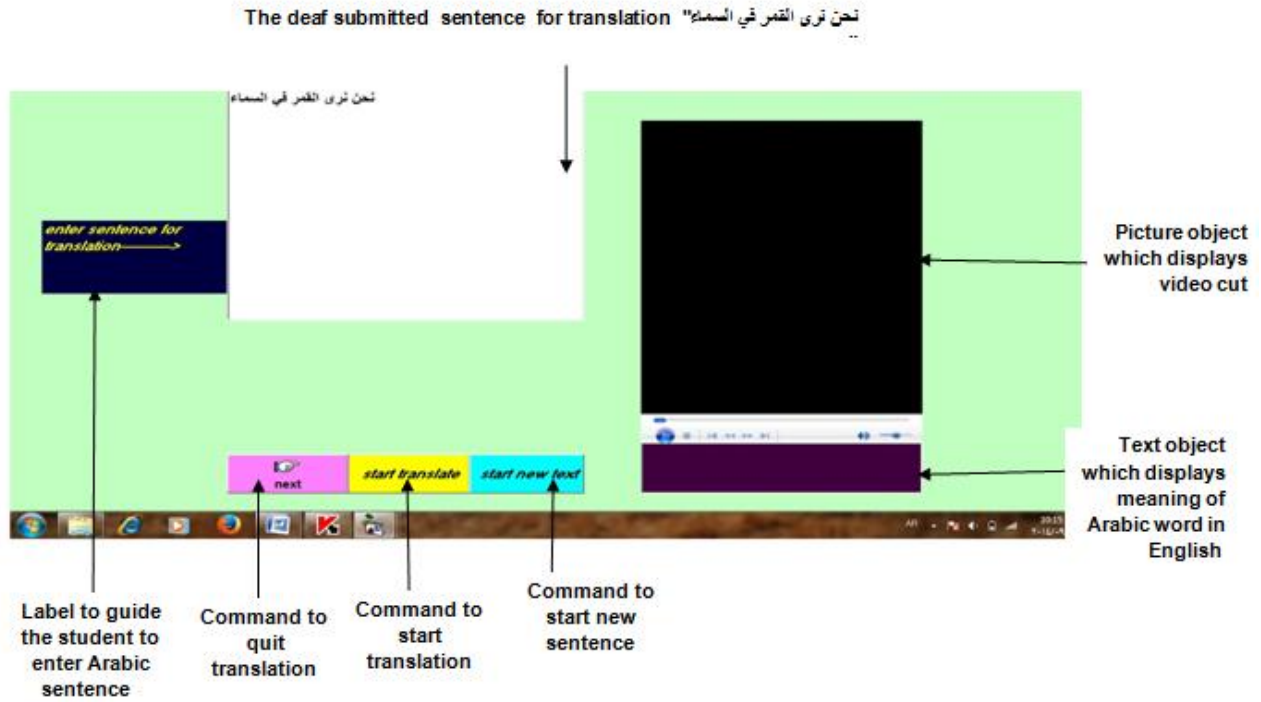
Command to
start new
sentence

Fig .1: Run-Out form after submission Arabic sentence before translation process

All the text is cleaned to be free from any word then words of sentence are displayed word by
word from right hand, the word " نحن " is displayed in red color , bigger size and underlining
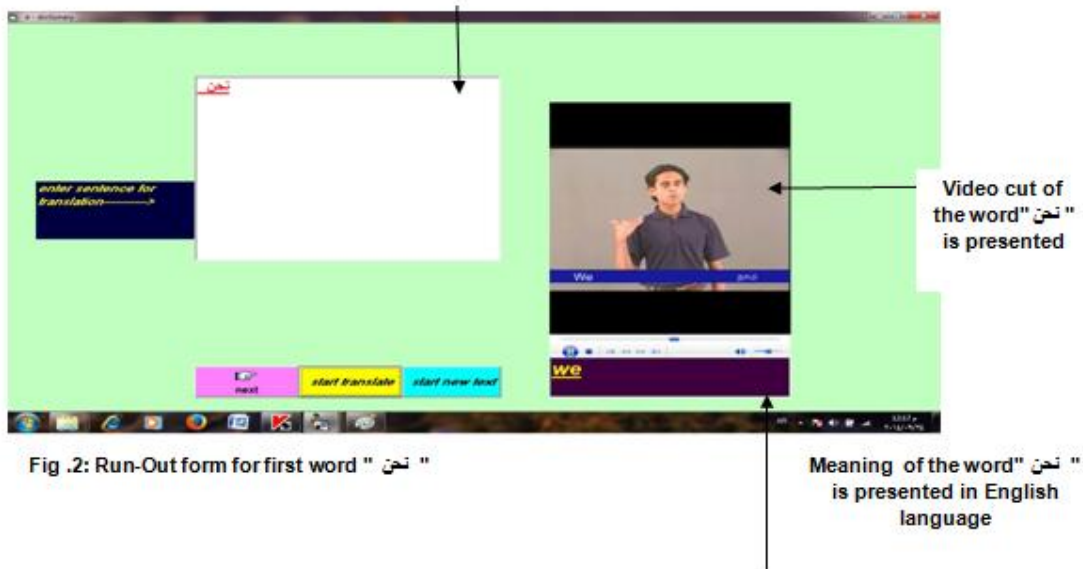
نحن

enter sentence for
translation⟶

next   start translate   start new text

we

Video cut of
the word" نحن "
is presented

Fig .2: Run-Out form for first word " نحن "

Meaning of the word" نحن "
is presented in English
language

Displaying the word" ترى " in red color, bigger size and underlining

Video cut of the word" ترى "

Meaning of the word" ترى " is presented in English language
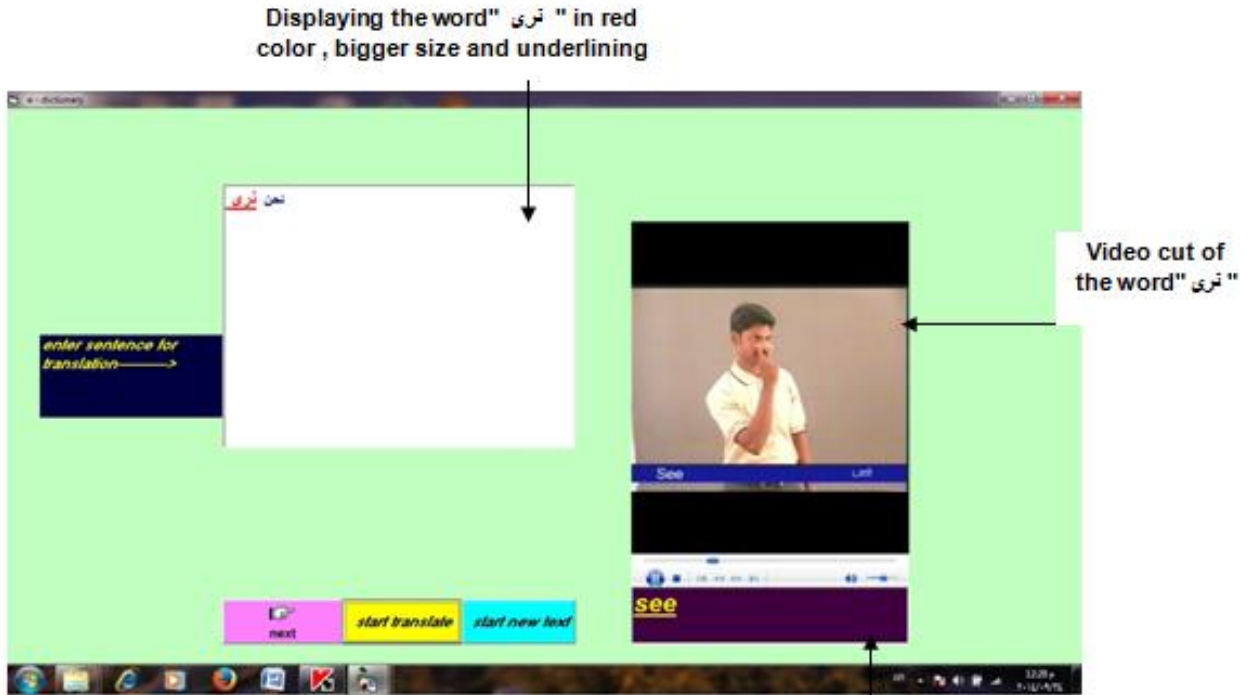
Fig .3: Run-Out form for second word " ترى "

The dictionary displays multiple tasks for translation first word by word in corresponding sign language second practicing on reading skills in English language however the author concentrated his system on facilities of tracing the word under translation in the sentence.
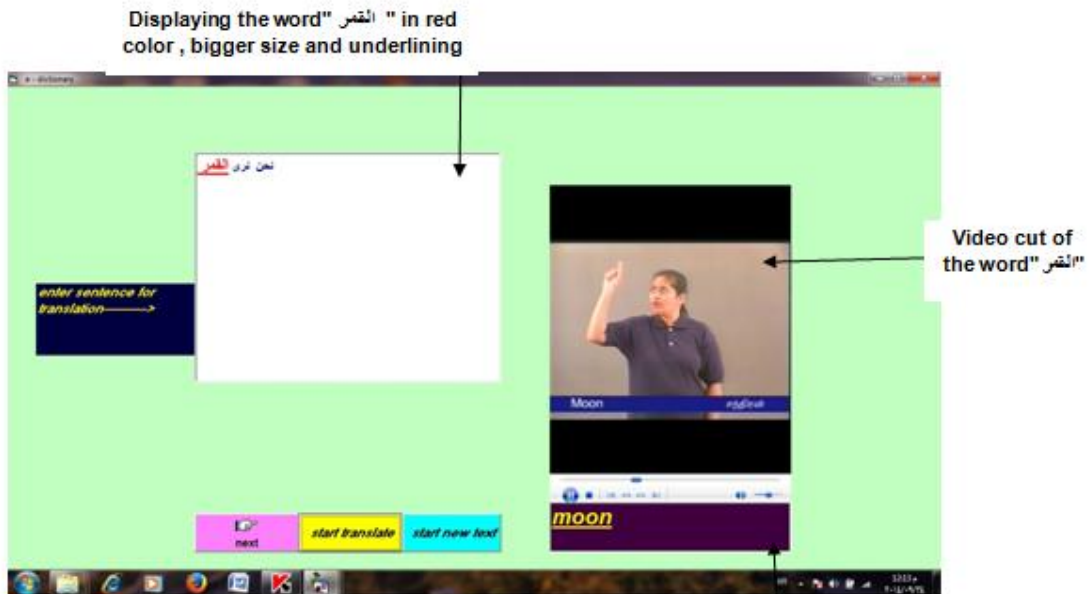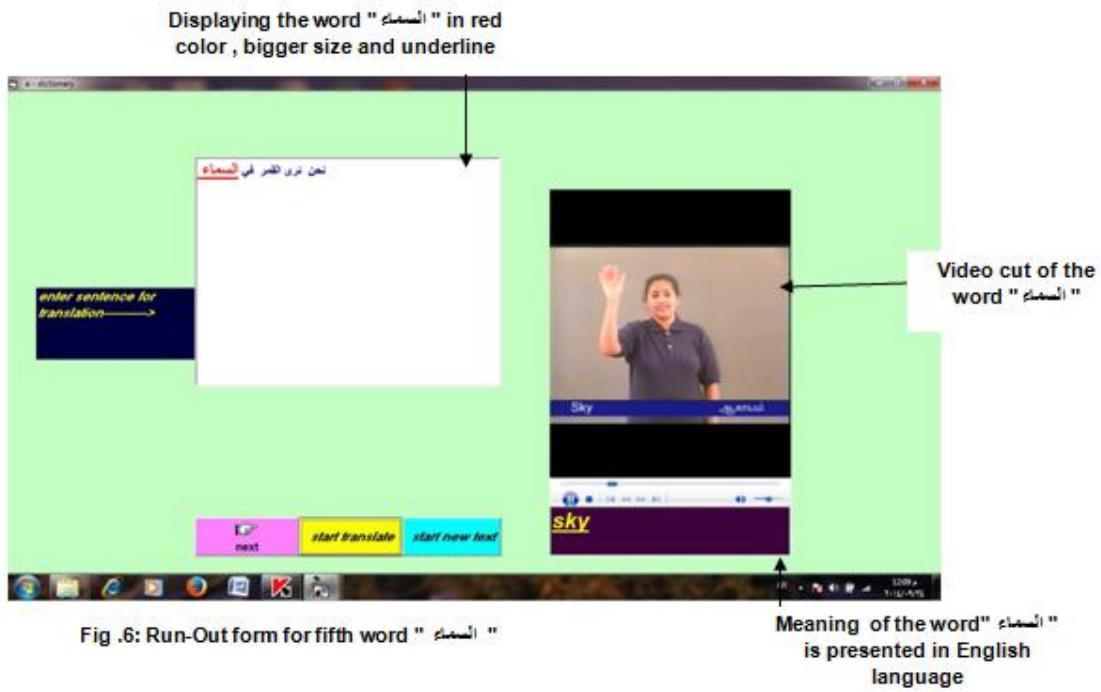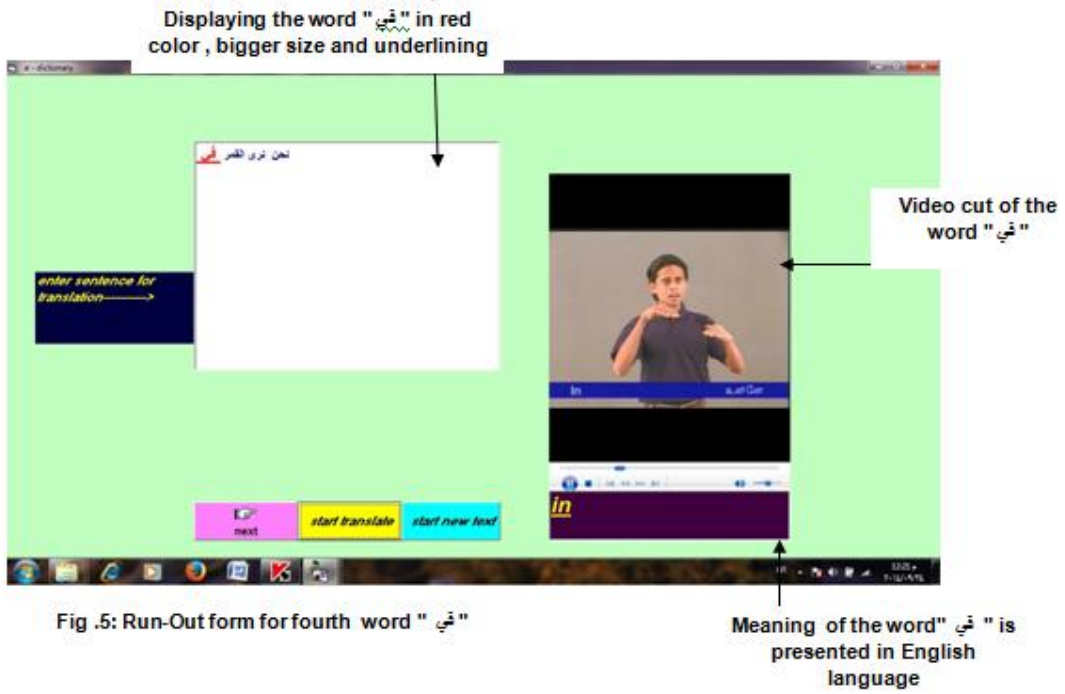

Displaying the word" القمر " in red color, bigger size and underlining

Video cut of the word" القمر "

Meaning of the word" القمر " is presented in English language

Fig .4: Run-Out form for third word " القمر "

Displaying the word " في " in red
color , bigger size and underlining

Video cut of the
word " في "

enter sentence for
translation——→

next | start translate | start new text

in

Fig .5: Run-Out form for fourth word " في "

Meaning of the word" في " is
presented in English
language

Displaying the word " السماء " in red
color , bigger size and underline

Video cut of the
word " السماء "

enter sentence for
translation——→

next | start translate | start new text

sky

Fig .6: Run-Out form for fifth word " السماء "

Meaning of the word" السماء "
is presented in English
language

VII.   RESULTS AND DISCUSSION   : Comments and feedback of experts could be summarized as shown:

i. Positive Comments   :
1. it is modern and friendly learning tool. The deaf can easily trace translation process by recognition of word under translation with different size and color as well as underlining.
2. Deaf can get benefit of translation not only practicing and training on sign language but improve his skills on English reading skills too.
3. The interface is simple and loading of system as well as translation run-time is quick . No delay in submission , translation process and quieting the dictionary.
4. The dictionary is well protected under any undesired access for coding and for the vocabulary.

ii. Negative Comments :
1. It is expected that Arab deaf person is in early stage like primary school . Thus all the interface gaudiness should be in simple images with little Arabic script. It hard for Arab deaf student to deal with completely English script objects. Simple Images or friendly cartoon pictures are typical for Deaf instated of English labels and commands.
2. Arabic language is wide and completely different than other language particularly in grammar therefore it is hard to develop this dictionary into traditional public usage. It sounds to great challenge.

iii.   Future work : some experts suggested many projects for future work like:
1. Developing Mobile   system for Arab deaf to communicate deaf persons as well as normal persons.
2. Develop communicate system via facebook to chat between Deaf persons with normal depending on sign language as major mode of communication.
3. Develop similar idea of dictionary for Blind persons using Arabic e-Brill keyboard.
4. Publishing this work after completing the valuably (not only 100 video cuts but covering thousands of cuts for Arab words) in the web to be free instructional website for Arab Deaf.
5. The Dictionary would process multiple modes of communication like one-hand finger spelling and two-hands finger spelling.

VIII.   CONCLUSION

Finally some selected conclusion would be presented   after completing and evaluating this e-dictionary.
1. As per comments of experts and idea of research it is expected that this dictionary is a friendly learning tool. It helps Arab deaf in training and practicing on day-to-day activities as well as learning skills for English language.
2. It is good technique to help the deaf in tracing process word by word.
3. According to the author survey , it is the first dictionary in such facility to translate Arabic sentences word by word into sign language video cut. Technique of displaying word under translation simultaneously with

the action of corresponding video cut with English meaning are all satisfactory and well considered.

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