TTS ARABIC

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TTS Arabic

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Chapter1

Introduction

1.1 Introduction

Language is among the mainly most important features that differentiate humans from other living creatures and speech is the key medium of language .
With the advent of digital electronic technology, the goal of developing machines that simulates human sounds has come closest to be achieved. It has to be said that no one has really succeeded in synthesizing a voice that is identical to a human voice. Meanwhile, speech synthesizers are now available which produce speech of a quality adequate for many applications.

Text-To-Speech Synthesizer System (TTS) is simply defined as written text transformed into speech; reading or dictating machines; the part of speech technology, which is concerned with automatically generating speech from a computer. Speech synthesizers used in TTS have been developed over the years as the memory resources become available and cheaper; as a result, large enhancements in the quality and the intelligibility of the synthesized speech have been achieved.

A TTS synthesizer System is a computer-based system that has the ability to read any text, whether it is directly introduced in the computer by an operator or scanned and submitted to an Optical Character Recognition (OCR) system. OCR is the process that allows the transformation of a string of phonetic/syllabic and symbols into an artificial signal, (i.e. the automatic production of speech, through a Grapheme-To-Phoneme transcription of the sentences to utter). Grapheme is the letters in a words' dictionary, while, Phoneme is the smallest unit of speech that differentiates one word from another.
TTS system includes mainly two parts: natural language processing and digital signal processing. The general block diagram of TTS system is shown in (figure 1)

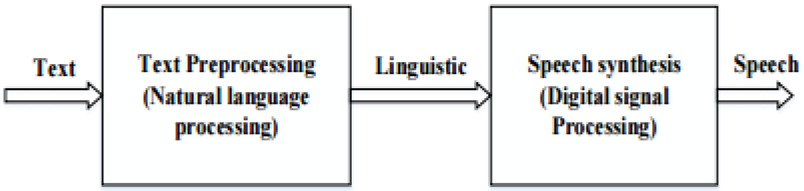

Text
Text Preprocessing (Natural language processing)
Linguistic
Speech synthesis (Digital signal Processing)
Speech

***Figure1** .General block diagram of Text to speech (TTS)*

Figure 1.1

The TTS technology is becoming inevitable in some businesses that need to provide for their customers with the latest and fundamental information in real time
Converting fundamental data stored in Web sites, databases and files into human voice using the traditional expensive and time-consuming human recordings is becoming a hard.

Arabic is a complex language and it is not like other languages, those languages written in Latin script have vowels, while the Arabic language has special characters called “diacritics” (التشكيل). These diacritics give the Arabic words the correct meaning within a sentence. For example, two Arabic words have different meaning can be written the same and only the diacritics can help the reader to distinguish them. Such as, the word “مدرسة” is for example, pronounced differently in **" سَلِمْتُ عَلَى الْمُدَرِّسَةِ"** meaning “I greeted my teacher” and in the other sentence
"ذَهَبْتِ الى الْمَدْرَسَةَ" meaning “I went to school”. This depends on diacritics.

1.2. Motivation

The motivation behind building and developing such a system is that the TTS interface can improve the user’s experience on a desktop. It is more relaxing to listen instead of reading large portions of text. It is good for the blind, slow readers, and less straining for the eyes. Arabic TTS Synthesizer System brings benefits especially in the educational field. It assists the research, data collecting and text analyzing. It is very useful for the students, educators, and language researchers. It provides them with an effective way of knowing how to pronounce the words. The following are benefits of the Arabic TTS Synthesizer System:

1. Easy to use – intuitive: Arabic TTS Synthesizer System interface will be designed to be intuitive and easy to use.
2. Efficient: Arabic TTS Synthesizer System reduces costs and increases efficiency.
3. Arabic TTS Synthesizer System will help users to learn Arabic language
4. Provides accessibility: Over the Web and over the phone.
5. Offers adaptability and flexibility: Any time, anywhere.

1.3 Problem definition

Information and communication technology(ICT) is rapidly evolving as an effective tool for making information widespread and available online to several communities . The increased use of information technology is enabling people across the world to participate in the knowledge network; however, people in some developing countries are being deprived of the benefits of the use of ICT and the computer system. One of the main reasons for this is the lack of suitable human computer interface for disabled people and the software designed and developed to meet their needs. To design and develop a computer interface for a person who can not see what computer displays, is the most challenging task for many software developers.

TTS Synthesizer Systems converts the written input to spoken output by automatically generating synthetic or computer generated speech. Typed text is converted into speech using various algorithms such as formant synthesis, concatenative synthesis or Articulatory synthesis.

As the system being developed, it cannot avoid from having a problem. Primarily, there are problems that are actually faced by the people who develop the program as to make the program works efficiency and fulfills the users requirements. discusses the major problems that will be rose during the development of the system starting from the stage of designing the system until the stage where it is being implemented and tested.
The problem area in speech synthesis is very extensive. There are quite a few problems in text pre-processing, such as numerals, abbreviations, punctuation. Moreover, the pronunciation of written text is a major problem nowadays as well. For example, when concerning the Arabic words that cannot be translated the same into other languages.

Speech synthesis has been found also more difficult with female and child voices. Female voice has a pitch almost twice as high as with male voice and with children it may be even three times as high

1.3.1 Text-to-Phonetic Conversion

The first task faced by any TTS system is the conversion of input text into linguistic representation, usually called text-to-phonetic or grapheme-to-phoneme conversion. The difficulty of conversion is highly language includes many problems. In some languages, the conversion is quite simple because written text almost corresponds to its pronunciation. For Arabic and most of other languages the conversion is much complicated. A very large set of different rules and their exceptions is needed to produce correct pronunciation for synthesized speech

Natural language processing contains three steps. They are text analysis, phonetic analysis and prosodic analysis. The text analysis includes segmentation (the input sentence is segmented into token), text normalization, and part of speech (POS) tagger. Phonetic conversion is to assign phonetic transcription to each word and it is a Dictionary based approach. There are two approaches in phonetic conversion. They are rule based and dictionary based approaches. Rule based is applied for unknown words whereas dictionary based is used for known words. Prosodic analysis is to determine intonation, amplitude and duration modeling of speech. It describes speaker‘s emotion.

Text preprocessing is usually a very complex task and includes several language dependent problems. Digits and numerals must be expanded into full words. For example in Arabic, numeral 243 would be expanded as meaning two-hundreds and forty three. Fractions and dates are also problematic. 2/3 would be expanded as meaning (ثلثان) or (الثانى من مارس) in case if it is a date . Abbreviations may be expanded into full words, pronounced as written or pronounced letter-by-letter. There are also some contextual problems. For example, can be pronounced either as, كجم meaning kilogram(كيلوجرام) or as meaning kilograms depending on preceding number; yet another example .د as, Dr.(دكتور) meaning Doctor and as, الخ meaning etcetera(الى اخره).

Special characters and symbols, such as #, %, &, *, (,), -, /, <, >, [,]) are generally spoken as at symbol, cause also special kind of problems. In some situations, the word order must be changed. For example, $71.55 must be expanded as meaning "واحد وسبعون دولاراً جنيه وخمسون سنتاً"

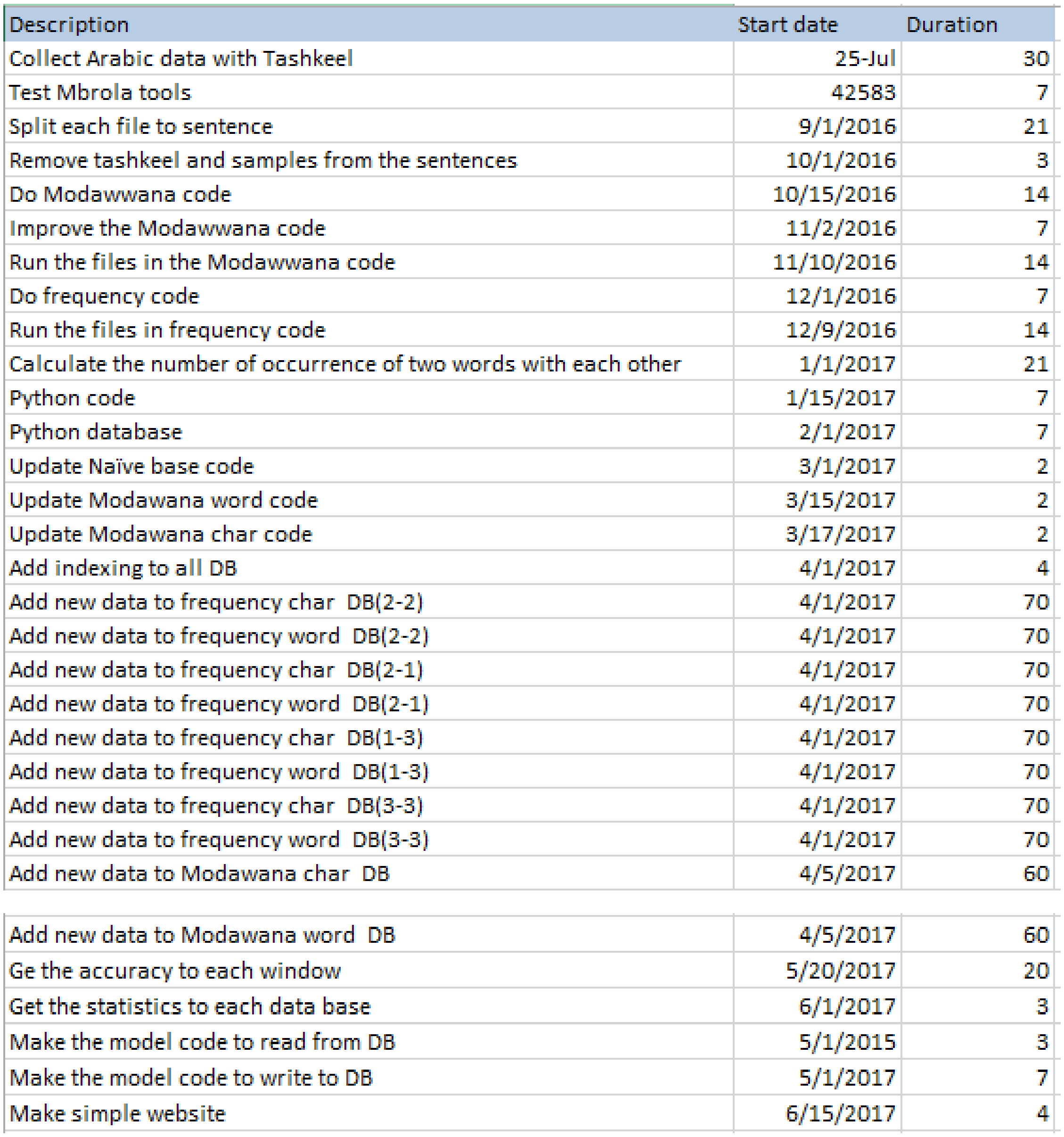
The second task faced by any text-to-speech synthesizer system is to find correct pronunciation for different contexts in the text.
Some words, called homographs, cause maybe the most difficult problems in TTS systems. Homographs are spelled the same way but they differ in meaning and usually in pronunciation .The word " ذهب" is for example pronounced differently in sentences "ذَهَّبَ الطَّالِبُ الى الْمَدْرَسَةَ. " meaning "the boy went to the school" and "اِشْتَرَتْ أُمى ذَهْبٌ." meaning "my mother bought gold".

The pronunciation of a certain word may also be different due to contextual effects. Some sounds may also be either voiced or unvoiced in different context. For example, phoneme /س/ in word " الصراط in " اهْدِنَا الصِّرَاطَ الْمُسْتَقِيمَ " meaning "path" the character "ص" is voiced as "س", but unvoiced in word " المستقيم" meaning "straight".

1.4 Suggested solution

Study the diacritization system(نظام التشكيل) in Arabic text and hence build a system that would be able to diacritize Arabic text automatically. Such a system can be integrated into other systems such as text-to-speech and speech-to-text systems.

1.5 Gannet chart for the project time plan



Description	Start date	Duration
Collect Arabic data with Tashkeel	25-Jul	30
Test Mbrola tools	42583	7
Split each file to sentence	9/1/2016	21
Remove tashkeel and samples from the sentences	10/1/2016	3
Do Modawwana code	10/15/2016	14
Improve the Modawwana code	11/2/2016	7
Run the files in the Modawwana code	11/10/2016	14
Do frequency code	12/1/2016	7
Run the files in frequency code	12/9/2016	14
Calculate the number of occurrence of two words with each other	1/1/2017	21
Python code	1/15/2017	7
Python database	2/1/2017	7
Update Naïve base code	3/1/2017	2
Update Modawana word code	3/15/2017	2
Update Modawana char code	3/17/2017	2
Add indexing to all DB	4/1/2017	4
Add new data to frequency char DB(2-2)	4/1/2017	70
Add new data to frequency word DB(2-2)	4/1/2017	70
Add new data to frequency char DB(2-1)	4/1/2017	70
Add new data to frequency word DB(2-1)	4/1/2017	70
Add new data to frequency char DB(1-3)	4/1/2017	70
Add new data to frequency word DB(1-3)	4/1/2017	70
Add new data to frequency char DB(3-3)	4/1/2017	70
Add new data to frequency word DB(3-3)	4/1/2017	70
Add new data to Modawana char DB	4/5/2017	60
Add new data to Modawana word DB	4/5/2017	60
Ge the accuracy to each window	5/20/2017	20
Get the statistics to each data base	6/1/2017	3
Make the model code to read from DB	5/1/2015	3
Make the model code to write to DB	5/1/2017	7
Make simple website	6/15/2017	4

table 1.5(a) Gannet chart table for project time plan

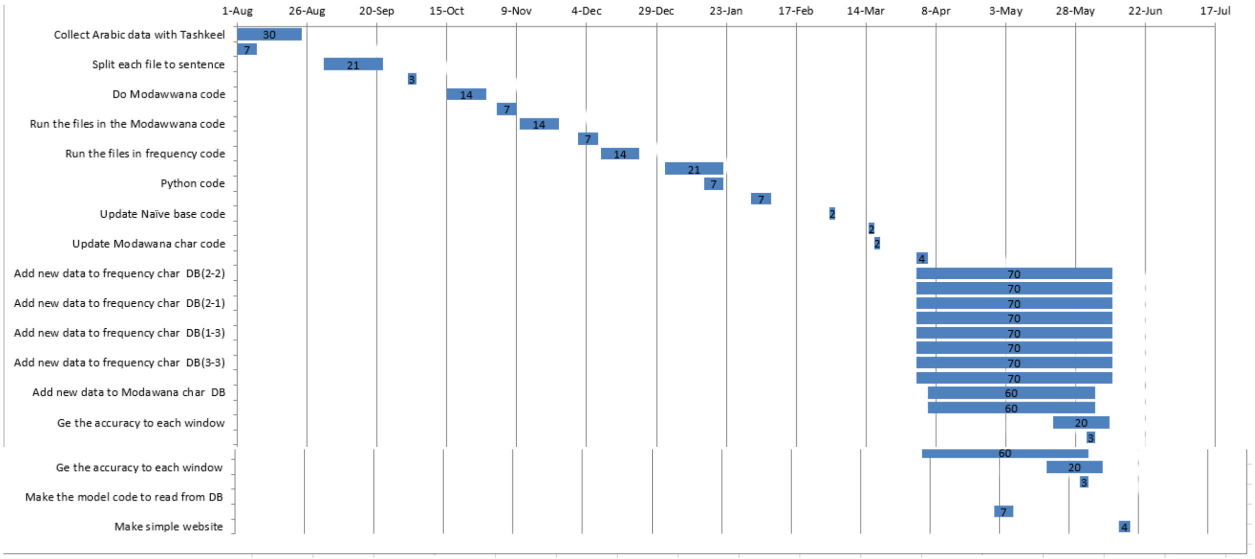


Figure 1.5(b) Gannet chart for project time plan

1.6 Project development methodology

Supervised Machine Learning

The majority of practical machine learning uses supervised learning. And we use it too in our project. Supervised learning is where you have input variables (x) and an output variable (Y) and you use an algorithm to learn the mapping function from the input to the output.

$$Y = f(X)$$

The goal is to approximate the mapping function so well that when you have new input data (x) that you can predict the output variables (Y) for that data.

It is called supervised learning because the process of an algorithm learning from the training dataset can be thought of as a teacher supervising the learning process. We know the correct answers, the algorithm iteratively makes predictions on the training data and is corrected by the teacher. Learning stops when the algorithm achieves an acceptable level of performance.

Supervised learning problems can be further grouped into regression and classification Problems.

- **Classification**: A classification problem is when the output variable is a category, such as “red” or “blue” or “disease” and “no disease”.
- **Regression**: A regression problem is when the output variable is a real value, such as “dollars” or “weight”.

Some common types of problems built on top of classification and regression include recommendation and time series prediction respectively.

Some popular examples of supervised machine learning algorithms are:

- Linear regression for regression problems.
- Random forest for classification and regression problems.
- Support vector machines for classification problems.

NBC

Naive Bayes is a simple technique for constructing classifiers: models that assign class labels to problem instances, represented as vectors of feature values, where the class labels are drawn from some finite set. It is not a single algorithm for training such classifiers, but a family of algorithms based on a common principle: all naive Bayes classifiers assume that the value of a particular feature is independent of the value of any other feature, given the class variable.

For example, a fruit may be considered to be an apple if it is red, round, and about 10 cm in diameter. A naive Bayes classifier considers each of these features to contribute independently to the probability that this fruit is an apple, regardless of any possible correlations between the color, roundness, and diameter features

1.7 Used tools

Software:

- المكتبة الشاملة website(for collecting data)
- MS word (for splitting large files to small files)
- Eclipse
- MySQL workbench
- PHPMyadmin
- Languages
    - Java
    - Python
    - MySQL
    - cherrpy framwork
    - Html/css

Hardware:

- laptops

1.8 Report organization

Chapter 2 :

Chapter 2 will discuss the related work of our project, which includes

(“ARABTALK” , “Cimos French Company” ,”Aramedia company” ,”Sakhr TTS”, ”MBROLA”, ”ACAPELA”)

In addition, will give a brief introduction about each of them.

Chapter 3:

Chapter 3 will discuss

1. Functional and nonfunctional requirements of each program we made.

2. Will show some UML diagrams
    a. Use Case Diagram
    b. Sequence Diagram
3. Will show some test cases for our project in the form of input ⇒ PROGRAM ⇒ output

Chapter 4 :

Chapter 4 will discuss 2 major things .

1. ERD for each program .
2. Will be snapshots of the GUI used in the system that show how you will use it and some functionality.

Chapter2

Related Works

There is some of the commercial TTS Synthesis Systems available today.
More than 28 TTS Synthesizer Systems currently existing in the market.

ARABTALK

The ARABTALK TTS Synthesis System was developed at Research ad Development International (RDI), for Arabic language. ARABTALK is a state-of-the-art corpus based concatenative TTS System. The system uses Artificial Neural Networks (ANN) statistical prosody based models.
In addition, it has a real time synthesis by selection algorithm to explore large speech corpus. ARABTALK has a Hidden Markov models (HMMs) based procedure to automatically time-align new voices transcriptions to their acoustic phoneme boundaries.
The RDI Product is based on morphological analysis (التحليل الصرفى)

The speed of automatic diacritics for arabic text reaches to 100 words/sec and memory of 64 MB and runs on Microsoft's Windows system.

The Automated diacritics accuracy is more than 95% measured at the level of words.

http://www.rdi-eg.com/

Cimos French Company

This company produced system for automated formation of the Arabic text, have been buying this program and testing them. The correct formation ratio is equal to almost 70% at the level of the word and protect it, as it does not allow using it in more than one device.

This program add the diacritics to Arabic text, and it is on three copies

First one works on computer device, second one cooperate with another systems through API and third one connected to the server to work on a world network.

http://www.cimos.com/

Aramedia company (Diacritizer)

It has developed the formation of a system where it seems the fastest and most accurate (according to the producing company) since the formation at high speed and accuracy up to 98% and gives the option of forming end of words (اعراب نهاية الكلام او عدمه) or not. This system is part of the office software tools "صخر" Office Tools http://www.sakhr.com

https://www.aramedia.com/diacritizer.htm

Sakhr TTS

Sakhr TTS engine converts any Arabic/English text into a human voice. Sakhr has been focusing in the last 5 years on creating an Arabic TTS engine that can match in its quality the human voice.

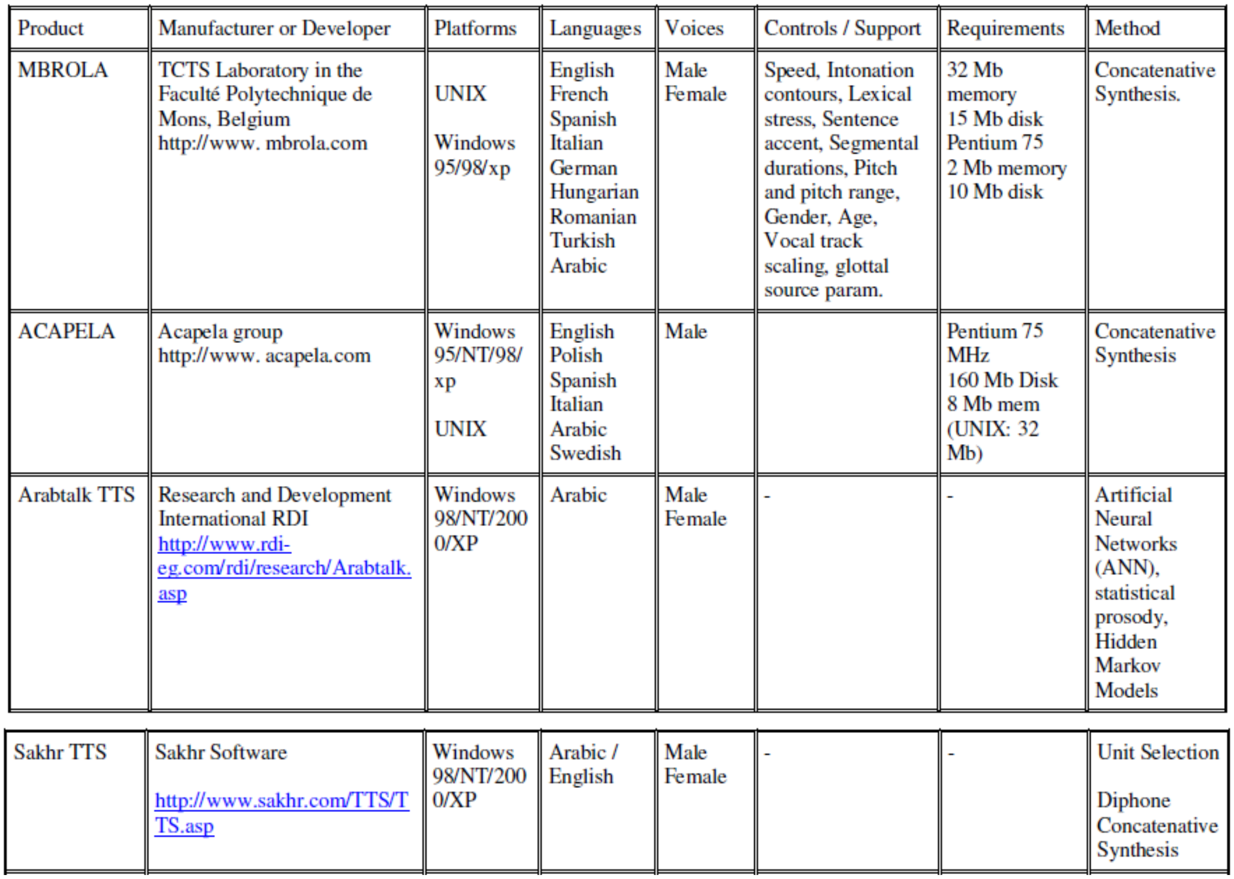
Sakhr developed the Diacritizer engine .This engine can put the diacritics needed in Arabic texts automatically. The Diacritizer is the main component in Arabic TTS. Without the Diacritizer, the output quality of the TTS engine would be inaccurate and not clear. Since Arabic native speakers write Arabic text without diacritics, the TTS engine should handle the non-diacritized text. The Diacritizer will convert the non-diacritized text into a diacritized text and then the TTS engine will convert it to a clear and human Arabic voice. Moreover, Text-To-Speech technology Software Development Kit (SDK) converts any computer readable text into a human sounding synthetic speech. Arabic is at least one order of magnitude difficult than other common languages due to the lack of diacritics.

MBROLA – PROJECT

MBROLA-project is one of the main systems that have an Arabic voice.
The main goal of the project is to have a speech synthesis for as many
languages as possible. MBROLA is used for non-commercial purposes. Another purpose with it is to increase the academic research, especially in prosody generation(علوم نحوية).
The MBROLA speech synthesizer is based on diphone concatenation.
The diphone databases are currently available for English, Arabic Brazilian Portuguese, Dutch, French, German, Romanian, Spanish, Greek, Turkish,.etc.
Some of these languages exist with male and female voice (MBROLA).

ACAPELA – GROUP

Acapela group constitutes all speech technologies that have been developed over the last 20 years. Speech synthesis and speech recognition have been created and improved by Acapela. Acapela Group evolves from the strategic combination of three major European companies in vocal technologies: "Babel Technologies" created in Mons, Belgium, "Infovox" created in Stockholm, Sweden and "Elan Speech" created in Toulouse, France. Acapela owns currently three technologies, TTS by diphone, TTS by Unit Selection and Automatic Speech Recognition. Acapela is currently available for US English, UK English, Arabic, Belgian Dutch, Dutch, French, German, Italian, Polish, Spanish and Swedish.



Product	Manufacturer or Developer	Platforms	Languages	Voices	Controls / Support	Requirements	Method
MBROLA	TCTS Laboratory in the Faculté Polytechnique de Mons, Belgium http://www. mbrola.com	UNIX Windows 95/98/xp	English French Spanish Italian German Hungarian Romanian Turkish Arabic	Male Female	Speed, Intonation contours, Lexical stress, Sentence accent, Segmental durations, Pitch and pitch range, Gender, Age, Vocal track scaling, glottal source param.	32 Mb memory 15 Mb disk Pentium 75 2 Mb memory 10 Mb disk	Concatenative Synthesis.
ACAPELA	Acapela group http://www. acapela.com	Windows 95/NT/98/ xp UNIX	English Polish Spanish Italian Arabic Swedish	Male		Pentium 75 MHz 160 Mb Disk 8 Mb mem (UNIX: 32 Mb)	Concatenative Synthesis
Arabtalk TTS	Research and Development International RDI http://www.rdi-eg.com/rdi/research/Arabtalk.asp	Windows 98/NT/2000/XP	Arabic	Male Female	-	-	Artificial Neural Networks (ANN), statistical prosody, Hidden Markov Models
Sakhr TTS	Sakhr Software http://www.sakhr.com/TTS/TTS.asp	Windows 98/NT/2000/XP	Arabic / English	Male Female	-	-	Unit Selection Diphone Concatenative Synthesis

Table 2.1 Summary of Text-To-Speech Existing Products

Chapter3

System Analysis

3.1 Project specification

3.1.1 Functional Requirements:

Functional for Tekrar code:

1. The system should remove Tashkeel from words.
2. The system should remove samples from words.
3. The system should read file and splits the file into words.
4. The system should connect to Mysql Database.
5. The system should select all elements from the table of the character we use.
6. The system should identify the word is new if the word does not be in the selected data from database.
7. The system should identify the word is updated if the word is in the selected data and update its counter.
8. The system should identify the word is old if it’s not modified.
9. The system should insert the data back to the database based on tags.
10. The system should work on (n var) window size left and right.
11. The system should make key of the hash map word1&word2
12. The system should add the key of the hash map to database if it’s not in the selected data.
13. The system should update the counter if it’s exists in the selected data.
14. The system should run on each character to insert its data in the associated table.

Functional for modowana code:

1. The system should remove Tashkeel from words.
2. The system should remove samples from words.
3. The system should read file and splits the file into words.
4. The system should connect to Mysql Database.
5. The system should select all elements from the table of the character we use.
6. The system should identify the word is new if the word does not be in the selected data from database.

7. The system should identify the word is updated if the word is in the selected data and update its counter.
8. The system should identify the word is old if it’s not modified.
9. The system should insert the data back to the database based on tags.
10. The system should add a word in primary table if it’s new and it’s (مشكلة) version in secondary.

Functional:

1. The system should implement Naive Bayes Algorithm.
2. The system should connect to 2 databases (Modawana & gpFrequency)
3. The system should get the id for specific word in primary table.
4. The system should get all words associated to a certain id from secondary table.
5. The system should get the number of times 2 words repeated.
6. The system should remove samples from words.
7. The system should remove tashkeel from words.

3.1.2 Non-Functional Requirements

Non-Functional for Tekrar code:

1. The data should be Average 600,000 words.
2. Selection of data from database should be less than 10 seconds.
3. Execution of the whole program should be less than 24 hours.
4. Database should be Mysql.
5. This program should be in java.
6. Program will run properly if word is in the database or not.

Non-Functional for modowana:

1. Selection of data from database should be less than 10 seconds.
2. Execution of the whole program should be less than 24 hours.
3. Database should be Mysql.
4. This program should be in java.
5. Program will run properly if word is in the database or not.

3.2 Use Cases Diagrams

3.2.1 Modwanna system(words and characters)

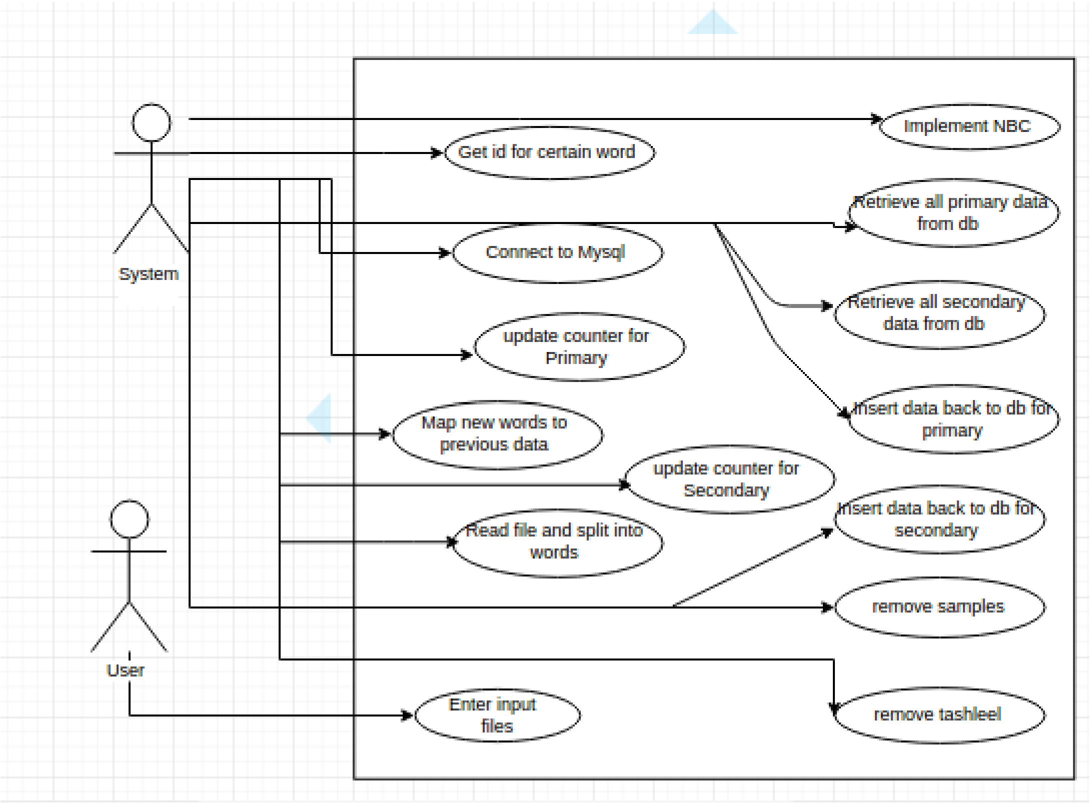

System
User
Implement NBC
Get id for certain word
Retrieve all primary data from db
Connect to Mysql
Retrieve all secondary data from db
update counter for Primary
Insert data back to db for primary
Map new words to previous data
update counter for Secondary
Insert data back to db for secondary
Read file and split into words
remove samples
Enter input files
remove tashleel

Figure 3.1(a) Use case for modwanna system

3.2.2 Frequency system (words and characters)

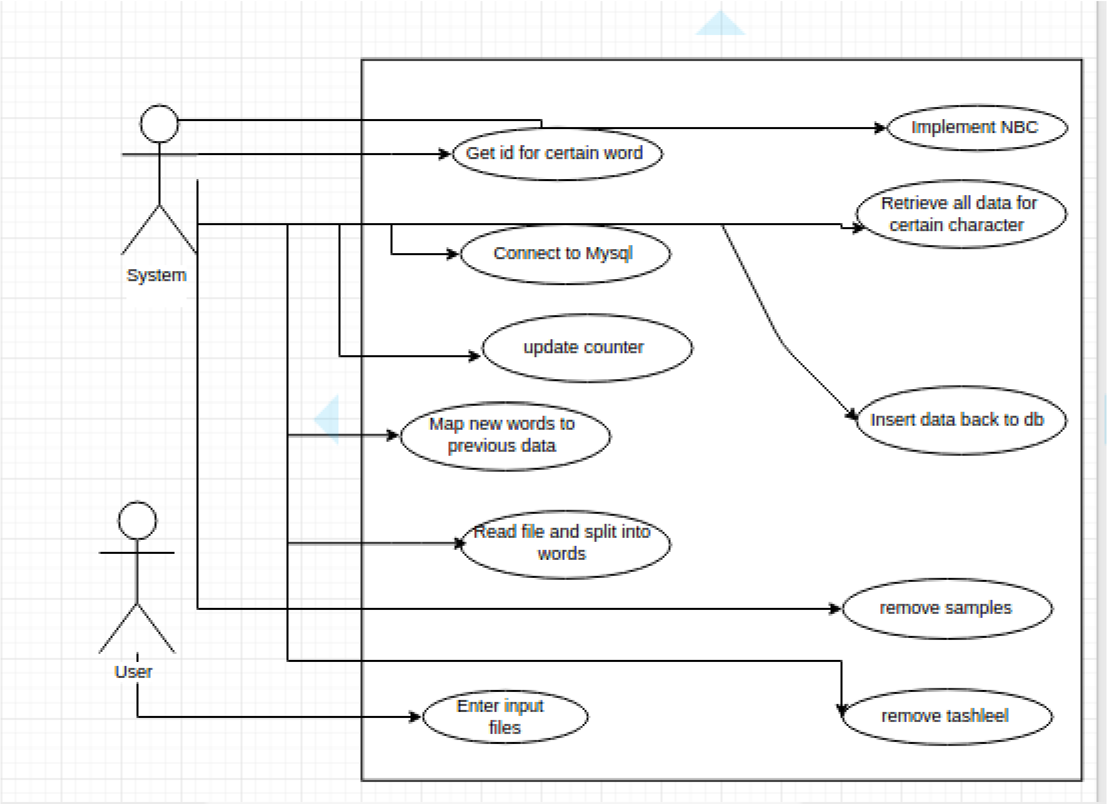


Figure 3.1(b) Use case for frequency system

3.2.3 Machine learning system

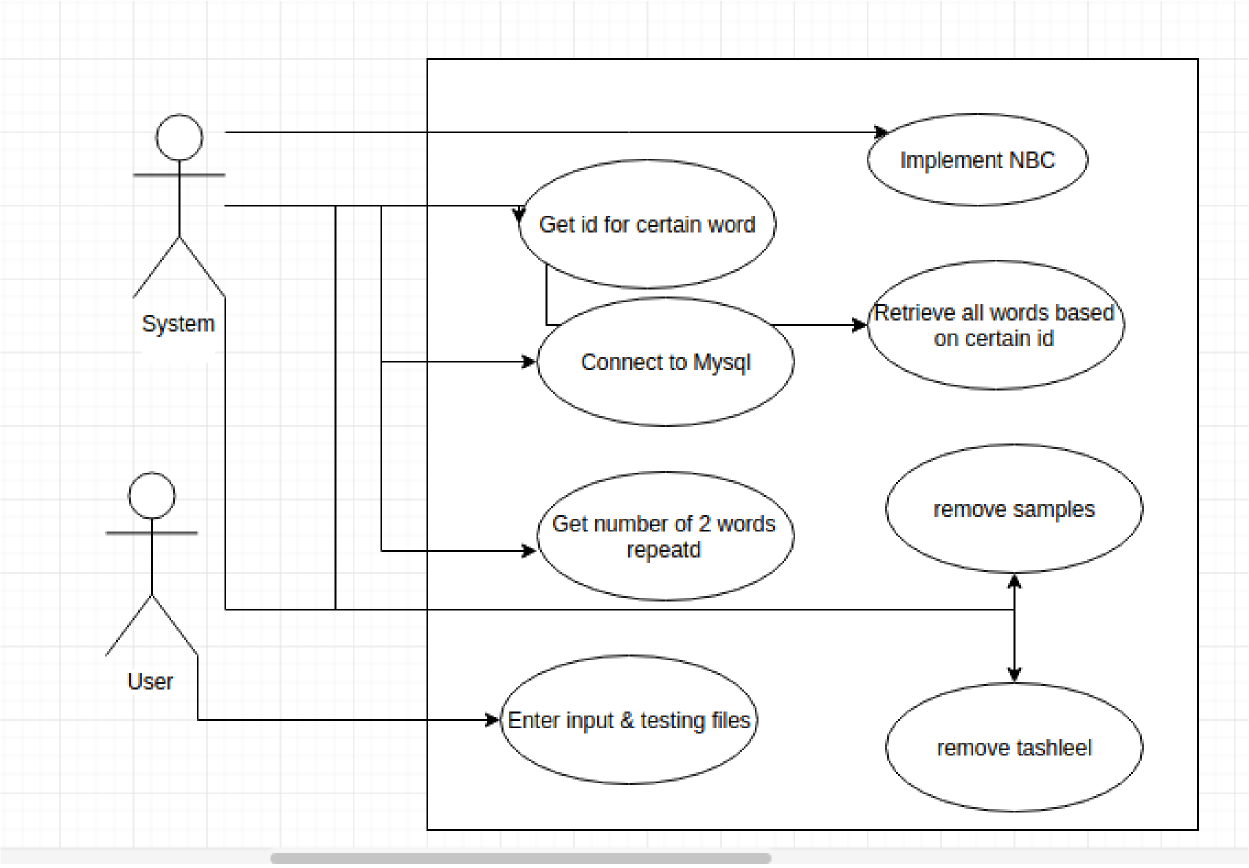

System
User
Implement NBC
Get id for certain word
Retrieve all words based on certain id
Connect to Mysql
remove samples
Get number of 2 words repeatd
Enter input & testing files
remove tashleel

Figure 3.1(c) Use case for Machine learning

3.3 Sequence Diagrams

Frequency Characters

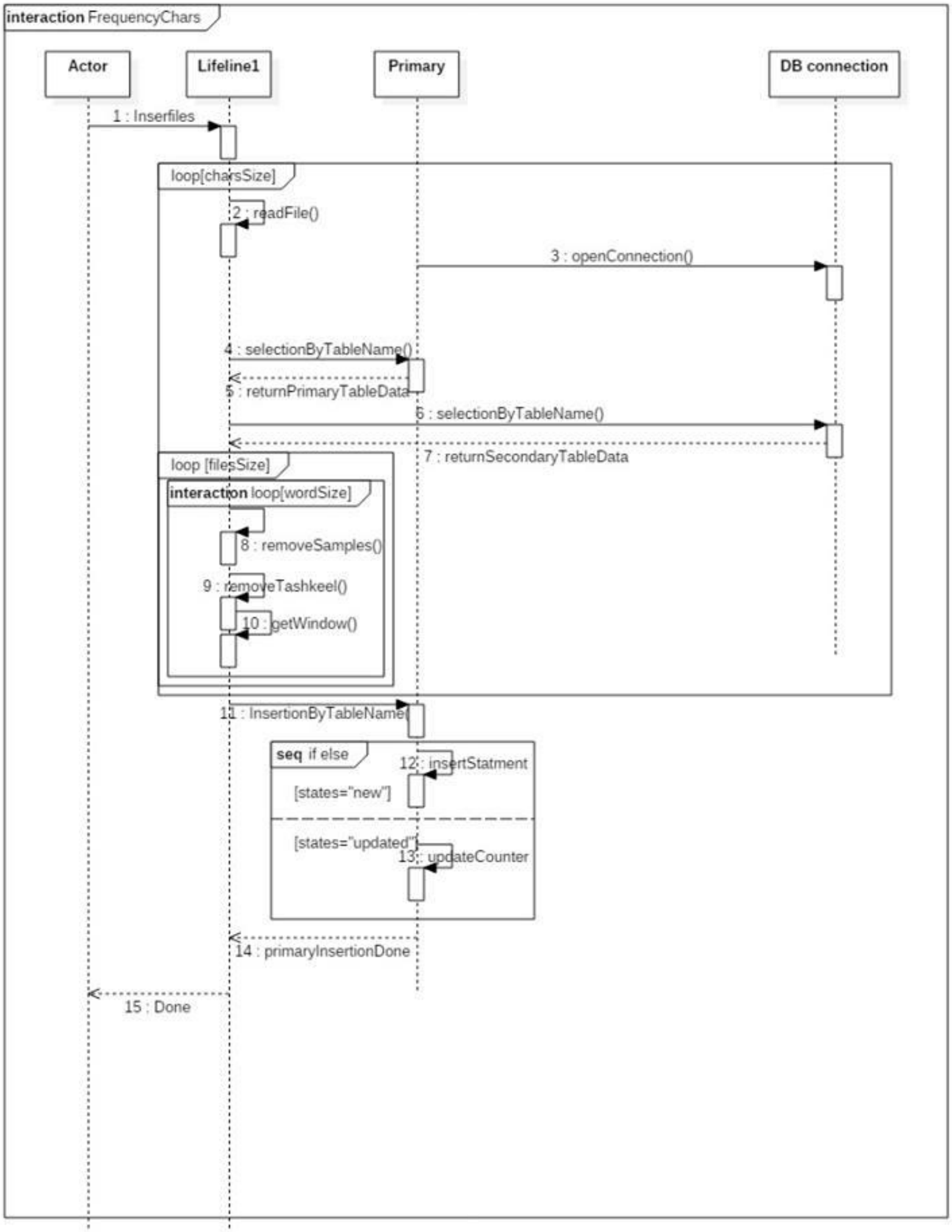


Figure 3.3(a) sequence diagram for frequency character system

Frequency Words

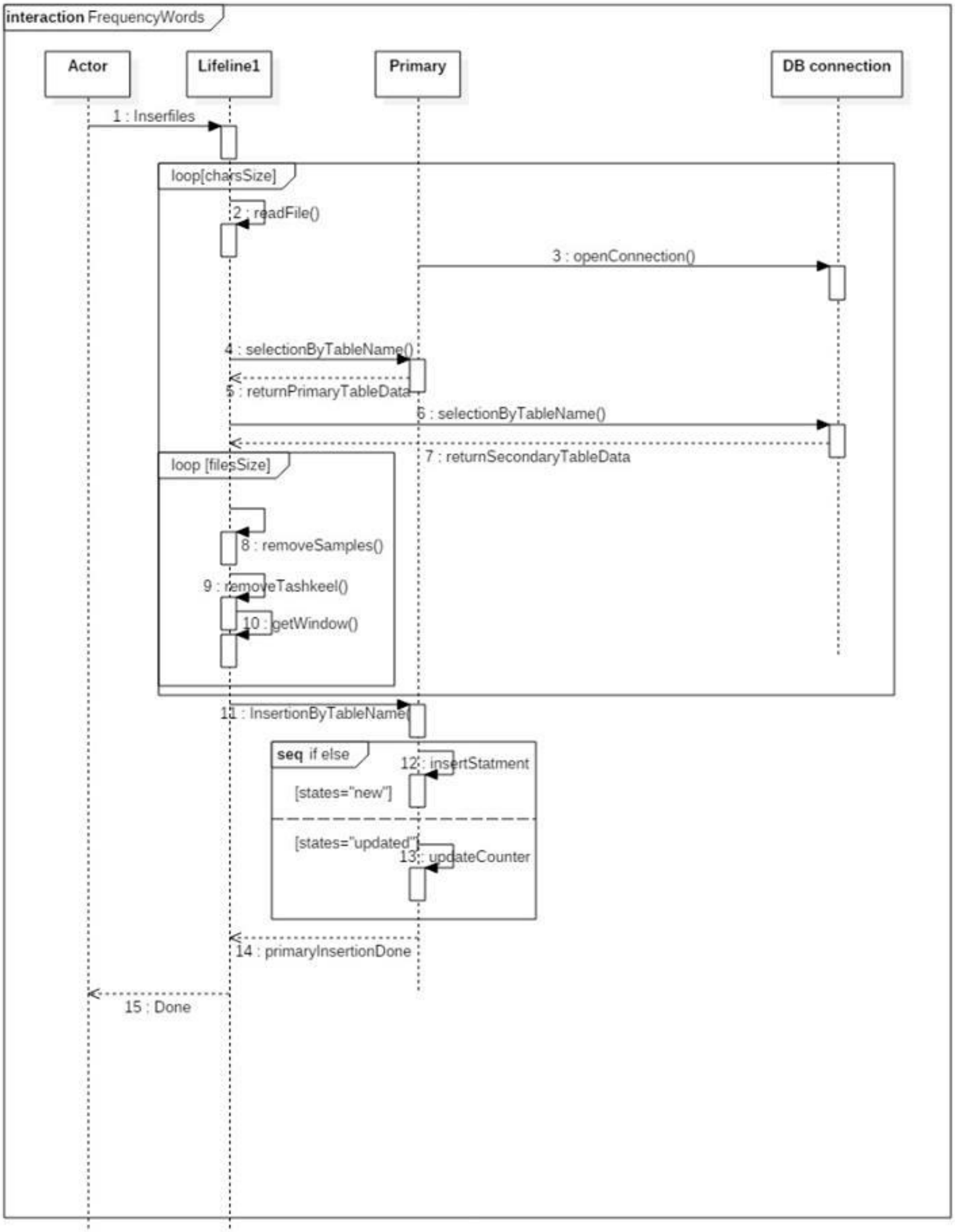


Figure 3.3(b) sequence diagram for frequency words system

Modwanna Characters

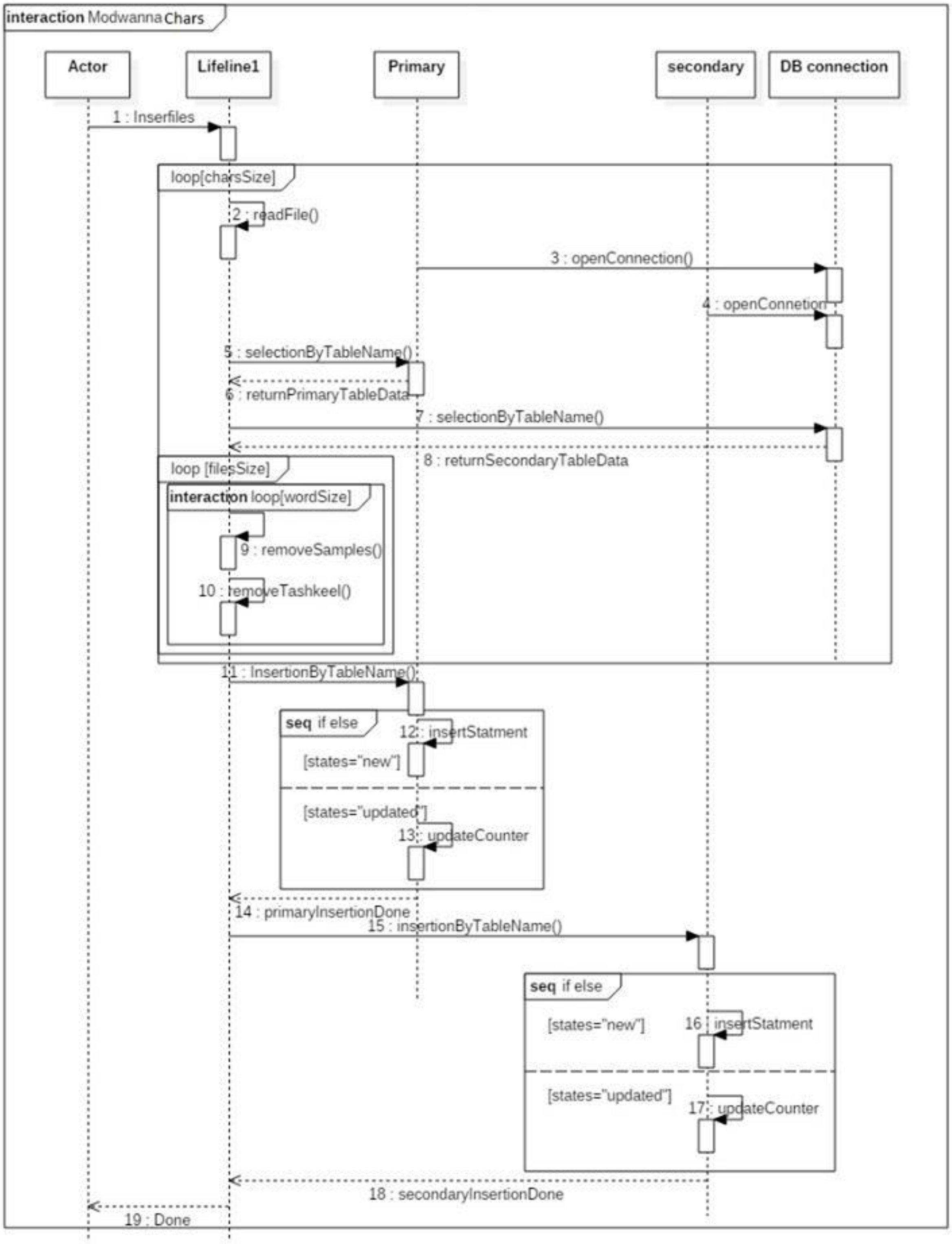


Figure 3.3(c) sequence diagram for modwanna character system

Modwanna Words

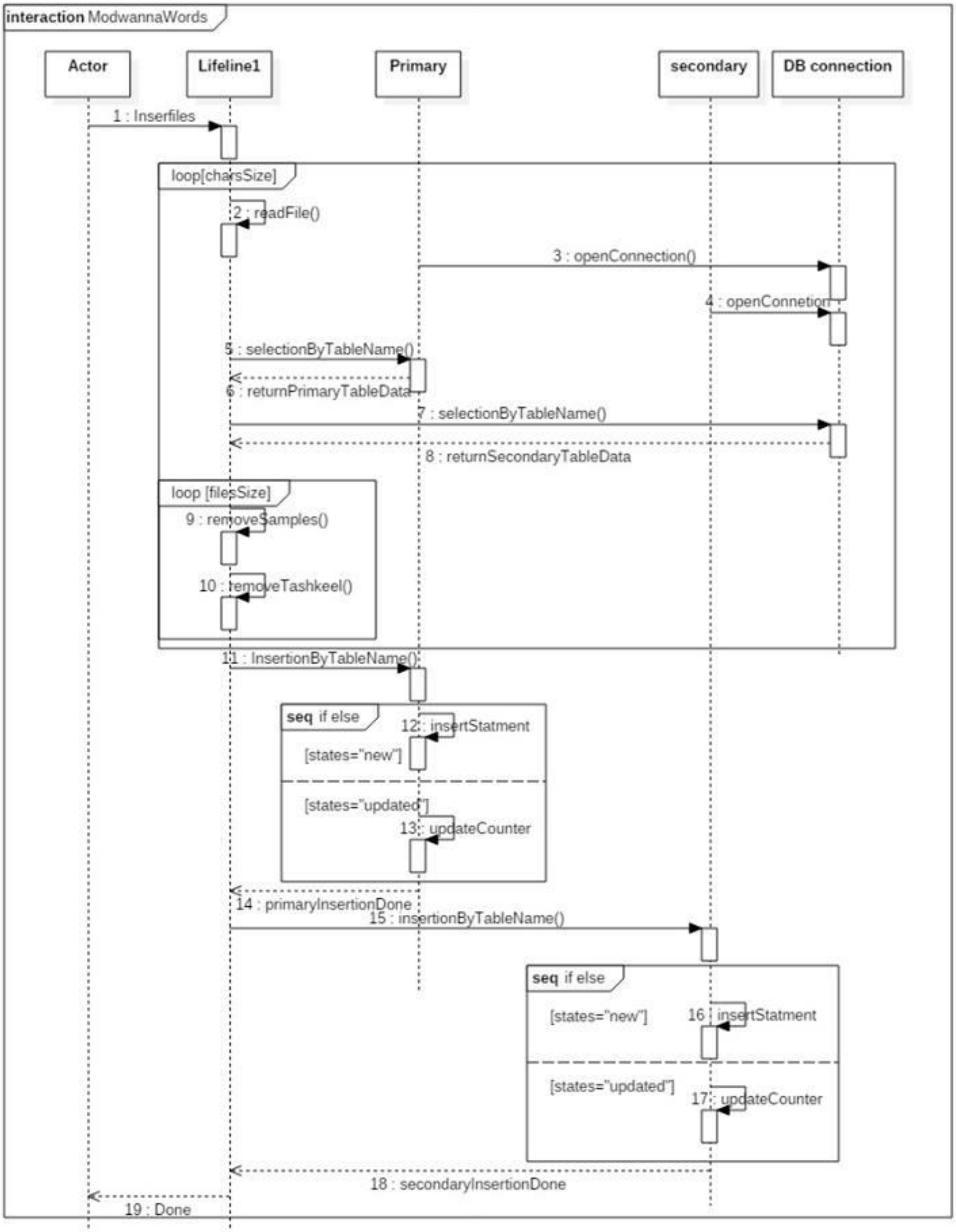
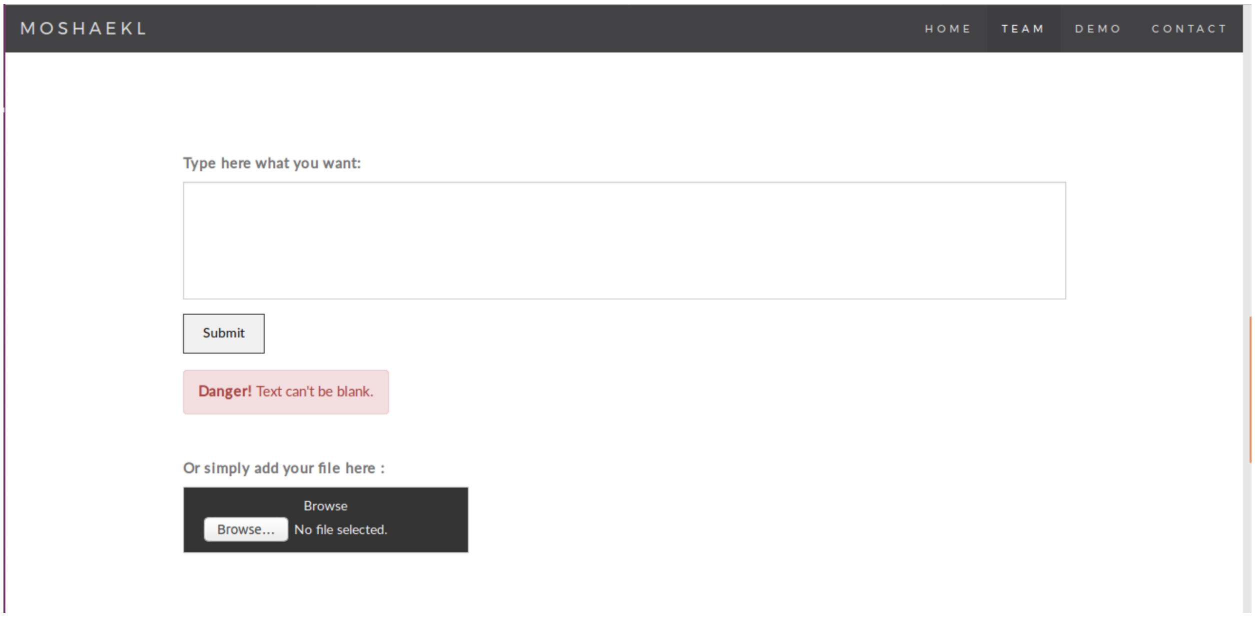


Figure 3.3(d) sequence diagram for modwanna words system

3.4 System test cases

When enter empty text:



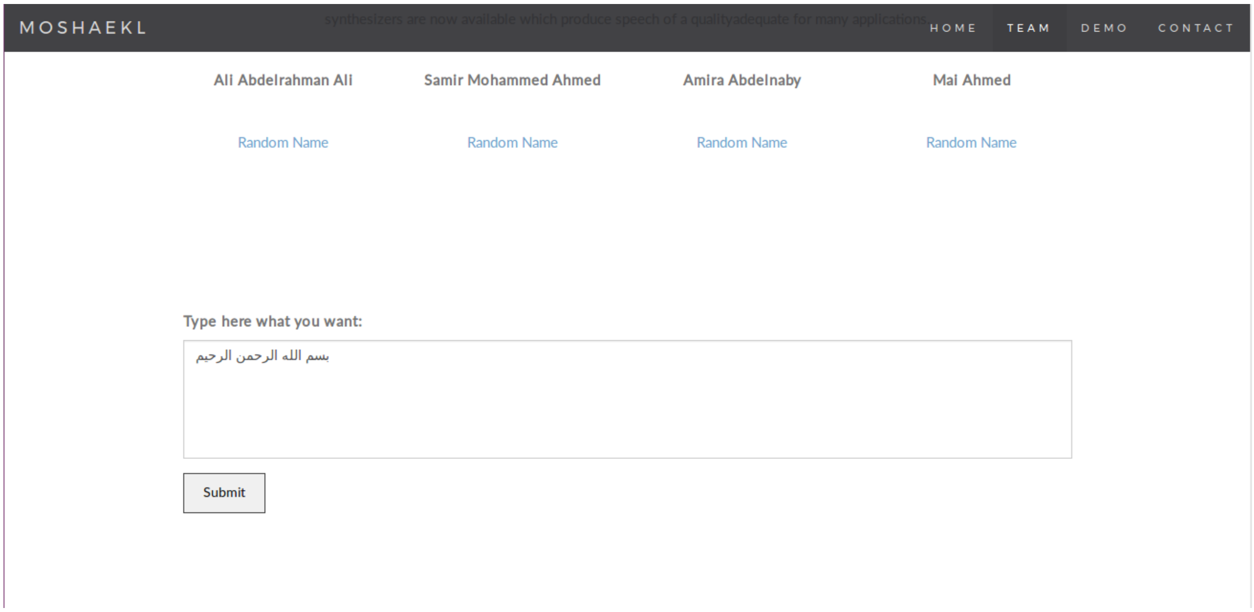
Type here what you want:

Danger! Text can't be blank.

Or simply add your file here :

No file selected.

Test case:

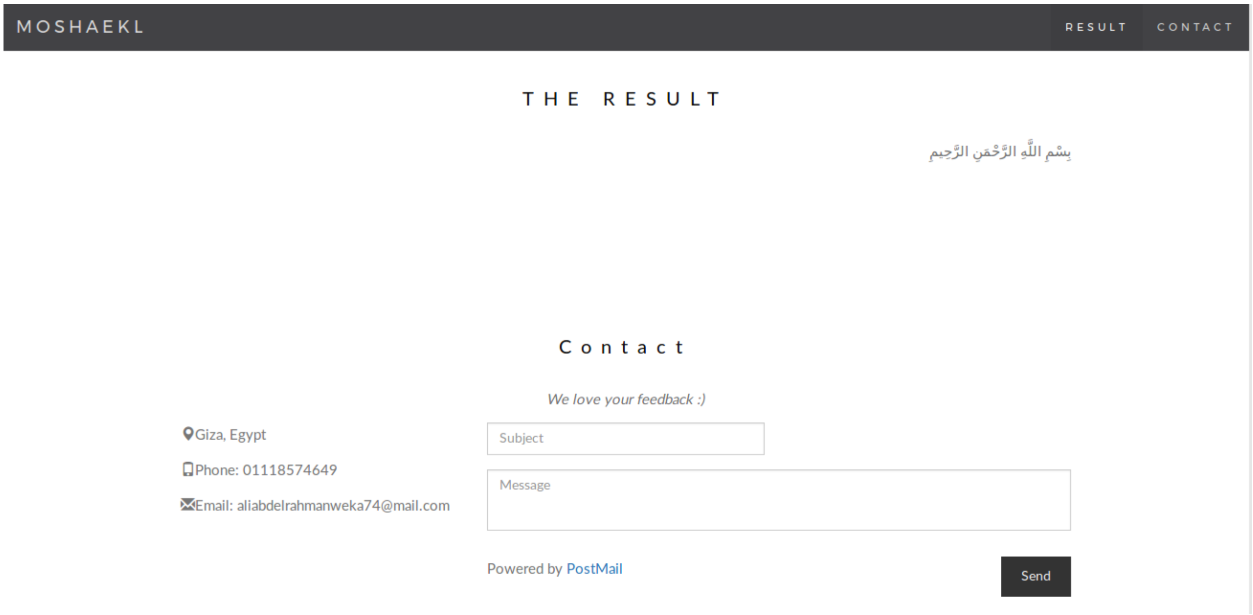

MOSHAEKL
synthesizers are now available which produce speech of a qualityadequate for many applications
HOME
TEAM
DEMO
CONTACT
Submit

Ali Abdelrahman Ali	Samir Mohammed Ahmed	Amira Abdelnaby	Mai Ahmed
Random Name	Random Name	Random Name	Random Name

Type here what you want:

بسم الله الرحمن الرحيم

Output:



THE RESULT

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Contact

We love your feedback :)

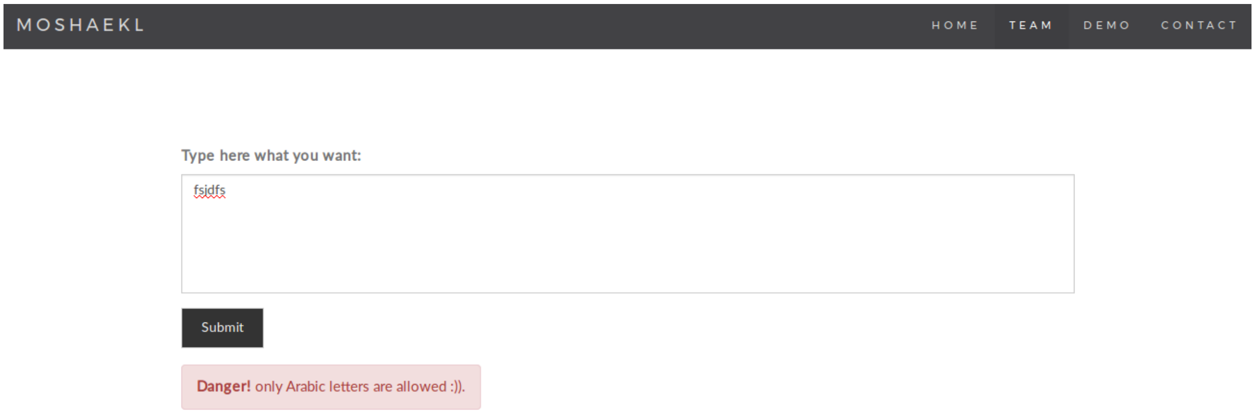
Giza, Egypt

Phone: 01118574649

Email: aliabdelrahmanweka74@mail.com

Powered by PostMail

English or wrong test case:



Type here what you want:

fsjdfs

Danger! only Arabic letters are allowed :)).

Chapter4

System Design

4.1 Project ERD

4.1.1 Conceptual

Characters Frequency

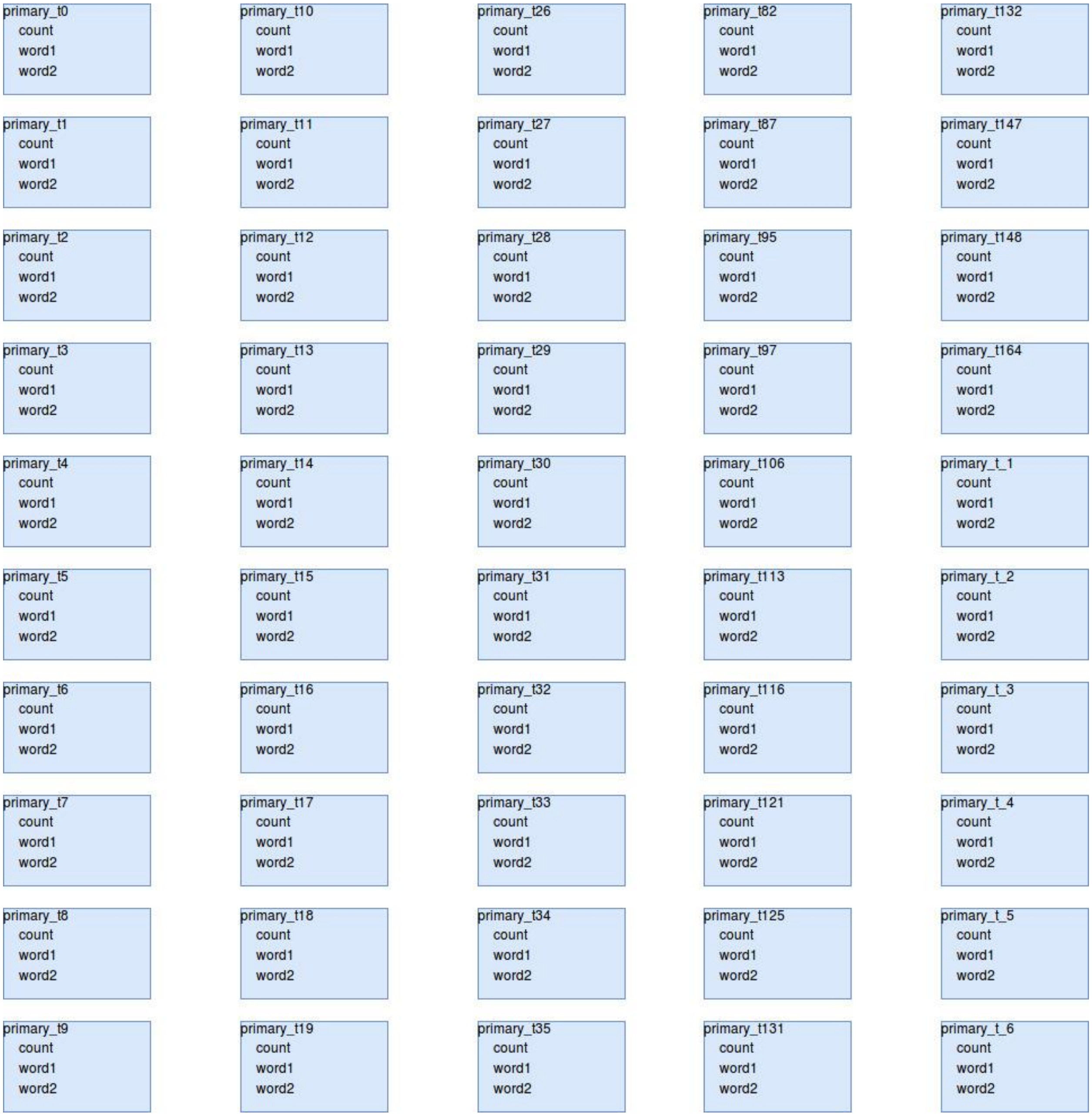


Figure 4.1.1(a) conceptual characters frequency ERD diagram

Words Frequency

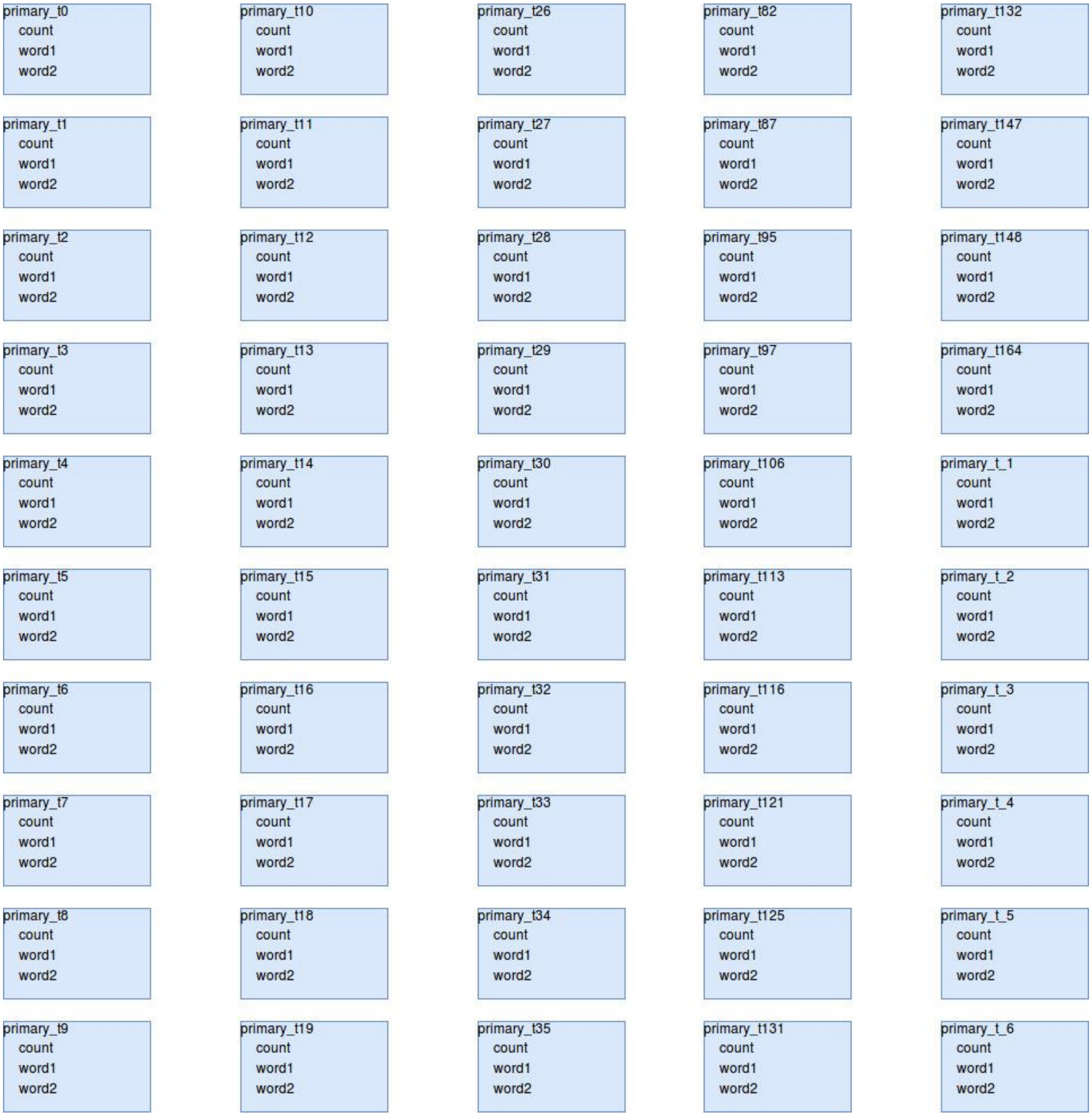


Figure 4.1.1(b) conceptual words frequency ERD diagram

Characters Modwanna

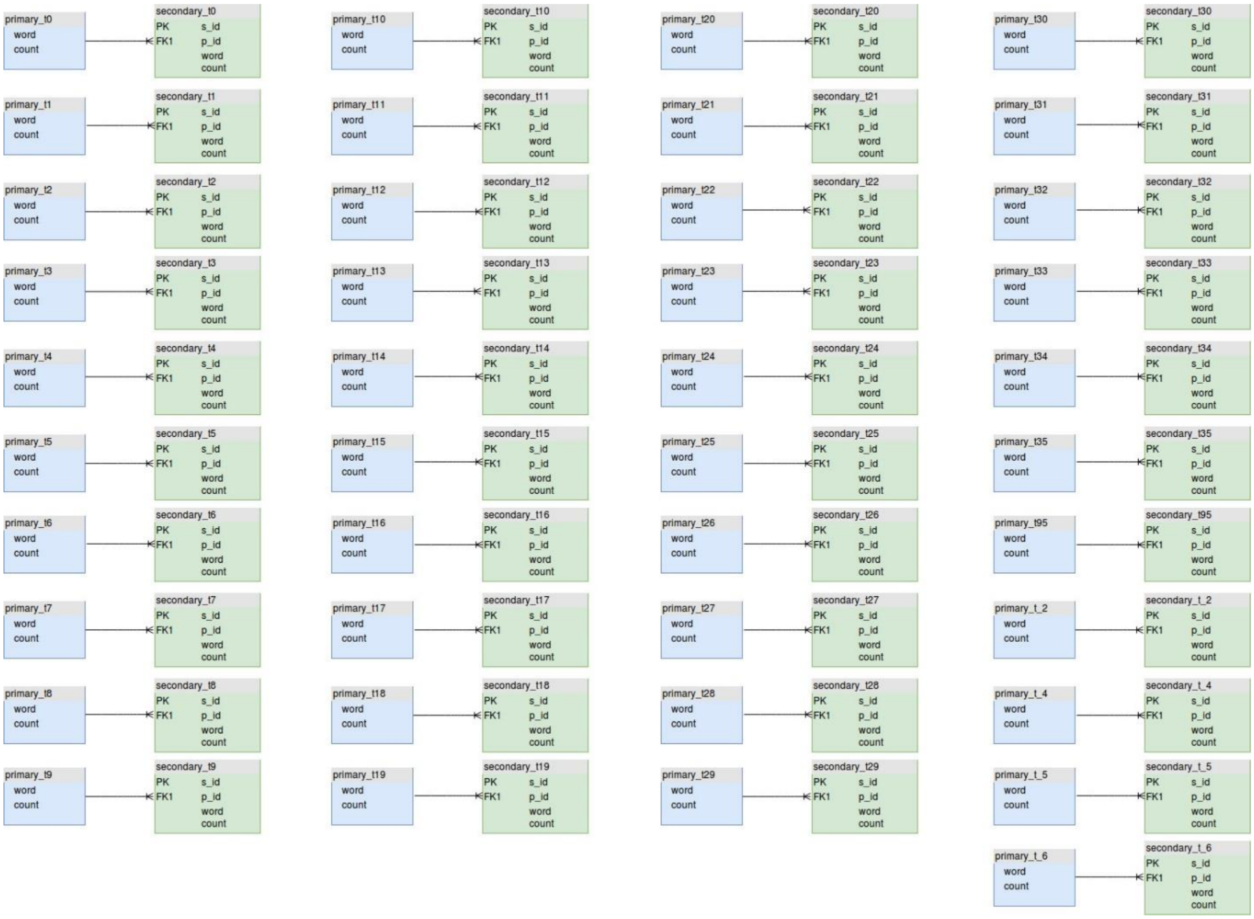


Figure 4.1.1(c) conceptual characters modwanna ERD diagram

Words Modwanna

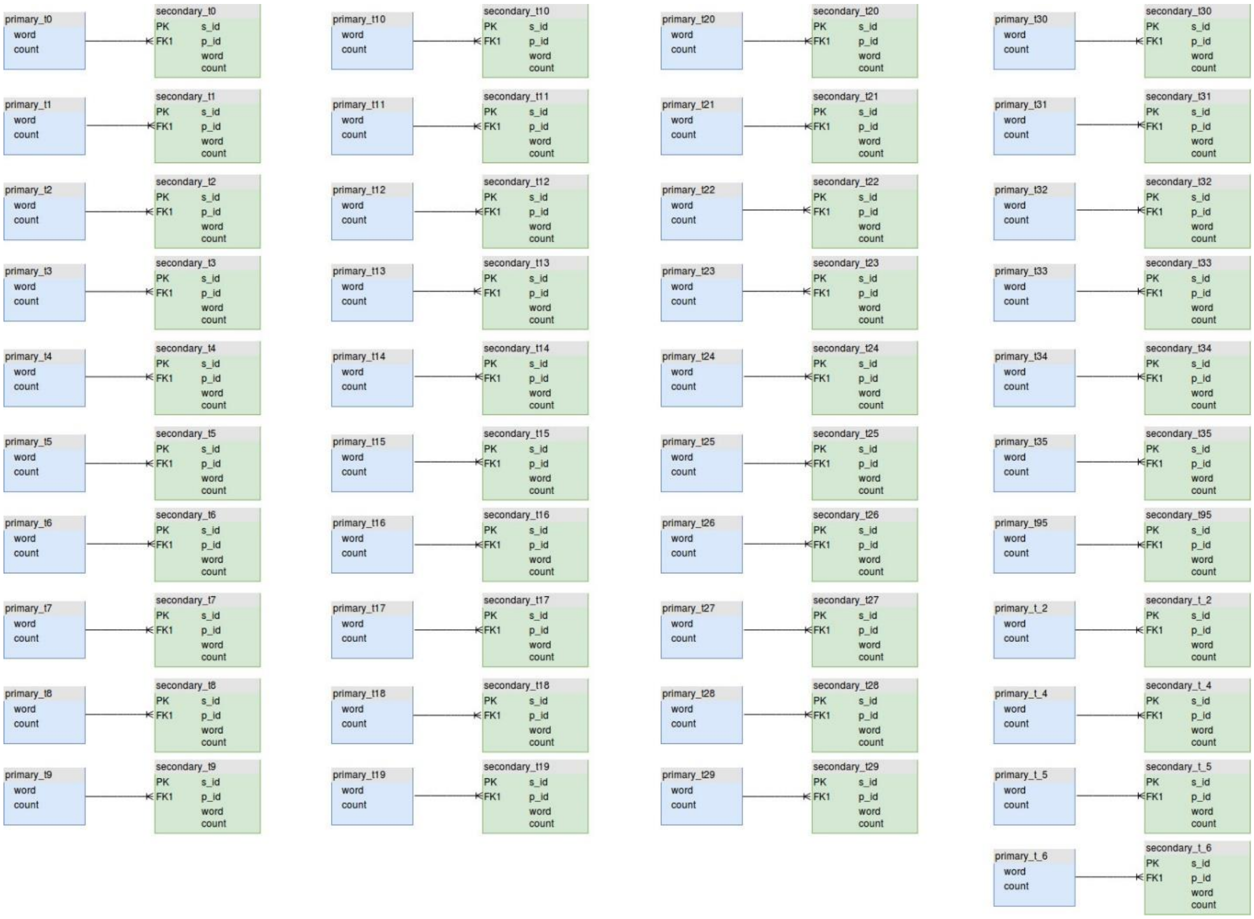


Figure 4.1.1(d) conceptual words modwanna ERD diagram

4.1.2 Physical

Characters Frequency

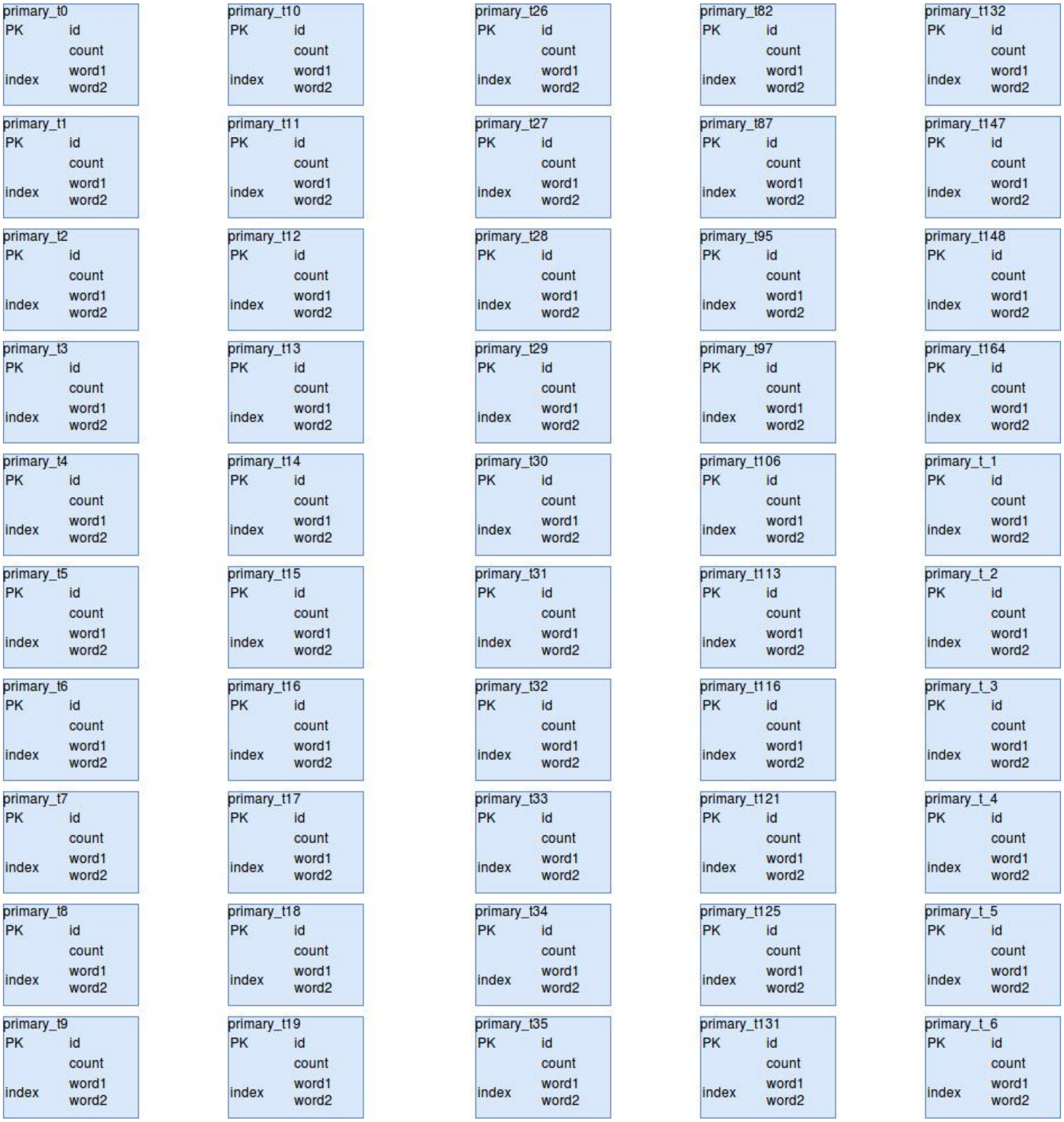

primary_t0 PK id count index word1 word2
primary_t1 PK id count index word1 word2
primary_t2 PK id count index word1 word2
primary_t3 PK id count index word1 word2
primary_t4 PK id count index word1 word2
primary_t5 PK id count index word1 word2
primary_t6 PK id count index word1 word2
primary_t7 PK id count index word1 word2
primary_t8 PK id count index word1 word2
primary_t9 PK id count index word1 word2
primary_t10 PK id count index word1 word2
primary_t11 PK id count index word1 word2
primary_t12 PK id count index word1 word2
primary_t13 PK id count index word1 word2
primary_t14 PK id count index word1 word2
primary_t15 PK id count index word1 word2
primary_t16 PK id count index word1 word2
primary_t17 PK id count index word1 word2
primary_t18 PK id count index word1 word2
primary_t19 PK id count index word1 word2
primary_t26 PK id count index word1 word2
primary_t27 PK id count index word1 word2
primary_t28 PK id count index word1 word2
primary_t29 PK id count index word1 word2
primary_t30 PK id count index word1 word2
primary_t31 PK id count index word1 word2
primary_t32 PK id count index word1 word2
primary_t33 PK id count index word1 word2
primary_t34 PK id count index word1 word2
primary_t35 PK id count index word1 word2
primary_t82 PK id count index word1 word2
primary_t87 PK id count index word1 word2
primary_t95 PK id count index word1 word2
primary_t97 PK id count index word1 word2
primary_t106 PK id count index word1 word2
primary_t113 PK id count index word1 word2
primary_t116 PK id count index word1 word2
primary_t121 PK id count index word1 word2
primary_t125 PK id count index word1 word2
primary_t131 PK id count index word1 word2
primary_t132 PK id count index word1 word2
primary_t147 PK id count index word1 word2
primary_t148 PK id count index word1 word2
primary_t164 PK id count index word1 word2
primary_t_1 PK id count index word1 word2
primary_t_2 PK id count index word1 word2
primary_t_3 PK id count index word1 word2
primary_t_4 PK id count index word1 word2
primary_t_5 PK id count index word1 word2
primary_t_6 PK id count index word1 word2

Figure 4.1.2(a) physical characters frequency ERD diagram

Words Frequency

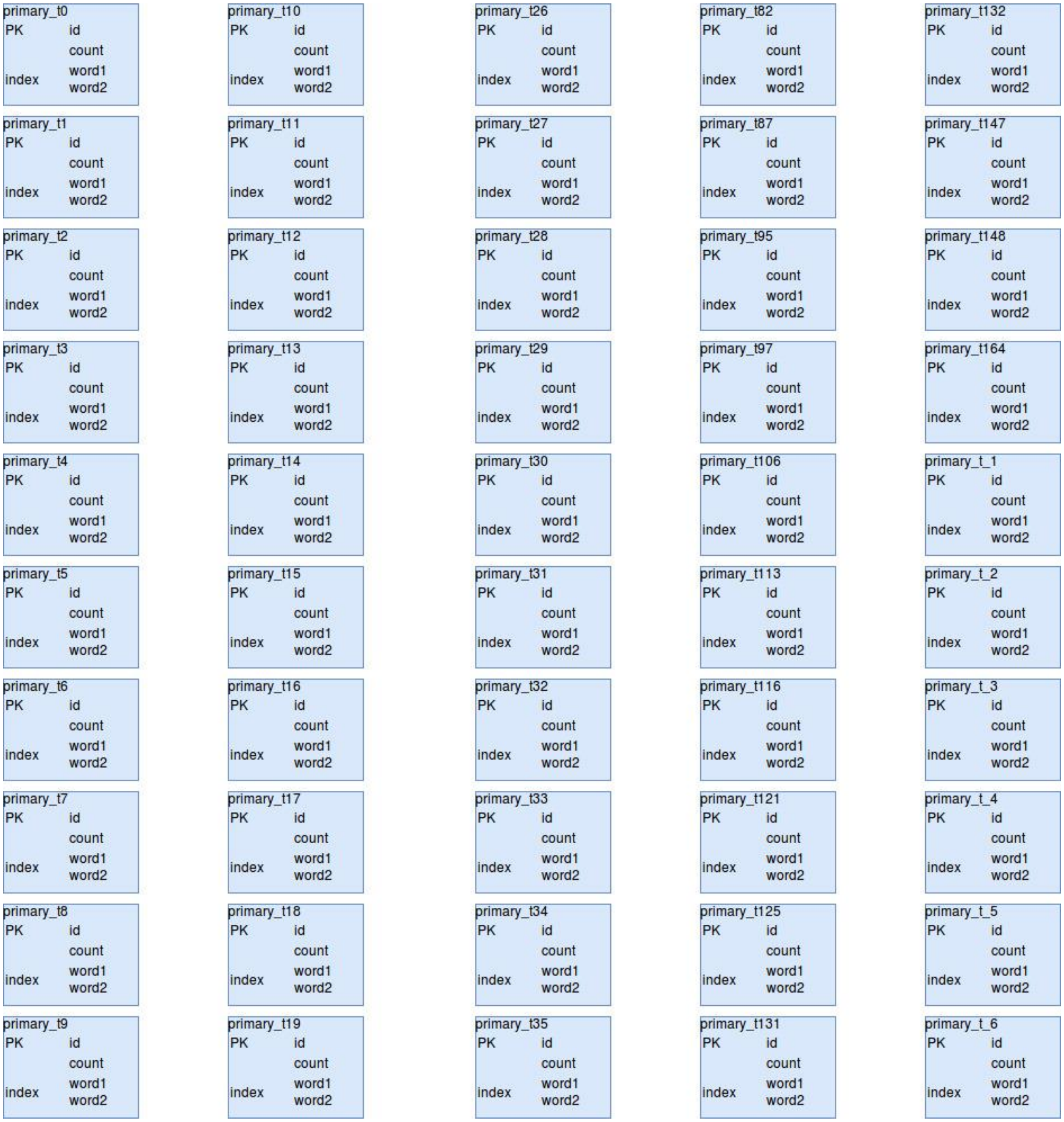


Figure 4.1.2(b) physical words frequency ERD diagram

Characters Modwanna

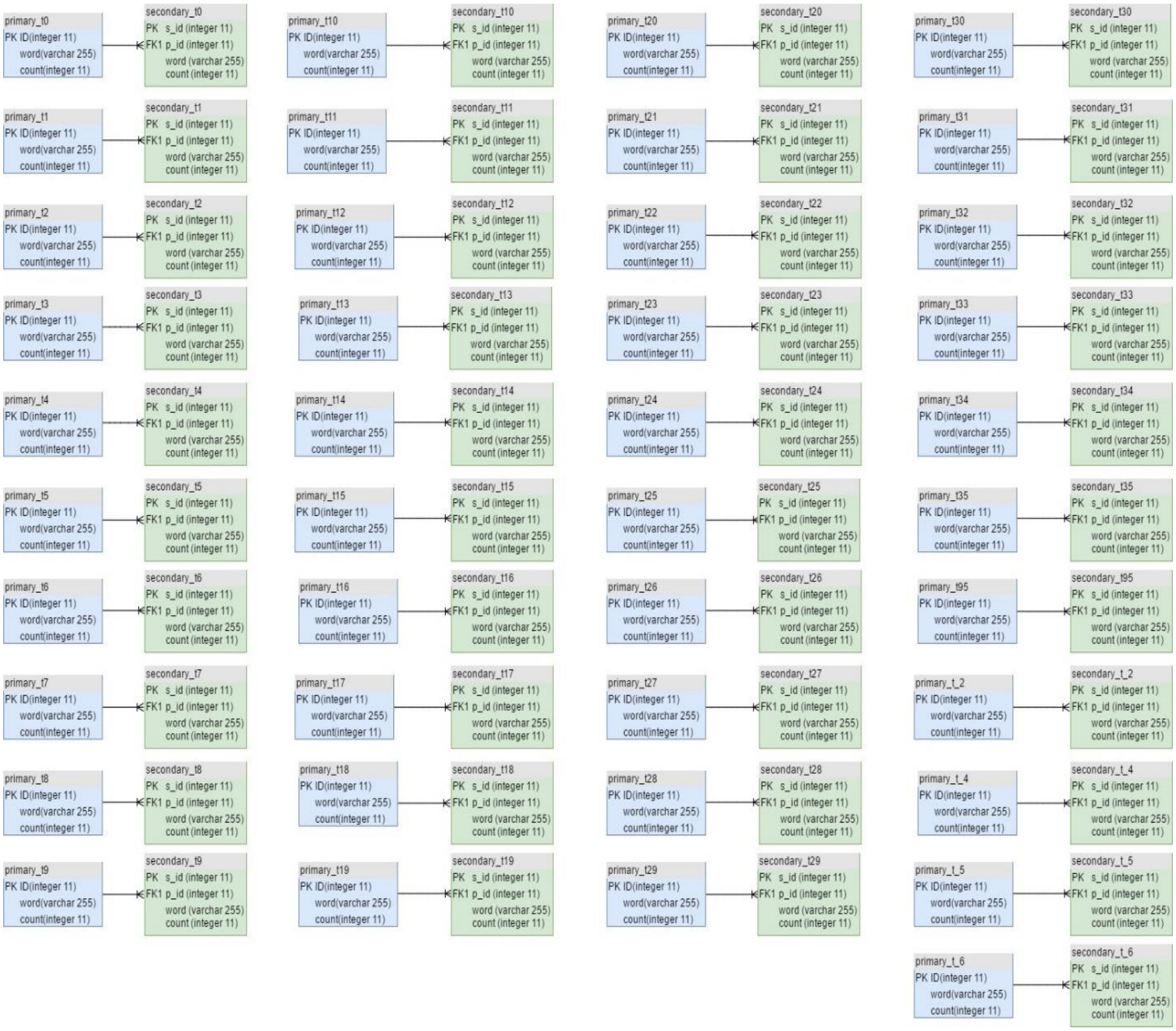


Figure 4.1.2(c) physical characters modwanna ERD diagram

Words Modwanna

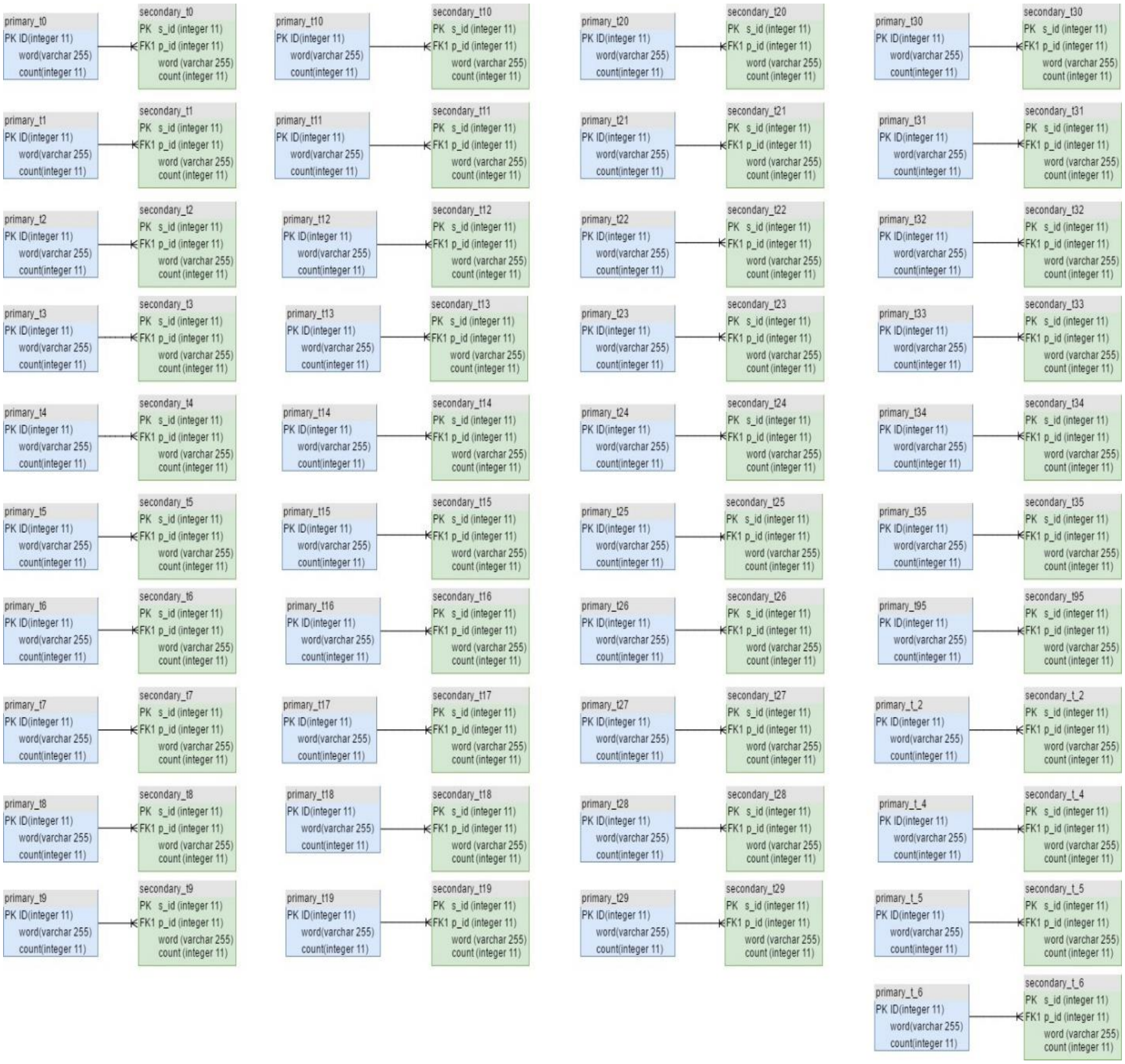
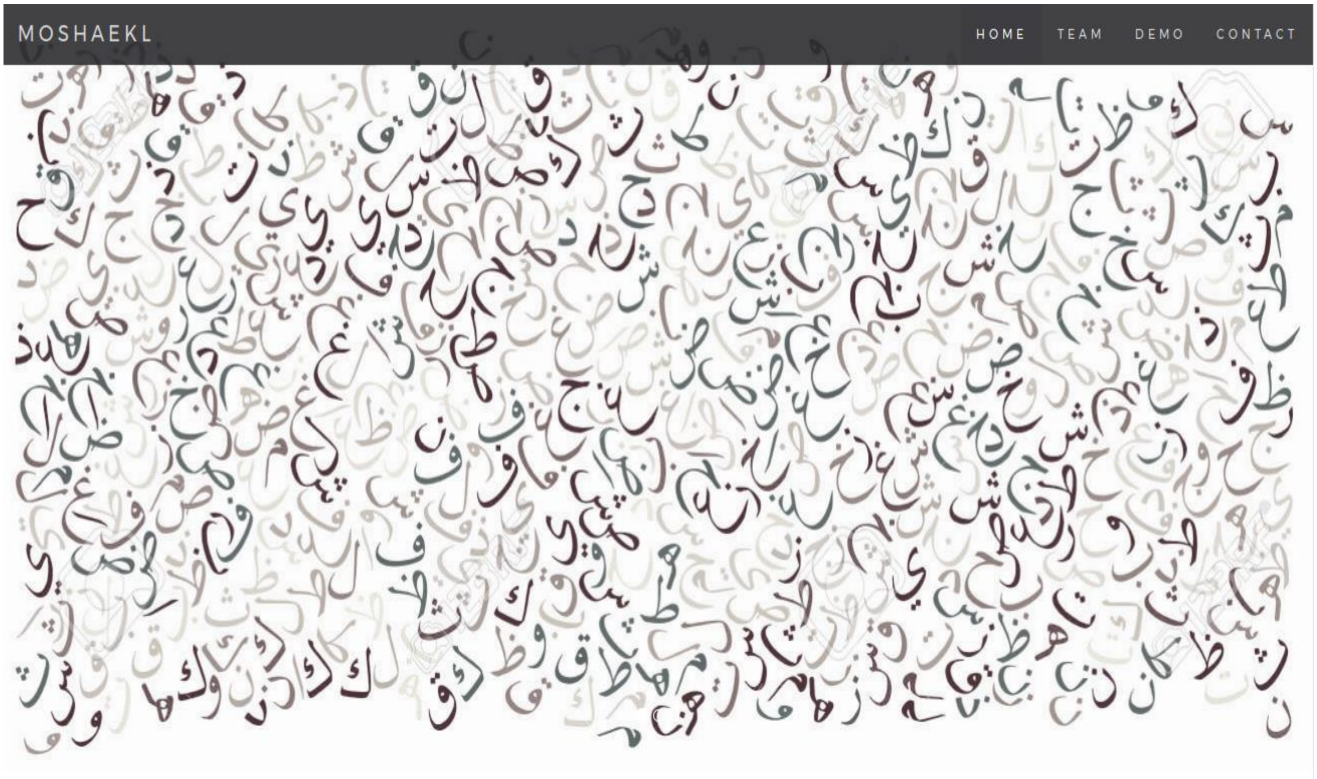


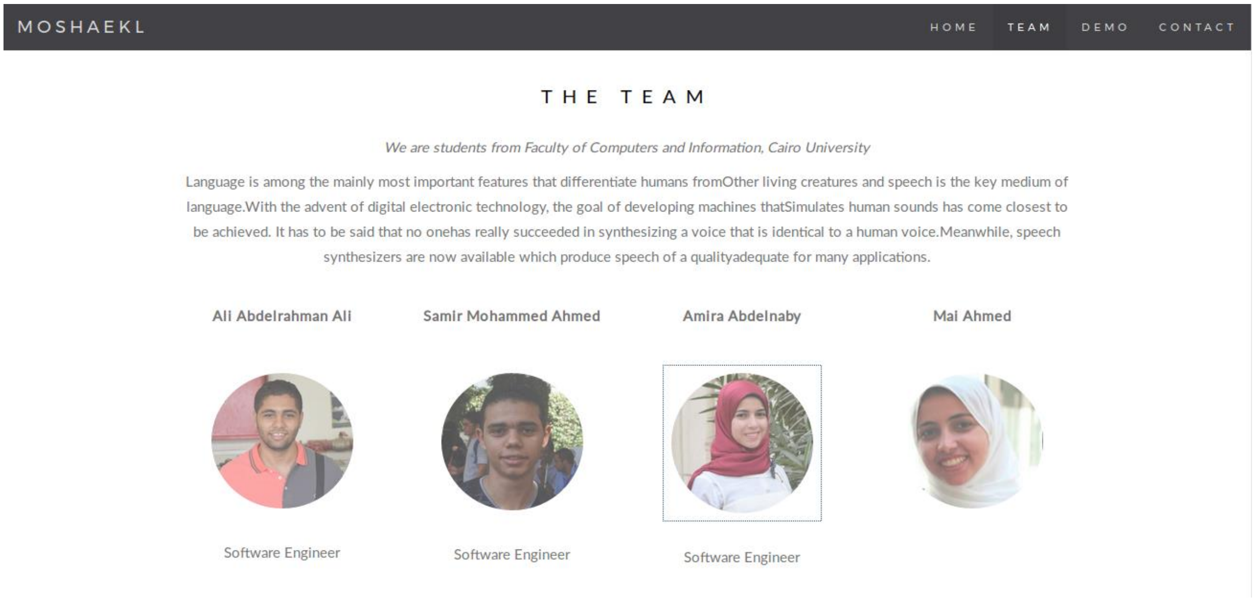
Figure 4.1.2(d) physical words modwanna ERD diagram

4.2 Elementary Design

Home page:



Our TEAM:



THE TEAM

We are students from Faculty of Computers and Information, Cairo University

Language is among the mainly most important features that differentiate humans fromOther living creatures and speech is the key medium of language.With the advent of digital electronic technology, the goal of developing machines thatSimulates human sounds has come closest to be achieved. It has to be said that no onehas really succeeded in synthesizing a voice that is identical to a human voice.Meanwhile, speech synthesizers are now available which produce speech of a qualityadequate for many applications.

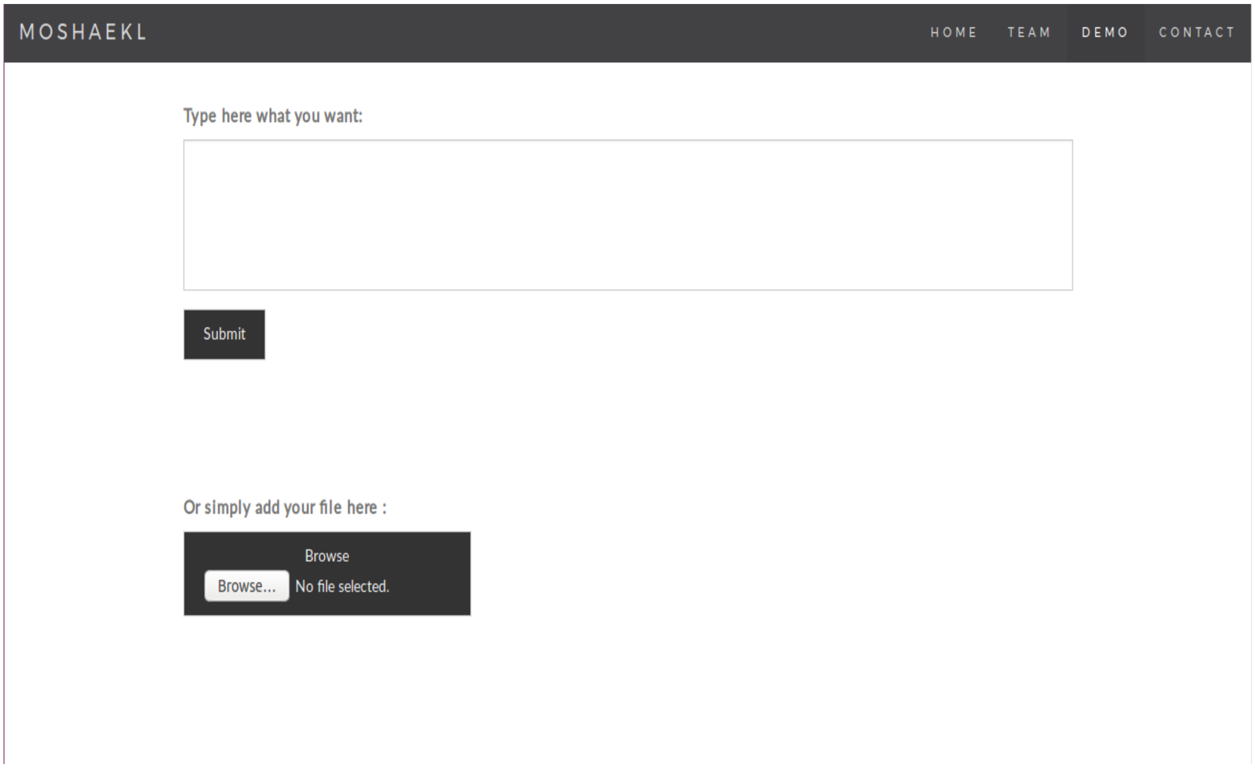
Ali Abdelrahman Ali — Software Engineer

Samir Mohammed Ahmed — Software Engineer

Amira Abdelnaby — Software Engineer

Mai Ahmed

DEMO:

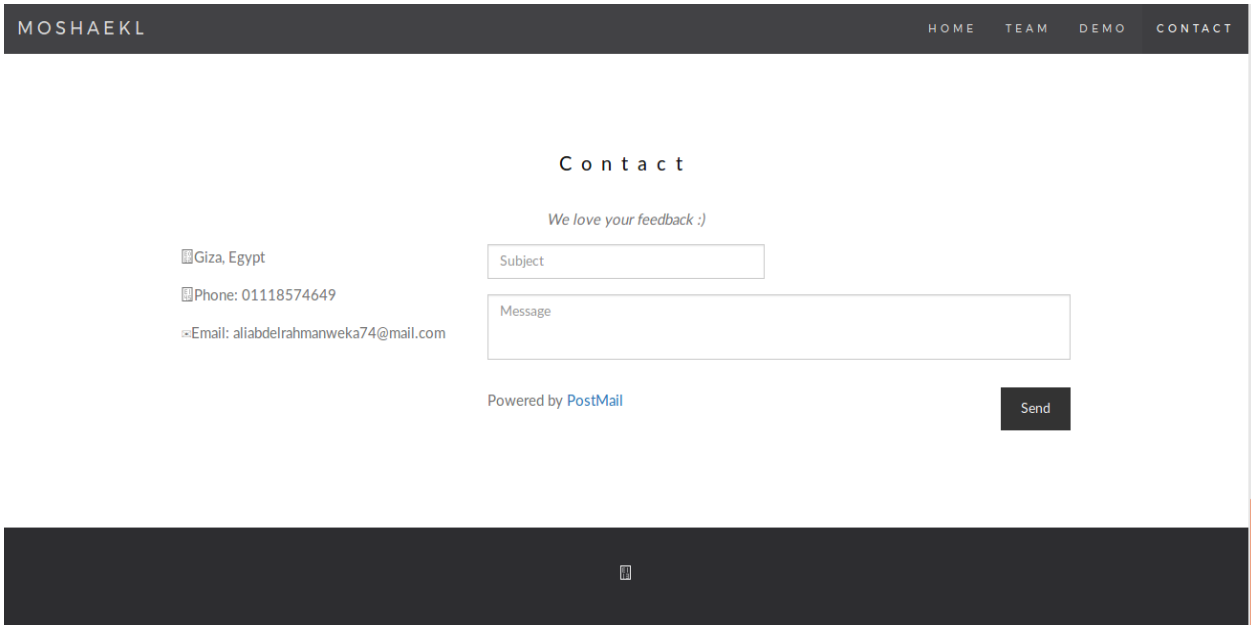


Type here what you want:

Or simply add your file here :

No file selected.

CONTACT US :



Contact

We love your feedback :)

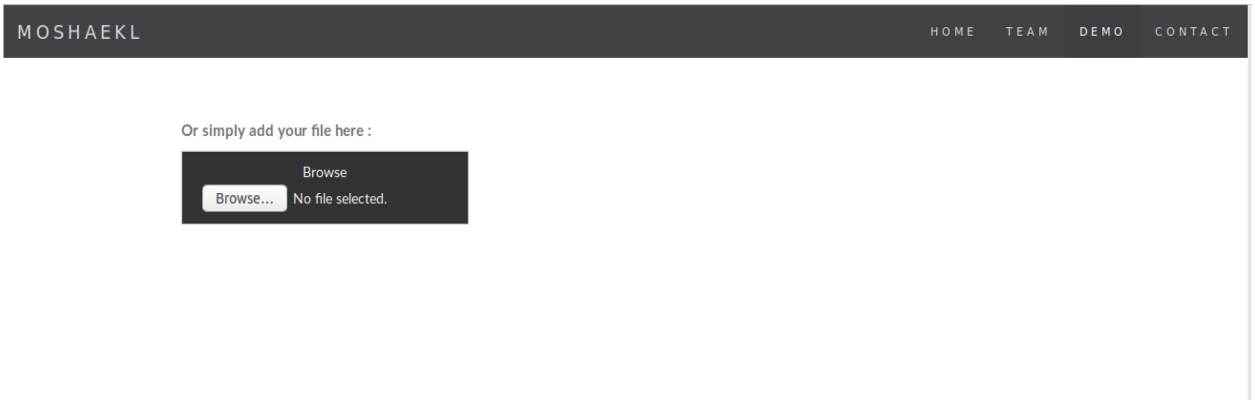
Giza, Egypt

Phone: 01118574649

Email: aliabdelrahmanweka74@mail.com

Powered by PostMail

To insert file:



Or simply add your file here :

No file selected.

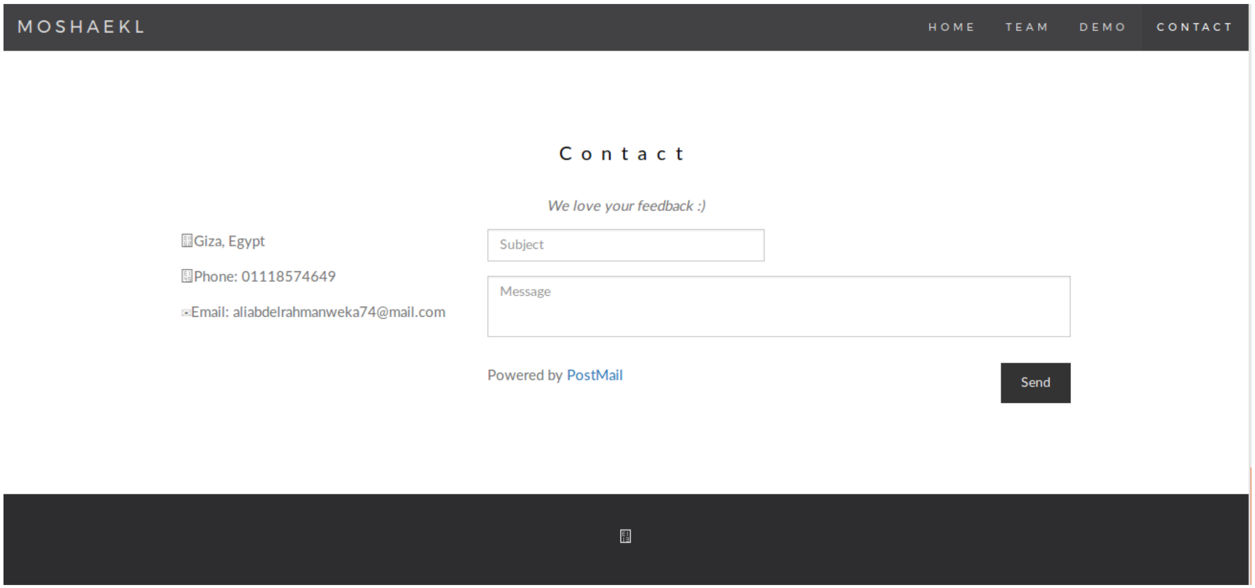
Chapter5

Implementation and Testing

System Testing

Step No.	Test cases	Test data	Expected result	Actual result	Status(pass/fail)
1	Check if area is empty	Text or File	Danger message	System success	Pass
2	Check if entered text is not arabic	Text or File	Danger message	System success	Pass
3	Check if input text is in arabic language	Text or File	نص مُشَكَل	System success	Pass
4	Check if mail vaild in CONTACT form	Mail or user data	Sent message to user	System success	Pass

Table 5.1 table of System testing



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Giza, Egypt

Phone: 01118574649

Email: aliabdelrahmanweka74@mail.com

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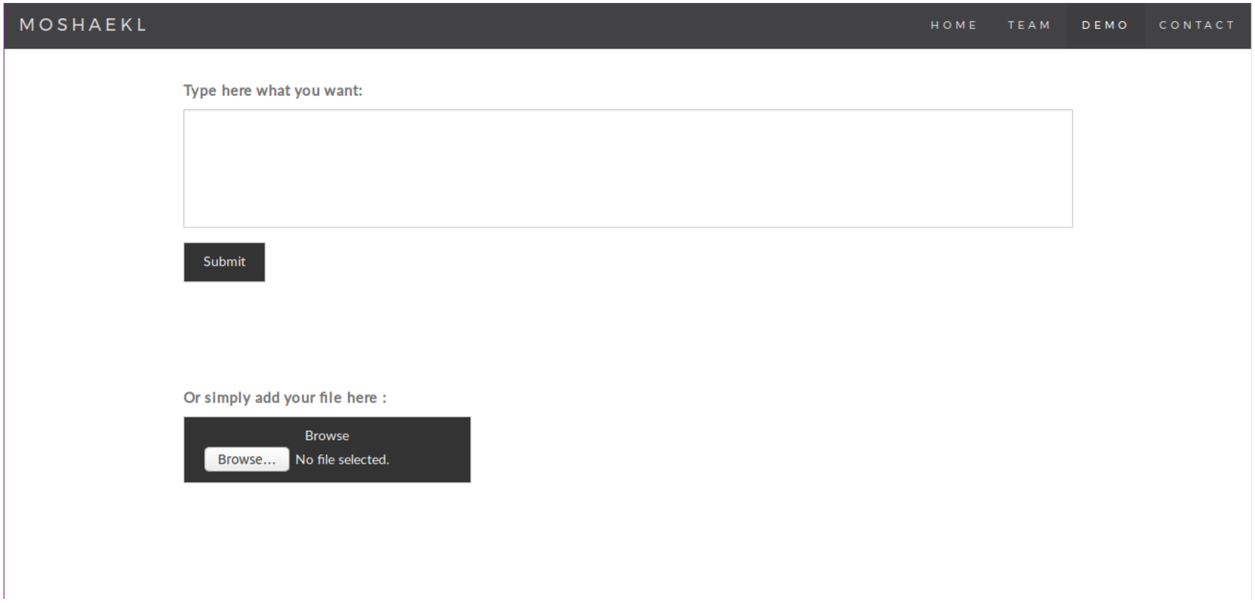
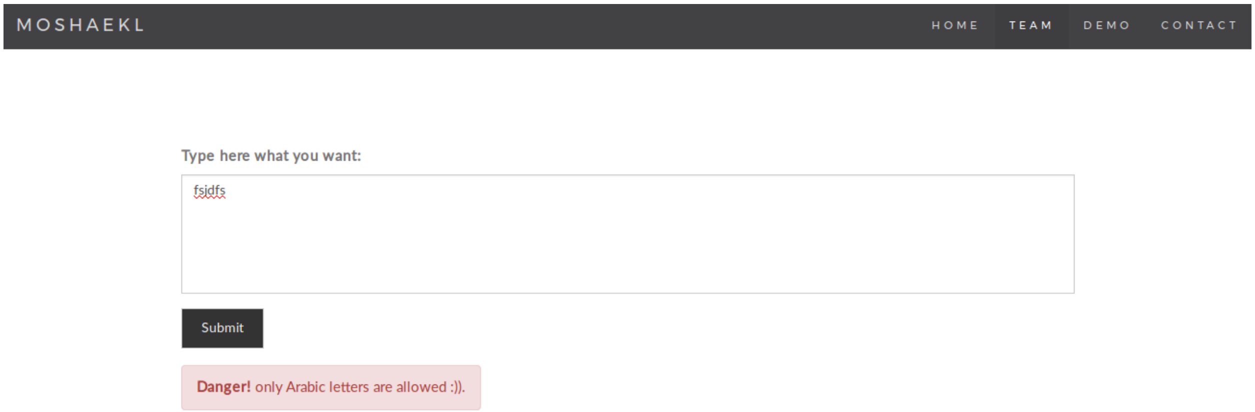


Type here what you want:

Or simply add your file here :

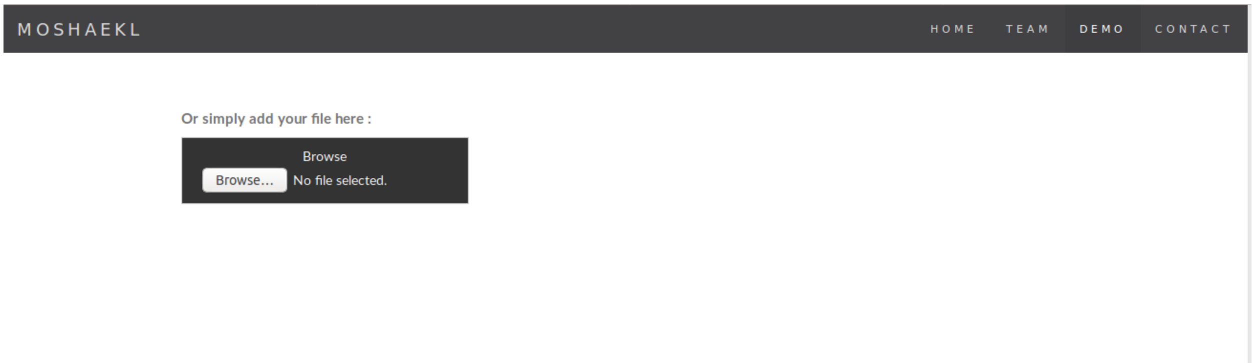
No file selected.



Type here what you want:

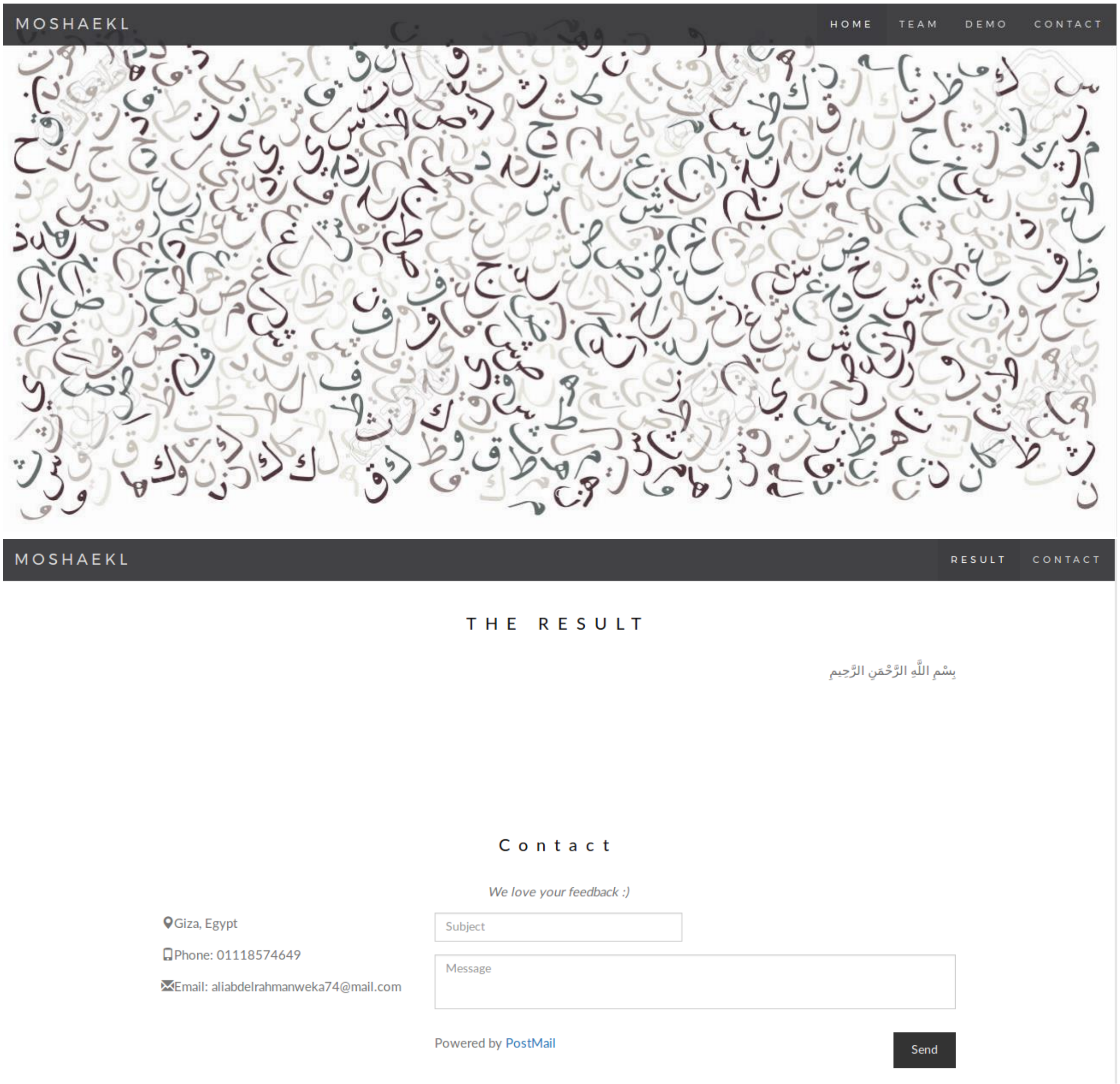
fsjdfs

Danger! only Arabic letters are allowed :)).



Or simply add your file here :

No file selected.



THE RESULT

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيم

Contact

We love your feedback :)

Giza, Egypt

Phone: 01118574649

Email: aliabdelrahmanweka74@mail.com

Subject

Message

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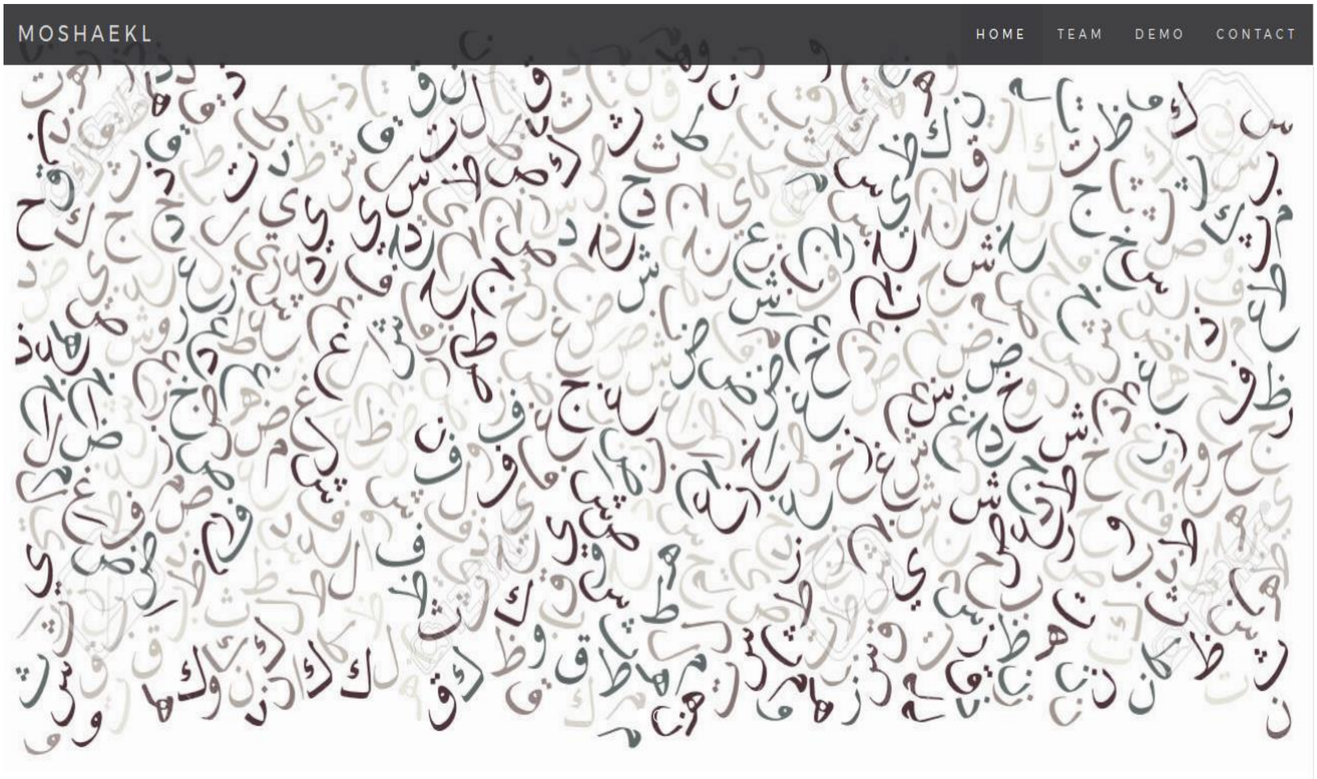
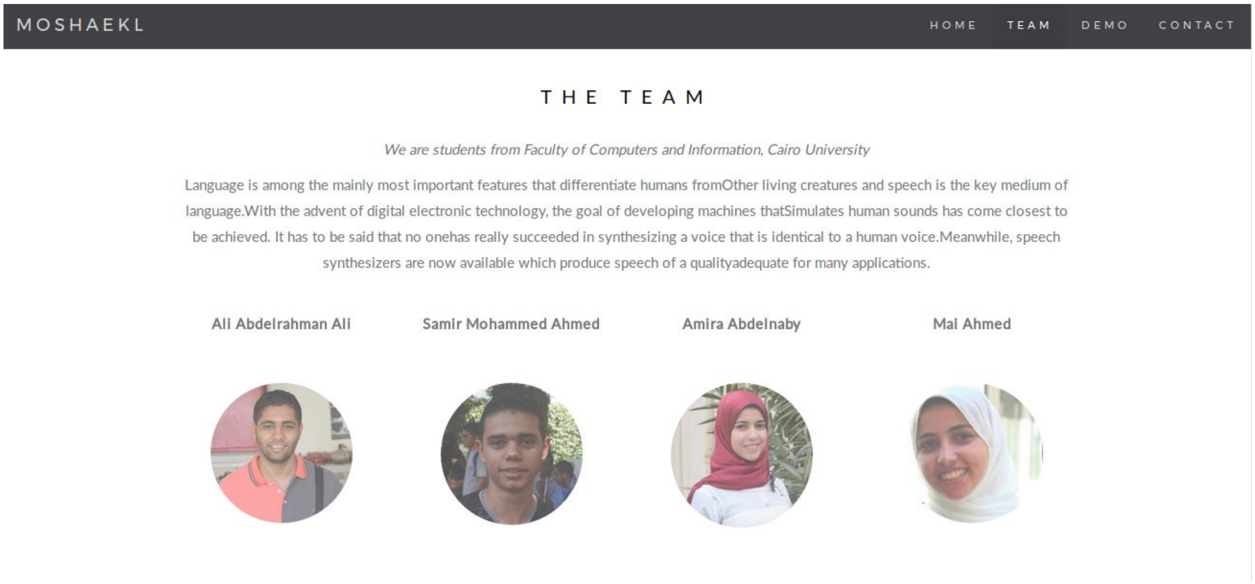
Samples of the applied test cases:

Home page:



When click in TEAM buttom:



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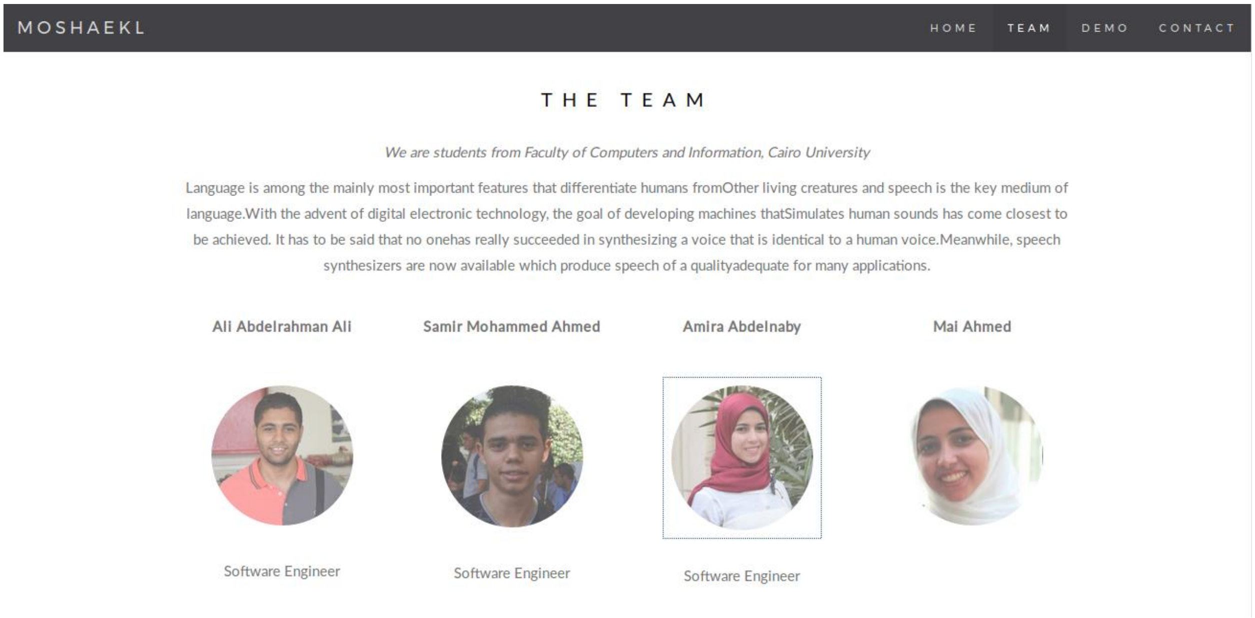
Ali Abdelrahman Ali

Samir Mohammed Ahmed

Amira Abdelnaby

Mai Ahmed

When click in one of team pictures:



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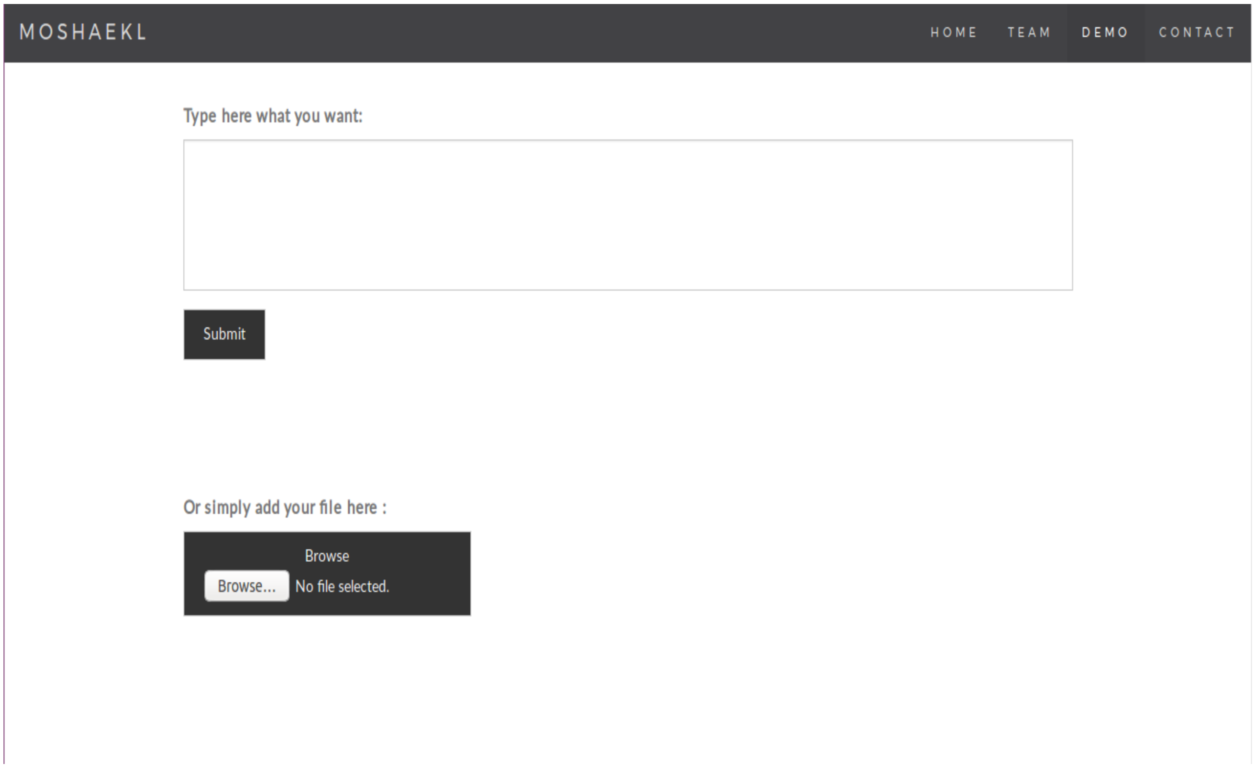
Ali Abdelrahman Ali	Samir Mohammed Ahmed	Amira Abdelnaby	Mai Ahmed
Software Engineer	Software Engineer	Software Engineer	

When click in DEMO buttom:

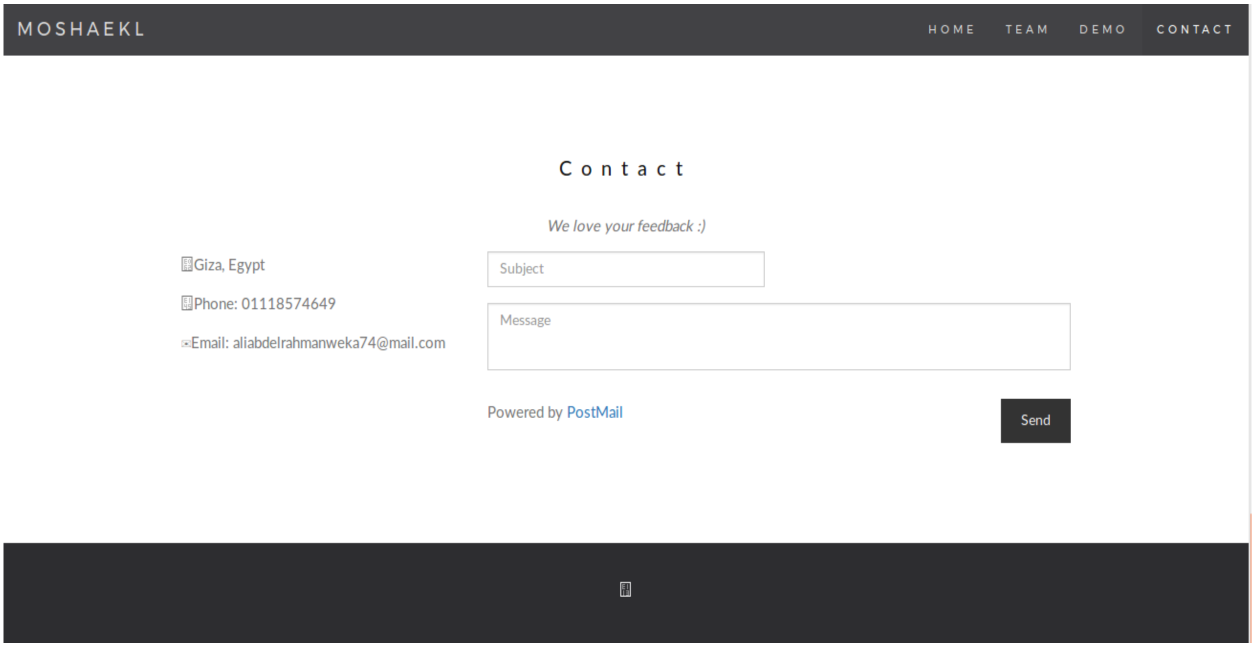


Type here what you want:

Or simply add your file here :

No file selected.

When click in CONTACT buttom:



Contact

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Giza, Egypt

Phone: 01118574649

Email: aliabdelrahmanweka74@mail.com

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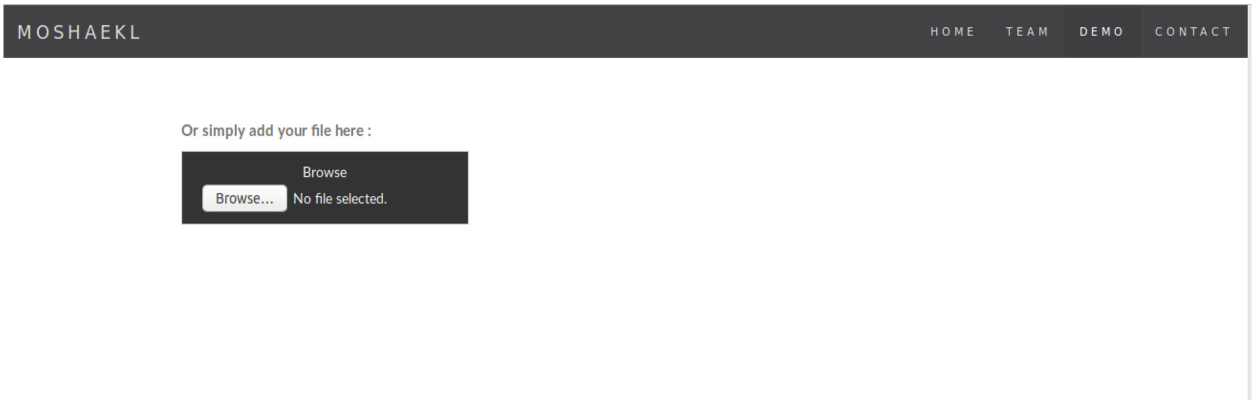
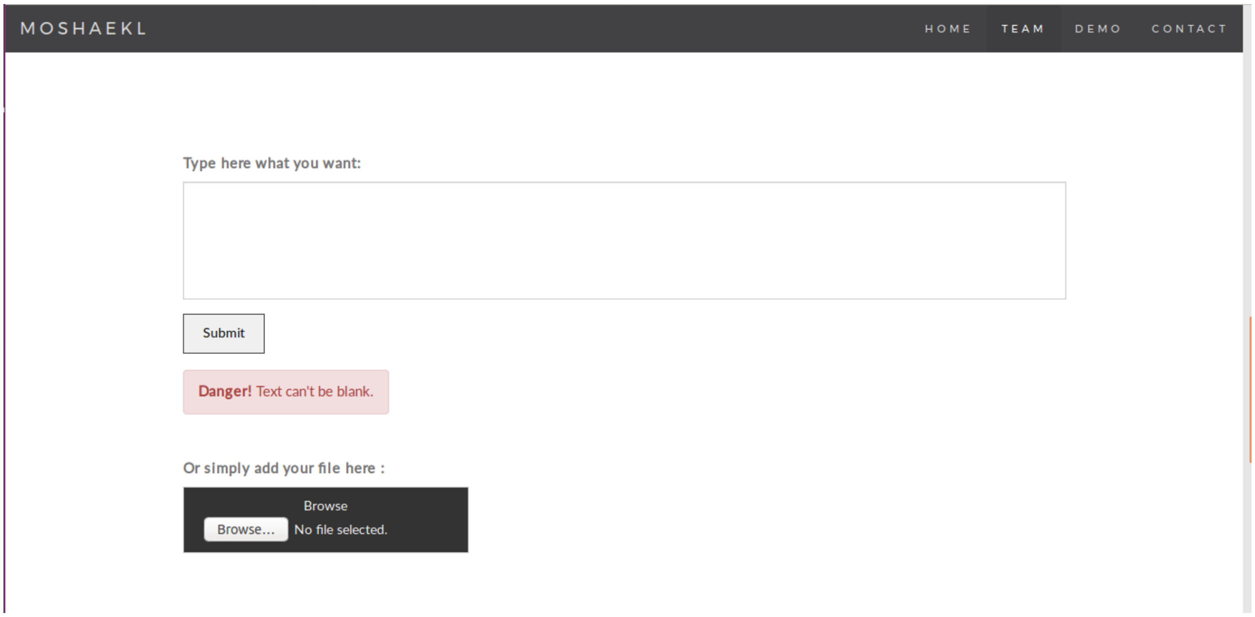
To insert file:



Or simply add your file here :

No file selected.

When enter enpty text:



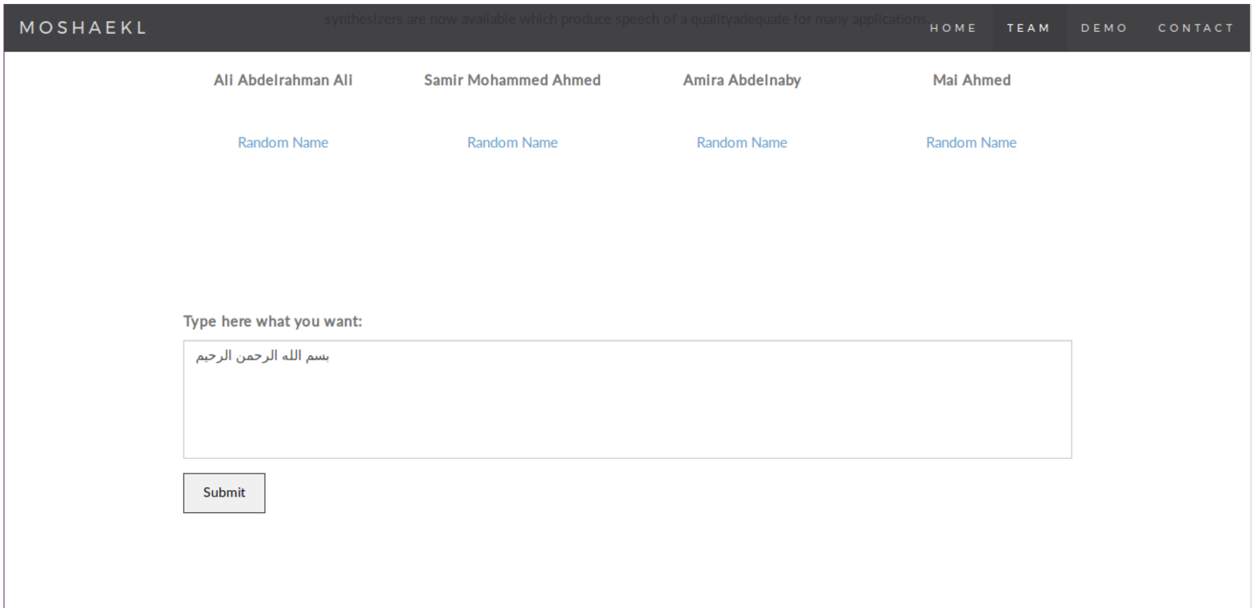
Type here what you want:

Danger! Text can't be blank.

Or simply add your file here :

No file selected.

Test case:



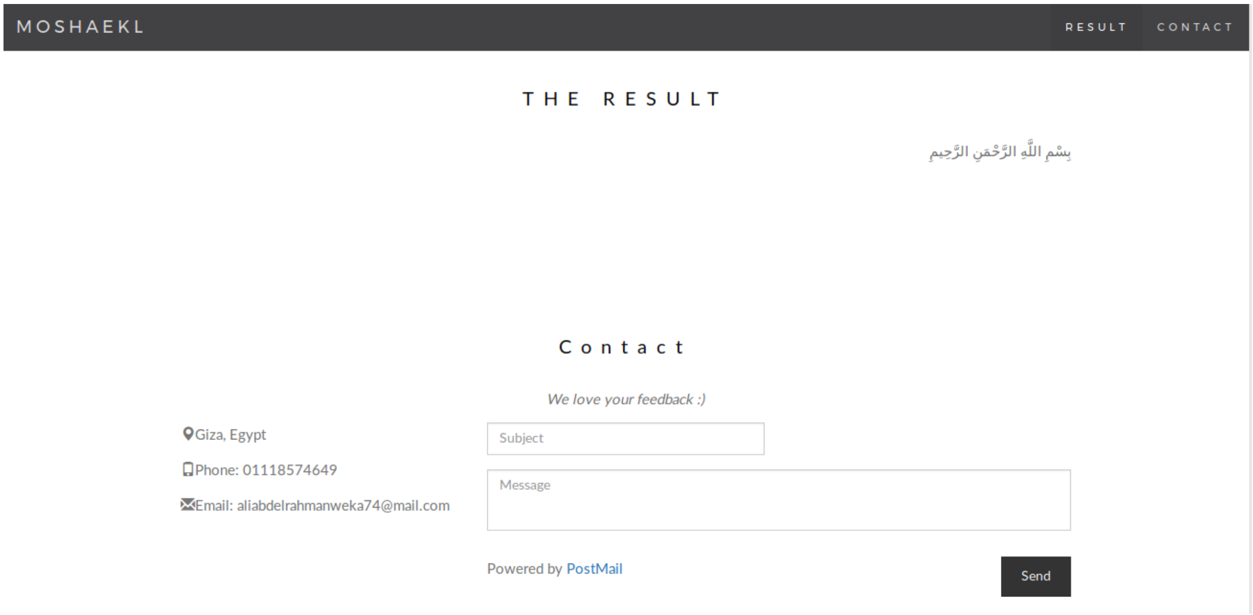
synthesizers are now available which produce speech of a qualityadequate for many applications.

Ali Abdelrahman Ali	Samir Mohammed Ahmed	Amira Abdelnaby	Mai Ahmed
Random Name	Random Name	Random Name	Random Name

Type here what you want:

بسم الله الرحمن الرحيم

Output:



THE RESULT

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Contact

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Giza, Egypt

Phone: 01118574649

Email: aliabdelrahmanweka74@mail.com

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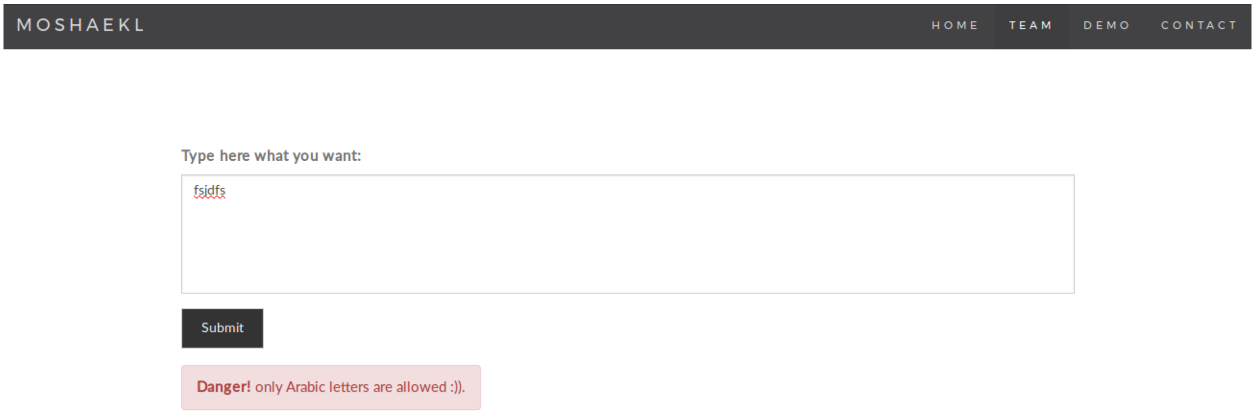
English or wrong test case:



Type here what you want:

fsjdfs

Danger! only Arabic letters are allowed :)).

SUMMARY

	Window Size	Accuracy V1		Accuracy V2	
		بنية	اعراب	بنية	اعراب
	2 - 2	66.7 %	66.05%	77.25 %	73.98 %
	1 - 3	65.6 %	64.19 %	77.18 %	73.89 %
	1 - 1	65.81 %	64.85 %	77.49 %	75.42 %
Unique words		41710		151263	
Non Unique Words		263824		1254200	

Table xs(a) table of System accuracy

Based on 2 Versions

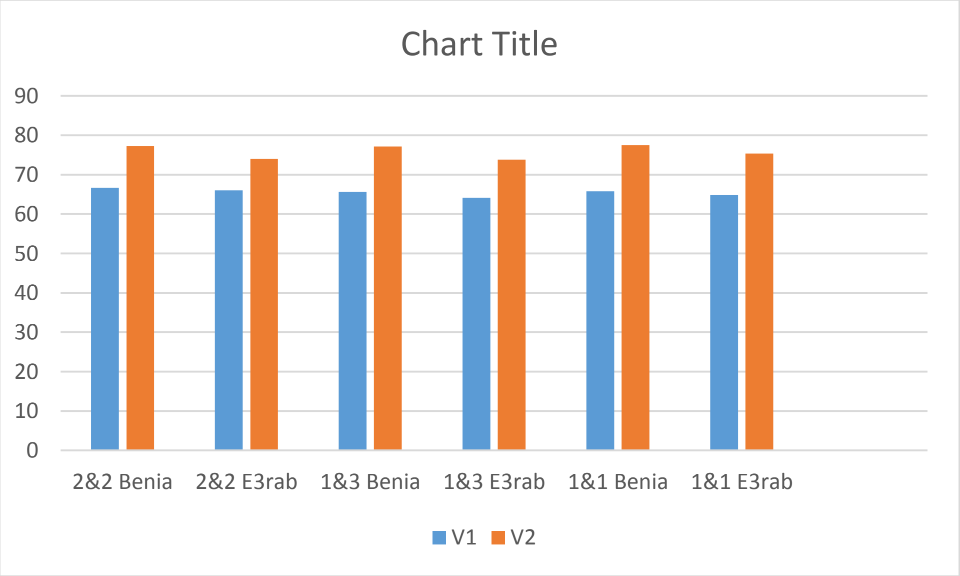


Figure xs(a) accuracy chart based on versions

Based on Windows

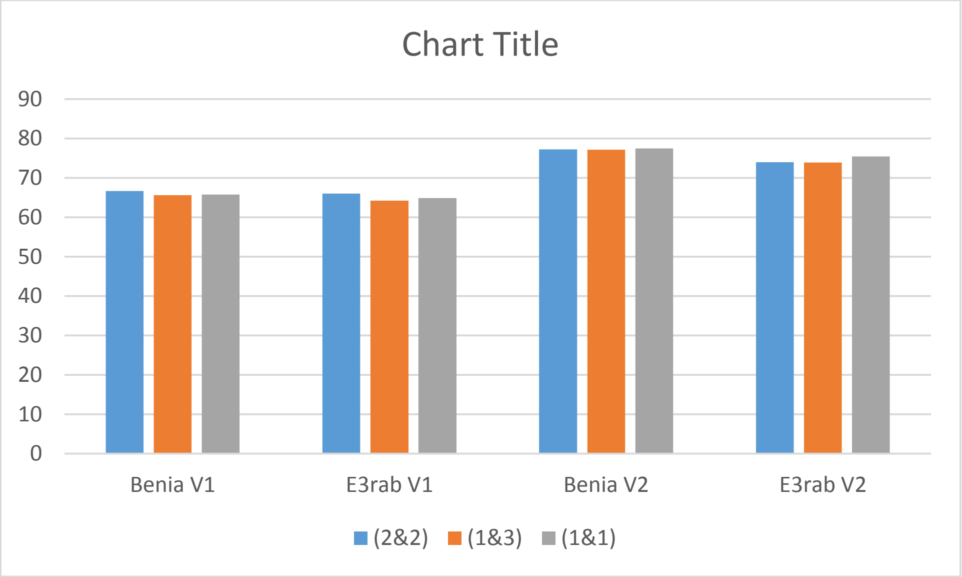


Figure xs(b) accuracy chart based on windows

Based on tashkeel benya and Eraab

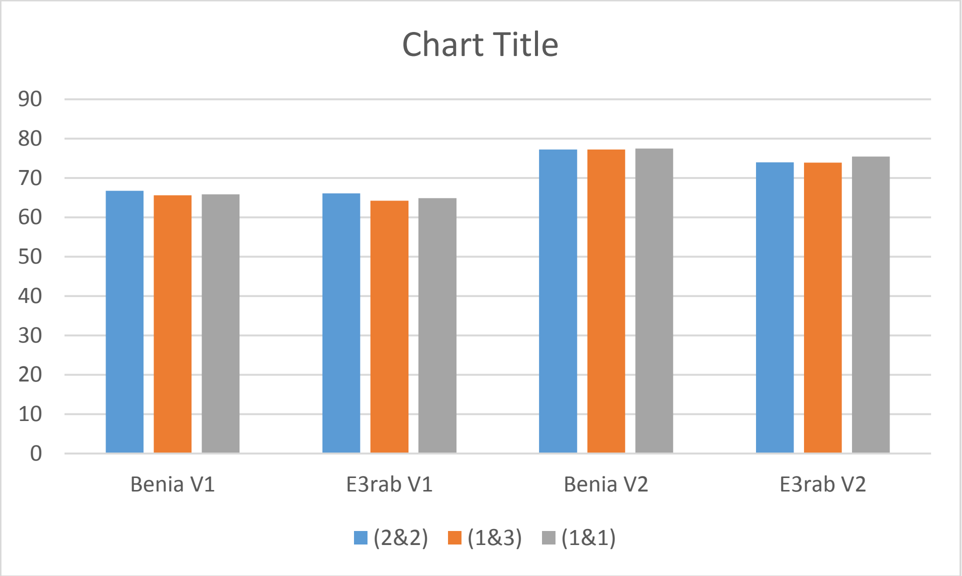


Figure xs(c) accuracy chart based on tashkeel benya and eraab

References

REFERENCES AND RESOURCES

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Wael H. & Mohsen R. (2000). Concatenative Arabic speech synthesis using large database, In Proceedings of ICSLP2000, vol. 2, pp. 182-185, Beijing, China.

http://repository.um.edu.my/142/1/Arabic%20TTS%20Synthesizer.pdf

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Todd K. & Stephen C. (2000). Microsoft Visual Basic. South-western Educational Publishing.

Wael H. & Mohsen R. (2000). Concatenative Arabic speech synthesis using large database, In Proceedings of ICSLP2000, vol. 2, pp. 182-185, Beijing, China.

List of Abbreviations

LIST OF SYMBOLS AND ABBREVIATIONS

ANN	Artificial Neural Network
ASCII	American Standard Character International Institute
BIDI	Bi-Directional
DSP	Digital Signal Processing
GTP	Grapheme-To-Phoneme
HMM	Hidden Markov Model
ICT	Information Communication Technology
IPO	Input-Process-Output Schematic
LPC	Linear Prediction Coding
OCR	Optical Character Recognition
RDI	Research and Development International
SAPI	Speech Application Programming Interface
SDK	Software Development Kit

SDLC	System Development Life Cycle
TTP	Text-To-Phonetic
TTS	Text-To-Speech

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