FACE RECOGNITION WITH RASPBERRY PI ON DRONE

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ABSTRACT

This work consists of a Machine Learning Algorithm, Local Binary Pattern Method (LBP), and a Face Recognition system by applying Raspberry Pi on the drone. Face recognition uses a cascaded classifier and face recognition is performed in three stages; feature extraction, mapping and classification. As a two-step application, the following steps apply; In the first case, the unique and most useful features are extracted and the face image is compared with the images in the database in the final stage (classification). In this LBP, both shape and texture information are accepted for the evaluation of a person's face recognition. This is based on the ability to find a weighted composition of several transformed vectors that can predict each face in a hundred databases. The main purpose of this system is; create a new generation mail deck. When the Drone (Quadcopter F450) recognizes the receiver, the image is taken in real time, thanks to a remote connected computer, and the recognized persons appear instantly. In addition, the developed application and tool can be used to detect criminals and find the person sought. In this study, it has been shown that the face recognition system can easily be done at a small cost.

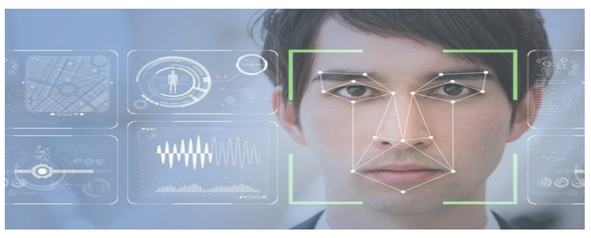
INTRODUCTION

Face recognition algorithms are in used in many domains, as applications such as in computers, on the smart-phones, in entry systems of many companies' private areas, etc. Even finding a proper hardware could be seen as problem, with the new developments in embedded computing, the computers such as Raspberries, Odroids and also other devices with proper mobile processors could be used with the budget friendly solutions. From this perspective, the most crucial part of the system is the application. The problem of face detection is challenging owing to textual differences among the faces, pose, facial expressions, orientation, facial size, lighting conditions, gender, different skin tones and changes in background. Machine cannot fully recognize the same person in different mimics. We want to introduce that person to the machine, regardless of people's mimics. Many face recognition systems are software based.

Face recognition algorithms are divided into two according to their general structure. The first is facial recognition using images, and the other is facial recognition using a moving image. These two technologies are often used. The method used in this study is to create a dataset with the photos taken from the moving image. If we summarize the working principle of face recognition system in three basic steps; person identification, knowing who a person is in a population census; verifying a person, knowing whether a person's claim to an identity claim is correct; person approving, if the person is already a registered person and if it is registered, to be updated.

Some of the popular face recognition algorithms are; Local Binary Pattern (LBP), Principal Component Analysis (PCA), Independent Component Analysis (ICA), Linear Discriminant Analysis (LDA), Evolutionary Pursuit (EP), Elastic Bunch Graph Matching (EBGM), TraceTransform Radon, Active Appearance Model (AAM), 3-D Morphable Model, 3-D FaceRecognition. In this study, Local Binary Pattern (LBP) is used with Raspberry Pi.

This work refers to a face recognition system with a credit card size is established. Later, this small system can be installed in any field, or it can be used concealed appropriately.



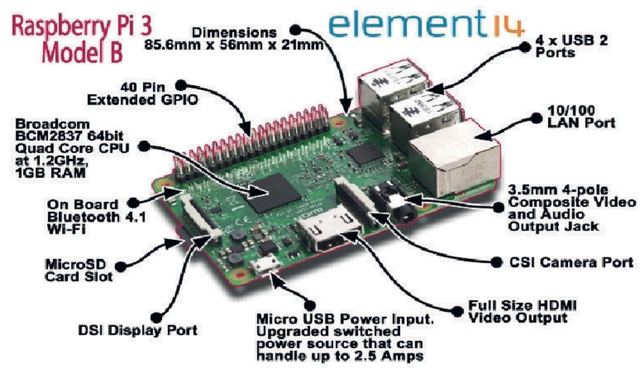
METHODOLOGY:
The Hardware and Local Binary Pattern

1. Raspberry Pi:

The Raspberry Pi is a series of small single-board computers developed by UK, Raspberry Pi Foundation. The aim of this small microcomputer is to teach the basics of programming and computer science to school students all over the world. It developed in two versions, Model A and B. There are some similarities between these models like Model A is cheaper than Model B, Model A has 256MB memory and with single USB port also without a Ethernet port. Model B comes with two USB ports, 512MB memory and an Ethernet port. The Raspberry Pi 3 has a quad-core 64-bit processor. It has 1GB of RAM and a 400 MHz VideoCore IV graphics processor. There is also a 64-bit 1.2 GHz ARM Cortex A53 chip on Raspberry Pi 3.

Also, Raspberry Pi Camera Module (Pi NoIR) was selected for use with Raspberry Pi 3. The 5 MP resolution camera has a fixed focus lens. The camera offers static image resolution of 2592 x 1944 pixels and supports 1080p30, 720p60 and 640x480p60 / 90 resolution for video shooting.

In this study, Raspberry Pi 3 Model B was chosen to create a hardware based system. Raspberry Pi 3, is a hardware system that gives us many conveniences in terms of its features.



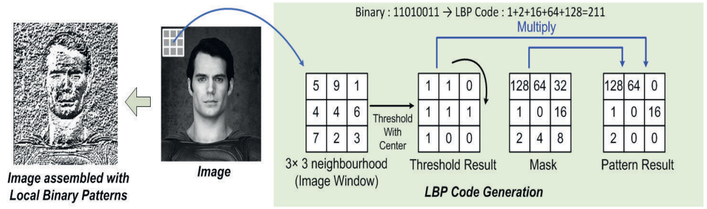
2. Quadcopter F450:

Drone usually refers to devices with autonomous flight capability. RC vehicles (radio controlled or remote controlled) can be called drone. In various forms and structures there are drones that serve different purposes. There are drones in different structures like planes, helicopters and multicopters.

DJI F450 is actually designed as a frame. The F450 is made in pieces and this is the best part about this quadcopter. The frame is robust and puncture resistant. However, damaged parts may be replaced in the event of a more severe collision. You can also buy other items such as this quad, flight controller and camera. However, these councils will be more expensive. In addition, this quad can be purchased with RTF (ready to use) mode with an attached camera. We used Raspberry Pi's own camera here.

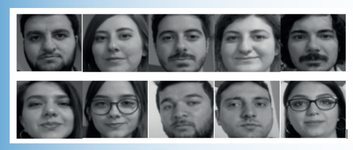
Local Binary Pattern Technique:

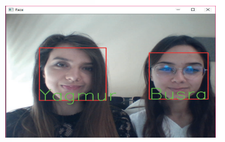
The LBPH method takes a different approach than the other machine learning methods. In LBPH each images are analyzed independently, while the eigenfaces method looks at the data-set as a whole. The LBPH method is somewhat simpler, in the sense that we characterize each image in the dataset locally; and when a new unknown image is provided, we perform the same analysis on it and compare the result to each of the images in the dataset. The way which we analyze the images is by characterizing the local patterns in each location in the image. Many dark lighting features will be created in areas such as the mouth, nose, forehead, hair in the face scan. Target values are generated from each of these. And this process is repeated in other stages by changing frame sizes.



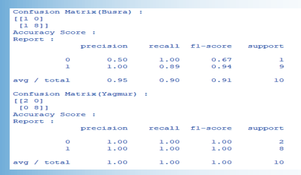
RESULTS

The results obtained by selecting a few of the datasets taken with a professional camera are as follows in the picture below. In left picture, each selected photo is converted to N * N size and converted to grayscale. Then, we used Local Binary Pattern Method for train all images. When the dataset is trained more than once, the machine learns the people and we can recognize more than one person. The result is seen in the image at right.

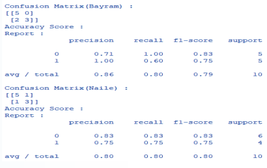




The following images show some selected people from the dataset. It species the accuracy and confusion matrix separately for each person the average of total accuracy is 87.4%.



```
Confusion Matrix(Busra) :
[[1 0]
 [1 8]]
Accuracy Score :
Report :
              precision    recall  f1-score   support

           0       0.50      1.00      0.67         1
           1       1.00      0.89      0.94         9

   avg / total       0.95      0.90      0.91        10

Confusion Matrix(Yagmur) :
[[2 0]
 [0 8]]
Accuracy Score :
Report :
              precision    recall  f1-score   support

           0       1.00      1.00      1.00         2
           1       1.00      1.00      1.00         8

   avg / total       1.00      1.00      1.00        10
```



```
Confusion Matrix(Bayram) :
[[5 0]
 [2 3]]
Accuracy Score :
Report :
              precision    recall  f1-score   support

           0       0.71      1.00      0.83         5
           1       1.00      0.60      0.75         5

   avg / total       0.86      0.80      0.79        10

Confusion Matrix(Haile) :
[[5 1]
 [1 3]]
Accuracy Score :
Report :
              precision    recall  f1-score   support

           0       0.83      0.83      0.83         6
           1       0.75      0.75      0.75         4

   avg / total       0.80      0.80      0.80        10
```

The reason for choosing Raspberry Pi for performing facial recognition instead of a computer is to provide a system that requires less space and requires fewer external elements. When we integrate this system into any device, it will be understood why the need for space and external elements is very important. It has been determined that the background is also important in the photographs taken with all these different methods. Pose, orientation, lighting conditions and changes in background, the machine's recognition success has changed.

Extraction of Cyber Security Related Discussions on Twitter

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ABSTRACT

Security analysts gather essential information about cyber-attacks, exploits, vulnerabilities, and victims by manually searching social media sites. This effort can be dramatically reduced using natural language and machine learning techniques. Aim of this project is to detect cyber-attacks using Twitter.

In order to obtain our initial dataset we have collected tweets that cover some predefined keywords such as “cyber security”, “cyber attack” etc. A keyword extraction technique based on TF-IDF weighting was applied on this dataset to obtain other cyber security related terms. We have enriched our dataset by crawling tweets that cover those identified keywords.

With the aim of identifying cyber security related discussions, we have applied clustering algorithms on our dataset.

DATASETS

The TF-IDF values are calculated over cyber security related datasets and non-related datasets. Then, the top ten words was extracted according to the TF-IDF calculation. Total raw volume of our Twitter dataset obtained in 2 months with the use of extracted keywords is 1,215,993 tweets.

METHODOLOGY

Research Methods and Tools

The first step of the project, a Twitter API was used to create a dataset from tweets using Tweepy which is an easy to use Python library to access Twitter API. The information that is necessary to access Twitter and to extract tweets from the Twitter through Twitter API was created using developer interface of Twitter API.

Elasticsearch

Elasticsearch that is a full-text search engine developed on top of the Apache Lucene infrastructure, distributed NoSQL database was preferred for real-time recording, retrieval, analysis and processing of extracted tweets. Elasticsearch indices are a collection of JSON documents.

Java-based Elasticsearch is provided via RestfulAPI and it is very fast and useful with 3rd party visual tools and security monitoring options. It can be used with all programming languages because it provides service through RestfulAPI. It can easily run on both Windows and Linux.

Logstash

Logstash was used to connect to Twitter API and extract tweets. Logstash configuration file was created with the information obtained from the Twitter developer interface, the necessary code segments and the keywords were written and the tweets containing these keywords were extracted in the real-time stream and saved to Elasticsearch.

Logstash is a real-time open-source data collection engine that collects data from different channels, filters at the configuration level, enables you to segment by certain rules, and distributes them to different types of channels.

In addition, data from all these sources can be analyzed by data visualization tools which are embedded in Kibana which is the user interface for Elasticsearch.

Kibana

Kibana, a data visualization tool, was used to display tweets stored in Elasticsearch. After launching Kibana in the system, the tweet stream can be displayed using http://localhost: 5601/app/kibana.
It is an open source data visualization tool where we can monitor the data recorded in Elasticsearch. It has visualization capabilities on top of the content indexed on an Elasticsearch cluster.

NLTK

Preprocessing operations were performed to calculate TF-IDF values via extracted tweets. The NLTK module is a Python toolkit which has implementations of Natural Language processing (NLP) tools. NLTK performs operations such as splitting sentences from paragraphs, splitting up words, recognizing the part of speech of those words, highlighting the main subjects, and then even with helping your machine to understand what the text is all about.

It was used to eliminate the stop words in these obtained datasets and generate word groups (n-grams). The 1st and 2nd N-grams of the datasets that cleared from the stop words were calculated by writing the necessary codes and filters. The TF-IDF values of the words or word groups are calculated by applying the TF-IDF algorithm on these filtered datasets.

The top ten keywords were selected from the calculated TF-IDF values to extract the keywords. Tweets were extracted from the dataset in the beginning with these keywords to create a dataset.

CONCLUSION

WE HAVE DEMONSTRATED THE RELEVANT PREDICTIONS FOR THE TOPICS ARE DISCUSSED BY APPLYING THE CLUSTERING ALGORITHM ON THE DATASET THAT IS OBTAINED USING EXTRACTED TOP TEN WORDS. TF-IDF VALUES ARE CALCULATED WITH THE CYBER SECURITY-RELATED WEBSITES WE CRAWLED, COLLECTED TWEETS; AND PUBMED DATASET WHICH IS A NON-RELEVANT RESOURCE FOR BALANCING THE DATASET. AN EFFICIENT KEYWORD EXTRACTION HAS BEEN OBTAINED BY USING TF-IDF SO THAT IT ALLOWS TO ANALYZE TWITTER'S CYBER SECURITY DOMAIN IN A MORE FOCUSED WAY.

AS A RESULT OF K-MEANS CLUSTERING, TWEETS ARE SEPARATED INTO FIVE CLUSTERS. THREE OF THE CLUSTERS WERE RELATED TO CYBER SECURITY ISSUES SUCH AS “RUSSIAN CYBER THREAT”, “INTERNET SECURITY” ETC. WHILE THE OTHER TWO GROUPS WERE FOUND TO BE RELATED TO DAILY TOPICS SUCH AS SOCIAL MEDIA. THESE CLUSTERS GAVE MORE INFORMATION ABOUT THE TRENDING TOPICS RATHER THAN THE SPECIFIC TYPE OF CYBER SECURITY EVENT. IT HAS BEEN UNDERSTOOD THAT MORE REFINED KEYWORDS SHOULD BE SELECTED IN ORDER TO EXTRACT CYBER SECURITY EVENTS. EVENT CATEGORIES SHOULD BE DEFINED FOR SPECIFIC TYPES OF CYBER SECURITY EVENT EXTRACTION AND MORE INTENSIVE SEARCH SHOULD BE PERFORMED OVER THE RELEVANT SEED KEYWORDS ABOUT THESE CATEGORIES.

Where to Stay ?

FACULTY OF ENGINEERING AND NATURAL SCIENCES

Saliha ALTINDİŞ Orhan AVAN Süleyman Fatih KILIÇ

Introduction

In this project, we developed an application for mobile devices using the Android operating system infrastructure. Our application basically aimed at providing communication between the house and the customer. Homeowners can rent and sell their houses or rooms on a daily / monthly / unlimited basis. Customers can find a roommate or rental place to rent a house for themselves.

We searched similar apps on Google Play before we started to develop and interface. We compensated for missing places in our own practice and identified human computer interaction mistakes. We designed our own practice this way. In the development process we first made hand-drawings. Then we plotted digitally with computer software in form that could be the closest to reality.

In this process, we have clone applications that include the properties of our application. We then used our mockups in the android environment, with the real interfaces using the android studio components. We made tests using drawings of our application with people who are not a project team and have a standard user qualification.

Using Firebase and the Google Maps API, we have used storage and technology in an easy and practical way, as another part of our application, internet interaction and storage.

Platforms

- This project's client side is developed in **Android Studio** by using **JAVA Programming** language.
- Prepared a mobile app in the **Android Studio** environment.
- **Firebase** to use to create and store data and we used Firebase for authentication, storage, database.
- To provide simple communication and code sharing between project members with **Git** and **Github**.
- **Picasso** library for images. Picasso is a powerful image downloading and caching library for Android.
- **Okhttp** allows us to make our HTTP requests more efficiently. It has been used to make uploads faster and save bandwidth.
- **Google Places API**, users will have better positioning and will be able to see their location in places

Goals

1- If the user registered to the app, the application starts by logging in.

2- The user can put the house(s) for rent in the application.

3- The second type of user can rent any house(s).

4- All users are required to attach photos, phone numbers and e-mail addresses in order to secure their own profiles. In the meantime, everyone can access the profiles of all other users. Non-registered users can only see part of the information of the ad owners for security reasons.

5- Users can see detailed information about ads given on the ad flow page.

6- The third type of user can sell the house(s).

7- Another type of user can buy any house.

8- The student is the first type of user that is primarily targeted. More than one person can contact to rent a house and they can search for a partner and be a partner.

Individuality

Our application is aimed at a wide range of users, from university students to engineers. However, the first feature that makes our application different is the first targeted user type of the students. Another distinguishing feature is that the user can rent a house for a daily, weekly or a certain period of time. Our third different feature is that users can communicate with other users while renting a house.

Conclusions

This project is not only a graduation project but also a business idea.

In the developing and globalizing world, with innovations brought by technology, people want to do things in less time. Everything that is fast and practical can be very attractive. Especially mobile applications should be fast and more practical. At the same time, the person should be satisfy. We chose the real estate application, which is the most demanding and challenging, but so necessary. The application is aimed at a wide range of users, from university students to engineers. So we chose to implement a mobile real estate application.

Our main goal in this project is to make the work of the users simple and practical. The safety part is an important detail. Our application is an application that can be improved. But with our current features, it is ideal for students who are mostly university students and who are looking for a place to rent for a certain period of time, weekly or even a day.

VIRTUAL REALITY FOR AUSTISTIC CHILDREN & THE WEBSITE FOR İLGİ AUTISM ASSOCIATION

Hatice AKIN - Şeyma KIZILTAŞ - Büşra ŞENDERİN

Supervisor: Özkan KILIÇ

Introduction

-Aim of improving the vital and social activities of autistic children, taking into consideration the difficulties that autistic children have

-VR is far from the limitations of traditional education

-These children can be customized according to their obstacles and offers children the opportunity to learn while having fun

-VR began to be used for many social and physical discomfortable and obstacles that decrease people's quality of lifein 1990s. We also consider such studies.

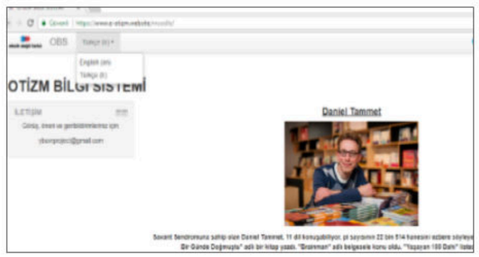
-Aim to keep the information of education institutions with a centralized web system to facilitate control and management.

-Make it easier for educators and administration to get information through the web system.

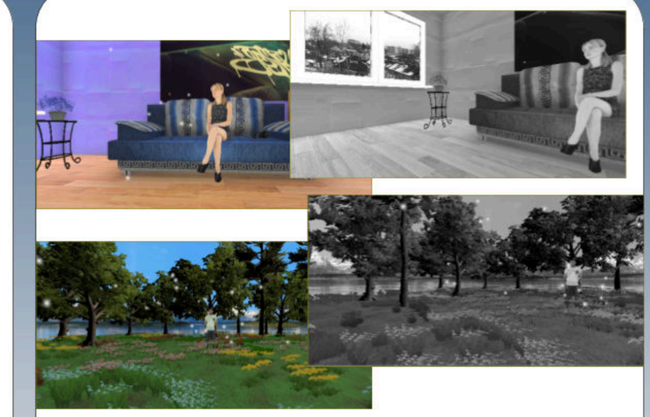
-The synchronization between the educators and administration

Methods

-Our website is the server-side dynamic web pages that are created by using PHP and MySQL because of Moodle.



-We plan to teach the autistic children, who tend to use technological tools and prefer visual stimuli, how to communicate correctly with Unity3D modeling. For example, if the child is in a virtual home (black and white), she/he will be a woman figure. If the child look at the model, home environment will be colored and will be black and white again after 8 seconds. In this respect, it is aimed to increase the rate of looking at the humans when the child communicates.



Results

Name	Theme	Total Time (Second)	How many times did s/he look?	How many seconds did s/he look at the human model?
Gökhan	Home	177.75	9	24.12
Gökhan	Forest	105.83	0	0
Emin	Home	190.87	9	19.03
Emin	Forest	89.90	2	9.60
Ceyda	Home	47.27	2	2.64
Ceyda	Forest	109.81	0	0
Ceyda	Forest	91.25	1	0.21
Ali	Home	62.52	0	0
Ali	Forest	92.93	0	0
Ahmet	Home	98.81	6	16.05
Ahmet	Forest	92.81	4	7.81

-It can be a developmental factor in communicating with people. Because children who have difficulty communicating with people communicated with us while testing

-Children are generally more successful in identifying and telling us moving and colored objects because they are highly sensitive to moving, colored objects.

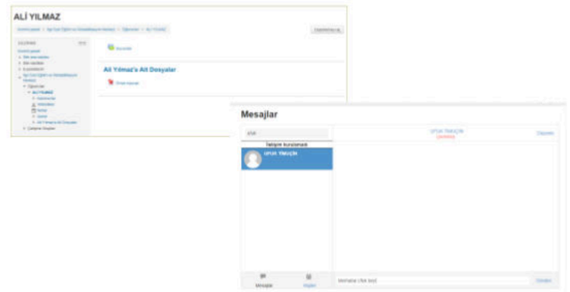
Conclusions

-https://e-otizm.website is available for access for İlgi Autism Association.

-Support to track and control of progress of children

-Make easy to enable information sharing about children.

-Be able to send messages and documents to communicate among the educators through this system.



-Develop and test virtual environment for the children to see whether this technology can be used to increase attention and focus on communication with people.

-Children feel like playing games. Virtual environments was appropriate for the purpose.

Speech and Eye-Gaze-Based PC and Ardunio Car Control System for Disabled People

Fatih Furkan İÇEL-Ferhat ÖZATAK
Osman SARIYER-Sinan KARAKOÇ
Supervisor: Asst.Prof. Hilal KAYA

ABSTRACT

The field of human computer interaction (HCI) involves the creation of interactive computing systems for humans to enhance the quality of life of people especially with disabilities all over the world. This study proposes a multimodal system to give the opportunity to carry out all daily works with a personal computer (PC) for disabled people that cannot use their hands. In this study, it's aimed to create an interaction between the user and a machine that is performed by user's voice and eye movements. Turkish Speech Recognition was performed by using mel-frequency cepstral coefficient (MFCC) extraction, hidden markov model (HMM) and artificial neural networks (ANN). As a joint part of the software, an efficient eye tracking system with a Tobii 4C eye tracker, was developed having a feature of eye blink detection for controlling an interface that provides an alternate way of communication. This multimodal system was developed by the authors using Java language and Matlab library and the system performed promising results for Turkish training words. To increase the system's performance, usage of natural language processing methods is planned as a future work.

INTRODUCTION

Many people are unable to operate PC by means of standard computer mouse or keyboard because of disabilities of their hands or arms. One possible alternative for these people is a multimodal system, which allows controlling PC without mouse and keyboard but using: (1) head movements to control the mouse cursor position on screen [1]; (2) speech for giving the control commands and (3) eye-gaze tracking to control the screen keyboard or mouse cursor position on screen. For instance, a human can have problems with activity of neck and hence reduced ability to move the head in one or more directions. In such cases the eye tracking system can be more successful than a head tracking system [2]. Of course, speech input is only one acceptable alternative to keyboard for motor-disabled users [3]. The multimodal system is aimed for the disabled people, which need other kinds of interfaces than ordinary people [4].

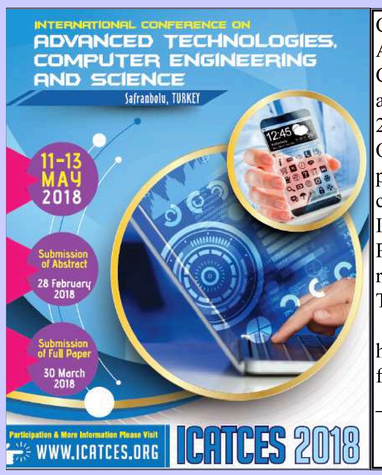
Most of the multimodal systems combine two modalities only: speech and head movements. It is concerned with specific application area for hand-disabled people, also there are some applications using such modalities as gestures, haptic, handwriting. On the other side using emotion recognition, facial moves, eye detection, etc. the system can be faced in the literature [5-7]. Telemaque is a system which employs a force feedback ready pen to help children learning to write. According to its authors this system achieved positive results regarding the adoption of a proactive strategy to control handwriting movements by the children who participated in the evaluation [8].

RESULTS

		TESTING	
TRAINING		YES	NO
	YES	49	13
	NO	11	27
Accuracy:0.76		Sensitivity:0.82	Specifity:0.71

Fig.11- Results of ANN Process in Viterbi Algorithm

INTERNATIONAL CONFERENCE



Conference on Advanced Technologies, Computer Engineering and Science (ICATCES 2018)
Our article has also been published in this conference and printed. International The Proceeding Book is released.
That link is below:

http://icatces.org/home_files/Icatces_Proceeding_2018.pdf

METHODS

HMM and ANN are known to be effective in the same way as for the voice signal processing and classification of the words. Fast Fourier Transformation (FFT) is a method for converting a change in the value of the time to the frequency domain. In contrast, the inverse Fourier transform is a method of converting the frequency values to the time domain. MFCC is the most popular method for extracting speech features from the speech recognition field. HMM, which is one of the state-of-the-art speech recognition methods, is used in the medium scale speech recognition studies [16]. HMMs provide a simple and effective framework for modeling time-varying spectral vector sequences. As a consequence, almost all present day large vocabulary continuous speech recognition (LVCSR) systems are based on HMMs [17].
Steps of speech recognition process is shown in Fig. 1.

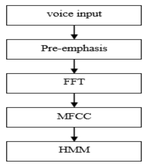


Figure 1. Speech recognition process [16]

Figure 2 represents FFT spectrum and speech signal.

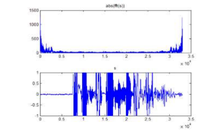


Figure 2. FFT spectrum and speech signal [16]

Steps of pre-processing process on the recorded word's signal as using noise removal method to achieve the speech without silence can be seen in Fig. 3.

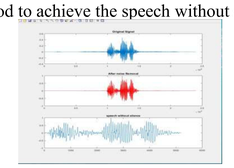
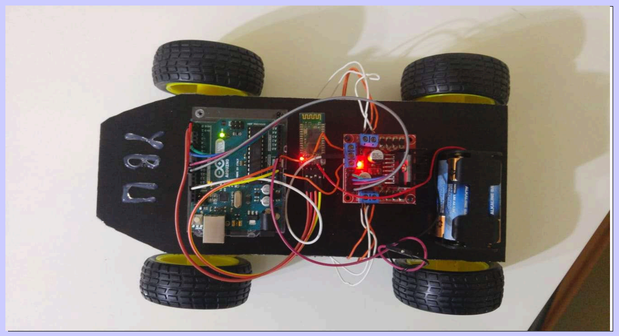


Figure 3. Noise removal step of signal pre-processing

ARDUINO CAR CONTROL SYSTEM



Our project goal was to build a car that we can control with the bluetooth feature in the computer using Matlab. We got the supplies for the car and the connection. Later we combined the supplies and completed the car setup. Then we installed the necessary codes on my Arduino card. When we loaded the code into Arduino, we disconnected the connections of the bluetooth module, otherwise we got error messages. To give you a simple explanation of the contents of our code; that a car can go to as left, right, up, down, etc. Finally, we designed an interface and matched it with the commands in our code so that our car could work with the eye and the voice.

After training the system with isolated words, system converts the signal to the text and uses it as a command. Interface can be seen in Fig. 4.

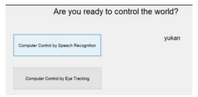


Figure 4. Graphical User Interface (GUI) of the system

How to extract the features from the signal using MFCC is represented in Fig. 5.

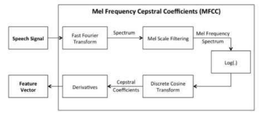


Figure 5. Study architecture of MFCC [18]

ANNs are nothing but the crude electronic models based on neural structure of brain. Artificial neurons are the basic unit of ANN which simulates the four basic function of biological neuron. It is a mathematical function conceived as a model of natural neuron. Fig. 6 shows the basic artificial neuron architecture [19].

In this figure, various inputs are shown by the mathematical symbol, i(n). Each of this inputs are multiplied by connecting weights w(n). Generally, this products are simply summed and fed to the transfer function to generate the output results. The applications like text recognition and speech recognition are required to turn these real world inputs into discrete values after MFCC, HMM steps [19].

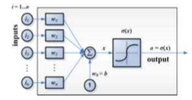


Figure 6. Basic artificial neuron [19]

In addition to the speech recognition phase, this paper also presents an efficient eye tracking system having a feature of eye blink detection for controlling an interface that provides an alternate way of communication for the people who are suffering from some kind of severe physical disabilities.

In this eye-tracking study, Tobii 4C eye tracker was used and on the area in Fig. 7, user's eye blink is tracked. Mouse cursor positioning on the screen is based on this eye-tracking process and activating the process is started with eye-blinking on the related area. Fig. 7 represents the eye-tracking area of the system.

Figure 7. Eye-tracking interface of the system

The eye tracker – which consists of sensors (camera + projectors) and algorithms. The custom-designed sensors are the hardware designed to be a high-performance sensor consisting of custom components and advanced optics. With this technology, user is able to point, select, zoom and do actions in faster, easier, more natural ways than it would be done with the mouse or touchpad [20].

SUMMARY

The overall aim of our project is to help disabled people use computers with a speech recognition system and Eye-Gaze-Based so they can make their lives easier.
Managing systems using voice and eye tracking facilitate operations like;
-Using search engines to find any information,
-Sending and receiving E-mail,
-Banking operations,
-Using social networks

CONCLUSIONS

This study proposes a multimodal system to give the opportunity to carry out all daily works with a personal computer (PC) for disabled people that cannot use their hands. In this study, it's aimed to create an interaction between the user and a machine that is performed by user's voice and eye movements. Turkish Speech Recognition was performed by using mel-frequency cepstral coefficient (MFCC) extraction, hidden markov model (HMM) and artificial neural networks (ANN). As a joint part of the software, an efficient eye tracking system was developed having a feature of eye blink detection for controlling an interface that provides an alternate way of communication. This system performed promising results for Turkish training words but for an isolated training set. To increase the system's performance, adapting the natural language processing methods is planned as a future work.

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ONLINE EXAMINATION SYSTEM

Fevzi AKYOL - Bayram İRPİK - Mehmet GÜLER - Cansın SARAL
Yrd. Doç. Dr. Hilal KAYA

INTRODUCTION

Before I start to explain the project, I would like to start with project narration by answering the following questions in general. What is the online exam system? What does it do? What is our goal with this project? Who will be able to use this project? What are the advantages of this project for us?

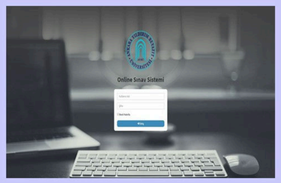
As we all know nowadays, there is a rapid transition to the online system in the examination systems as we know it. This examination system is widely used, as it is the examinations that the staff of the companies, the schools will do, and even the government agencies that give the documents and many in the unknown.

With this test system, we are aiming to evaluate the exams in a shorter time. Ensure that all students are admitted on the same terms. The questions given by exam periods can easily be tracked through this system. Removal of any building and supervisor needs for the exam.

We believe that all the examinations that will no longer be conducted on paper in the future will be conducted online. Also companies will select their staff, school students and public sector employees by subjecting them to a system of examinations conducted in this way. It is a fact that we are seeing that this test system, which is starting to be used slowly nowadays, is actually a fact that is not very far away. this interim report, and at the end of the project we can also add to the specifics of this emergence. We can offer a visuality and new acquisitions at a higher level

So what are the privileges of this system, what are the features? We are considering a project scope as below. Within this scope, we specify our plans to implement, implement or provide users in our proj- ect, and we have already passed out a lot of the bums as we have already mentioned in

LOGIN

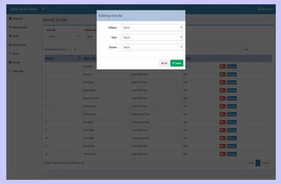


Login screen generally speaking, if we are going to build our project, it will be correct to start with the login screen of our project. Our Login screen has two check boxes, one text box and one login button. Here, user name and password are entered and then input button is pressed to enter the system. With the Remember me section here you can easily enter the next entry process. Another key point is that we can refer to the following issue with the "md5Has" method, which is used in terms of the security of the system when the login button is pressed. We've already mentioned this system in detail before you mention it.

DASHBOARD

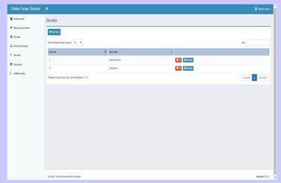
This is our AdminDashboard screen, where we have three episodes to come across. These are the "Exams", "Users" and "Permissions" sections. Shown here is the shudder. This is a section giving the general information about how many tests are being held, how many are registered on this system and how many tests are administered to these persons. In the second part, there is a field showing the graph. This graph decides what to display in the graph according to the experiment taken from the Drop Down section selected from above. So change the graphic. At the bottom is TimeTable. If we will briefly exemplify. When a new person or a new exam is added, it is possible that we do not see it here. We can say that this is a section that informs the administrator that the log records so far have been kept.

ASSIGN EXAM



Admin provides the system user through this screen to assign the exam. Admin tells you where he assigned himself before. Which exams these people are obliged to. In addition to these, it is a part of these tests showing whether they are active or passive. On the right side there are delete and edit buttons which are related to each data. These buttons are actions that enable the operations related to deletion or deactivation of the given permit. In addition to this, the user has the possibility to filter on the top side for convenience. For example, when you say username, it only attracts him. However, when the button is clicked on the newly assigned test button, the user drops down three tests and states that it is generally added when we select and approve the necessary ones. A new server is being asssigned for the exam.

LESSONS



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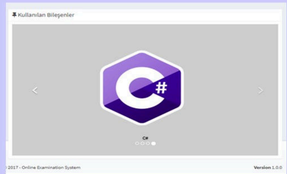
TECNOLOGY USED



HIGHLIGHT

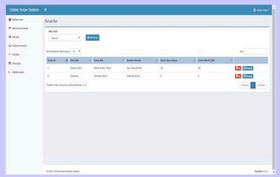
In the Admin dashboard screen , there is a field showing the graph. This graph decides what to display in the graph according to the experiment taken from the Drop Down section selected from above. So change the graphic. At the bottom is TimeTable. If we will briefly exemplify. When a new person or a new exam is added, it is possible that we do not see it here. We can say that this is a section that informs the administrator that the log records so far have been kept

If you have a question that you do not answer, you will be alerted and you can not leave the exam without answering all the questions (if you are not finished).

Power interruption and the response of your answers in case of an attack can be saved. We can do this operation by loading the log records from the database which we keep instantly each stylish selection.

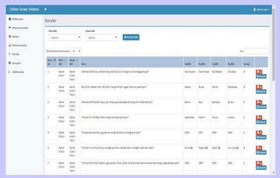
During the exam “right click” event of “f12” key is turned off in the current page. users are also prevented from accessing the script files. The user is also blocked from performing the dropdown button (upper right) until the end of the exam. this issue has prevented the wrong exit procedures that may occur during the exam.

EXAMS



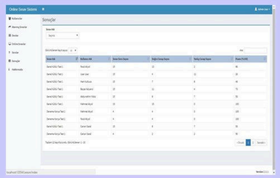
An important part to add here is the active passive state of the system. What is what we call active or passive? If a user has been assigned an exam in the active state, the button will be displayed when you log in with your username and password. If it is not active, the user will not be able to test it. So we will summarize. This section only includes the issue of whether the user will be able to go to and from the lab.

QUESTIONS



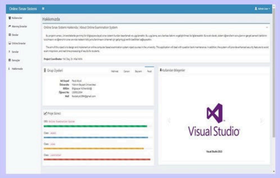
In our background, we can call it a question bank. Admin adds, deletes and edits questions here. Since the number of questions and the number of lessons will increase in the future, easier and faster processing can be done with the course and exam filter on the upper left. In addition, when there is a search related to the questions, a special search can be made with the search section in the upper right corner. When we add a new question, we need to select two fields, the course name and the exam. And we write about the questions related to the question text, options and correct answer. In this way we have added a new question.

RESULTS



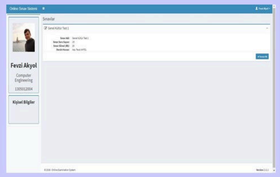
The screen where the results are displayed on the admin side after the user finishes the exam. There is a tableau on this screen. On Tableau are the names of the exams the users have participated, the number of questions in the exams, and the users have correct and incorrect answers. There are also scores for exams and the score is calculated over 100 points. A specific search can be made for users with the area at the top right

ABOUT US



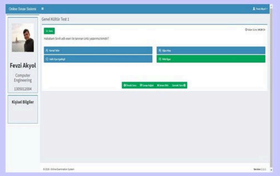
This section contains information about online examination system, project coordinator and group members. In addition, the names of the technologies and the

USER HOME



When the user logs in the online examination system , user comes to this screen. On the left is the information of the user. If the user has not been given an exam, the user will see the text "There are no guided examinations". If the user has been given exams, user will be able to see the user exams here. If there are more than one exam, the first exam will appear broadly.

USER TEST

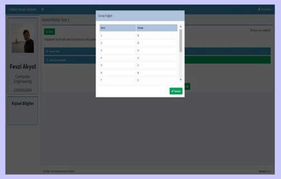


Reminder: in the upper right corner and it shows the remaining time of the exam. The time is decreasing from the moment the test is started. your exam will be terminated and your system will take you to the exam page.

Choices button: If you choose to make a choice, the stylish green color you choose will return.

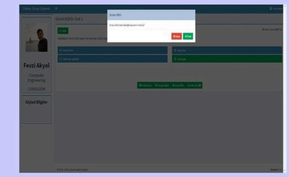
Preliminary question(önceki soru)-next question(sonraki soru) buttons: the first question button does not work during the first question and the next question button does not work while the last question is in question. After you answer the question you have, you can switch between questions and change your answer

ANSWER KEY



Answer key button(cevap anahtarı): when you click on this button you get a model in which you can see which question you are giving the answer. thanks to this model you can check your answers.

FINISH EXAM



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Next Generation Sequencing Pipeline For Oncology

Ahmet Kürşat Esim (1205012003) Ömer Ulutaş (1305011040) Faris Fathurrahman (14050141015) Engin Volkan Çolpan (15050161001)

Supervisor: Assist. Prof. Dr. Hilal KAYA

Introduction

The DNA contains the design of life. Inside the DNA structure there are codes required for the assembly of proteins and RNA. By understanding the sequence of DNA, scientists have been able to illuminate the structure and the function of proteins and RNA. They have acquired the interpretatiton of the underlying causes of diseases. Next-generation sequencing technologies – massively parallel sequencing, high-throughput sequencing, deep sequencing – help sequence DNA and RNA much more quickly and cheaper than the previously used technologies. NGS have revolutionised the study of genomics and molecular biology with regard to its high throughput, scalability, and speed capabilities in terms of sequencing multiple individuals and thousands to millions of DNA molecules at the same time. The aim of this article is to use Targeted NGS approach with bioinformatics analysis pipeline to explore the molecular diagnosis of Retinoblastoma [1].

Retinoblastoma is an eye cancer that begins in the retina, the sensitive lining on the inside of your eye. Retinoblastoma most commonly affects young children, but can rarely occur in adults. Retinoblastoma occurs when nerve cells in the retina develop genetic mutations. These mutations cause the cells to continue growing and multiplying when healthy cells would die. This accumulating mass of cells forms a tumor [2].

Tumor profiling using NGS focuses on a preselected subset of genes/gene panel. These panels contain genes that have known involvement in cancer, enabling the assessment of all potentially causative genes at the same time. Tumor profiling using NGS follows a simple workflow that can be easily scaled to hundreds of samples, enabling clinical labs to process more samples and deliver answers sooner. Targeted gene sequencing analyzes multiple genes in a single assay, optimizes use of limited tissue samples by reducing need for sequential testing, enables the accurate identification of rare variants in heterogeneous tumor samples [3].

A bioinformatics pipeline was developed in order to detect both single nucleotide variants (SNVs) and small insertions and deletions (InDels) and to distinguish between somatic and germline mutations targeted Next-generation sequencing is applied.

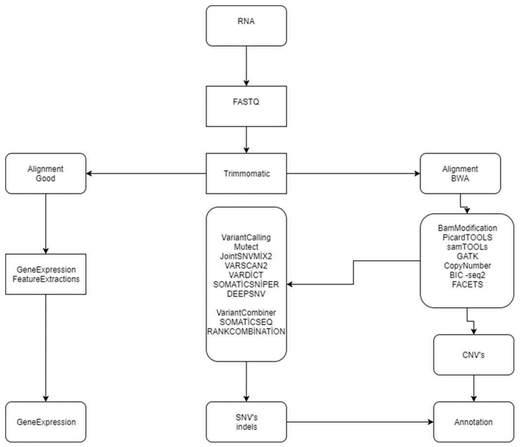

Fig.1 - System Architecture

Methods

A SH file is prepared by utilizing the ftp servers of NCBI. With this SH file, from anywhere at anytime downloading the Retinoblastoma Sample and the Healthy Reference Sample without surfing any website is provided. After preparing unhealthy sample the healthy reference sample is downloaded and converted to necessaary file types, FASTA, fastfai and dict. Another file type is bed file which helped us to locate appropriate region making the targeting operation. This was downloaded from ftp servers of Illumina.

Burrows-Wheeler Alignment

BWA is a software package for mapping low-divergent sequences against a large reference genome, such as the human genome.

Trimmomatic

It is important to clean up and trim the reads to improve its overall quality.

Variant Calling

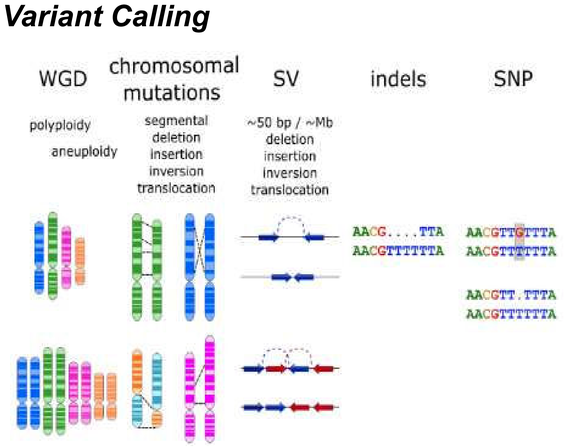

Fig.2 - Representation of Variant Calling

Single Nucleotide Polymorphism Calling

SNP calling identifies variable sites. SNP calling aims to determine in which positions there are polymorphisms or in which positions at least one of the bases differs from a reference sequence.

Genome Annotation ANNOVAR

Giving meaning to the nucleotide sequence.

Results

The output is a text file, Tumor Matching Report.txt:

```
Matching report
>>>>>>> Input
    bam file = out/TumorMatching/PCL-019_CTRL.bam
    outfile = out/TumorMatching/PCL-
019_CTRL.bam_snvStats/TumorMatchingReport_results.txt
>>>>>>> Reference
    number of bases = 3,137,161,264 bp
    number of contigs = 93
>>>>>>> Globals
    number of windows = 492
    number of reads = 35,031,285
    number of mapped reads = 34,926,693 (99.7%)
    number of secondary alignments = 0
    number of mapped paired reads (first in pair) = 17,486,510
    number of mapped paired reads (second in pair) = 17,440,183
    number of mapped paired reads (both in pair) = 34,876,146
    number of mapped paired reads (singletons) = 50,547
    number of mapped bases = 1,225,290,318 bp
    number of sequenced bases = 1,224,820,337 bp
    number of aligned bases = 0 bp
    number of duplicated reads (estimated) = 3,458,196
    duplication rate = 18.02%
>>>>>>> Insert size
    mean insert size = 13,141.326
    std insert size = 1,099,486.3897
    median insert size = 275
>>>>>>> Mapping quality
    mean mapping quality = 58.2668
>>>>>>> ACTG content
    number of A's = 316,809,826 bp (25.87%)
    number of C's = 295,884,321 bp (24.16%)
    number of T's = 317,663,806 bp (25.94%)
    number of G's = 294,462,384 bp (24.04%)
    number of N's = 348,996 bp (0.03%)
    GC percentage = 48.2%
>>>>>>> Mismatches and indels
   general error rate = 0.0047
    number of mismatches = 5,637,291
    number of insertions = 51,304
    mapped reads with insertion percentage = 0.15%
    number of deletions = 77,767
    mapped reads with deletion percentage = 0.22%
    homopolymer indels = 63.42%
>>>>>>> Coverage
    mean coverageData = 19.7356X
    std coverageData = 26.1748X
    There is a 96.41% of reference with a coverageData >= 1X
    There is a 94.44% of reference with a coverageData >= 2X
    There is a 92.41% of reference with a coverageData >= 3X
    There is a 90.17% of reference with a coverageData >= 4X
    There is a 87.67% of reference with a coverageData >= 5X
    There is a 84.86% of reference with a coverageData >= 6X
    There is a 81.78% of reference with a coverageData >= 7X
    There is a 78.46% of reference with a coverageData >= 8X
    There is a 74.92% of reference with a coverageData >= 9X
    There is a 71.23% of reference with a coverageData >= 10X
     ……
>>>>>>> Tumor Matching
    chrM    0       0       0.0             0.0
    Tumor Matching
    chr1    6235259     128384744   20.590122078329063
    26.221241034339034          No
    chr2    4375163     82075352    18.759381536185053
    22.551468209162955          Yes
    chr3    3699926     68895858    18.620874579653755
    20.644236275584824          Yes
     ……
```

Conclusion

We tried to detect tumor gene sequence using a reference sample by creating a pipeline for Next-generation Sequencing for tumor detection. As can be seen from the results we succeeded to an extent. Better results might have been gained and more solid conclusion might have been reached on the condition that we had more powerful hardware. Real world application of this process is done by machines and platforms that are specifically produced for this purpose. i.e. Illumina, ABI machines, PacBio etc.

Table 1- Confusion Matrix for Classification Results

Sample Size 30 Human Genom	Yes	No
Yes	TP 13	FN 2
No	FP 3	TN 12

Taking all the correctly classified instances into account, accuracy can be computed as: PA = 100 *(TP + TN)/(TP + TN + FP + FN.)

PA=100*(13+12)/(13+12+2+3)
PA=%83,33
This scientific study correctly classified in accuracy ratio of 83%.

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ENGELSİZ SES

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ABSTRACT

As a cross-disciplinary, speech recognition is based on the voice as the research object. Speech recognition allows

the machine to turn the speech signal into text or commands through the processof identification and understanding

and also makes the function of natural voice communication. And its ultimate goal is to achieve natural language communication between man and machine.

INTRODUCTION

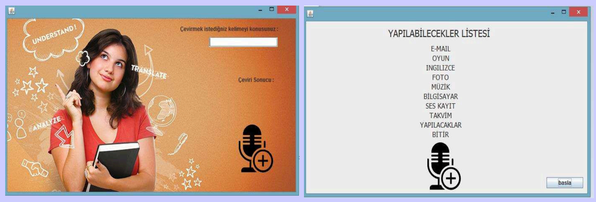
One of the basic agreement features of people is the ability to speak. One of the most basic ways that people use to communicate with each other is to talk. The human voice has many features in its body. These characteristics can vary according to the conditions such as human language, religion, race, climate. You can also gather information about the spea ker by looking at these features. Speech recognition, the ability of devices to respond to spoken commands. [1] Speech recognition enables hands-free control of various devices and equipment (a particular boon to many disabled persons), provides input to automatic translation, and crea tes print-ready dictation. Among the earliest applications for speech recognition were automated telephone systems and medical dictation software. It is frequently used for dictation, for querying databeses, and for giving commands to computer -based systems, especially in professions that rely on specialized vocabularies. It also enables personal assistants in vehicles and smartphones, such as Apple's Siri.

Before any machine can interpret speech, a microphone must translate the vibrations of a person's voice into a wavelike electrical signal. This signal in turn is converted by the system'shardware—for instance, a computer's sound card—into a digital signal. It is the digital signal that a speech recognition program analyzes in order to recognize separate phonemes, the basic building blocks of speech. The phonemes are then recombined into words. However, many words sound alike, and, in order to select the appropriate word, the progra m must rely on the context. Many programs establish context through trigram analysis, a method based on a database of frequent three-word clusters in which probabilities are assigned that any two words willbe followed by a given third word. For example, if a speaker says "who am," the next word will be recognized as the pronoun "I" rather than the similar-sounding but less likely "eye." Nevertheless, human intervention is sometimes needed to correct errors.

Programs for recognizing a few isolated words, such as telephone voice navigation systems, work for almost every user. On the other hand, continuous speech programs, such as dictation programs, must be trained to recognize an individual's speech patterns; training involves the user reading aloud samples of text. Today, with the growing power of personal computers and mobile devices, the accuracy of speech recognition has improved markedly. Error rates have been reduced to about 5 percent in vocabularies containing tens of thousands of words. Even

greater accuracy is reached in limited vocabularies for specialized applications s uch as dictation of radiological diagnoses.[1]

The objective of speech recognition is to determine which speaker is present based on the individual's characterization.



Translate page and main page view from our the interface.

METHODS

RECORD METHOD:
First matlab method is named Untitled it records voices.İt records voices for 5 second.

NOICE REDUCTION(normalization)
Second method is used for noise reduction.After that we determine total number of samples in audio file in code.Than Design a bandpass filter that filters out between 700 to 12000 Hz.Finally we just audio write data and sample and override old sound.

SLIENCE REMOVAL
Silence/unvoiced portion removal along with endpoint detection is the fundamental step for applications like Speech and Speaker RecognitionThis function is used for slience removal.We have to delete slience part in audio so we will be able to process on that audio in hmm and mfcc.We make a treshold valuethan only save loud parts in speech.After that it saves loud data to start of the speech so we coded a end point detection to the matlab and used threshold(0.03) value to remove slience from audio.

TRAIN-TRAIN_ALL-METHODS
First we audioread the voice than we have to extract features of voices so use melpcst function which comes from voicebox toolbox.We used 22 coefficent of melcpst After that we used our hmm function to train the system with 5 numstate and than used Expectation–maximization algorithm to find (local) maximum likelihood parameters which gives us 2parameter called my_mu ve my_sigma finally we saved those parameters to the results as .mat file to use in test state. For making training more easy we created a train_all_words function.We read sound names from file than used them to call train word function.

TEST WORD METHOD
We read the names of data with 'dir' than used melcpst again.Than with hmm_vit function we get a score for each word we want to recognize.Hmm-vit is a viterbi search algorithm.Viterbi algorithm is a dynamic programming algorithm for finding the most likely sequence of hidden states—called the Viterbi path—that results in a sequence of observed events, especially in the context hidden Markov models.So after those among the words we have trained, we report the one with the highest score, the most similar word, as the recognized word.And word have to be greater than -2.5e+04 if its less than this we return "ses bulunamadi" as a result.

TRANSLATE:
If the word is "English" when doing the Translate job, the program starts to listen to the sound. If the sound is heard and the resting sound is recorded in our data, the sesten word is estimated, and the sound predicted by the translation class is displayed on the screen. We designed the translation class in the following way. We used Java.net's java.net library. We used the URLConnection, URLEncoder, etc. URL link in "http://translate.google.com/translate_a/single" in this library.

COMPUTER:
In the computer control class, our goal was to have a few basic tasks of the computer with sound for those who can not use the computer. First of all, we had to get the position of that moment. We took the coordinates of the phare using the properties of the "awt.event" library so we can do this job. Then we made mouse cursor move right, left, down, up. We also used some of the important keys on the keyboard, "enter, space". In the user keyboard command, the word is written on the screen.

PHOTOGRAPH
One of the commands we would like the user to do while controlling the computer with sound was his own picture-taking process. In doing so, the "photo" command we receive from the user shows the user a snapshot of the photo. We used the most popular "OpenCV" library in photo and video processing programs to do photo taking in java. In this library, we first tested whether there was a camera attached to the computer that the program was running on. If there is a camera, "Videodevice" object in "OpenCV" is photographed with user. Then the used video device is released. Since the photograph was in "matte" format, we converted it to "BufferedImage" format to convert it to the form we wanted. Finally, the captured image was converted to jpg format and presented to the user.

MUSIC:
We have three commands in music section. We can "dur", "devam", "bitir". We added the jlayer library for the music section of the system. JLayer is a Java library that allows MP3 files to be played from Java programs. The "traditional" way to play MP3 files from Java is the Java Media Framework, which is a huge, it takes hours or days of heartrending labor to install, configure etc.., Jlayer on the other hand, is available as a JAR file, and for the most part just works, even from an applet. We created a Jlayer object. Than we saved Player object With the FileInputStream, we followed the instant spot of the music when its paused and resumed. So, when the user stops, we can turn off the music player and resume where the music is currently stopped. Than when we say "bitir" we can turn to main page.

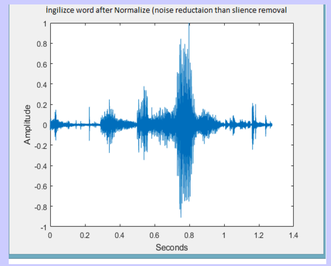
MAIL:
When the user wants to send mail by voice, he is called by "email" command. The person to whom the user will send an email and the person whom the mail will send will be saved in the system and prepares to send the mail. When the user speaks the word "email", the user is expected to voice "voice record" or "photo". If the user speaks "voicemail", the voice of the user is recorded for 6 seconds and sent to the corresponding voicemail. If the user says "photo", the photograph will be taken and sent to the corresponding salary. We chose to use the "javax.mail" library. The reason we like this is because in this mail library we can easily add the file we want to mail and it is easy to change the contents of the mail as we want. We used "javax.mail" library to send mail to port 465 from the smtp port required for java mail.
javax.activation: library for the data to be added to the mail
javax.mail: a library used for all the operations required to send mail .content, port, etc.

VOICE RECORD:
When the user wants to record a voice, he or she will say "record voice" and the voice recorder will record the user's voice for 6 seconds. In order to do voice recording, we used sound recording from our Matlab libraries, which we used to do estimation work in our project. When the user wants to record the sound, our Java audio record class will run the .m file that we wrote for the sound record in matlab and the sound will be recorded with success.

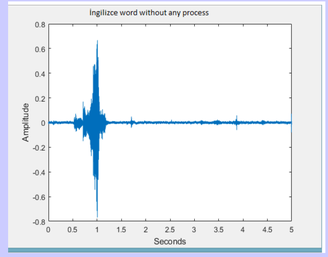
ROCK PAPER SCISSORS:
The game in which a human player plays Rock, Paper, Scissors against an AI using probabilistic reasoning. Rock, Paper, Scissors is an extremely simple game, popular amongst children, and for the purpose of simple decision making. The game involves players simultaneously (usually at the end of a countdown) choosing rock, paper, or scissors (usually in the form of a hand gesture). Rock beats scissors, scissors beat paper, and paper beats rock. More complex and 3+ player variants exist, but this is the most common version. We used Math.Random library for this part. We appoint random number between 1 -3 to ai and we assign number to rock, paper or scissor than we get input of the user a voice than compare the results between these and declare the winner.

TO DO LIST:
The purpose of this function is to record what the user will do and delete what has been made from the recordings.
When the user says ADD, the system waits for a sound, and if it can match one of the recorded sounds with the incoming sound, this data is added to the special list of the user. If the user say DELETE, the system will again pick up the sound from the user and remove it from the list if it is on the list.
Since this application is made by adding to the notepad, the system keeps the data in an external area and even if the system is turned off, this data will not be lost. The data will be displayed directly to the user when each application is opened.

CALENDAR:
We let the user see the calendar with sound. When the user say calendar on the main screen, it will be directed to the calendar screen directly, and when user say BITIR on the calendar screen, it will return to the main screen again. We used datachoier jar to use calendar.



After making preprocessing steps on the voice. («Ingilizce» word)



Before making preprocessing steps on the voice. («Ingilizce» word)

RESULT

We have 300 voice as dataset.We preprocessed 12 different voieces.Than tested these with trained dataset.There were %75 percentage of accuracy rate.We tested scores of voices with viterbi search algorithm and its showed us if it takes longer to spell a Word the algorithms the correct guess rate was dropping.Also when make some researches and tests and decided to use -2,5e+04 as a our limit to comparison of words after that our guessing rate it has risen slightly.

CONCLUSIONS

The goal of this project is to try control certain applications on the computer using fewer tools that need to be manually controlled, such as keyboard or mouse. In order to achieve this goal, we tried to implement a recorded command (turn on the music, move the mouse to the left or to the right) by teaching the commands we want to control (by getting the amount of sound we think is sufficient for both sexes).
The mass of people we expect to use the program will be people who will have obstacles in their bodies generally. Naturally, since the people using the program would not have the sound data stored in the system we choose to use Pattern Recognition Approach in our project.

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SUMMARY

We have researched what kind of characteristics the voice has, and what characteristics of these voices should be used. Firstly we pre-processed the voice with normalization(reduce noise) and slience removal.After that as a result of our research, we realized that we need to extract the sound mfcc properties.After extracting the properties of the voice, a prediction algorithm was needed to predict the characteristics of the voice.We searched for algorithms that could do this.We found that it was a useful algorithm for estimating the sound properties of the Hidden Markov Model algorithm and decided to do it and we also used viterbi search algorithm to sort voices. Than we then used this algorithms to develop a matlab implementation that is predicted based on voice properties. Then we wanted to use the application we used for this prediction in the Java.We moved the matlab application we developed with Matlab JavaBuilder(matlab compiler sdk) to Java.Because in Java we wanted to do various operations on the computer with these sounds. After we moved the voice recognition to Java, we needed to make an application for the user. First, we decided to make a simple application to the user by showing the actions that can be done using the voices we can recognize on the main screen. On our main screen, you have the options of Calendar, Music, Photo, Game, English, When the user speaks one of these, the recognition process will take place and the necessary intermediate will go and process. We used various libraries when doing these operations.

CONTENT RESTRICTION

Gülay YAVUZ, Benginur BAYRAM, Cansu AYDOĞAN, Eda KAPITAŞI

Supervisor: Assist. Prof. Dr. Hilal KAYA, ANKARA YILDIRIM BEYAZIT UNIVERSITY

Introduction

The project presents an overwiev of speech recognition and speech-to-text technologies and their applications on MATLAB platform.

We aimed at developing a suitable speech recognition system for Turkish language.

Speech recognition technology provides to take inputs from the human and removes the keyboard keys from the human-machine communication. Speech-to-text apps include the speech recognition technology.

The main work of this project is to study and research the techniques and algorithms of the speech recognition and speech-to-text technologies, thus to create a applicable system to provide the speech recognition.

There are many algorithms about speech recognition.

The algorithms used in this project:

- Hidden Markov Model Algorithm
- Viterbi Algorithm
- Stemming Algorithm

Methods

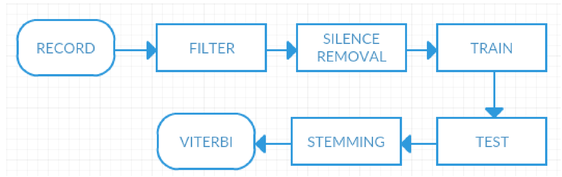


Figure 1: Recognition process

- **HMM ALGORITM**

HMM method is used as a classifier for signal processing and used for speech recognition because of order and place are important for this systems.
It models sound signals as a statistical and used in compare and accuracy processing which is the most important phase of speech recognition.

- **VITERBI ALGORITM**

The Viterbi algorithms finds the most likely string of text given acoustic signal.

- **STEMMING ALGORITHM**

Stemming is the procedure of reducing inflected words to their word stem, base or root form, generally a written word form.

Results

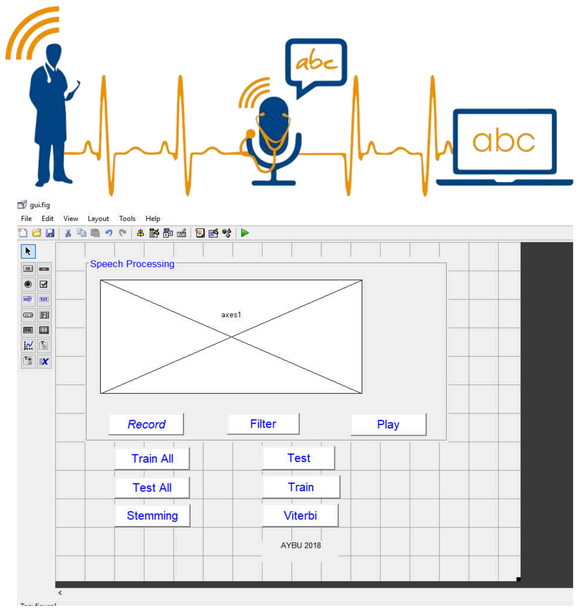


Figure 2: GUI

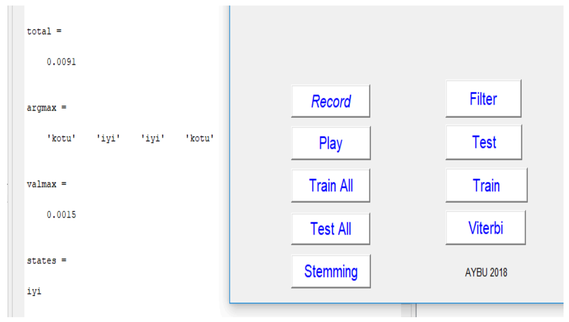


Figure 3: Viterbi algorithm

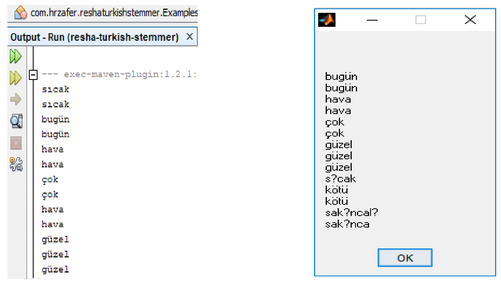


Figure 4: Stemming algorithm

Conclusions

As a result, this project have developed on both NetBeans and MATLAB platforms. Every word was recorded as .wav file. In the training process, voice record of a word was transformed into HMM. The voices were filtered. In the testing process, an unknown word was recognized by using created HMM in training stage. We used Viterbi Algorithm for finding the most likely sequences of hidden states that results in sequences of observed events, iyi and kotu, especially in the context Hidden Markov Models. We were able to separate the words into their roots thanks to Stemming Algorithm.

Future Works

- As we shown the methods in Figure 1 and Figure 2 with the steps, we aimed that automatically run these methods in a single button.
- Train more sentences and restrict each newly recorded sentence.
- In our viterbi algorithm we are now giving state weights ourselves but in the future works we aim at providing the state weights automatically with a deep learning algorithm using a large data set.

AUGMENTED HISTORY

FACULTY OF ENGINEERING AND NATURAL SCIENCES

Senem Arslan, Edanur Köklü, Merve Hatice Arslan
Instructor : M.Abdullah Bülbül

INTRODUCTION

Today, there are many historical buildings such as mosques, towers, bridges, palaces, buildings that date from our history, so they are of great value for us But many of today's historical structures have lost their original appearance for different reasons like that they were damaged, destroyed or restored.

We aim for originality with Augmented Reality to protect our history and our historical values.

AUGMENTED HISTORY is a project that provides reconstruction or restoration of the structures that have lost their original appea rance with increased reality by means of a device with GPS and camera,such as phone and tablet. We have developed the project to improve historic buildings, convert them to their original appearances, and hide the created 3d models.

This application creates a repository of the models of the works.If the created repository is corrupted, even if it is lost, the basic infor mation of the structures will be available in 3d model of the structures. For this using the Augmented Reality technology, the model of the build can be seen as if it were in place.

MATERIALS AND METHODS

The project was divided into two parts as a **WEB part** for 3d model and database and **ANDROID part** for Augmented Reality in the device camera. And we executed these parts simultaneously as two groups.

➤ ***On the Web part***, the user can create a 3d model and structure repository. For this, many photographs that taken from different perspectives were paired with the Visual FM and 3d point clouds were created. The Meshlab program was used to transform and edit point clouds into available 3D models. Texture was created. There are 3 files in the model: obj, obj-. mtl and texture. Database was created in which the structure and models were stored by receiving information from the target users. In the construction of the website MySQL was used as database, wamp server as server and html, css, java script, php as software language. Three.js library and json files were used to upload 3D models.

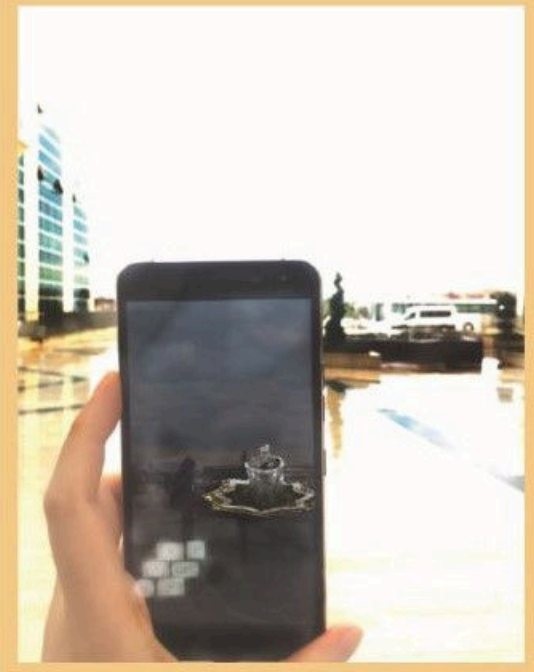
➤ ***On the Android part,*** Augmented Reality is realized by using Unity3d platform. For this, the user opens the camera of device with the application and sees the building in the camera. The application identifies the position of the user and orientation of the cam. by taking GPS coordinates and coding Gyroscope in C#. Then it gets model of the building as AssetBundle format from the reached Wampserver database. The code converts it to a 3d model and places over the building in the camera. For possible Gps coordinates errors, to place the model exactly at the right place, we added buttonson the screen that the user could change the position of the model. Thus, it is seen in the camera in its original *or* repaired form

Project Development Method

Scrum software development method, which is a recursive development method, was preferred and we did sprints every week by meeting with the instructor.

CONCLUSION

As a result, on our website, the user can login to the site, sign up, upload the model, like the model, download the model and reach the model on the map. Or the user direct can use the program in device camera. The user can see the 3d model that taken from database over the building by using Augmented Reality.



A Real-time and Secure Patient Monitoring System (RSPMS)

Yrd.Doç.Dr.Hilal KAYA

Tuğba YILMAZ,M.Betül MURATOĞLU,Melike S.ERARSLAN

ABSTRACT

The main objective of this research is design and realization of a wireless, secure, remote monitoring, control and feedback system using GSM technology for patient health. In this study, CRUD (Create, Read, Update and Delete) operations can be performed on a Windows Communication Foundation (WCF) server and on the developed mobile application using MySQL database. This system also includes a ripped QR scanner that prevents the browsers from entering QR code information because authors developed a crypto QR code definition of the patient's TC identity number. All of patient's assay results and their radiological views are recorded along their reports. Doctor can access this information by scanning patient's QR code. Patients who need daily follow-up (such as blood pressure, blood sugar, heart rate) can send their daily, weekly and monthly results to the physician using this application. If there is an extreme situation in their results out of the reference interval, doctor will be notified automatically. System can also support the appointment processes easily. In an instant panic situation, this system can communicate to the 112 emergency services and also in this urgent situation, by the help of push-to-talk button, system can send the patient's instant location to the number indicated by short message service (SMS). If 112 emergency departments support the connection, system can also send this location information automatically to 112 emergency system. Transmitted data is archived and visualized both on a mobile phone and on a central server. The experiments on the proposed system gave promising results that is accurate in scanning, clear in monitoring, intelligent in decision making and also reliable in communication.

INTRODUCTION

The main goal of the Real Time and Secure Patient Monitoring System project is a mobile application that aims to make patients who need to be constantly monitored communicate with doctors more easily and remotely.
It allows patients registered in any health facility to easily follow their diseases by the doctor.
This allows the most effective use of the communication between the patient and the doctor in a shorter time.
The transactions that are followed up through the document are monitored and managed by the mobile application.
The time loss is planned to be reduced to a minimum.

SOLUTION

With the QR code created for the patient, the doctor will scan the QR code instead of reviewing it from the file and quickly access the patient's file and all assay information.
Patients who need daily follow-up (such as blood pressure, blood sugar, heart rate) can send their daily, weekly and monthly results to the physician using this application.
Application automatically reports the data regularly entered by the patient and automatically graph the data at specific intervals, doctors will make their follow-up more effective.
In a panic situation, this system can communicate to the 112 emergency services and also in this urgent situation, by the help of push-to-talk button, system can send the patient's instant location to the number indicated by short message service (SMS).
If 112 emergency departments support the connection, system can also send this location information automatically to 112 emergency system.
System can also support the appointment processes easily.
With in-app messaging and appointments, doctor-patient interaction is improved, and it provides a more

METHODOLOGY

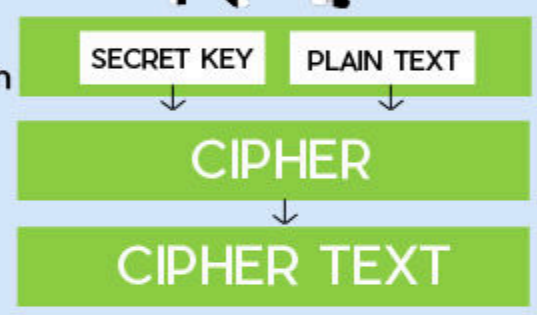
Windows Communication Foundation(WCF) Server provides communication between the android interface and the database.
In this study, CRUD (Create, Read, Update and Delete) operations can be performed on a Windows Communication Foundation (WCF) server and on the developed mobile application using MySQL database.

Zxing Library for QR code

We used the Zxing(zebra crossing) library, one of the google open source libraries, for QR code generation and scanning.
QR was created using the patient's identity number. The QR code is encrypted using the AES algorithm to ensure the security of the patient's identity number.

Advanced Encryption Standard(AES) Algorithm

The AES algorithm is a block cipher algorithm that encrypts 128-bit data blocks with 128,192 or 256-bit key options.



SIMILAR STUDIES

E-Nabız is a personal healthcare system provided by Ministry of Health in Turkey. Anybody who has an account can access the personal health information from a single location, regardless of where the examinations and treatments are conducted.

Another remote healthcare system Doktorderki is a consultation model that works with professional doctors from different branches. Patients can consult some experts for free, share their labs by the help of the messaging system and they can get a quick return from the doctors.

A commercial application iCare provides personal health programs (diet, sports) and health risk assessment for users by collecting and analyzing the health information with wearable device that makes phone measurement.

CONCLUSION

In this study, a wireless, secure, remote patient monitoring, control and feedback system was developed using GSM technology for patient health. RSPMS aims to facilitate the follow-up procedure of regularly monitored patients by the doctor. This system can be used by private health institutions, private clinics etc. User-friendly design, securely storing information structure and the ability to receive all kinds of summarized reports make the system preferable. Conducted user tests on the system gave promising results. As a future work, we would like to incorporate the medical sensors via wireless connections to this system to automate the information sending-out process.

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Visual Studio

MySQL

Admin Portal Website

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Supervisor : Özkan Kılıç

ABSTRACT

The objective of this study was developed a useful website to create an employee, admin and parent portal concept for use in the Albatros educational institution. The portal concept consists of three different login, users were divided into three main areas: admin, parent, and personnel, where different pages were organized according to user requirements and different authorities were defined. Albatros needed to improve with regard to all portals. The first proposal produced during this study is usefull designing and portals for the users. The second proposal is users should be able to handle their transactions as soon as possible.

The portal was developed using several development tools such as where the Windows platform is the operating system on which the portal runs, Apache is the server, while MySQL was used for the database and PHP as the scripting language.

INTRODUCTION

Interactive admin portal for effective management in Albatros institution seeks to address the arising from result processing, tuition fee payment,a calendar system for teachers to organize their curriculum and add the necessary grades, student informations and their lessons situation management ,are analyzed in this work. An interface was generated to handle this problem, the software is an interactive one. This portal is protected by security measures such as passwords, encryption, and firewalls, and thus can be accessed by authorized users. The purpose of this project is to develop a software product that would meet the needs mentioned above in the problem definition. The objective of this study is develop a useful website to create an employee, admin and parent portal concept for use in the Albatros educational institution.

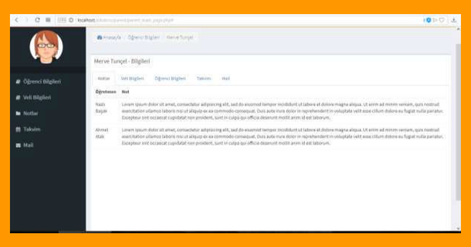
This project contains 2 parts:

1-Front-end

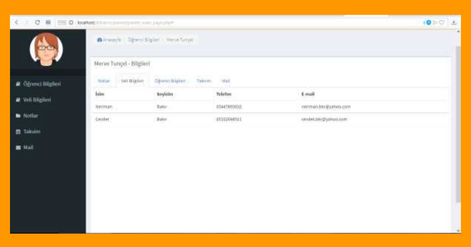
2-Back-end

Users access their pages by logging in from their own section. Admin, parent, and personnel, where different pages were organized according to user requirements and different authorities were defined.

PARENT



Parent can see teachers' notes about the student. At this point, the parent can follow the course status of the child.



Parents information is on the page. If Parent wants to change any information, it can update the information by communicating with the institution.

METHODS

Overall Description

Through this web portal we are trying to overcome the drawbacks that are present in existing website. We are also providing new facilities to the users which is quite different from other website. It will enable users to see the information according to their preference, by using sorting facilities according to rent or distance from given location. It will display information through effective searching.

Our main class is admin who will able to handle the website and the database related works. Admin will manage the new student and personel to the web portal. Our second class personel can add notes and absenteeism about their students' lectures. They can plan their course schedules from the calendar section on the page. Our last class parent can see the content about the student and the teacher's notes about the student in the website and parent can't change anything on website.

System Features

Maintainability: There will be no maintenance requirement for the web portal. The database is provided by the administrator and clients and therefore is maintained by this Admin. This website is automated.

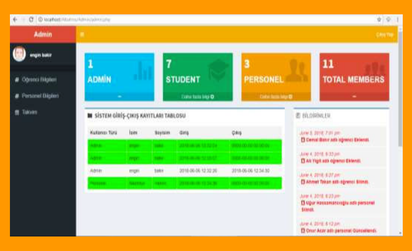
Portability: The system is developed to work on any environment so it can be portable.

Availability: This system will available on any system.

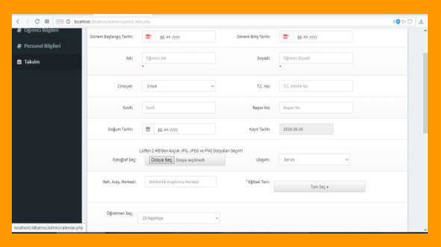
Reduce Time: The system was passed from the written system to the online system, where both data access and record time were minimized.

Security: Data security was provided by querying the user name and password on login to the system.

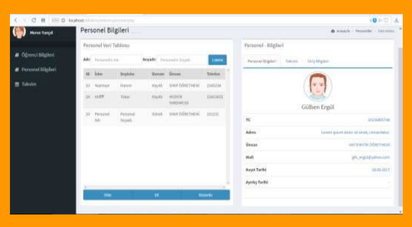
ADMIN



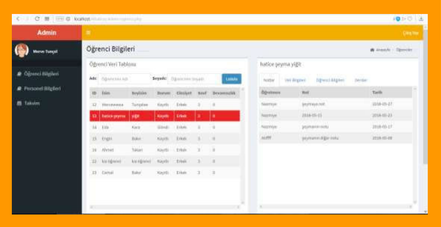
Thanks to the notification table located on the adminin page, the admin is informed about the changes made within the institution. The number of students registered in the institution and the number of employees can be updated on the main screen. The information of all the students can be read easily, the notes that teachers give about their students, can be reached.



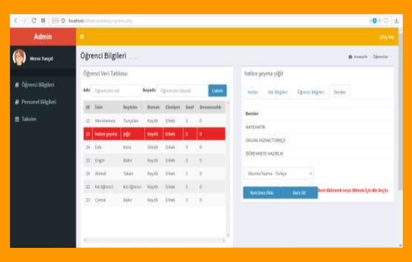
The student registration page is located in the admin panel. There is a requirement to fill in the yearly fields and this information prevents the necessary information from being overlooked during registration. The user can upload the photograph of the student on the computer to the system during recording.



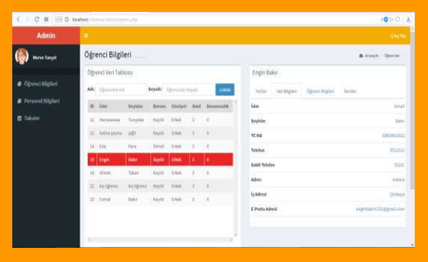
In the personel information section on the Admin page, admin can add new personel, delete existing personel, or update personel information.



In the courses attended by the students, the information about the student can be seen by the teachers.



Lessons taken by the learners can be accessed by clicking on the courses area.



Family information can be viewed on the same page.

RESULTS

Admin portal web site creates a useful and secure environment with three different user login screens. It is aimed to reduce most of the time loss of users while creating portal. As a solution to the needs of the Albatros special education center, admin, staff and parent pages were made.

The admin page gives admin access to all staff, family and student information. The student enrollment system was designed to minimize the loss of time by taking into consideration the problems encountered in the new student enrollment. Some of the operations performed with the pencil pen are moved to the virtual center and the admin table is informed up to date with the changes made in the institution thanks to the notification table which is located on this processing time greatly.Adminin page. The number of the enrolled students and the number of employees can be seen on the main screen up to date. information about the teachers, notes about the students about the students, absence of the students, parents information.

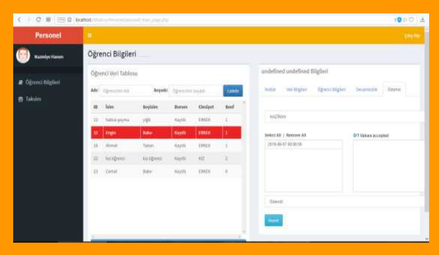
Teachers can add to the payment table of the lecturer by means of payment follow page in the staff section. By adding the lecture status of the learner as a note, it provides data for itself as well as for management, family and other teachers. The students who can not attend the lesson record the absentee status and plan the lesson that the student will take in the next days. Thanks to the calendar on the personel page, the teachers can see the days when the students who have given the common lesson are appropriate. The progress of the student is monitored by updating the table of achievements belonging to the student periodically.

It is aimed to reach the information about the student of the family and to follow the lecture program. Parent can see teachers' notes about the student and the curriculum. They can not add anything to the system or delete anything from the system.

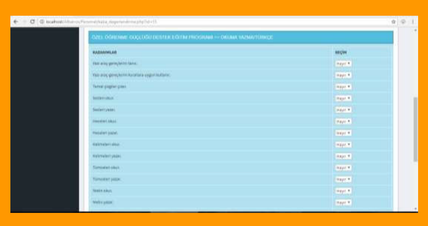
SUMMARY

The aim of the roject is to develop a useful web site that is helpful to Albatros Education Company and also to enhance the registry system hat is already in use. There is a loading period while registering the students on the in use system, instead in the web site admin or the secretary can directly register by logging in. This decreases the processing time greatly. Teachers can edit student or class procedures by few steps in the web site. Teacher can easily change the information of the students or the class by the calendar on the teacher page. The information of the students can only be accessed by admin or secretary as a security measure. If needed, these informations can be shared with other employees by admin. On te website there are some icons showing the continuation of the students. The admin can easily track the course continuations. Students will be dismissed if they exceeds the total number of allowed absence days. Before this happens, admin and secretary will be informed. Other function of the web ste is to inform the admin and the secretary about the payments of the parents. These payments can be seen in terms of amount and dates.

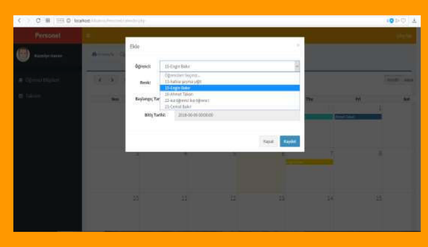
PERSONEL



Teachers can add to the payment table of the lecturer by means of payment follow page in the personnel section.



The teacher keeps track of the progress of the student by updating the table of achievements belonging to the student periodically.



With the calendar on the personel page, the teachers see the days when the students that they give a common lecture are suitable, so that the lesson plans accordingly. The coloring and the adjustment of the start date of the start date of the calendar.

CONCLUSIONS

- Admin portal web site with three different user login screen with a useful and secure environment was created. While the portal was created, it was aimed to save the most time lost. The admin, staff and parent pages were made as a solution to the needs of the Albatros special education center. The admin page gives admin access to all staff, family and student information. The student enrollment system was designed to minimize the loss of time by taking into consideration the problems encountered in the new student enrollment. Some operations made with a pencil pen are moved to the virtual center and this decreases the processing time greatly..The use of this system provides benefits such as efficient use of time by users, safe access to data storage and easy access to data.

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Mobile Restaurant Finder Application

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Supervisor: M. Abdullah Bülbül

Introduction

Goal of the Project

Goal of the Restaurant Finder Application is that people might be able to learn which restaurants fit the users' needs and criteria.People tend to go to places which other people also likes and they want to be able to see the other people's thoughts about those places.Another criteria is that nowadays people don't have much time to eat.Hence they want to eat somewhere that they can easily reach,somewhere that they are close by.
Restaurant Finder Application intends to meet users' demands according to above criteria.In this application, people will login by their emails and they will be able to leave comments on restaurants, or rate them.People can see these comments,ratings, pictures of restaurants.They can also view these restaurants on Google Map with a single button.Google Maps will show the route to these places according to the users' current location.

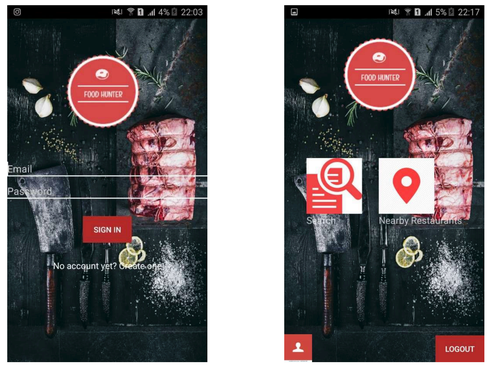
General Structure of the Application

Restaurant Finder Application is an app that has been developed for Android smartphones.This app retrieves data from a website that was developed for this app via web server.First this application has a Login and a Sign-Up page.If users don't have an account,first they create one via Sign-Up page and they are redirected to Login page.After they are logged in they can either search for a specific restaurant or they can view the ones that are near to them.Then they can see restaurant info including distance,comments,rating and pictures of these restaurants.Also, they can view the route to these places via Google Maps app according to their current location.Lastly,they can view the restaurants that they have rated or they left comments on by going to the profile page.

RESTAURANTS
Restaurants

ID	NAME	LATITUDE	LONGITUDE	IMAGE
1	Big Baker	39.931407	32.826221	
2	Timboo	39.913344	32.809319	
8	Etlik Mangal	39.969338	32.819824	
9	The Bigos	39.916690	32.858074	
10	Devrez	39.905074	32.868818	

Restaurant Web Page



Methods

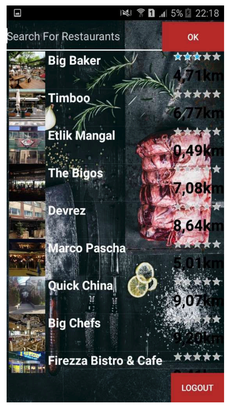
XAMPP:
A server was needed to build a bridge between android application and database which all the information this app uses are stored.Hence XAMPP which is a local server was set up.

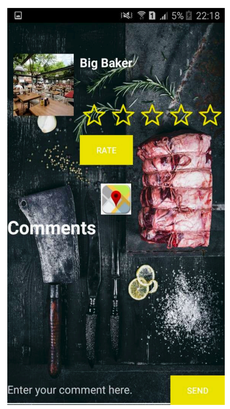
MySQL:
MySQL is a relational database management system.It was used to store data about appllication.

HTML/CSS:
A simple web page for restaurant information was created in order to use when Android application requests the data about restaurants.For the design of this page, HTML/CSS was used.
Web Services:
Web Service is a part of the program that provides services via the HTTP protocol over the web.Usually, two data formats are used for web services which are XML and JSON.In this app, JSON was used.
In Android:
AsyncTask:A structure on the back of our main screen to continue the process without interrupting the user's operations.
Location Service:Used for finding the latitude and longitude of current location.

Summary

In the restaurant finder application, first back-end part like server, web services etc. was created.A local server(XAMPP) setup was made to be able to communicate through network.Then data which will be used in the application was put into the MySQL database.By using this info, a restaurant web page which includes information about restaurants was created.Also, three other tables were created aside restaurant table.In PHP, these data was converted into JSON format for further usage on Android app. Then in Android part, several activities were done by using these JSON data.For saving data into database, information in Android was converted into JSON and then sent to PHP through http client.Data was saved to MySQL by using PHP.
In application, there are several activities which are Login, Signup, Home, Search, Find, Profile and Rating and Comments.If user account exists, user can login, if not they can create account on Signup page.Then in Home page,user select Search or Find option.In search section, user can search for restaurants.In find section, app automatically lists the nearby restaurants.In home page, user can also see profile.Finally if user click on a restaurant, Rating and Comments page is displayed and user can leave a comment or rate the restaurant.





Conclusions

In conclusion, this application was made for people to use when they want to go to a restaurant and can't decide where to go.By this app, people can see comments, ratings about restaurants and decide acccordingly.Also people can see the distance between them and location of restaurants.
When compared to other applications which is similar to this, database can be improved for this app, because in this app, a certain amount of restaurant info wasa used.If this amount can be increased, application can be used more by people.

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