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ÖNSÖZ

Fakültemiz bünyesinde bulunan 11 Bölümümüzde mezuniyet aşamasına gelmiş mühendis adayı öğrencilerimizin mezun olabilmeleri için Bitirme Projesi hazırlama zorunluluğu bulunmaktadır. Hazırlanan bitirme projelerinin yılsonunda sergilenmesi Fakültemizde bir gelenek haline gelmiştir.

Öğrencilerimizi, öğrenimleri sırasında elde ettikleri bilgi ve becerileri kullanarak sorgulayan, araştıran, veri toplayan ve sonuçları bir proje çerçevesinde bir araya getirerek sunabilen iyi birer mühendis olarak yetiştirmenin gayreti içerisindeyiz. Bitirme projeleri, öğrencilerimizi yaratıcılığa teşvik etmekte, yeteneklerinin desteklenerek geliştirilmesine ortam hazırlamakta ve ülkemizin geleceğini yönlendirecek, bilimsel alanlarda özgün ve farklı düşünceler ortaya koyabilen, özgüveni gelişmiş bireylerin yetiştirilmesine katkıda bulunmaktadır.

Proje sergisi etkinliği ile öğrencilerimiz gerçekleştirdikleri projeleri diğer öğrenci, öğretim üyesi ve üniversite dışındaki kuruluş temsilcilerine tanıtma fırsatı bulmakta, sanayi ve üniversitenin iş birliği sürecine katkıda bulunmaktadır.

Bitirme Projesi sergisine katılan öğretim üyelerimize/elemanlarımıza, öğrencilerimize ve tüm kuruluş temsilcilerine katkıları için teşekkür eder, saygı ve sevgilerimi sunarım.

Prof. Dr. Turgay ONARGAN

Dekan

Bitirme Projesi Sergisi

Düzenleme Kurulu Adına

3D AR MODELS ON A REAL ENVIRONMENT

Berkay HAN, Vedat ÖZCAN, Cem HAFIZOĞULLARI

Advisor: Asst. Prof. Yunus DOĞAN

If we look at the past years, we can see that augmented reality has become widespread day by day. It is developed by working on it day by day and is included in our lives. With the applications made in this context by observing real life, this technology is integrated into the daily or technological tools we use and is included in our lives. Since this technology serves all kinds of fields, it can be encountered in the field of entertainment, history and art, health and treatment, education and sports. To put it briefly, it is advancing step by step towards a position that will cover all areas of our lives.

While creating the application, the project was started by trying to combine augmented reality with history. Historical events have always attracted people's attention. It triggered the motivation to research and learn the right information from the right place. The desire to learn where people come from, who they are and what happened when they did not witness it has always prevailed. While developing the application based on this, historical events were researched and tried to make them livable again in the places where these events took place. In the application, options appear in front of the user with a login screen. From here, it is possible to access the information on the determined locations by switching to the maps and then accessing the actions in these locations before being there. This information includes historical events on the same location in the past years, and this information is supported by visuals and sounds. In addition to the information mentioned at this point, mobile models designed for augmented reality appear in the application when the user can see the instantaneous location on the map regularly and goes to a desired location from the determined points. Thus, it has been tried and realized that the user has been in the action at that time with animated visuals, sounds and explanatory texts. The app appeals to all types of people. It provides a positive interaction with the user in maturing the historical consciousness, witnessing the past events in a more realistic way, developing the general culture and informing.

AEROWAND : IOT BASED AIR QUALITY MONITORING SYSTEM

Muhammed Alperen DUYMAZ, Yusuf Batuhan YAŞAR

Advisor: Assoc. Prof. Dr. Gökhan DALKILIÇ

Air pollution is one of the biggest problems that arise with the increasing human population, industrialization and advancement of technology. Air pollution is the change in the natural composition of the air for a variety of reasons that is not good. Foreign substances in the air are dangerous elements for the life of people and all living things. Air pollution, which is increasing day by day, causes millions of living things to die directly or indirectly every year. Air pollution can be reduced in various ways such as filtering and awareness. By taking the necessary precautions, air pollution can be affected in the least way possible.

In this thesis, an air quality monitoring system and a mobile application showing the measurements of this system have been developed in order to raise awareness for air pollution and to help combat this pollution. Using the ESP-32 development board, the necessary software and sensors were installed for the system. The air quality measurement data taken from the system was sent to the cloud database, stored there, and transferred to the developed mobile application. By developing a mobile application, it is aimed to access the data of the system easily and at any time.

The main achievements in this thesis; ESP-32 development board development; Understanding the working principles of air quality sensors; forming an integrated circuit with multiple electronic device structure and establishing the network structure of these circuits; data storage and routing with cloud databases; Android-based mobile application development.

ANALYSIS OF INDUSTRIAL REFRIGERATION SYSTEMS BY USING MACHINE LEARNING

İdrishan PARLAYAN, Rıdvan ÖZDEMİR

Advisor: Res. Asst. Dr. Göksu TÜYSÜZOĞLU

The increase in the number of transitions from local markets to grocery chains continues at a rapid pace for years. This rapid growth has also increased product diversity. All these increases also revealed the need to protect these products under appropriate conditions. These grocery chains gave birth to industrial refrigeration systems in greater quantity, better quality and automation than small local grocery stores, and as a result of their needs. Although these systems are continuously active and controlled systems, the mechanical devices used could not be controlled continuously. This lack of control has also shown an increase in costs.

Compressors are one of the most important mechanical components in these systems and the devices studied in this project. The problems in these devices vary as they vary depending on the scenarios. In cases where these problems are not detected, it can lead to inefficient operation of the cooling system, shortening of the life of the compressors and even product losses.

In this project, a study will be made on making scenario predictions with the data produced continuously in the cooling system and on the operating times of the compressors according to these scenarios. As a result of this study, it was aimed to detect abnormal situations in compressors. In this way, it is aimed to prevent larger problems that may occur in the system with early diagnosis.

ANALYSIS OF MARKET SALES USING DATA MINING AND MACHINE LEARNING TECHNIQUES

Sena YURTSEVEN, Burcu AĞDAR, Emirhan Bilge BULUT

Advisor: Res. Asst. Dr. Göksu TÜYSÜZOĞLU

With data mining and machine learning models, the sales rates of the trading houses and the relationships between the products can be captured and made available in the proactive business development methods of the companies. By revealing data-based time analyzes and product relationships, both the workplace and the customer can be beneficial. In this study, applications and results on classification, time series analysis, associative rule mining and clustering models on data obtained from two different places with machine learning and data mining applications are mentioned. It was studied with two different data. The first data includes bicycle sales, while the second dataset consists of actual food sales data. Bicycle sales data are much cleaner than actual sales data, so pre-processing took a short time. However, when working on real data, the longest process was the preprocessing process. Bicycle sales data was more machine learning applicable than real data. Both pre-processing processes were experienced within the scope of this project.

Data mining algorithms and machine learning applications, which are frequently used after pre-processing, participated in the study within the scope of this project. Due to the nature of the data, only a few algorithms can be tried after preprocessing on real data. For this reason, Association Rule Mining and Time Series Forecasting can often be preferred in the use of data from small companies. Methods such as Classification may be preferred in addition to the previous algorithms, depending on the data characteristics of larger companies.

When the bicycle sales data are examined, the number of values to be estimated is important to us. In addition, the similarities of these values to each other have also been seen which greatly affects the results of our machine learning and data mining applications.

ANDROID-BASED SHOPPING ASSISTANT WITH BLUETOOTH BEACON AND AUGMENTED REALITY

Kürşadcan AKAY, Ümmünur KANDEMİR

Advisor: Asst. Prof. Dr. Feriştah DALKILIÇ

The capabilities and market of mobile technologies have grown rapidly in the last decade. Despite this growth, the rate of mobile technology usage in traditional shopping is quite low. The rapid spread of supermarkets, which are the contexts of traditional shopping, has brought with it increased product options and larger supermarkets. In this study, it has been evaluated that consumers' access to the ideal product and decision time can be optimized. An Android-based application that consumers will use in traditional shopping has been developed. Bluetooth Beacon technology and versatile algorithms were used to optimize the process of accessing the products in the grocery store. The utilization of Bluetooth Beacon technology was employed to map the inside of the grocery store and create a route for preferred products. Augmented Reality technology has been integrated to increase the user experience of consumers in the navigation process. QR Code technology and Augmented Reality were used together for detailed viewing and filtering of the products on the shelves. In this way, more ideal outputs were obtained from the scanning and filtering processes to be performed by the human eye. It has been ensured that the processes of the consumers in the grocery stores are made more optimal by considering their consumption or economic sensitivities. By using the preferences and route information of the consumers in the shopping process, data that will appeal to the business intelligence units of the grocery stores were obtained.

AN IOT APPLICATION ON THE DETECTION OF CAR PARKING AREA BY ARTIFICIAL INTELLIGENCE METHOD

Fikret Mert GÜLTEKİN, Oğuzhan KARAKAYA, Mert BAŞKAYA

Advisor: Asst. Prof. Dr. Yunus Doğan

Nowadays, the problem of finding a parking place triggers people to solve these problems with technology. Our study also appeals to users who want to park their vehicle quickly and who want to find out whether the parking place is available to park before searching for a parking place. This application aims to find a solution to the problem of searching for a place to park.

We started the project by analyzing the problems people face when searching for a place to park on the side of the street and identifying solutions to these problems. Then, we tried to find a solution to these problems by using image processing methods and utilizing pictures of streetside parking places in the most effective way. In addition, we decided that we could deliver the results obtained through the image processing module to users via a mobile application and we continued the project through a mobile application.

As a result, we prepared a parking lot determination system in this study. Thanks to this system, vehicle owners who want to park their vehicles on the side of the street will be able to learn whether the parking places in a street are available in advance and they will be able to save their time by preferring more available streets.

APPLICATION OF NATURE INSPIRED ALGORITHMS IN HUMAN TRANSPORTATION

Gökhan Göksel ELPEZE, Murat Taylan ŞAHİN

Advisor: Assist. Prof. Dr. Özlem Aktaş

We explore different learning-based techniques to solve a Traveling Salesperson Problem (TSP) variant for human transportation with shuttles. We implement various well-known algorithms and some novel approaches and evaluate them on symmetric TSP instances with graph sizes up to 200 nodes. We also develop a mobile application that simplifies the process of picking up passengers, optimizing the order in which passengers are picked up and showing shortest roads from the starting point to destination. Experiment results show that self-organizing maps with genetic algorithms achieve competitive results against approaches with hand-crafted heuristic algorithms. Although results are somewhat worse, reinforcement learning techniques have some advantages such as easily accounting for different real-world factors such as traffic.

AUGMENTED REALITY IN REAL ESTATE MOBILE APPLICATION

Ece KAZAN, Şefika Özlem PUL

Advisor: Asst. Prof. Dr. Yunus Doğan

The aim of the AUGMENTED REALITY project in the REAL ESTATE MOBILE APPLICATION is to see the postings added to the android mobile application on the camera screen of the phone using AR technology at the specified location. In today's technology age, people carry out almost all their work with smartphones. Augmented Reality also allows the physical environment of the real world to be combined with the virtual environment via the phone. Therefore, the project was developed by combining augmented reality and mobile application. When the user opens the application via the mobile application, he sees the advertisements added to the home page as listed. When you click on any ad, the ad's information, pictures and location on the map are displayed. You can add the advertisement to your favourites, and view your favorite advertisements on a separate page. The user can update the postings he/she has added. With the AR application, the advertisement information can be seen in the marked position with the phone camera.

For the AR application, the object on which the advertisement details are displayed was placed in certain locations and it was tested whether the location information was correctly detected. Later, thanks to the database connection, the posting information and location information added to the android application are received by the AR application. Thus, objects are dynamically created for the advertisements recorded in the database. Advertisements are reflected on the screen with the camera angle according to the distance between the designated phone and the advertisement location.

A common database was needed in order to use the posting and location information added to the Android application on the Unity side. For this, the database was shared in both applications with a remote database connection using a server. Information that is not required to be used by Unity is kept in the SQLite database.

AUGMENTED REALITY VIDEO GAMES FOR MULTIPLE SCLEROSIS PATIENTS REHABILITATION

Ahmet EFENDİOĞLU, İhsan Batuhan UZ, Mesut Selim SERBES

Advisor: Assoc. Prof. Dr. Mehmet Hilal ÖZCANHAN

Nowadays, applications using augmented reality have become widespread. The use of these applications in the field of health is also gaining importance. Although there are applications for health, there are not many applications for the rehabilitation of neurological patients. In this study, exergames were designed and developed using augmented reality to contribute to the rehabilitation process of MS patients. Exergames can be played using the depth sensor (Kinect). Kinect is a device that captures a person's joint movements in real time. Patients will play the games in a sitting position in front of the device. These exercises specifically target immobile patients. Exergames contain certain scenarios. These scenarios are chosen from daily life and aim to increase the motivation of patients during rehabilitation. In addition, patients experience problems accessing the hospital. This situation hinders the treatment process. The main goal of the project is to enable patients to continue their rehabilitation from home without coming to the hospital.

BLOCKCHAIN BASED REVIEW APP

Hüseyin ERDOĞAN, Umut ŞAVK

Advisor: Assoc. Prof. Dr. Derya BİRANT

Today, with the development of the e-commerce sector, it has become inevitable for monopolized companies or companies to abuse user satisfaction. In this direction, a blockchain based product review application is being developed in order to eliminate the possibility of manipulation in the comments or reviews of the product that the user would like to buy.

CALL CENTER DENSITY ESTIMATION WITH MACHINE LEARNING

Burcu ÖLMEZ

Advisor: Prof. Dr. Recep Alp KUT

Every business that has a call center needs to improve its operation of the call center and reduce customers waiting time in order to satisfy them. However, increasing the number of people to work in the call center is not the best solution, the density of the call center is not always the same. It would be more logical to predict this intensity and to arrange the work schedules of the employees according to this intensity. Both the cost will decrease and the customers will be satisfied.

In this project, density estimation is made for the call center of an electricity distribution company. Since it is a necessity of the project, it is estimated how long the power outage will last with the power outage data. Machine learning techniques were used for this estimation study. In order to apply the methods, the data were first examined in detail. Necessary visualization and statistical studies were carried out. After estimating how long the power outage will last, the power outage data is combined with the data of the call center together with the target column. In order to enrich this data set, data on weather, holidays and the day of the week were used. Exploratory data analysis was also performed on the new data set to examine the visualization and statistical approaches. In order to bring the data into a form that machine learning algorithms can use, the data has been pre-processed.

Regression analysis, classification analysis and time series analysis techniques were used to estimate the density of the call center. A number of differences have been made in the data preprocessing steps for all these techniques. In order to increase the success of these analyzes, the hyperparameters of some algorithms have been improved. Afterwards, it was examined whether these algorithms were really successful or had a random success. Estimates were made using successful models.

COLLABORATIVE SOCIAL MEDIA COMMENTS ANNOTION TOOL

Nazlıcan VARIŞLI, Bahlbi Brhane GEBREALIF

Advisor: Assoc. Prof. Dr. Semih UTKU

Social media has become an inseparable part of society daily activity in recent years. It has helped people in getting information from every corner of the world, connect with long lost family and friends, and participate in causes and organizations that interest them. It has democratized access to information because people have various options to getting news and information, unlike the old times of being dependent on official news outlets such as newsletters, radio, television, and other information dissemination forms.

As happens with other forms of technological advancements, unfortunately, it has become societies double-edged sword. Some of its negative effects on the wellbeing of people's mental health has started to show recently. Social media platforms have been used by some to carry out misinformation, destabilization campaigns and other malicious activities. Moreover, some recent studies show the side effects of social media usage on adolescents regarding their self-esteem and self-worth.

We tried to tackle the misinformation that occurs in social media, especially twitter, in this project. It uses the collective effort of many concerned people to collaboratively fight misinformation, violence, cyberbullying, and other malicious activities in social media. It is a tool that can help society to self-censor and weed out the distractive sides of social media.

CROSSWORD GAME USING UNITY GAME ENGINE FOR MOBILE PLATFORMS

Onur Can DOĞANLAR

Advisor: Assoc. Prof. Dr. Semih UTKU

Due to the increase in use of smartphones in all demographics, it has become more important than ever that what smartphones replace should live through in one way or another. With the ever-growing nature of internet news, newspapers started to disappear as well. While news stories and daily events found their place on the internet, some niche parts of those newspapers haven't created a space for themselves yet. Perhaps the biggest one from all the niche parts of a newspaper is the crossword puzzle. This thesis is an academic report written to document the creation of a successfully implemented crossword generation system, a crossword puzzle game using the generated crosswords and the game's expected and/or unexpected demographic data. In this study we accumulated data on how long it takes to create puzzles from varying dictionary sizes using the backtracking algorithm and created a game that is easy to use for all ages thanks to its advanced user login system, easy to understand UI and fun gameplay. From the release of the app to two different platforms (Apple App Store and Google Play Store), we found out that the biggest age-group to play our game was 50-65+. This combined with lower downloads per person in bigger cities suggest that crossword games are mostly popular between the older generation, who were the most accustomed to crossword puzzles in their life. The game itself is unique compared to other crossword games with its traditional approach to crosswords but arcade way of playing. With improvements to UI, feature additions and a better dictionary, it is expected that this app will perform considerably better compared to the alternatives. The ultimate goal of the preparation of this thesis was to create a next-generation game that combines new technologies with a classic game made for all ages, and to investigate the interest it gathered.

DATA ANALYSIS AND WEB APPLICATION ABOUT DIABETES AND HEALT CARE

Mert DÜVER

Advisor: Prof. Dr. Recep Alp KUT

Human Nature have been a biological mystery for a long time and still is. Since the years passed and science progressed Human nature has started to being understood. These years we use the developing technology to make our lives better from every angle including the health care. Health Care requires to that Human Nature is understood. Human Nature is so complex, and technology helps us about this complexity. In this thesis we will be helping to save lives. The plan is examining diabetes data of the last decade according to data warehousing and business intelligence techniques and creating its web application. According to data mining results from previous patients we will be trying to predict the possible future patients and help them more with early diagnosis.

The main achievements addressed in the thesis are; learning data mining techniques, learning Data Warehousing and Business Intelligence techniques. In addition, since we will be creating a web application, learning how to create a web application.

DETECTING MARITIME TRAFFIC ANOMALIES AT THE GULF OF IZMIR

Yağmur KONUKSEVER

Advisor: Asst. Prof. Dr. Özlem Aktaş

These days maritime transport is widely used. In maritime transport, for the smooth transportation sea vehicles' information transferring is very crucial between vehicle to vehicle and vehicle to land station. To information transferring, AIS technology is used. AIS (Automatic Identification System) is mandatory on all ships of 300 gross tonnage and upwards engaged on international voyages and cargo ships of 500 gross tonnages and upwards not engaged on international voyages and passenger ships irrespective of size. AIS is an automated tracking system. Unlike GPS (Global Positioning System), AIS does not only shows vehicle's position also shows date of the broadcast, type of the broadcast, vehicle's identity, position in latitude and longitude, speed, speed of turn and situation.

In this project, sea traffic in the gulf of İzmir was monitored with the data coming from the AIS receiver located in Dokuz Eylül University Tınaztepe Campus. Maritime traffic anomalies have been identified by looking at historical AIS data. It has been examined whether the sea vehicles violated the maritime traffic rules, whether they followed their routes and to what extent their departure from their route endangered the traffic.

DETECTING WRONG POSTURE OF FITNESS EXERCISES USING NEURAL NETWORKS

Doğukan Ali GÜNDOĞAN, Ezgi ÇETİNKAYA, Alper TEMEL

Advisor: Asst. Prof. Dr. Yunus Doğan

In this study, it was possible to predict the posture accuracy of a person exercising by using artificial neural networks in real time with high performance. Mainly, it works on two different mobile platforms, ANDROID and IOS. Transactions based on the user's information are carried out over the web service. Our web services are hosted in the cloud system. There is a web page where detailed information about the application is shared. With the pandemic, many of our activities have started to be done at home. We offer the opportunity to reduce the risk of injury while exercising, primarily suitable for individuals who have just started to exercise at home. Remote physiotherapy exercises can be made available not only to individuals who do sports, but also to individuals in need with certain minor changes. Thus, our artificial intelligence-supported application; As a staff coach for sports and as a physiotherapist for physiotherapy, it is aimed that people benefit from sports and health opportunities that can be accessed by each person by reducing the monetary costs for these needs. Once the user registers to the system, their information is protected by KVKK principles. By establishing a connection between the athlete and the sports teacher, the patient, the individual, and the doctor, exercise processes can be tracked. Individuals' recovery processes can also be monitored and exercises can be assigned to the individual by the doctor/sport instructor, and if they wish, the doctor/sport instructor can receive feedback from the artificial intelligence assistant at regular intervals and shape the exercises accordingly. In this study, a fast version was created by enabling many technologies to communicate together. With the big data obtained today, powerful processors and successful algorithms, an artificial intelligence assistant that returns real-time results with a high performance rate, where each phone owner can be just one click away, awaits them.

EMPTY BOTTLE CLASSIFICATION AND COUNTING SYSTEM

Tutku ÖZBAKIR

Advisor: Asst. Prof. Dr. Ercan AVŞAR

The increase in recycling awareness in the world has brought along various needs. Although planned studies are carried out for the classification of wastes, most of the wastes are disposed without being classified yet. At this point, classification systems are needed. Although these systems are not very common yet, increasing requirements have brought this need with them. Reverse vending machines, which are widely used throughout Europe, can be shown as an example that meets this need. With these vending machines, the wastes coming from the consumers are classified and the consumer is served in return. Thanks to this application, consumers are encouraged to recycle.

With the Empty Bottle Classification and Counting System, it is aimed to develop a system similar to reverse vending machines. In this system, it is aimed to classify the empty bottle images taken from the user as glass, metal or plastic by using the neural network structure and to present the class of the image to the user.

ENDLESS RUNNER GAME WITH PROCEDURAL GENERATION METHODS

Muhammet ÖZDAMAR, Bergin ÖNAÇAN

Advisor: Asst. Prof. Dr. Özlem Aktaş

People occasionally feel the desire to detach themselves from reality. This is typically accomplished through a variety of activities. One of these pastimes has become increasingly popular. This hobby is video games. To capitalize on these recent developments, and to make developing games with different experiences easier, procedural generation techniques can be used.

In this project, the goal is to design a video game, which is minimal, that can produce environments with platforms that are automatically generated without needing level designers and testers. These environments will be produced with procedural generation. With the help of specific algorithms, such as perlin noise, these platforms are generated in a way which the player is able to complete. Perlin noise is a type of gradient noise that smoothly transitions between minimum and maximum values.

Player's aim is to be as fast as possible while going through generated platforms and obstacles, while also watching out for certain collectibles that can help or hinder their ability to go through those platforms. Because of the fact that platforms and other interactable objects in the game such as obstacles and collectibles are generated randomly, player experience is unpredictable. This increases the replayability of the game which also increases the longevity of the player's enjoyment.

FINDMYSPOT

Ferhat YILDIZ, Ozan SANDIKÇI, Beydoğan Ünsal TURAN

Advisor: Asst. Prof. Dr. Ercan AVŞAR

It is a smartphone application that displays the nearest available parking space. It is an application that reads the phone's GPS coordinates and displays the appropriate ones. The aim of the development of the project is to quickly find and park in the parking spaces that do not have a parking ban on the streets. From the app you can find and reserve the appropriate parking spot. The fee is also paid at the time of booking. The parking space reserved by GPS is reached in the fastest way. With the sensor placed in the parking lot, it is checked whether the parking space is full or empty. The data received from the sensor is transferred to the cloud and the mobile application pulls the data from there. The location data and user information of the sensors are kept in the database.

We used the react native framework to develop the mobile application because we made both android and ios applications. We used firebase as database. The cloud technology where we store the data received from the sensors is ThingSpeak. A light sensor was used as a sensor. We used arduino in the hardware part, because there is no need for an external programmer to program on arduino boards, because a bootloader program is written to the microcontroller on the board. We used ESP8266 as wifi sensor. This sensor sends data to ThingSpeak. Our application works flawlessly.

FIND MY PHOTO: A FACIAL RECOGNITION AND DETECTION PROGRAM

Melisa BEYSÜMENGÜ

Advisor: Asst. Prof. Dr. Ercan AVŞAR

Face recognition and detection methods are a field that is widely used and researched today. With the development of technology, these methods began to be used in areas such as security and began to take place in our daily lives.

In this thesis, all the photos in the source file will be examined with the help of a target photo selected with a program created by using face recognition and detection methods, and from these photos, the photos with all the faces similar to the ones in the target photo will be selected and transferred to a separate folder.

The main achievements addressed in this thesis are; examination of face recognition algorithms and face detection methods; face recognition and detection methods, project development steps and application design; the use of face recognition and detection algorithms in the Python language.

GAMIFICATION IN FITNESS MOBILE APPLICATION

Deniz ALBAYRAK, Damla ÜLKÜ, Mehmedcan ÖZMAN

Advisor: Asst. Prof. Dr. Kökten Ulaş BİRANT

Nowadays, having a quality life style and a healthy body has gained great importance with the influence of social media. Doing sports, which has a great effect on having a healthy body, has become important for people of all ages. Despite this, people who want to do sports find sports boring, they cannot start and maintain their continuity, and the majority of those who can do exercise unconsciously.

With the increase in the use of mobile devices recently, people spend more time in mobile applications. They even started to meet their daily needs through mobile applications. However, sports applications gained importance and their numbers gradually increased. However, the majority of these applications have not been able to remove the sport from being boring and have not been able to ensure user continuity.

“Workout GO!” application is a cross-platform application developed by using gamification techniques in order to ensure the continuity and commitment of the person to the sport. This application aims to enable users to exercise according to their own physical needs while doing sports and to ensure the continuity of sports by having fun.

GENOME-WIDE DATA ANALYSIS FOR ALZHEIMER'S DISEASE DIAGNOSIS

İsmail Ege OĞUZ, Zeynep Hilal DESTEBASI

Advisor: Assoc. Prof. Dr. Zerrin IŞIK

Alzheimer's disease is one of our greatest enemies, threatening the quality of extended human life. The most important symptom of the disease is forgetfulness, it can progress to such an advanced level that the sick person forgets who he is. The number of people suffering from Alzheimer's disease is increasing day by day, and since we cannot effectively slow down the progression of this disease, research in this area continues with an increasing momentum. Although some effects of the disease on the brain are known, the exact cause is currently unknown, so the margin of error in the diagnosis of the disease is higher than most of the other diseases. The clinical diagnosis rate is around 77%. Hence, there is an urgent need for more accurate diagnosis of Alzheimer's disease.

In our study, we tried to examine this problem by integrating genome-wide data, namely microarray data and the other is SNP data. These data are processed separately and different analysis can be carried out. The starting point of this study is to experiment to create a method for integrating two data and to see whether this method is superior to the data processed separately. Our hypothesis is that we can create a machine learning model that uses the integrated microarray and SNP data for computerized diagnosis of Alzheimer's disease. In this study, microarray and SNP data were analyzed genome-wide with the help of protein-protein interaction networks and graph clustering algorithms. Different machine learning models were used to make diagnosis from the integrated data. The algorithms with the most consistent results were recorded with the help of R and Python programming languages. The final machine learning algorithm, Random Forest, was used in our web application, where users can get diagnosis test result for given microarray input files.

As a result, it has been extensively experimented to reach the information about how much the SNP and microarray data sets will be helpful when they are processed together for diagnosis of Alzheimer's disease. The implications provide information on how successful a genome-wide examination should be for the diagnosis of Alzheimer's disease.

GRADUATION PROJECT MANAGEMENT SYSTEM WITH SCRUM METHODOLOGY

Muhammed Buğra ATEŞ, Hüseyin Emrecan TAN, Oğuzhan TÜRKMEN

Advisor: Asst. Prof. Dr. Kökten Ulaş BİRANT

University students must successfully submit their final project in their final year in order to graduate. Our project was made to help a senior university student successfully and accurately complete the process from the beginning of the graduation project to its delivery. Communication is one of the most important factors that will affect the success of students throughout their graduation project. Our project "Graduation Project Management System with Scrum Methodology" will be the biggest assistant of the students in this process. Students' better interaction with both their advisors and teammates is a tool for this process to be much more successful. In addition, many reports are delivered from the beginning to the end of the graduation project. This project will be of great help to students, both by providing more detailed information about the timing and content of these reports, and to avoid confusion and ease in report layouts. Based on the principles of Scrum Methodology, this project realizes an effective process management by dividing the "planned" and complex software projects into more "simple" and "understandable" parts. As a result of our research, we tried to find solutions to the issues that students had problems during their graduation projects. We believe that the best solution for the problems we have found is in our project, "The Graduation Project Management System with Scrum Methodology" and it will help every student. Based on the principles of Scrum Methodology, this project realizes an effective process management by dividing the "planned" and complex software projects into more "simple" and "understandable" parts. As a result of our research, we tried to find solutions to the issues that students had problems during their graduation projects. We believe that the best solution for the problems we have found is in our project, "The Graduation Project Management System with Scrum Methodology" and it will help every student. Based on the principles of Scrum Methodology, this project realizes an effective process management by dividing the "planned" and complex software projects into more "simple" and "understandable" parts. As a result of our research, we tried to find solutions to the issues that students had problems during their graduation projects. We believe that the best solution for the problems we have found is in our project, "The Graduation Project Management System with Scrum Methodology" and it will help every student.

INCREASING THE PRECAUTIONS OF DISASTERS WITH MESH NETWORKS

Alim ULAŞ, Seda ERGÜL, Enhar Berat TÜRKOVA

Advisor: Assoc. Prof. Dr. Gökhan DALKILIÇ

Natural disasters have always been and will continue to be in people's lives. These are natural disasters (earthquake, flood, fire, landslide, etc.) and the biggest problem experienced in cases such as mine crashes is experiencing a network outage and not being able to communicate. In addition to the damage caused by the natural disaster, the interruption of communication after the disaster caused people to panic greatly and also caused an increase in the loss of life. We cannot prevent the occurrence of a natural disaster, but we can minimize the damage it causes.

Our project is a work aimed at eliminating the loss of communication that may occur at the time of a disaster or after it. We are trying to prevent the victimization of the victims in line outages or intensity, internet connection outages. By establishing our own closed network with mesh network, we enable the survivors and the aid team to communicate in the messaging application we have designed over this network.

We used ESP32 NODE MCU in our project. We used the full mesh topology on our devices and wifi as the communication methods. With Broadcast, we send messages to our other devices. We prevented possible data loss by keeping the sent messages inside our devices. In addition to text messages, they can also be sent in a photo or location in our messaging application. We used the RSA algorithm for the security of sent messages. We chose a simple design in the interface we created so that it would be easy and understandable for every user.

INDOOR AIR QUALITY MONITORING SYSTEM

Sanem KAÇAR, Seçil ÖZTÜRK

Advisor: Asst. Prof. Dr. Ercan AVŞAR

The rapid increase in the world population causes an increase in air pollution. Indoor air quality is of great importance for people who spend most of their time indoors. For this reason, many studies have been conducted on the effects of indoor air quality on humans. In this project, an IoT system measuring indoor air quality was studied. Variables such as indoor temperature, humidity, amount of carbon-monoxide (CO), amount of carbon-dioxide (CO₂) and amount of dust in the environment were measured. Indoor air quality is being determined by applying machine learning algorithms (regression techniques) to the data obtained as a result of these measurements. In order for the indoor people to reach these results that obtained from this IoT system - the indoor air quality values – are being displayed on a mobile application. This provides convenience to users. In addition, with this study, an alternative study was presented to those who want to do such a study on IoT systems.

MACHINE LEARNING AIDED PATIENT DISABILITY PERFORMANCE ASSESSMENT

Şaban ÖZGÜR

Advisor: Assoc. Prof. Dr. Mehmet Hilal ÖZCANHAN

Artificial Intelligence applications are used in many fields today. Machine Learning (ML) applications, which are Artificial Intelligence expertise in the field of health, have become widespread.

In our study, an application was developed using ML to monitor oxygen consumption in the rehabilitation processes of Multiple Sclerosis (MS) patients. In addition, the effects of Restless Legs Syndrome (RLS) and Sleepiness Status (SS), which complicate the daily lives of the patients, on their rehabilitation were investigated.

Manual input of information by specialists facilitated the calculation processes and contributed to the assessment of the course of the physical condition of the patients. The Studies have also been extended to other factors included in the data.

MACHINE LEARNING BASED DECISION SUPPORT SYSTEM THAT PREDICTS THE RISK OF CONTRACTING THE COVID-19

Hasan MUMCU

Advisor: Asst. Prof. Dr. Yunus DOĞAN

Machine learning applications expand the area they have in our daily lives with developing technology. Many algorithms are used when developing machine learning applications Logistic Regression, Naive Bayes, Random Forest and XGBoost algorithms can be cited among them. Test results published jointly by governments were preferred because they are real data and large. Data cleaning & data imputation, data visualization & data manipulation, feature selection and data modeling steps were followed, respectively. HTML, js, css, Flask + replit can be shown as technology stack. It is embedded in the interface as a pickle file. A flawless interface was designed and created.

The user will be able to see how much probability is Covid-19 by entering situations such as cough, fever, sore throat, shortness of breath, headache, going abroad, contact with Covid-19 object, and contact with Covid-19 patient via the interface. In addition, a directive containing information about Covid will be sent to the e-mail address with the test result. As the modeling achieved very high success rates, it was seen that the estimation results were highly accurate. When the test results and symptoms of 50 people gathered around and tested before were compared, a success rate of 97.4358% was achieved.

MELANOMA SKIN CANCER DETECTION USING DEEP LEARNING

Süleyman Ayberk KILIÇASLAN, Hazar ÖZYAĞCI, Arif MERTASLAN

Advisor: Assoc. Prof. Dr. Zerrin IŞIK

Melanoma is a cancer caused by pigment-containing cells called melanocytes. It is one of the most dangerous cancers. Melanoma cancer causes nearly 55,000 deaths per year, accounting for 0.7 percent of all cancer deaths. On the other hand, recently, medical diagnostic systems with artificial intelligence support have become quite widespread. The aim of this project is to develop a mobile phone application that will help in the early diagnosis of melanoma skin cancer with the help of deep neural network models.

In the project, 4000 melanoma cancer and 4000 benign labeled skin lesion images selected from the dataset of the ISIC 2017 competition were used. After the images were passed through preprocessing, they were used in the training of deep neural networks. The results of different deep learning models have been compared with each other. Comparisons have been made both in terms of accuracy rates and their applicability to mobile phones. As a result of the comparisons made, the most suitable model has been determined and it has been brought to the format to be used in mobile applications.

There is no literature documentation of other applications working for similar purposes of this project. Therefore, it is not possible to compare the accuracy rates of the models hosted by the applications, but the model hosted by the application in this study has an accuracy rate of approximately 85-86 percent. According to other applications, the result returned to the user is understandable by all kinds of user profiles and images can be obtained from multiple media such as camera, gallery, and the relevant part of this image is cropped and edited, which makes this project a step forward compared to other applications.

MOBILE APPLICATION FOR DEMONSTRATING KICKBOXING MOVES

Muzaffer Berşan KONAL, Koray ÇAĞLAR, Uğurcan SEVİNÇ

Advisor: Assoc. Prof. Dr. Semih UTKU

In martial arts, basic moves are important. In order to do the advanced movements correctly, the basic moves must be done correctly. Even when training with the trainers, it takes months of practice to learn the basic moves correctly. Kickboxing has the same situation. Jabs and hooks are the most important moves and need to be demonstrated perfectly. Beginners often can't tell if they're doing the moves right. In advanced training, performing these moves incorrectly can cause both injuries and not being able to apply enough power with the punches. Training with professional trainers can solve these problems, but kickboxing gyms costs too much money and time.

We developed a mobile application to bring a solution to these problems. Our application provides guidelines and pictures that show the correct poses of the moves. Users can upload their own photo and see if they perform the move correctly. With image processing our application can tell the user if their pose is correct or not, so the user can fix their pose.

MOBILE APPLICATION FOR LANGUAGE LEARNING

Efe Kaan KABAKAŞ, İlker BAŞ

Advisor: Asst. Prof. Dr. Feriştah DALKILIÇ

Learning English is one of the inevitable facts of the modern world. It is a language that can be said to be compulsory to be learned in terms of career-oriented and personal and cultural development. In the globalizing world, language is an important tool for each individual to play an active role and for a better future for humanity. The majority of online and hard copy contents are in English. This situation is similar in all sectors. English language is a must in order to be good at one subject, to communicate globally and to improve oneself.

Of course, learning a language is a challenging process. It requires many different points, such as learning vocabulary and assimilate grammar rules. It can be said that classical language learning methods are weak at these points. At this point, the use of technology comes to the fore. Technology is now a big part of daily life and its use in the language learning process is a must. It can also make this process much better with the convenience it provides.

In the language learning process, vocabulary learning is one of the main points. In order to use the learned language effectively, a minimum level of vocabulary is required. Providing vocabulary learning using technology instead of classical methods will facilitate and accelerate the learning process. During vocabulary learning, it is important to see and learn similar words of the words desired to be learned so that the learning process can progress better.

In this thesis, an English vocabulary learning application has been developed by emphasizing these features in order to facilitate, accelerate and integrate the English vocabulary learning process with mobile technology. In this way, the project team wanted to contribute to the globalizing world. There is a wide range of words in this application. Many similar words are suggested for each word. It includes games and features to make the vocabulary learning process more fun. Its interface is designed to be user-friendly and can appeal to people from all walks of life.

MOBILE INDOOR NAVIGATION SYSTEM

Çağlar GÜRPINAR, Melike TAHTA

Advisor: Asst. Prof. Dr. Feriştah DALKILIÇ

In these days, navigation systems are advanced and widely used. But when it comes to buildings, navigation in indoor places is still an issue that should be developed. While this issue continuing, buildings and new structures are improving rapidly. Especially in these buildings such as shopping mall, hospitals and schools, going a specific place is getting harder day by day. For this problem, we developed an indoor navigation system that solves the pathfinding problem which steals our lots of time.

Mobile indoor navigation system is an AR-supported application developed to enable people to easily navigate to the places they want to go in large and complex buildings. The application can be easily applied on any building scanned using Vuforia Area Target technology and can be used on all AR supported Android devices.

While developing the application, the model of the building was created with the Vuforia Area Target Generator application from the Lidar sensor supported iPad device to create the model of the building. Unity NavMesh technology was used for path drawing and navigation implementation. Vuforia Image Target technology was used to find users' starting points for navigation. Image targets were placed in various parts of the building and different starting points were determined.

NEAREST CAR CHARGE STATION

Durmuş Furkan ÖZKAN, Osman KOÇ

Advisor: Asst. Prof. Dr. Feriştah DALKILIÇ

With the increase of electric vehicles, demand of electric cars and their charge stations has also been increased. Hence, people started to set up charging stations in their homes and wanted to rent these charging stations when they were not using it. People with electric cars, on the other hand, wanted to charge their cars at the nearest point of their location. As a solution to this problem, we wanted to develop a mobile application that will bring together those who want to rent a charging station and those who want to charge their car. Our application has the features of renting a station (can be both as a tenant or renter), communication between users via messaging through the app and map implementations according to the user's location. Map implementations includes adding new stations to the required locations on the map, getting navigation between the locations of user and station, getting information of selected stations on the map. Since the current use of electric vehicles in Turkey is less than abroad, such mobile application has not been developed or used yet. With the increase in the use of electric vehicles in the near future, such mobile application will be needed, and our application was developed to contribute in this direction.

NFT COLLECTION CREATION AND MARKET DATA ANALYSIS SOFTWARE

Furkan Enes APAYDIN, Halil İbrahim ÇAĞIRKAN

Advisor: Asst. Prof. Dr. Feriřtah DALKILIÇ

With the development of blockchain technology and the technological innovations it brings in recent years, the habits of the society are changing. Previously being required to be approved by a specific authority, artifact ownership can now be achieved digitally and without a singular authority using blockchain-based NFT (Non-Fungible Token) technology. This technology is not only a technological advance, it also has become a new trend followed by large masses with the opening of large markets where NFT artworks are traded, sales made with auctions, hundreds of thousands of new artists/manufacturers producing new business models.

The main purpose of the “NFT Collection Creator” software that we developed with this thesis is to be a tool that can supply some of the needs of users that have not yet been fully met in this newly formed area. These days, when the upper limits of this new industry are not yet certain, the first goals of the project are to ensure that all artists participating in markets can easily create collections with thousands of pieces of artwork and can easily access basic analytical data about their collections. However, future versions of this project would also target advanced market trend predictions by analyzing the data collected from users, sales information integrated from third party marketplaces and creating a dataset by the tagging of artworks uploaded to the system.

ONLINE COURSE VIDEO SOURCE SELECTOR

Ferhat DOĞAN, Uygur UYĞUN, Berker ŞAL

Advisor: Asst. Prof. Dr. Ercan AVŞAR

Due to the Covid-19 epidemic, which deeply affected today's world, radical changes have occurred in many areas of our lives. Education was one of the areas that suffered the most from the quarantine and pandemic conditions. The difficulties caused by the disruptions in the transition phase and the lack of technology knowledge of the users caused great loss of motivation and efficiency in the field of education. This impact to the educational life poses risks of damaging the reputation and credibility of future professions.

For this reason, in our thesis, the team aimed to develop a software solution to this situation, to reduce the responsibility on users and to increase the efficiency of remote and hybrid lessons. Instructors will be able to continue teaching in the order they are accustomed to, and in this case, it will be ensured that there are as few disruptions as possible. This will increase the spontaneity of the lessons and increase the motivation of the students.

As a result, the gains that can be obtained thanks to the software whose development process is described in our thesis can be listed as follows. The automatic selection of the video to be sent to the online course platform according to the lecture environment will make it easier for the lecturers to use the whiteboard and the computer environment at the same time, and the selection of the video to be sent to the main screen by the computer will eliminate the vision and focus problems that the students may experience as much as possible. Thus, both classroom and online courses can be carried out at the same time, and students who cannot attend the classroom environment for certain reasons will get the highest possible efficiency from the lessons.

PACKAGE DELIVERY SYSTEM USING ARTIFICIAL INTELLIGENCE AND REINFORCEMENT LEARNING

Burak Alp YAŞAR, Beyzun AMAÇ, Mert AKSEKİOĞLU

Advisor: Assoc. Prof. Dr. Derya BİRANT

An in-plant package delivery system has been developed in order to safely deliver the right amount of material needed during manufacturing in the factory to the desired location at the appropriate time and with optimum cost, and to position the products produced after manufacturing in certain places in the most accurate way. Although rail-guided vehicles, electrified monorail system, conveyors, and automatic guided vehicles provide convenience during package transport, they follow a fixed route. In this study, the agent/carrier whose training is done using reinforcement machine learning can take action against different situations that may come across. There is no obligation to follow a fixed route. Interpretations such as the actions to be taken by the carrier in different situations and the benefit it provides in terms of time are mentioned in the study. The tests of this study were not carried out in real life applications, but were carried out through simulations made on Unity Engine, which is a versatile and free game engine, using the C # and Python programming language.

PANDEMIC TRACKER

Denizhan MISIRLIOĞLU, Mustafa Onur ŞARBAK

Advisor: Res. Asst. Dr. Meltem Yıldırım EKİCİ

We have made a project that aims to observe the pandemic data (current covid) on the basis of global, continents and countries through the android phone application and compare them under some headings.

While doing the project, we obtained our data as csv from ourworldindata. The resulting csv was translated as json in the python environment and then uploaded to the firebase firestore side. The firebase firestore we used as a database was connected to our android application and the application we developed in kotlin language was connected. After the connection, we presented the desired data to the user with some graphs and tables through some sql queries and data structures where we store the data.

PREDICTION OF NEW TREATMENTS FOR PANCREATIC CANCER

Ece KOBANÇ, Can KIZILÖZ

Advisor: Assoc. Prof. Dr. Zerrin IŞIK

Pancreatic cancer has a rather poor prognosis, with a five-year survival rate of less than 5% of patients diagnosed. The most important reasons for this prognosis are that approximately 90% of patients are diagnosed at stage III or IV as pancreatic cancer progresses with almost no clinical symptoms and the therapeutic options available are limited. The aim of the project is to find candidate treatments for pancreas with appropriate pre-processing methods and algorithms using microarray gene expression profiles. The project also offers a platform where all users, who have gene expression data in cancer-specific Affymetrix U133 Plus 2.0 whole-genome chip, can search for candidate drugs using their own data. Within the scope of project, the most convenient pancreas cancer samples and healthy controls were searched, two of the data sets are selected. Differential expression analysis was performed on both data sets by applying statistical tests. We obtained functional and physical protein interactions from the STRING database to create a protein-protein interaction (PPI) network. In order to identify the most important genes in this network, the personalized Page Rank algorithm was run on the network. The most important genes were chosen from the high rank valued ones, then they were matched with differentially expressed genes obtained from the microarray data analysis. The rDGIdb library was used for searching of drugs that are targeting treatment candidates. As a result of this search, a total of 71 drugs were obtained as new suggestions for pancreas cancer treatment.

After receiving the results of our study, the above-mentioned algorithms were rearranged to work on microarray data set. Using NodeJs, HTML, CSS, JavaScript web technologies, a web environment was developed where users can upload their cancer-specific datasets as normal samples and tumor samples. In addition, the user can enter his own p and fold change values here.

As a conclusion, this project both provides new candidate treatments for pancreas cancer and web platform for users to analyze their own microarray data for finding potential treatments for different diseases.

QUALITY CONTROL DECISION SUPPORT SYSTEM

Zeynep KAYA, Nilay YÜCEL

Advisor: Prof. Dr. Recep Alp KUT

Quality has been in our lives as an important concept in every field from past to present. It is also of great importance in the manufacturing sector. In the production sector, which accelerates as mechanization increases, it has become a very difficult situation to monitor and control quality. “If the role of the machine in production is increasing, why not in quality control?”. With this question, machines were needed to support human power and decision. With these systems, which have started to take their place in this sector as decision support systems, it is aimed to enable people to make decisions like humans by teaching their behaviours/decisions to a machine.

Within the framework of this purpose, the methods, models and results used in researches and studies in this field were examined. It has been observed that very successful results have been achieved with a correct working method. At the end of the preliminary studies, the real quality control measurement values taken from a factory producing machine parts and the production decisions made by people according to these values were decided to be processed. However, it has been observed that this data, which is not collected for the purpose of teaching the machine, will complicate the work.

As an additional and preliminary study, it was decided to collect the reports containing the quality control measurement values in a system belonging to us and to make the human decision through this system. In this way, the report content has been converted into a suitable form for machine learning modelling. At the same time, the data for the human decision, namely the target column of the study, were collected from a single source. A data set ready for modeling was obtained by applying the methods taken as a result of the research on the collected data. iii Algorithms with high success were determined in the studies conducted in this area. The modeling process was carried out by selecting the best parameters.

When the results were examined, it was observed that very high success values were obtained. These results greatly increase the confidence in the decision of the decision support system.

REMOTE HEALTH CHECK OF HOME PATIENTS & ELDERLY USING IOT AND CLOUD TECHNOLOGIES

Efe Kaan KARAKAYA, Murat KIRLIOĞLU, Zekiye DOĞAN

Advisor: Assoc. Prof. Dr. Mehmet Hilal ÖZCANHAN

Data on the patient's health status is necessary to study the patient's health status and determine the appropriate treatment based on the results of the examination. The measurement of this data is usually performed by paramedics in a hospital setting. However, often this leads to problematic situations for elderly patients who need regular checkups of their health status. Due to some problems, the elderly have difficulty in checking their health regularly and this may lead to undesirable consequences. In order to bring a solution to this problem, with the help of the remote monitoring system, patients can easily have their health status monitored, viewed, and assessed by health professionals and themselves, anywhere at any time. This solution is beneficial for patients, elderly people, and health professionals alike - it saves time, money, and safety.

Thereupon, the project was developed in three phases. In the first stage, the health data of the patients were measured through sensors, either by themselves or with the help of someone else. Subsequently, these data were sent to the cloud service, which is the second phase of the project, and stored there. Cloud service was used in many areas within the project. Besides storing patient data, it also provides management and control of these data. In the mobile application, which is the third stage of the project, an application was developed for two different flows for both the patient and the doctor by communicating with the cloud. In addition to accessing and managing the detailed information of the patient through the application, the measurement data was visualized and presented to the user. The project can be used as a guide for people who want to benefit from IoT, cloud technologies, and mobile application frameworks.

SHEEN GAME PROGRAMMING KIT FOR UNITY

Oktaý TÜRKAĐLI, Anıl Orhan ARSLAN

Advisor: Tanzer ONURĐIL

Most of today's mobile or desktop games are made using the Unity game engine. Developers have to write the same code over and over for some repetitive tasks in this game engine, thanks to the game kit we developed, developers can do some game work using this kit to make their own games without writing code or with less coding. The developer can develop his games by making choices as he wishes. There are 3 different types of controls in our game set. These are intro, character and level design. In the input controller, the user can make adjustments such as the input type to be given in the game, where to place it, its size or input type console, mouse ..etc. In the character controller, the user can choose the gender, clothes, hair of the character, also the developer can use their own design characters. In the level design section, the developer can design the character's route according to 3 different sections, these are the beginning, middle and final sections. The developer can design the dimensions and lengths of these parts as he wishes.

SPEECH ENHANCEMENT USING DEEP LEARNING BASED CONVOLUTIONAL AUTOENCODER MODEL

Berhan Türkü AY

Advisor: Asst. Prof. Dr. Özlem Aktaş

Speech Enhancement is a relevant component in many real-world applications, such as hearing aids, mobile telecommunications, and healthcare applications. In this article, the use of U-Net++ for noise removal has been realized. Improved techniques for separating the speaker's voice and background noise in audio data and separating background noise from audio data have been explored. Some of the previously applied techniques have been tried, and new approaches have been established on these algorithms. It was noticed that the U-Net ++ Model had never been used for this problem before, and a model was created in accordance with this problem. This established model was trained on 10000 samples.

My experiments were tested with suggested methods such as PESQ, CSIG, CBAK, COVL, SSNR. Vocal sounds from Edinburgh University's database were used. Noises such as environment, vehicle, airport, restaurant were collected and used. The results show that deep learning-based models work much better than models with statistical approaches. The U-Net++ model can protect data and prevent loss much better than the previously used U-Net model, which has a high success rate. It shows that despite being trained with smaller data in terms of quality metrics, it performs as well as other state-of-the-art methods and MSE loss is one of the top performers.

VR APPLICATION FOR PSYCHIATRY EDUCATION

Asude AĞAYA, Şükran ÖZBEK

Advisor: Asst. Prof. Dr. Kökten Ulaş BİRANT

With the rapid development of technology, innovative solutions have emerged in many areas. These areas are health, education, academia, finance, etc. fields are examples. In this project, an innovative study was developed by bringing together the fields of health and education. The aim of the study is to assist medical students in their education in the field of psychiatry with virtual reality and to further develop their theoretical education with practical training. The project is to provide appropriate treatment by educating the physician candidates on this issue, encouraging them to empathize and at the same time making better diagnoses. While doing this, virtual reality will be used. Virtual reality is a technology that allows to experience images in three-dimensional reality instead of perceiving them from two-dimensional screens. It is planned to reach the maximum learning point when the theoretical knowledge is integrated with the simulation applications in the targeted success of the project. In addition, one of the important works done in this study is to convert the sentences taken from the user by voice to text with the speech-to-text feature. After this conversion process, it is aimed to show the videos developed for training to the user in certain situations. The project brings together many different majors. This project, which has been developed and continues to be developed, can be used not only in the field of virtual reality, but also in integration with many different platforms. It can also be applied in many different branches of education, not just psychiatry.

WATERLESS: PREDICTING WATER FOOTPRINT USING MACHINE LEARNING

İrem OKUR, İrem ÇALMAZ

Advisor: Assoc. Prof. Dr. Derya BİRANT

The estimation of water consumption is a crucial task in achieving global sustainability targets and meeting the long-term water needs of urban citizens. Although some efforts have been conducted on estimating individual water footprints, there is still a limited amount of research on this area. Towards addressing this gap, this paper proposes a new machine learning based mobile application, called WaterLess, to estimate the water consumption scores of urban residents by considering the direct and indirect water use through the water footprint indicator. It compares four different machine learning algorithms to determine the best one for water consumption estimation. Data was collected with a questionnaire survey. The experimental results show that the proposed model can be successfully used to predict personal water consumption score in an effective way.

The main contributions of this study can be summarized as follows. (i) It proposes a new machine learning based model, to estimate the water consumption scores of individual's by considering the direct and indirect water use through the water footprint indicator. (ii) A new questionnaire survey was designed and conducted to residents in Turkey to collect quantitative data. (iii) This study is also original in that it compares four machine learning (ML) algorithms for personal water usage estimates, including linear regression, lasso regression, gradient boosting, and extreme gradient boosting. The proposed model is used in the mobile application.

WORDFLOW: A MOBILE WORD GAME BASED ON AI

Ayberk DİKÇİNAR, Gaye SÜNER, Zafer YALÇIN

Advisor: Asst. Prof. Dr. Feriştah DALKILIÇ

In this study, Word Embedding methods, which is a category of Natural Language Processing, were applied. Word Vector Space models made for Turkish that is an agglutinative language, were examined. In the previously developed Turkish Word Vector Space models, preprocessing methods such as lemmatization and pos tagging were applied. After these processes, the consistency ratio of the weights between words was increased. It has been observed that the need for larger dataset required by other models has been reduced.

For the active use of the Turkish Word Vector Space that is developed in this study and the previously developed English Word Vector Space GloVe models, a single-player and multiplayer mobile game developed with cross-platform support. In the game, using the Word Vector Spaces, a clue and the closest words connected to this clue are determined. In the single-player option in the game, the user is expected to choose the words with the closest connotation by using the clue word given. In the multiplayer option, the closest words are tried to be found by using the clue given mutually, as in the single-player option.



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