جامعة الإمام عبدالرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY
كلية علوم الحاسب وتقنية المعلومات
College of Computer Science and Information Technology

2021-2022

# CCSIT

GRADUATION PROJECT SHOWCASE 7

# College of computer science and information technology

## Graduation projects showcase

**Organized by**
Graduation Projects and Entrepreneurship Unit
& Public relations unit

جامعة الإمام عبدالرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

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# CS

## Computer Science

# My Smart Safe Home

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**In general, a smart home refers to a convenient home-setup where almost all domestic appliances/devices could be monitored/controlled remotely, from any corner of the globe, using a smart mobile and/or any other networked device having access to the Internet.**

**As in a smart home, devices are generally connected with each other; therefore, these could be accessed from a central point such as a smartphone. For example, the door locks, smart TVs, fridge, cameras, lights, etc. can easily be monitored and controlled nowadays using a composite home automation system. For the user interface, a suitable App is generally installed on a smart mobile or other networked device, where a user may create his/her desired time schedules for certain events to take place automatically.**

**As the latest smart home appliances come with the built-in self-learning skills, therefore these can learn the homeowner's preferred schedules and could also make adjustments in schedule as per the needs. A smart home being enabled with the lighting control should allow its owner to reduce the electricity use and take benefit from the energy-related cost savings. Moreover, a smart home automation system should be capable to alert its concerned homeowner if any motion is detected in target proximity when homeowner is normally away. In addition, it should also be able to make a call to the concerned authorities (e.g., police or fire department) in case of any severe anomaly is detected. Once connected, the services such as a smart doorbell, smart security system, and smart appliances are all part of the internet-of-things (IoT) technology, a network of physical objects capable to gather and share the electronic information whenever required.**

# BidChain: Bidding Platform Based on Blockchain Technology


## Supervisors

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**Most leading companies when they have new projects to implement, they ask for cooperation from others when they announce a project and the bidders come to propose prices. When it's time to choose the winner, the company uses a specific criterion usually it is the minimum price. The process is long and requires monitoring by specialized people. Also, high privacy and security since no one should know the prices to maintain fairness and integrity. Prices must be secured from the day of the announcement until the day of the results. Until today there are lots of companies doing the process using paper and others have basic systems. However, current solutions do not completely prevent fraud and change. Bidchain is a blockchain-based platform developed with web programming languages to overcome previous challenges. Blockchain technology is used to ensure document stability and that no bidder or project owner can go back and change the prices. Since important events are hashed using timestamps and recorded in the Blockchain. Furthermore, from the publication of the bid, until it is opened, we will encrypt the file containing the price requested by the bidder. The file content will be hashed and saved on the blockchain. Further by comparing and matching the saved hashes, we will make sure that the files were sent securely at the correct time. Finally, using the digital signature and the correct hash, the verification will end, and this is how we will ensure that the bidding process went correctly.**

# Twitter Arabic Sentiment Analysis to Detect Cyber Bullyingon


## Supervisors

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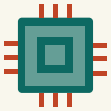


**For decades, bullying has been a severe problem affecting children, teenagers, and adults. Unfortunately, this problem has grown out to the cyber world as cyberbullying. cyberbullying can be found a lot in social media platforms such as twitter. However, developing an efficient cyberbullying detector is a challenging task especially with Arabic language. The main objective of this paper is to create a system that can detect cyberbullying on the Twitter platform. The system aims to detect cyberbullying by analyzing tweets to detect any Arabic word that could be associated with bullying behavior. It will focus on tweets from Saudi Arabia. The system will collect data from storing thousands of tweets and will use algorithms in machine learning such as Naïve Bayes, Random Forest, Logistic Regression, and KNN to analyze the tweets and distinguish cyberbullying. The aim of the project is to highlight the amount of cyberbullying in Arabic tweets and to raise awareness to the issue.**

# Cyberbullying Detection Using Machine Learning Techniques


## Supervisors

Dr. Dhiaa Ali Musleh

## Group Members

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**With the growth of internet usage amongst people, a new platform has been created that enables practicing bullying. Cyberbullying has increased over the past decade, and it has the same adverse effects as face-to-face bullying like anger, sadness, and fear. With the anonymity people get on the internet, they tend to be more aggressive and express their emotions freely, which can be a reason for the increment in cyberbullying. This study presents the background of cyberbullying and the techniques used to collect and preprocess the datasets used in our future work. Moreover, we reviewed several papers that use different classifiers to detect cyberbullying. The focus of this work is to apply Machine Learning algorithms (ML) in Natural Language Processing (NLP) for Arabic datasets collected from Twitter. Also, discuss the performance measures like accuracy, precision, recall, and F1-score. Therefore, the classifiers were selected based on their results from previous research, which are Support Vector Machine (SVM), Naive Bayes (NB), Random Forest (RF), Logistic regression (LR), Bootstrap aggregating (Bagging), Gradient Boosting (CatBoost), Light Gradient Boosting Machine (LightGBM), Adaptive Boosting (AdaBoost), and eXtreme Gradient Boosting (XGBoost). The best performance resulted from experimenting with the XGBoost with an accuracy equal to 89.56%.**

# Ein for image accessibility for the visually impaired using deep learning model

## Supervisors

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## Group Members

Jawaher Bader Alotaibi
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Arwa Khalid Alsahli
Fadiah Musaad Alghamdi
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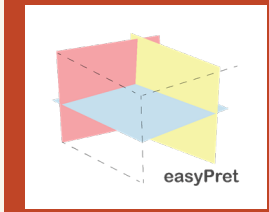
**Technology in our generation has been able to help many people and has saved their time and efforts. Technology has many fields that can help people with special needs, especially visually impaired people and those who face problems and difficulties in vision. Due to the lack of clear alternative text that explains the image and the lack of an accurate description, visually impaired people face difficulty when browsing the web and understanding its content. This project aims to develop a deep learning model that will help visually impaired people understand the image's content clearly by providing a description of the image. This model will process the image and translate it into a caption that will be displayed in text and audio format to the user.**

**Publication:** Conference
12th International Conference on Computer Science and Information Technology (CCSIT 2022)




# Industry Standard 3D Seismic Dataset Visualization Software

## Supervisors

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Student name
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**Seismic imaging is known as an important technique that helps geoscientists locate the potential oil and gas reservoirs and decide whether to go for the drilling or not. Seismic data process goes through three phases seismic data acquisition, processing and lastly interpretation. In order to make a crucial decision regarding the drilling, different techniques are developed as a solution. In this project, we discuss and describe the solution of visualizing 3D seismic dataset, the aim is to create and deploy a stand-alone application that achieves our aim. This application will help the users to discover and analyse obtained seismic data and apply slicing to get more details regarding the earth's subsurface. There also other features such as coloring the 3D seismic data and saving result as captured images of the created plot.**

# Twitter sentiment analysis


## Supervisors

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**Saudi Telecom Company (STC) is among the most popular companies in Saudi Arabia, with many customers. Yet, there is still a big room for improvement in users' satisfaction. Social media is the most robust platform to gauge users' satisfaction and determine their sentiments and critics. Twitter is among the most popular social media platform in this regard. One way to achieve customer demands and improve customer service is using the Sentiment Analysis tool. Sentiment Analysis on Twitter is highly used because of the significant number of tweets and the different opinions. Likewise, Deep learning is the best existing Sentiment Analysis method, and it has diverse models. Bidirectional Encoder Representations from Transformers (BERT) model is one of the deep learning models which has achieved excellent results in Sentiment Analysis for Natural Language Processing (NLP). Therefore, we developed 'Twitter Sentiment Analysis' that aims to analyze plenty of feedback and keep track of what people are tweeting about STC. The system is implemented using python programing language and has two deep learning models named 'MARBERT.' Trained on two datasets that the client privately provides. The first one contains STC customer feedback collected from Twitter only labeled manually (Negative, Positive, and Neutral). The second one is the spam tweets dataset containing tweets with some unwanted data labeled as (Yes, NO) to indicate whether it is spam or not. The first model is the spam detection model, which reaches a 98% score. The second model is the sentiment analysis model, classifying tweets into negative, positive, and neutral, achieving a 90% score.**

# MOMZIE

## Supervisors

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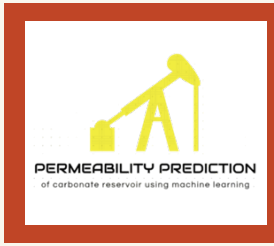
**Despite the fact that applications have evolved and been adopted in a wide range of fields, there are very few applications that are specifically designed to assist puerperal mothers. Based on that, we created an app that makes life easier for mothers and their babies by combining services from multiple apps into one app to assist mothers in a variety of situations, particularly the advanced chatbot service for quick responses to mothers questions. Additionally, other services will assist mothers at any time, such as reminding mothers when to get their children vaccinated, tips to assist them in taking care of themselves and their babies, and a tracker to track their babies' sleep and feeding.**




# Permeability Prediction of Carbonate Reservoir using Machine Learning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**Predicting permeability is always hard and expensive using the traditional techniques since they require large amount of time, resources, and manpower. Thus, it is always important to accurately predict permeability to characterize hydrocarbon deposits and successfully explore oil and gas. Thus, in this project, a permeability prediction model will be built using one of the famous machine learning algorithms, like Gradient Boost (GB), Support Victor Machines (SVM), or other machine learning algorithms. We will use real-industrial dataset gathered from five different oil wells in the Middle East during the petroleum exploration several years ago.**

# Machine Learning Based Prediction Model for the Diagnosis of Multiple Sclerosis


## Supervisors

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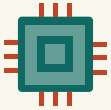
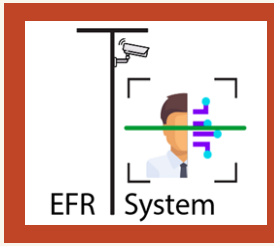



**Multiple Sclerosis (MS) is a disease that affects the Central Nervous System (CNS), which can lead to brain, spinal cord, and optic nerves problems. There has been an increase in the number of MS patients globally. This is also a cause of concern in Saudi Arabia as the increase has put the kingdom above the low-risk zone. Moreover, the prevalence of MS and the importance of early diagnosis create a necessity for an autonomous method for MS detection to enable early medical intervention. Artificial Intelligence (AI) plays a significant role in automated diagnosis of several diseases. Furthermore, Machine Learning (ML) and Deep Learning (DL) techniques can aid in simplifying the lengthy diagnosis process to make it more efficient. Numerous models have been developed that aim to detect MS disease. These models were built using different types of data, including Magnetic Resonance Imaging (MRI) and clinical data. However, most of the past efforts mainly relied on MRI to train their models. Hence, we will explore the impact of integrating both MRI and clinical data in training the model. Considering limitations in dataset size found in previous studies, we will try to work on collecting a considerably large dataset for our model. However, the size of the data is limited to the number of patients data available in the teaching hospital. Although there has been previous work utilizing different AI techniques for the prediction of MS, this is the first contribution in developing a model that uses a dataset that is collected in Saudi Arabia. In this project we will implement and compare several ML and DL techniques and discuss their performance in terms of different evaluation metrics.**




# Face Recognition and Tracking system

## Supervisors

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Samirah Alkholaif
Souad Alghamdi
Sarah Alshammari

**Using face biometrics to record an individual's identity is a standard solution in continuous data recording cases because it is fast and hard to be compromised. Administrators who work in a large firm with several buildings on one complex need to know the employee's current location by returning to previous records, which requires updating employees' current location continually. However, recording process takes time if it is not done efficiently.**
**This project addresses Saudi Telecom Company (STC), a well-known firm for providing cellular and broadband services, needs to develop a face recognition system to record employees' current location to ease tracking them at the premises. Besides, the system markes employee attendance, sends SMS in emergencies, and calculates total working hours.**

# Smart Attendance Management System (SAMS)


## Supervisors

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Zainab Yousef Alali
Mashael Mishal Alshalan



**Keeping track of attendance while engaging studnets in the classroom may be tough, especially when the class is big. The conventional method of calling pupils' names is tedious and time-consuming, and proxy attendance is always a possibility.To address this problem and maintain track of students' attendance, we presented a smart attendance management system (SAMS) using face recognition, fingerprints, and location. SAMS assists the instructor in two ways. First, it provides an automatic and error-free rollcall. Second, it records the attendance of pupils over time. to share with the advising unit, and to generate a DN list of students with short attendance before the exam for the academic affairs unit. SAMS notifies students when the rollcall window on their smartphone is activated/opened, based on the precise date/time slot for a class (under instructor ID, subject ID, and classroom location). It allows students to register for classes using their smartphone's face recognition and/or fingerprint sensor. The fingerprint is provided for two reasons: first, for fault tolerance (in the event that one of the alternatives is not functioning due to hardware non-availability/failure), and second, for students who are uncomfortable supplying their facial photos to the system. As a result, the student's rollcall is recorded in the system, along with the classroom location identifier. The system uses deep learning (DL) approaches for biometrics, such as the histogram of oriented gradient approach for facial recognition and fingerprint recognition.The suggested system can manage many occurrences of a student's rollcall at the same time, and it can even be used for rollcall in online classrooms during a pandemic.**

# Aman: Detection of Breast Cancer in Equivocal Mammogram Images


## Supervisors

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Majd Al-Qanbar
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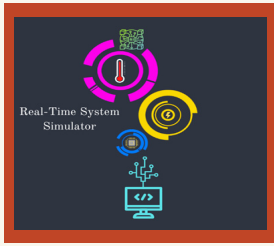
**Breast cancer is a primary cause of death among women. To diagnose this disease in its early stages, an Intelligent System (AMAN) employing X-ray mammography can be built, which can then support doctors and radiologists in their clinical judgments. This research offers an AMAN system based on two strategies to classify breast cancer using a private Saudi dataset from King Fahad University Hospital; The first strategy is based on a pre-trained Xception model that extracts the most significant features of X-ray mammography images. While the second strategy is based on classifying clinical data using Gradient boost by using a specified set of characteristics. Results demonstrate the proposed method attains an accuracy, area under the curve (AUC), and recall of 87%, 95%, and 86% respectively for the mammography classification using Xception model, while clinical data classification using Gradient boost has achieved AUC of 97% and balanced accuracy of 92%.**




# Simulator for Scheduling Real-Time Systems with Reduced Power Consumptions


## Supervisors

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Saud Saad Alwasfer


**Optimum resources utilization in computing devices, especially power, has been among the prime areas of research from the very beginning of computer systems. However, its importance in the current era has been significantly increased due to the diverse nature of devices and their real time applications. On the other hand, the paradigm is shifting towards sustainable resources that are green/environment friendly (low emission) in nature and produce low energy/power. Real time systems (RTS) on power-hungry due to their time constrained nature. So, there is room to investigate the scheduling algorithms (schedulers) with minimum (low) power consumption.**

**Simulators are software that mimic the real time environment for various parameter testing without actual implementation that could be costly as well as complex to build in the beginning. In this study, we intend to develop a "Simulator for Scheduling Real-Time Systems (RTS) with Reduced Power Consumptions (RPC)." That is potentially an environment where various algorithms can be tested over different case studies to examine their performance pertaining RPC for RTS.**

# Detection of Malicious URL of the Arabic Content Websites Using AI Technologies


## Supervisors

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**Search engines are major sources of information inquiry and retrieval. Each day, a huge number of new web pages are added in a different language. With this massive volume of data, the risks of cyberattacks are increasing rapidly. On the other hand, web attackers are continuously improving the search engine rankings of their malicious pages to trick users into visiting them, which may result in the system being hacked or getting access to sensitive data. Most of the studies that investigated the detection of malicious websites were mainly focused on English content websites. This calls for more research on malicious detection in Arabic content websites. In this project, we aimed to investigate the security of the Arabic pages by developing a detection tool that analyzes Arabic content based on AI techniques. To our knowledge, this tool is the first to be developed for Arabic content websites. We have contributed to the field of cybersecurity and artificial intelligence by creating an extensive literature review study and building a dataset with 4,048 records of Arabic content websites. We built four different Machine Learning models which are XGBoost, Random Forest, Decision Tree, and Support Vector Machine with different feature extraction and selection techniques. The conducted work was embedded in a developed Chrome extension based on a Random Forest model. As a result, this developed tool achieved an accuracy of 92.96% with the use of the features selected by the chi-square technique. With our extension, users will be able to identify whether a webpage is phishing, suspicious, or benign.**

# Tathakar application


## Supervisors

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## Group Members

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Salihah AlOtaibi


**Alzheimer's disease is spreading more rapidly nowadays among older people, so they need special attention and care, which may affect the people around them in terms of extra ordinary measures to be taken. In this project, we developed an android application with clear and simple interfaces to make the interaction with the patients more easily and more efficiently. Tathakar application will provide the patient and caregiver with a lot of functionalities, such as the patient can add new posts with pictures to remind them to finish their tasks. In addition, the patient can add new tasks and subtasks to the to-do list with a deadline to receive notifications of every added task. Moreover, the patient will be provided with a calendar that contains all the added tasks.**

**On the other hand, the caregiver can track the patient's status by viewing the patient's tasks. Furthermore, the caregiver can track the patient location to ensure the patient's safety. Our main goal is to help the patients to do their daily tasks by themselves and assist the caregivers in monitoring the patient's activities.**

# Arabic Sign language Interpreter (ASLI)


## Supervisors

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Renad Ali Alqahtani
Masarrah Kamal Alqurash
Zainab Abduljaleel Alrashed



**Language may be used in a variety of ways to communicate with the outside world via sounds, gestures, and facial expressions. Nonverbal communication is just as vital as verbal communication. Our bodies and expressions, on the other hand, are the tools through which we communicate our ideas without using words. Sign language is the primary way of communication in the Arabic deaf and mute community. As a result, without interpretation, the deaf population is unable to communicate with the public. When people with hearing loss make hand motions, Arabic sign language recognition technology recognizes them and transforms their movements into text. In this paper we used three algorithms CNN, LSTM and Dense and worked on two classification models one created for image classification, and the other was created for video classification. In the image classification model, we made a comparison between an open-source dataset and a dataset that we have built, and for both datasets we achieved more than 99% accuracy. As for the video classification model we built our own dataset and achieved a 100% accuracy.**

# Musnad Translation Mobile Application

## Supervisors

Dr. Naya Nagy

## Group Members

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Fatima Furaij
Zahra Al-Radhwan
Safaa Almulla
Feda Alomeran

**Our work features a mobile application meant to use state-of-the-art algorithms to translate the ancient transcript Musnad, into Arabic and English and vice versa. The application's different functionalities include translating scripts from images directly, supporting different keyboards (English, Arabic, and Musnad), and supporting the audio pronunciation of letters for the visually impaired. All these functionalities are to be provided in user-friendly interfaces. The final goal of this project is to raise awareness of history among the general public as well as aid Musnad scholars in translating this ancient script.**

# Predictive Artificial Intelligence for Detecting Dental Age Using Panoramic Radiographs


## Supervisors

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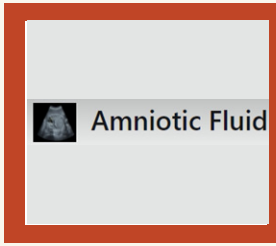
**Predicting dental development in individuals, specifically in children, is important to evaluate dental maturity and determine the factors that influence the development of teeth and growth of jaws. There are cases where the dental development is accelerated in patients with accelerated skeletal growth rate, and it can be related to the skeletal growth pattern of the child. Dental age (DA) of an individual is an essential information to the dentist for planning the required treatment in relation to maxillofacial growth. In this project, a deep learning- based model will be developed using panoramic radiograph images to predict the dental age. The dataset will be provided from dental hospital, Imam Abdulrahman Bin Faisal University, which will be preprocessed and implemented using different deep learning methods in order to achieve a sufficient mean absolute error. The proposed model can assist the dentist by applying the required procedure to the patients based on the exact dental age rather than the chronological age.**




# Deep Learning Based Model for Amniotic Fluid (AF) Classification Using Ultrasound Images


## Supervisors

Dr. Irfan Abdurrab
Dr. Nida Aslam

## Group Members

Fatima Muhammad Anis
Samiha Mirza
Alanoud Ahmed AlOwayed
Reef Mohammed Fahaid Aljuaid
Razan Mohammed Omar Bakr


**Technological advancements in the medical field have made a tremendous impact in treating many disorders that were once considered incurable or irreversible. Certainly, a fundamental step of any treatment is adequate and proper diagnosis. A fetal Ultrasound (US), or sonogram, is a technique to examine the baby's maturity and development. Consequently, in the second and third trimesters, US tests are performed for deep investigation, such as the assessment of Amniotic Fluid Volume (AFV), a key indicator of fetus health. Amniotic Fluid is a protective liquid surrounding the fetus inside the amniotic sac, serving multiple purposes, for instance, shielding the baby from external pressure, providing antibodies, and allowing the baby to begin exercising the muscles of various organ systems. Normal volumes of AF cater to the above-mentioned functions; however, abnormal volumes cause oligohydramnios (insufficient amount of AF) and polyhydramnios (an excessive amount of AF). The manual estimation of AF by physicians is tedious, lengthy, and highly reliant on the sonographer's skills and expertise, sometimes leading to inaccurate results. This project recognizes the setbacks of manual AF levels classification by medical sonographers to build an automated, accurate, and scalable AF levels classification tool by deploying transfer learning, image processing algorithms.**

# Detecting the Deformation of Surface Equipment in the Oil and Gas Field Using Deep Learning Models


## Supervisors

Ms. Sara AlEssa
Ms. Atta-Ur-Rahman

## Group Members

Dina Waleed AlFrayan
Fatimah Fakhir AlSadah
Noura Abdulrahman AlShuail
Rana Abdulrhman AlShedayed
Rand Osama AlEssa



**Oil and gas equipment abnormalities are detrimental, and their impact is significantly variable. Such abnormalities usually occur due to age or inclement weather conditions, and they may contribute to a loss of stability and integrity for future operations, causing violations of safety measures. The process of monitoring deformations can be time-consuming and inconvenient for workers and experts. To avoid the consequences of this problem, the process of monitoring the equipment needs to be automated. Applying artificial intelligence, specifically deep learning to detect and identify defects in oil and gas equipment can enhance inspection efficiency while also promoting the growth of industrial automation. In this project, the goal is to detect and classify the deformed and normal equipment. The proposed approach is implemented using standard machine-learning approaches and various CNN architectures are presented and analyzed. For instance, we focused on different versions of the You Only Look Once (YOLO) algorithm for detection and classification, such as YOLOv5, YOLOv4, YOLOx, YOLOv4-tiny, and scaled-YOLOv4, in addition to Faster-RCNN, and Resnet-50. The results demonstrate a promising capability in deformation detection with high reliability and low computational cost.**

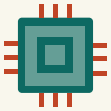
# Folium

## Supervisors

Ms. Mona Altassan

## Group Members

Sara AlQahtani
Amal Alwalmani
Rahaf Alamri
Sarah Alsudairi
Sultana AlQahtani



**Agriculture is the primary and indispensable source of income in many countries. There is no doubt that plant diseases are one of the major causes of deterioration in quantity and quality of production, which has devastating effects on the economy of nations. Consequently, the identification of diseases in plants is of vital importance. The detection of disease is important for preventing the loss of yields and quantities of agricultural products. It is very difficult to monitor plant diseases manually since it requires a great deal of work, expertise in plant diseases, and extensive processing time. This project aimed to develop a method of identifying plant diseases using image classification with the AlexNet algorithm. Our model provides high accuracy, which is 97% in the training and 93% in the testing. Using an automatic detection system, images of disease-affected leaves are taken and sent to the analysis system. The affected portion of the image is then segmented, and the useful feature values are extracted from the segmented image. As the extracted values are compared to the sample values stored in the database, the classifier is able to figure out the disease's identity and classify it. Finally, the user will be notified through a mobile application about the classification result and the necessary control measures.**

# Well Performance Classification and Prediction

## Supervisors

Dr. Nehad Ibrahim

## Group Members

Ali Abdulaziz Alharbi
Ibrahim Abdulaziz Alessa
Abdullah Ahmed Abdulkarim
Turki Ali Alzhrani
Abdullah Mohammed Hameed
Abdulaziz Suleiman Albabtain

**In the oil and gas industry, predicting and classifying oil and gas production for hydrocarbon wells are invariably difficult. Most oil and gas companies use reservoir simulation software to predict future oil and gas production and devise optimum field development plans. Reservoir simulation costs an immense amount of resources and is time-consuming. Each simulation can take several hours or days to finish. In addition, tens or hundreds of simulation runs are needed to complete a specific reservoir simulation study. Our project will address this problem by capitalizing on algorithms for machine learning and deep learning to give quick and accurate predictions.**

# Web System for Customer Satisfaction Prediction

## Supervisors

Dr. Alaa Alahmadi

## Group Members

Shahad Alzahrani
Raghad Alsahan
Lama Alsharhoof
Hanan Aldossiry
Nouf Alghamdi

**Measuring customer satisfaction is very important, companies need to be aware of their customers' opinions and thoughts in order to improve their services. Usually, customer satisfaction is evaluated by sending surveys or by asking customers over the phone to rate the services provided. Not all customers are willing to spend time to rate a service, these methods might not provide accurate feedback from the customers. In this project we are proposing a tool called "CALLTOPIA" that predict customer's satisfaction by converting voice conversations into text to apply sentiment analysis and classify the conversation into two classes, "satisfied" and "dissatisfied". The system will also help the agents to speed up the process of searching for specific services, by assessing them by providing the right answers when dealing with customers, which will enhance employees' knowledge regarding the company's services.**

# CIS

## Computer Information System

# Tahq'q Compliance Checking System

## Supervisors

Ms. Ghada Alrugaib

## Group Members

Ashwag Aloufi
Atheer Alqahtani
Shahad Alhajri
Danan Saleh
Shatha Alharbi
Razan Albalhareth

**Tahq'q web application aims to support the Construction sector in Saudi Arabia by digitizing the process of checking the Saudi Building Code regulations compliance for building projects. Tahq'q is considered to be a contribution between the college of computer science and college of architecture of Imam Abdulrahman bin Faisal university. Tahq'q creates a smooth and successful experience for Engineers and Auditors by providing Error Checking service in which users answer multiple questions -extracted from the regulations of the SBC book- based on the user's answers the result of the process will determine whether the project information is compiled or not complied in regards to the SBC. Moreover, Tahq'q provided with Apply SBC 1011 service which is considered as the beginners guidance to the SBC, it gives them access to the steps of applying the SBC during design to facilitate the process of following Saudi building code regulations.**

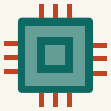
# HADER – EXAM ATTENDANCE SYSTEM


## Supervisors

Ms. Asiya Salam

## Group Members

Shahad Saud AlTamimi
Lamia Abdullah Alhammad
Danah Nasheer Aldosari
Deemah Adel Alrushood

**In today's modern educational industry, work and time efficiency are required, which can be achieved using technology. Many manual processes are currently being transformed by technology. This rapid pace of innovation is critical in any process that seeks to save time and effort. This project supports the student attendance system at CCSIT by utilizing QR Code technology. Traditionally, an invigilator would pass around an attendance sheet for students to sign alongside their names, and another way would require the invigilator to call out the students' names one by one and register their attendance. The QR Code attendance system is intended to replace the manual attendance process and accelerate the efficacy. At this project, we will propose a system that automates the examination attendance process in CCSIT by using a QR-based mobile application.**

# Ma'arifa initiative

## Supervisors

Dr.May Aldossary

## Group Members

Abeer alotaibi
Raneem Alamri
Nouf AlKhalifa
Ghozayal Alshuridah
Munira Alhuthyfi

**Ma'arifa educational initiative website aims to support peer tutoring as an online tool for classes. It is a website that creates an effective means of communication between students where they can access and view the details of their courses. As well as a discussion board for each course will be available to discuss and exchange useful resources. The volunteers who will tutor students will be accepted by the admin under certain conditions and will conduct a live session that will be on a weekly schedule based on the students' votes. The objectives of this website are to increase the students' academic level, gain a deeper understanding of their subjects, and allow them to practice teaching and communication skills.**

**Publication: Conference**
**Curriculum and Teaching Methods**

# Smart Gate that identifies health identity

## Supervisors

Dr. Mariam Elhussein
Dr. Abdullah Almuhaideb

## Group Members

Fatema AlHolyal
Maram Alawami
Leena AlGhamdi
Majd Al-Ismail
Zainab Kadour

**A significant problem facing a high percentage of people each day is the traffic jam at the entry to different facilities, such as (university campuses, supermarkets, hospitals, colleges, etc.). This is due to the lengthy process of verifying health status. For instance, the campus gate will have a long line of traffic due to the manual health status check that takes a lot of time. Due to the traffic congestion, staff and students will be late for work and classes.**

# Smart Padlock

## Supervisors

Mr. Saeed Al Qahtani

## Group Members

Yaser Alghanim
Mohammad Almousa
Ubejdullah Mujovic
Jawad al Assad
Fares Alnasser

**This project is all about personal belongings safety which makes it easier not to use a physical key with minimizing the physical interaction. The device is an Internet of Things ( IoT ), and it consists of face recognition, fingerprint, and passcode if a user needs it. As we all know, we are going through a covid-19 pandemic situation, and a Smart padlock can help users to avoid sharing the key. Instead, the main user can access the website and add another user and give permits to allow him to access the padlock. There are features where user can check the history log and how many times it unlocked during a specific duration, also any suspicious attempt could've saved in the log, and if there is a wrong entry multiple times, it will lock, the user needs to enable it again from the website, and in case its wrong entry in the device it will make buzz sound which alert surrounding.**

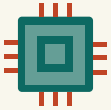
# Find<d>oor

## Supervisors

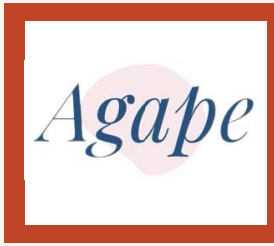
Dr. Sghaier Chabani

## Group Members

Khalid Mohammed Al-Shamsi
Dhafer Hussain AL Qahtani
Alaa Emad aldamshaqi
Faris Fahad alzahrani
fahad tariq alabdulatif
Saud khalid alyaqout



**The proposed indoor tracking system which expected to serve all staff members, students, instructors and visitors inside CCSIT college. The project focuses on developing a system that guide the system users toward any specific location inside the building with the help of the distributed access points at every floor which provide a WI-FI signals that will be used to locate the user's location and the destination as well**




# Agape

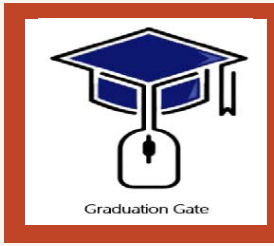
## Supervisors

Ms. Hina Gull

## Group Members

Nada Albashrawi
Laila Alnemer
Noor Alsaud
Hamidh Almozarra
Horyah Alsadah

**Nowadays, improving mental health is essential to living a healthy and balanced life. In the Middle East, there is difficulty in reaching the desired care and online therapy. Agape is an Android mobile application that targets people who have mental issues related to one of these issues: social anxiety, depression, insomnia, or general anxiety, by providing the services that the user needs. With the help of renewal and the Reward Center, Agape will provide treatment plans for people with social anxiety, depression, insomnia, and general anxiety and focus on living in the present moment and improving the quality of people's lives. This document contains the introduction and problem statement that explain the aims and objectives of developing Agape in Chapter One. While Chapter two shows the Software Project Management plan with all the plans and estimations needed to develop this software, Chapter three shows the software requirement specification needed to accomplish agape successfully together with Chapter four, which includes software design specifications. Also, Chapter five is the Test Plan, which shows the scope of the test as well as the testing strategy. It also includes the features that will be tested and those that will not be tested, the pass and fail criteria, and the test approach that we will use to test the system. Chapter six is the test report, which details all of the test cases and their outcomes. Chapter seven is the implementation chapter, which covers implementation progress tasks as well as a system preview with screenshots. Chapter eight is the user manual, which guides the user on how to use the system. Finally, the conclusion chapter discusses the findings and contributions, limitations, lessons learned, and future work for the system.**




# Graduation Gate

## Supervisors

Ms. Elham Binshaflout

## Group Members

Shaima khalid Alshaibi
Areej Nasser Alqhatani
Aisha Hasan Subai
Norah Meshari AlMeshari
Zainab Aon Almomen

**Our idea is intended for the graduation project management system. In educational institutions, and particularly in universities, systems that manage graduation projects are so important for project supervisors and students, as well as for external organizations that are looking for students to collaborate with them to implement the graduation project. However, many of these institutions lack such systems, hence the idea of this project has arisen, Students will join groups, after which each group will upload their proposed ideas for their projects; if they have them, the proposed ideas will be organized into a list that supervisors can see. The supervisors can also raise their ideas if they want. Students can read a brief profile of the Supervisors and rate them at the end of the year. Each group leader will send a request to the Supervisors to supervise them and vice versa, where the Supervisors can send a request to the groups. The system helps students by allowing them to see previous and external graduation projects ideas and its description to give them an idea about other projects. Graduation projects are important in all.**

# Smart Inventory

## Supervisors

Dr. Rami M Mohammad

## Group Members

Hussain Taqi Khoder
Hussain Ahmed Alyahya
Ali Mohammed Almuallim
Zeyad Ahmed Alquaimi
Mazin Mohammed Almohsin

**The smart Inventory project uses NFC cards, scanners, and sensors to offer an inventory management system. The proposed project attempts to create a system that makes inventory management easier by utilizing NFC cards and readers, as well as sensors that alert administrators to products that have been removed from the shelves. The project also is using hardware components such as Arduino, and a locker box to contain the items. For the software, we are using a website to alert the admins and the database using firebase.**

**Publication: Conference**
World Congress on Information Technology and Computer Science (WCITSC)

# Xrev

## Supervisors

Ms. Maryam AlNasser

## Group Members

Noof AlBassam
Fahdah AlSudairi
Haneen AlHmoudi
Fatima AlAsmari
Ahlam AlGhamdi

**It is known that when you have an automobile accident, there is always a car insurance agent that comes, takes your credentials, and assess the accident after taking forever to arrive. Coincidentally you have to be somewhere else, but rather you must wait for the agent. On top of the waiting, you have to handle all of the honking of cars that are stuck in traffic, angry faces, and the overwhelming feeling of fear that you just undergo. The proposed application erases all of that. The main purpose of Xrev is to have the automobile accident parties not endure the above scenarios, but rather solve the ordeal within minutes. A drone will replace the majority of the cars and will have a camera embedded in them to take 360° pictures to capture the accident scene accurately. Then, cars will be able to move aside in minutes and fill an accident report form on the application. After that, the operator is will begin assessing the accident while information is being entered from the Xrev headquarter. Without having to cause any traffic, more air pollution, and saving time.**

# Sa'ah Eco-Friendly Mobile Application

## Supervisors

Dr. Gomathi Krishna
Ms. Mona Altassan

## Group Members

Sara Alshaye
Shaima Alharbi
Aseel Almuhana
Jumana Abudally
Nouf Alghamdi

**In this time and age, with global warming and pollution rising by the minute, encouragement must be given to lessen their effect and protect our planet. Sa'ah app was developed with the hope of making the effort of reducing the waste that gets thrown out every day, easier. It targets three categories of waste reductions; reduce, reuse, and recycle. we reduce the waste by suggesting alternatives of reusing items and recycling them as well as the option of lending them out or simply donating them. Sa'ah app targets all the netizens by providing a platform for easy access and real time communication between users for instructiveness and bigger support. It solves the problem of having to make more than one connection and more than one action to reach the desired result by giving access to all the solutions needed in just one platform.**

**Publication: Conference**
**Advanced computing and communication system**

# TrainingLine Application

## Supervisors

Ms. Ruba Alsalah

## Group Members

Maram Mohammed Alotaibi
Wajd Khalid Alabbas
Dalal Nasser Almodraa
Rawan Ibrahim Alwhaibi
Aisha Khudhair Albarraq

**Nowadays, technology and mobile applications have evolved rapidly and become an important part in our daily lives. Therefore, there is always a need for applications that provide vital services in all areas and fields such as, healthcare, education, community services … etc. Accordingly, TrainingLine application is developed to help trainees who seek for a training or an internship opportunity to find it easily and quickly in one application. It also helps the training providers such as companies, organizations, or any institution to offer their training opportunities or training courses through this application. This would facilitate the interactive communication between trainees and training providers where the trainee can search and register in the appropriate training. The proposed application provides a user-friendly interface that enables all users to manage their training services in different fields easily.**

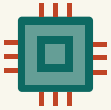
# FinReco: Financial Reconciliation Using Blockchain

## Supervisors

Dr. Rachid Zagrouba

## Group Members

Salma Abdullah Alshaye
Batool Abdullah Habbabeh
Raghad S. Al-Ghamdi
Ayshah D. Fatani
Amjad Majdi Alnahdi
Soaad Saeed Alghamdi



**Financial reconciliation is an important process for accountants who usually do reconciliation manually which is an error-prone method and consume a lot of time, and it affects the accuracy of the financial settlement which makes companies face compliance risk. Business growth makes data more complex which makes it higher error pone and risk rate. Therefore, companies getting interested to invest in automizing the reconciliation process. This project proposes the automization of the financial reconciliation process using blockchain. Our main goal is to speed up the financial reconciliation with high security for the accounting system of the companies. The solution validates the records in the payment gateway and bank gateway by Smart Contract and then stores them in a block, so the block is ready to be shared in a private ledger and results in a report for the reconciliation. In case of inconsistent data, the system will alert the accountant using a warning report. Hence, the solution was proposed to enhance the security and accuracy of the financial reconciliation process.**

# GlucoNote

## Supervisors

Dr. Mohammed Gollapalli

## Group Members

Saja Abdullah Alhassar
Ruba Hamdan Albaqami
Salma Ibrahim Alghamdi
Maram Faisal Alqahtani
Ghadeer Saeed Alghamdi

**Diabetes Mellitus (DM) is one of the developed world's fastest-growing health diseases. Due to wealthy lifestyles, lack of exercise, poor diets, and obesity, it has now reached epidemic proportions in nations such as the Kingdom of Saudi Arabia (KSA). Major socio-economic developments have happened in the country recently.Saudi Arabia is among the top ten countries in the world with the highest diabetes prevalence, with an estimated 24 percent of the population diabetic. In this project, we aim to increase the awareness of diabetic patients about the importance of monitoring and follow-up of blood sugar levels, and maintain a healthy lifestyle to prevent the occurrence of an imbalance in sugar levels which if not controlled, the chances of experiencing health complications such as loss of vision will increase. The project will provide a solution for diabetic patient to manage and keep a record of their diabetic status. GlucoNote is a mobile application designed and developed to serve all diabetic patients in Saudi Arabia.**

# Mahfoud

## Supervisors

Ms. Madeeha Saqib

## Group Members

Shmoukh tariq albattah
Fatimah Mohammed Al-Ghazwi
Reem Saad Alanazi
Maha Saleh Alqahtani
Renad Mohammed Alqahtani

**Archiving system is a website that helps the DICT is Deanship of Information and Communication Technology in IAU to keep their data from being lost. It is an archiving system to store, manage, edit, search, view all the files in the department via a web application. The system could be accessed 24/7 from any device; accessing it needs only an internet connection and a username and password of the employee. Then the system will check the entered information against the database to know the appropriate limitation for the user based on his role, making it easier for employees. Also, the application directly connects with the database to retrieve the files and images. The website application is build using php, HTML, CSS, and JavaScript language. And as a result, the website will accommodate different type of users and with a variety of functions for them to use to ease the process of archiving.**

# Kiddo: Kids Mobile Application


## Supervisors

Ms. Albandary Alamer

## Group Members

Enas A. AlGhamdi
Noura A. Alaskar
Jawaher M. AlKhamis
Sana M. Bukhamseen
Almaha S. AlMulhim



**A good and healthy seed will always produce a nice fruit, whereas an infected seed will produce an infected fruit. The same concept applies to the children, and the healthier the environment in which the kids grow, the more likely they become valuable members of society. Kiddo project introduces us to a mobile application that focuses on enhancing the sense of responsibility from a young age and makes raising kids fun and easy. The application aims to enhance the communication between parents and their children and to enrich the good habits of the kid. Kiddo Application enables kids to share their accomplishments with their peers in an interactive environment full of enjoyment followed by parental monitoring to handle what their kids are posting and friends following. Kiddo provides the kids' and parents' society with a safe platform free of cyberbullying and inappropriate content with parents' fun engagement.**



**Publication: Conference**
Advanced Research Society for Science and Sociology (ARSSS)

# Ataa Charity

## Supervisors

Mr. Ma'moun Abdelqade

## Group Members

Abdulaziz M. Al-shehri
Hassan Abdallah Al Ali
Abdullah Ahmed Almuqrin
Nawaf Essa Omair

**A smart donation platform that can help people. What is missing is the local communities helping each other more efficiently, by adding some new ideas to the donation service and by using and DL algorithms it can be more beneficial to local communities in finding who is more in need based on their information. The platform will automatically compare and give based on the needs and the budget of the charity; The donation campaigns would reach their goals more frequently.**

# Intelligent watering system (IWS)

## Supervisors

Dr. Mohammed Alqahtani

## Group Members

Rawyh Kadasah
Hadeel Al-otaibi
Ferdous Qabbani
Noof Alborai
Layan Alsahli

**To enhance these watering systems, we are developing an intelligent auto-watering system, that will be able to detect the soil moisture, Temperature and humidity levels and based on the soil moisture percentage the system will automatically open/close the water pump. Additionally, an application will be used to monitor the humidity, temperature, and the soil moisture level of the plants in all time.**

**Publication:** Conference
Women in data science @KFUPM2022 workshop

# Child World

## Supervisors

Dr.Maryam Ahmed

## Group Members

Zainab Abdulmohsin Al-Sulaiman
Maryam Ibrahim Al Fadel
Raghad Abdulaziz Al-Shehri
Ghada Ibrahim AlGahtani
Ruqaiah Mohammed Alkhater
Zakiah Abdullah Al-musalami

**Child World application. The application aims to develop the child's skills in terms of encouraging him to perform his daily tasks and motivating him to learn more than the existing sections of educational games and books. It also helps the child to be independent and act in critical times and perform his tasks correctly. The application is proposed to be easy to use instead of using physical tools. In addition, children benefit positively from using the tablet rather than using games and applications that could have a negative effect on them. The application intends to make it easier for parents and teachers to organize the tasks of the children.**

# Leen, pet adoption platform

## Supervisors

Dr. Saqib Saeed

## Group Members

Reema Alsuwailem
Reema Almobarak
Razan Aboali
Safa Alrubaiea.
Jazwa Aldossary

**Recently, "pet adoption" concept has become very popular in our society, and to support this concept, we have developed a web-based platform for people interested in adopting pets. Our platform aims to act as a midpoint between people who want to offer their pets for adoption and those willing to adopt them. Besides, providing a platform for pets exchange the platform allows to communicate among people who have the same interests to share their knowledge and personal experiences. Furthermore, all the provided services will be for free with no fees. Our platform will provide various distinctive features such as instant chatting, discussion forums, veterinary clinics, Donations, and Pet delivery.**

IEEE Advancing Technology for Humanity
IEEE IAS Global Conference on Emerging Technologies
IEEE IAS GLOBCONET 2022
May 20-22, 2022 | www.globconet.org

**Publication:** Conference
IEEE IAS Global Conference on Emerging Technologies (GlobConET)

# ColorMe: Food recommender system based on non-preferences of items


## Supervisors

Dr. Samiha Brahimi

## Group Members

Alanoud Abdulaziz Albasti
Arwa Ali Aseeri
Noor Ali Al-Shali
Naba Hussain Khuraidah
Rehab Ibrahim Alhares


**Food recommender systems are recommender systems that provide users with recommendations for food dishes that fit with the user's preferences, and it has started using the food domain to match users' preferences. Our food recommender system will focus on non-preferred ingredients chosen by the user. The food recommender systems have started using the food domain to match users' preferences. For instance, the system provides the user with recommendations of dishes based on allergies, preference ingredients, or a specific diet. The system will filter dishes based on the non-preferred ingredients and the menu entered by users. The ColorMe recommender system aims to help people select the most suitable dishes based on non-preferred ingredients chosen by the user.**

# Flourish

## Supervisors

Mr. Sardar Iqbal

## Group Members

Rayanh Alyami
Monera Almokzainzi
Jumana Aleleyo
Lubna Alghamdi
Aroob Alkarni

**As we advance in the IT field, we keep discovering new ways to provide technological solutions in different fields. One of those fields is the healthcare field, with the help of technology the healthcare field can make new discoveries, collect more data on symptoms for diseases, and provide more effective care and support to their patients. Our project proposes the idea of building an application called "Flourish" which is aimed towards individuals with Attention-Deficit/Hyperactivity Disorder (ADHD), in Saudi Arabia it is estimated that around 2.7% - 13.5% are affected by ADHD. By building an application we can help these individuals manage their symptoms better and understand the way they behave more. The application will include different sections that focus on the different symptoms that ADHD patients display; these sections will include time management and organization, mindfulness and relaxation, a platform to communicate with other ADHD patients and ADHD specialists, habit tracker and behavioural patterns.**

**Publication:** Conference
2nd ASIANCON 2022

# Aknaf Website

## Supervisors

Dr. Yasser Bamarouf

## Group Members

Renad Amer Alrabeea
Leena Talal Kanadiley
Wafa Mohammed Alsharekh
Bedour Waleed Aljindan
Renad Mohammed Alghamdi

**Technology is occupying a big part of our lives, which could become an essential part. All institutions these days need the use of technology to reach their peak and succeed. yet unfortunately, there is a large percentage of educational centers and consulting institutions that do not have a digital strategy, despite the advantages they could gain from technology. A meeting was held with the administrators of the Aknaf institution to discuss the problems they are facing. This project aims to develop a website for Aknaf institution, which is interesting because Aknaf still performing all their task manually without any help of technology. Current commercially available websites do not cater for all requirements. This website will help Aknaf institution to make things easier and to achieve its desired goal to reach the largest segment of beneficiaries and save operation costs for the institution. However, such a website can be extended to work in other consultation institutions.**

ICMDRSE

**Publication: Conference**

# Reservoir Models Calibrations and History Matching

## Supervisors

Dr. Fatema Shaikh

## Group Members

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Danah Fathi Alawami

**Reservoir simulation is an essential tool in reservoir studies, particularly in the gas and oil industries. It is a major application in the petroleum industry. For predictions to be accurate, the model must reproduce outcomes comparable to historical production, which can be achieved through historical matching, but requires considerable time and effort. Therefore, the reservoir model combined with ANN is the key to overcoming the challenges of complexity and effort by implementing its features. To provide engineers with accurate results, we created a website with integrated ANN that simplifies the reservoir modeling process.**

**Publication:** Conference

# You Stay We Serve application

## Supervisors

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Mohamed Bkeer al-shathili
Ali al-Basher
Abdulaziz al-Gurini

**Hotels industries are continuously seeking a new way to stay competitive, ameliorate customer's satisfaction, and save long-term costs, and with the development and rapid expansion of mobile technologies and their notable effect on hospitality and tourism, hotel industries were heartened to be part of the evolution and comprise their services in such technologies. The adoption of mobile technologies in hotel industries comes up with innovative services for customers and employees, yet undiscovered. Recently, there are thousands of mobile applications for hotels and still, many of these applications are designed to provide rudimentary services such as booking, check-in, and information delivery. Consequently, these applications lack bringing added value to the customers during their stays rather, majority of applications focus on before-arrival services. For this reason, the use of an enhanced mobile application as a solution will fill up the missing gaps and enable easy communication between customers and employees (staff) and enhance the user experience as well. Also, the mobile application will not only provide before-arrival services, but also will include during-stay services, and many of these services are users' preferences since the development of the mobile application will include user-centered design (UCD). Furthermore, unlike many other applications where the use of the hotel mobile application comes to an end after the arrival of guests, the mobile application will serve the guests throughout their entire journey starting from booking and arrival to their stays.**

# CYS

## Cyber security

# BC-Gov: A Trust and Integrity Framework for Integrated E-Government Systems


## Supervisors

Dr. Fahd Alhaidari

## Group Members

Asraa H. Alsowaiket
Daniah S. Alkhoudiri
Kawthar M. Alsharah
Lama A. Alghamdi
Montaha M. Alqudaihi



**Most government authorities integrate their systems to enhance public services and optimize resource usage. However, authority integration may result in trust and data integrity issues among the involved authorities. Consequently, it is critical for each authority to verify data integrity and track changes to prevent fraudulent acts. Blockchain has proven to be an efficient solution for data integrity. Nevertheless, blockchain suffers from performance issues that hinder its adoption across different domains other than cryptocurrency. This paper proposes a blockchain-based framework for e-government systems integration to enhance integrity while considering the performance. To validate the proposed solutions, an experimental work is conducted as a prototype considering Saudi Arabia's Tawakkalna application's integration with different authorities as a case study. The solution considers performance by filtering the data before submitting them to the blockchain, as only critical data is submitted. Moreover, only hash and metadata are submitted to the blockchain, and verification is done on a need basis through verification button or once the user logs in. Lastly, the designed platform's ability to enhance data integrity is tested against different scenarios, and performance testing is done using a benchmarking tool to test the blockchain network, and K6 tool for load testing. The results prove that the system can detect malicious acts and validate data with minimal impact on performance when network size and computing resources are configured accurately.**

# Network Forensics and Intrusion Detection in MQTT-Based Smart Homes


## Supervisors

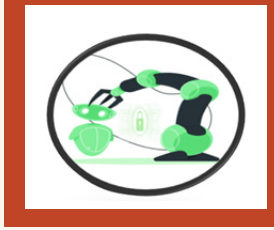
Ms. Maryam AlDossary

## Group Members

Lama AlNabulsi
Sireen AlGhamdi
Ghala AlMuhawis
Ghada AlSaif
Fouz AlKhaldi



**The emergence of Internet of Things (IoT) into our daily lives has grown rapidly. It's been integrated to our homes, cars, and cities, increasing the intelligence of devices involved in communications. Enormous amount of data is exchanged over smart devices through the internet, which raises security concerns in regards of privacy evasion. The developed tool (MQTTracker) is focused on the forensics and intrusion detection on one of the most common protocols in IoT environments, especially smart home environments, which is the Message Queuing Telemetry Transport (MQTT) protocol. Through the process of shaping MQTTracker, a research paper with the title of Network Forensics and Intrusion Detection in MQTT-Based Smart Homes was established. It covers the general IoT infrastructure, MQTT protocol and attacks conducted on it, and multiple network forensics frameworks in smart homes. Furthermore, a machine learning model is developed and tested to detect several types of attacks in an IoT network, different attack detection algorithms are compared to ensure the suitable algorithm is chosen to perform accurate classification of attacks within MQTT traffic. MQTTracker is proposed to contribute to the investigation of MQTT protocol, in order to provide a safer technological future in the warmth of people's homes.**



# Securing Mobile Robots Communication in the Oil Industry via Ad-Hoc Network Solutions


## Supervisors

Dr. Rachid Zagrouba

## Group Members

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Hadiah A. Almukhles
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Nadiyah M. Alkhaldi



**Oil and gas are among the industries that generate the most profits in the world and employ hundreds of thousands of workers annually that might put their lives at risk working in the Field. As a result, its security against any physical or technical issues that might delay the detection of gas leaking by the gas sensors attached to mobile robots is a major concern to stakeholders. Several infrastructure modifications have been implemented over the years to mitigate those issues. One of the approaches is the implementation of a remote robot hooked up to an Ad-hoc network to detect gas leaking. Ad-hoc networks, however, suffer from several security issues because there is no centralized management. As part of this project, AODV routing protocols will be enhanced within the MANET network to facilitate security against cyber-attacks that target mobile robots Communication in the oil Industry network.**

# Blockchain as an Intrusion Detection System for IoT Network


## Supervisors

Dr. Rami Mohammad

## Group Members

Ziyad Abdulhalim Mehdawi
Ahmed Ibrahem Al-Hassar
Mohammed Abdullah Mogiebl
Khaled Nasir Al-Mulhim
Abdullah Khalid Al-Qahtani



**The Internet of Things (IoT) is a new form of data exchange. Since it is meant to connect the end-nodes of its network system to transmit and interact with each other to get specific or periodic tasks done. However, as these end-nodes devices are different from each other regarding the manufacturing company, a sufficient security level is not guaranteed in most cases. Therefore, the final product of this project is a developed router that will function as an Intrusion Detection System (IDS) based on the blockchain authentication security for IoT devices named BlockChanger. Since the IoT devices have limited computing resources to make them participants nodes within a blockchain network. The BlockChanger stores a blockchain simulation of the connected IoT end-nodes within the network by representing each device with a Docker Container. Adding blockchain techniques to the network would erratically increase the authentication scheme inside the IoT network. Thus, any intruders could have access to the network via bypassing the Pre-shared Key (PSK) of the router, the BlockChanger will block any communication the intruder initiate with the blockchain devices because the intruder is not considered as a participant. In addition, there are added controls provided by the BlockChanger to enhance the functionality inside the IoT network.**

# PhishUs a Phishing Simulation Solution and a Learning Management System


## Supervisors

Dr. Nazar Abbas Saqib

## Group Members

Abdulrahman M. Alghamdi
Faisal E. Alarabi
Rami S. Almalki
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**Phishing attacks have increased tremendously in recent years. This widespread attack poses a serious threat in the virtual world and has proven to be an effective means of attacking various information systems. This threat can manifest itself in various forms and can be carried out in a manner that is unpredictable to others. Even though various developments have been made to address this problem, many lack certain aspects that would help in combating this issue. The PhishUs platform aims to further contribute to the solution by adding additional elements that help mitigate other phishing techniques (vishing and smishing) and incorporate an effective learning and compliance management system in which many overlooked these features. Therefore. PhishUs introduces a phishing simulation solution that includes a learning management system and a compliance manager. PhishUs seeks to combat phishing attacks through simulated phishing techniques aims to raise awareness and educate inexperienced users about the various tactics used by phishers through regular training and awareness.**

# Anti-Imposter: An Anti-phishing Outlook Add-in

## Supervisors

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Ms. Ghadeer Alazman

## Group Members

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Hawra Abdullah Aljunibi
Fai Fahad Aljohar
Rawan aaly Alrasheddi

**End users, institutions, and organizations alike are all vulnerable to phishing attacks. The majority of today's phishing attacks use e-mail as their primary mode of communication. Further, Anti-Imposter is implemented and integrated within the Outlook platform as an add-in tool. The Anti-Imposter add-in will run in Outlook's background to automatically detect received phishing emails by going through four main security check layers that include the attachment scan layer, URL scan layer, blacklisted layer, and finally an AI-based layer that utilizes six machine learning classifiers that have been proven for their outstanding performance in detecting phishing emails without relying on human awareness or interaction.**

International Journal of Computer Science and Network Security
IJCSNS

**Publication:** Journal
Phishing Email Detection Using Machine Learning Techniques

WOMEN IN DATA SCIENCE
DHAHRAN @ KFUPM

**Publication:** Conference
Women in data science

# PcapPeek: Automated Cyber-Attack Recognition and Visualization Tool


## Supervisors

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## Group Members

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Reem Aied Alrashedi
Nora Adnan Althani
Sara Mohammad Alsaidan



**With technology evolving, cyberattacks are increasing massively. Therefore, companies and organizations are obliged to implement high-security measures to prevent, mitigate, and respond to such attacks. If a company faces a cyberattack, it should pass through one of the major phases: the post-incident forensics analysis phase. This phase is a significant part of the investigation process since it provides valuable information on how the attack was conducted and where the vulnerability was, allowing the security team to patch it and learn how to defend against future attacks. For that reason, this project aims to discuss passive analysis of network traffic and review the current network traffic analysis tools and techniques, summarize, analyze, and compare them based on a pre-defied criteria to find the literature gap to address it. The gap found after the analysis is that no tool suffices all purposes of network traffic passive analysis, in term of both detecting the presence of attacks as well as to visualize the traffic flow. As a result, we propose a python-based framework which will be implemented as an automated cyberattack recognition and visualization command-line tool named PcapPeek. PcapPeek provides features to assess analysts and investigators during the post-incident forensics examination, through analysing pcap files to automatically detect the presence of ARP spoofing, SYN flooding, ICMP flooding, and ping of death attacks. As well as to visualize the network traffic to show packets flow from source to destination.**

# Learning-Based System for Detecting Website Phishing Attacks


## Supervisors

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## Group Members

Ruba Khaled Alobaidi
Reema Ali Abu Alsaud
Zainab Ahmed Alawami
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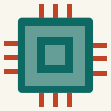


**Phishing websites are fake web pages created by attackers, to imitate real web pages and collect victims' personal information, where the attacker is not authorized to obtain. Website phishing is one of the most critical and sensitive attacks which result in significant impacts and losses on the individual and the community. Detecting phishing websites is a complex process that depends on various criteria and varies according to the type of systems used. Many non-machine learning systems are limited, following only specific instructions. It is also not easily scalable as it relies on the developer to improve the system. In the age of technology, our systems should keep pace with the rapid development in the technical field, especially in the field of cybersecurity, where speed is a sensitive factor. Machine learning provided a solution to keep pace with technical progress so that the system develops itself and does not wait for the developer to develop it. Machine learning-based techniques are effective for such detecting systems due to their capabilities on predication and classification considering changeable and dynamic input parameters and features. Therefore, detecting phishing websites using machine learning is a sustainable solution with many different website structures. This report presents strong literature all of which relying on machine learning to detect phishing websites. Also, this report introduced the proposed method as a result of exploring and analyzing the gap for many studies related to encountering this attack. Moreover, the proposed model was evaluated considering its accuracy and false rates. Finally, we implemented a prototype of the proposed model using Python libraries and then discussed its accuracy based on samples taken from popular datasets in the field. The results of the proposed model showed its effectiveness compared to others in the literature review.**

# Universal ID (UID): QR-Code Access Control System


## Supervisors

Dr. Nazar Abbas Saqib

## Group Members

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Mohammed Albahrani
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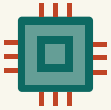
Omar Alfozan


**The exponential technological growth experienced today has changed the lifestyles of many. There is no denying that smartphones play a significant role in our day-to-day lives and have provided countless utilities that help in increasing the overall quality of life in addition to enhancing productivity. This project presents a secure access control system utilizing Quick Response codes (QR) for representing a Universal Identification key (UID), which then allows users of the system to be authenticated and securely access any facility within a given organization by using their smartphone, without any need for physical keys or managing multiple passwords and pin numbers. The UID system allows for easier and more cost-effective centralized key management, where keys are easily generated and disabled within the UID application. This project also provides a literature review of similar QR code access control systems, in addition to a thorough comparison and analysis between them based on a set of attributes. Afterwards, the application design is detailed along with all the functions provided. This UID access control system aims to solve the issues with normal authentication methods, by providing enhanced usability and performance, in addition to robust security.**

# CamFreeZe: A Method to Protect Hard-copied Material


## Supervisors

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## Group Members

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Zahra'a Althonyan



**There are several techniques to protect electronic documents such as encryption, access control, and copy right protection. On the other hand, techniques for protecting printed material are limited, especially when it comes to protecting the documents from being copied or distributed illegally. This project aims to find a solution for protecting sensitive printed- documents, from being illegally scanned or copied. To attain this goal multiple scientific papers were reviewed and summarized in this report**

# Tri-Auth: Authentication Method for DDoS Attack Control Based on The Traffic Light System Concept


## Supervisors

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Ms. Malak Khaled Alfosail

## Group Members

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Abdullah A. Alshobayan
Omar Aladwani
Rakan Alotaibi



**Distributed Denial of Service (DDoS) is one of the most common attacks affecting the cyber world. DDoS attacks can come from a variety of countries and are carried out by flooding the target host or network with traffic until it can no longer respond to legitimate users. In 2021, Yandex faced the largest DDoS attack in the history of the digital world. The noise volume of this attack broke a record and is now considered the largest DDoS attack known to mankind, with a traffic flow of nearly 22 million requests per second (RPS). In this study, we investigated several solutions to prevent DDoS attacks and try to develop a novel authentication method that prevents DDoS attacks based on a traffic light concept by blocking one or more lists depending on the server capacity. All proposed solutions prevent DDoS attacks based on the abnormal rate of sent requests (threshold). Consequently, no method uses capacity (CPU and memory uitlization ) as a threshold for blocking a country or a list of countries. To maintain availability for most users around the world and prevent bots requests, Tri-Auth is the optimal way to manage DDoS attack traffic and maintain availability.**

# CE

## Computer Engineering

# Real-Time Traffic Accident Detection & Alert System

## Supervisors

Dr.Mohammed Imran

## Group Members

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Sarah Alsharif
Reema Alsabt
Jomana Alabdulkarim
Bashayr Adnan Albin Saad

**Throughout the past years, a prolific number of AI traffic surveillance technologies have emerged, including the Saher system, to constructively ameliorate and enhance the traffic safety measures in Saudi Arabia. However, rapidly and accurately detecting a car accident in a traffic-moving environment can play a cardinal role in ameliorating the response speed of incident management which in return leads towards minimizing the road causalities and injuries that have been induced by the accident's occurrence. An automatic and real-time traffic accident detection and alert system that effectively employs a deep learning and computer vision approach is proposed in this work to attain a prevalent and permeating effect in achieving that goal as it can relatively increase the entailed demand for road traffic security and safety.**

**The proposed AI framework is composed of 2 models and it will be embedded within a prototype dashboard to fully visualize how the system will be implemented. .Firstly, a traffic accident and severity classification model will be deployed to accurately detect the occurrence of an accident by determining the accidents' level of extremity and seriousness where an immediate alert message will be sent to the nearest hospital if a severe accident is taken place to productively undertake the necessitated measures. Secondly, a vehicle fire incident detection model will be leveraged to assess whether or not a fire was taken place after the occurrence of an accident ,were an automated alert will be sent to the fire station incase such circumstances are taken place**

# Road Damages Detection and Classification Using Deep Learning Via UAV


## Supervisors

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Mr. Mohammad Aftab Khan

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**Road health management is particularly important, especially for big cities and countries. Problems that occur on roads like road cracks can be extremely dangerous to drivers' and passengers' lives. In this project, a road monitoring system will be designed to detect and classify the occurring problems on the road that happened due to obstacles, such as potholes. This work will help in repairing critical road damages faster and save people from accidents that are caused by these damages. The model will detect and classify the problems related to road damage into categories (cracks and potholes). The proposed model will be built using a deep learning technique which is mask- recurrent convolutional neural networks (Mask-RCNN). It has been found that Mask-RCNN is widely used in this area and in images detection and classification because it shows high performance. Numerous works have been done in this field, but it is hopefully that this proposed technique will achieve better results. The proposed model will be connected to camera, and it is integrated with a web application to demonstrate the results and manage the system. Also, reports with needed details like the location and preview picture of the damage will be created and displayed in the web app. Theoretically, the outcomes from this project shall demonstrate extremely reasonable findings in detecting and classifying road damages from real-time recording.**



**Publication: Conference**
2022 IEEE 2ND Asian Conference on Innovation in Technology

# Mubeen: Automatic Grammar Error Detection and Correction for Arabic Written Text


## Supervisors

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Dr. Malak Aljabri

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Farah Alsuwayeh
Moodhi Aljouali
Alhanoof Alhunief
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**With Arabic being one of the most widely spoken languages in the world, there has been an increased demand for systems that evaluate and adjust text quality. Certainly, Grammar Error Correction (GEC) represents one of the most advanced tasks in Natural Language Processing (NLP). However, studies on the Arabic language are relatively few due to the difficulty of the language and the lack of resources. The lack of resources includes a lack of annotated Arabic datasets that can be used for GEC tasks. In Mubeen, we constructed a new annotated parallel dataset and used it to develop an automated system for detecting and correcting grammar errors in Arabic written texts using Neural Machine Translation (NMT) approach, which we implemented by utilizing a Bidirectional Gated Recurrent Unit (BiGRU) for the encoder and a Gated Recurrent Unit (GRU) for the decoder with attention mechanism. To address the out-of-vocabulary (OOV) problem, we employed the Byte Pair Encoding (BPE) tokenization algorithm. Additionally, we investigated the use of three different approaches for initializing word embeddings for the encoder. The highest F0.5 score was achieved while initializing the encoder with pre-trained word embeddings from AraVec, where it reached 57.62%.**

# Calorie Estimation using image processing

## Supervisors

Mrs. Mehwash Farooqui

## Group Members

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Amal Sharaf Althobaiti
Sara Ibrahim Alnajim
Lubna Mohammed Alzaid
Mariam Essa Alqusser

**We developed an application that estimates the number of calories in the food by taking a picture. We used Image processing, Deep learning, and Machine learning algorithms to build our model, and then the estimated calories will show to the application user.**

# Preemptive Diagnosis of Glaucoma, Alzheimer's Disease, Lung Cancer, and Rheumatoid Arthritis Using Computational Intelligence Techniques


## Supervisors

Dr. Sunday Olatunji

## Group Members

Aisha Abdullah Alansari
Heba Abdullatif Alkhorasani
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Rasha Mohammed Sakloua
Reem Adnan Alzahrani
Yasmeen Ali Alsaleem



**Chronic diseases are among the leading causes of death worldwide. They impose significant effects on individuals, societies, and economies. Preemptive prediction of these diseases mainly contributes to supporting the health sector by managing individuals' health and improving their quality of life. Due to the prevalence of chronic diseases in Saudi Arabia, it is vital to leverage all the technologies available to early diagnose chronic diseases. Machine Learning (ML) is one of the emerging techniques utilized in the medical field for diagnosing various diseases more accurately. Despite the previous attempts to diagnose chronic diseases, their work mainly focused on targeting individuals who have already shown symptoms. The literature review also revealed that most recent publications used ML and deep learning approaches with Computed Tomography (CT) scan images for the diagnosis, which are insufficient, impractical, and inappropriate in local hospitals with limited or no imaging capabilities. Accordingly, this project aims to utilize ML techniques for the preemptive diagnosis of Alzheimer's, Glaucoma, Lung Cancer, and Rheumatoid Arthritis before symptoms are evident. Simple clinical data from Saudi Arabian hospitals are targeted since these data are generally more accessible from any medical facility and easily examined. Promising results were accomplished after investigating the intended diseases. Lung cancer was examined using an online dataset, attaining an accuracy of 97.27% using the Support Vector Machine (SVM) classifier. Similarly, The K-Nearest Neighbor (K-NN) model trained using the Glaucoma online dataset obtained an 88.77% accuracy. SVM outperformed the other algorithms to predict Alzheimer's disease using a Saudi dataset with an accuracy of 95.56%. Additionally, an accuracy of 94.03% was accomplished with a novel voting model to diagnose Rheumatoid Arthritis earlier using a Saudi dataset.**



CDMA2022

**Publication:** Conference
7th international conference on data science and machine learning applications (CDMA2022) Prince Sultan University, Riyadh

# Real-time Anomaly Detection Model for Oil and Gas Pipeline Using Machine Learning


## Supervisors

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## Group Members

Dorieh Alomari
Razan Alzannan
Shatha Alismail
Aljwharah Alkhudir
Fatimah Khawaher
Fatimah Aljubran



**The oil and gas industry is one of the most important industries in Saudi Arabia companies. Like many other industries, this industry faces many problems and difficult situations. The anomalies of oil and gas pipelines is one of the hugest problems in the oil and gas industry. As machine learning techniques add a great benefit to many fields and solve many problems, it was intended in this project to use them to solve this problem. In this project, a real-time anomaly detection model for oil and gas pipelines using machine learning is built and proposed to solve the problem of pipeline anomalies and help in enhancing the oil and gas industry in Saudi companies. Several machine learning (ML) algorithms are used to detect pipeline anomalies using operational parameters such as pressure, temperature, and flow rate through existing industry performance metrics (sensitivity, reliability, robustness, and accuracy). Support vector machines model showed the best performance with accuracy level of 97.43%. The proposed model can be deployed in oil and gas companies for early detection of anomalies in the oil and gas pipeline to avoid possible problems.**

# Preemptive Diagnosis of Multiple Sclerosis, Prostrate Cancer, and Hypothyroidism Using Computational Intelligence Techniques


## Supervisors

Dr. Sunday Olatunji (Aadam)

## Group Members

Sheriff Ameen K
Hamad Saad Y
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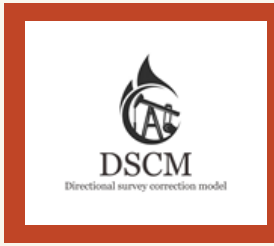
Abdullah Abdulrahman S
Mustafa Osama A



**This project aims to design a predictive system that preemptively diagnoses Multiple Sclerosis, Prostrate Cancer, and Hypothyroidism diseases. The system will be developed using machine learning techniques, and the performance evaluated using performance measures like Accuracy, Recall, and Precision. The system when completed will be able to make early detection of chosen diseases or better still, determine the chances of getting the disease to make an early intervention to improve health conditions in the Kingdom. It is hoped that the dataset to be used for this project will be that of Saudi Arabia, otherwise, an online dataset can be used instead if real-life Saudi datasets are not available. One of the objectives is to strengthen the healthcare system per the Kingdom of Saudi Arabia's Vision 2030. As a result, it is necessary to investigate all available ways of reaching and achieving that aim. In this project, we will concentrate on building machine learning-based tools that will act as early warning systems in recognizing even the most subtle indicators of the existence of any of these chronic diseases at an early stage. This would undoubtedly decrease, if not, eliminate the potential hazards commonly connected with these disorders when diagnosed later in their progression. Previous works of the same project with different diseases have achieved very high accuracy, for this reason, we are very hopeful of achieving similar or better outcomes in this project. The machine learning techniques used in this project are Support Vector Machine, K-Nearest Neighbor, Extreme Gradient Boost, and Voting Ensemble Classifier. The Hypothyroidism diagnosis had the highest accuracy 94.7% using the Voting Ensemble Classifier. Prostate Cancer diagnosis had 90% accuracy with Support Vector Machine, whiles an accuracy of 87% was obtained in the diagnosis of Multiple Sclerosis using Support Vector Machine.**




# Directional Data Survey Analysis grounded supported by ML Model to improve directional data acquisition and reporting system


## Supervisors

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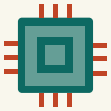
## Group Members

Mousa AlRabeea
Nawaf AlZaid
Abdulatif AlSuwaiti
Ahmed AlYousif

**The project aims to automate the process of the Directional Data Survey in a way that can be cost-effective for the operational process and more stable for future uses. In this work, we propose a fully automatic Directional Data Survey Analysis system based on the recognition patterns. The dataset used contained 34069 instances. Two machine learning algorithms SVM and NAIVE BAYES, and four deep learning RNN, LSTM, BI-LSTM, and ELM algorithms were utilized for this proposed work to aim toward achieving adequate results with a higher accuracy rate.**

# iGrade

## Supervisors

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## Group Members

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Yasminah Hani Alali
Aljowharah Mohammad Alajmi
Maryam Riyadh Alnassar
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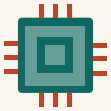

**During the COVID-19 pandemic, most countries rely on E-Learning to apply social distance policy which affects the exams evaluation process. This project aimed to assist instructors in grading the short answer questions for CCSIT courses. By implanting a website application that the instructors could use to upload the students' answers and the 'iGrade" software model will grade it. Moreover, the system will reduce the workload on the facilities members by saving time and effort as well as guarantee an objective grading for students. The model used in this project is a state-of-the-art BERT Neural Network model along with layers of BiLSTM that was trained using a dataset that has been collected from previous midterm and final exams of the CIS 211 course. The dataset consists of three categories which are (0, 0.5, 1) with around 1,128 instances. The "iGrade" test obtained an accuracy score of 85,4%, demonstrating BERT's superiority and independence from features during short answer grading as a default method in NLP.**

# Ensemble ML based identification of adult epilepsy


## Supervisors

Dr. Mohammed Imran

## Group Members

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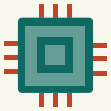
Mohammed Mansor Kurdi
Abdullah Kholaif Alshammari
Rayan Mohammed Altamimi
Abdulaziz Mohammed Noaman

**Millions of people worldwide are affected by different types of neurological diseases, and the most common one is epilepsy. Epilepsy affects brain functionality; it comes in the form of a brain disorder, and it can affect children and adults. The scary thing about epilepsy is that it comes without introductions, and it's challenging to anticipate the coming seizure. This raises the need for a system that can analyze the brain signal, which is the EEG signal, then detect the epilepsy seizure and predict the coming seizer. In this project, we will explore the EEG signal by applying a machine learning ensemble technique with SVM, ANN, CNN, and RNN algorithms to predict the subsequent seizure. In this project, we are the first team that uses machine learning ensemble techniques when adult epilepsy.**

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