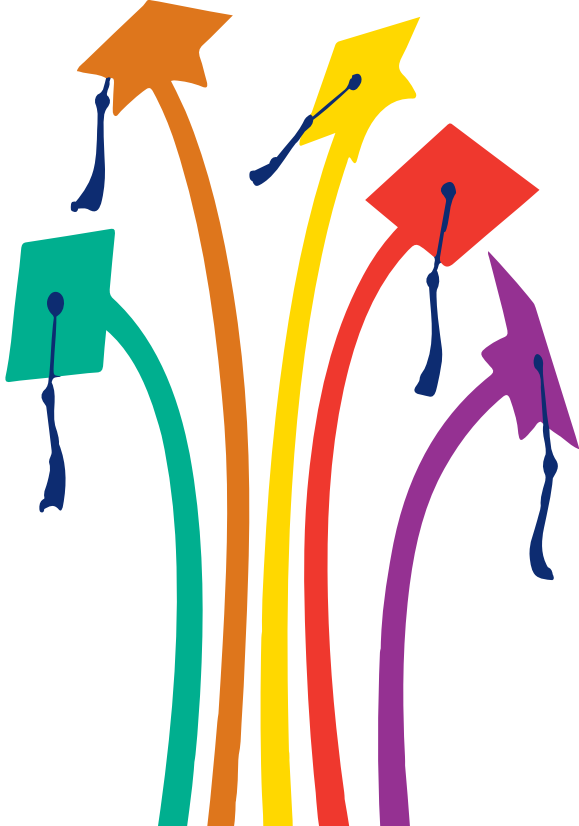




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# 6<sup>th</sup> PSUT Graduation Projects Exhibition 2023





عمادة القبول والتسجيل  
Deanship of Admissions & Registration

مكتب رعاية الموهوبين  
Talented Students Office

## PSUT's 6th Graduation Projects Exhibition معرض مشاريع التخرج السادس

The 6th annual Graduation Project Exhibition is a showcase of the innovative and creative projects produced by graduating students. The exhibition features a diverse range of projects spanning various fields of study including engineering, IT, and business. It provides an opportunity for students to present their work to peers, faculty, and industry professionals, as well as receive feedback and recognition for their achievements.

المعرض السنوي السادس لمشاريع التخرج هو عرض للمشاريع الإبداعية والمبتكرة التي أنتجها الطلاب الخريجون. يضم المعرض مجموعة متنوعة من المشاريع تشمل مختلف مجالات الدراسة بما في ذلك الهندسة وتكنولوجيا المعلومات والأعمال. يوفر المعرض فرصة للطلاب لعرض أعمالهم للزملاء وأعضاء هيئة التدريس والمهنيين في الصناعة، وكذلك تلقي ملاحظات وتقديرات لإنجازاتهم.

This project aims to send a positive message to the viewers by presenting an animated movie about two friends who experience a dispute with each other. However, they reach a resolution through compassion and forgiveness.

يهدف هذا المشروع إلى إيصال رسالة إيجابية للمشاهدين من خلال عرض فيلم رسوم متحركة يتحدث عن صديقين يتعرضان لخلاف، لكنهم يصلان إلى حل بالرحمة والمغفرة.

School: King Hussein School of Computing Sciences

Specialization: Computer Graphics and Animation

الكلية: الملك الحسين لعلوم الحوسبة

التخصص: علم الرسم الحاسوبي

By: Eman Daboor | Sarah Ashqar | Yaser Al Khatib

Supervisor: Ms. Rosana Marrar

# IMPACT

## 3D Short Movie

### Movie Description

Two friends, Adam and Ollie, dispute over a Gameboy that Adam owns in the school locker room, and it breaks. Adam then gets angry and goes to the bathroom to let out his emotions, where he writes spiteful things about his friend Ollie on the bathroom door. Later on this message turns into a monster that tries to destroy Ollie. We will see how Adam realizes that saving his friend is more important than holding on to grudges.

### Our Message

It is important for children to understand compassion, loving-kindness, and forgiveness. We should be taught from a young age that forgiveness is an essential life tool that will make navigating childhood and adolescence easier. Holding on to anger and resentment is a recipe for anxiety and depression for both children and adults.

### Shots From Our Movie



### Link to our movie

<https://www.youtube.com/watch?v=HqemccLX8g8>



Eman Daboor | Sarah Al-Ashqar | Yaser Al-Khatib  
Supervised By: Rosana Marrar

Princess Sumaya University for Technology  
Faculty of King Hussein School of Computing Sciences  
Department of Computer Graphics and Animation

The Prison's Architect is an epic survival game full of suspense. Enter the unforgiving Reynosa state prison and help Thomas escape it. Solve puzzles, run faster and think smarter in order to beat the cops and escape this brutal prison.

المعماري السجني هي لعبة بقاء ملحمية مليئة بالتشويق. ادخل السجن القاسي في ولاية رينوسا وساعد توماس على الهروب منه. حل الألغاز، اجري بسرعة وفكر بذكاء للتغلب على الشرطة والهرب من هذا السجن الوحشي.

---

School: King Hussein School of Computing Sciences

Specialization: Computer Graphics and Animation

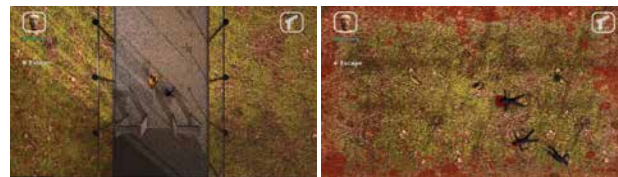
الكلية: الملك الحسين لعلوم الحوسبة

التخصص: علم الرسم الحاسوبي

By: Yazan Al Tahan | Saif Abdo | Saif Gharaibeh

Supervisor: Dr. Muhanna Muhanna

# The Prison's Architect Game Project



YAZAN RASMI SALIM AL-TAHAN | SAIF HUSAM NABIL ABDO | SAIF MA'MON MOHAMMAD GHARAIBEH

## Vehicle Management System

# VMS Project Summary

### Abstract

Vehicle monitoring can be tedious, especially if you have multiple vehicles or more than one person uses your vehicle. However, VMS software is designed to simplify this process by providing real-time monitoring and tracking of your vehicle. By installing a device on your vehicle's computer, VMS can read all relevant information, including anything displayed on the vehicle dashboard. When an issue occurs, the VMS mobile application will notify you and allow you to keep a detailed record of your vehicle's history. In addition, VMS can recommend the best spare parts and oils, track the vehicle's location, and provide other valuable features outlined in the accompanying document.

### Objectives

1. To explain the challenges associated with vehicle monitoring, particularly when managing sharing vehicles among multiple users.
2. To introduce the VMS software and its role in simplifying vehicle monitoring through real-time monitoring and tracking.
3. To outline the features and benefits of the VMS mobile application, including notifications of vehicle issues, detailed record keeping, and recommendations for spare parts and oils.
4. To describe the VMS software's ability to track vehicle location and provide other useful features, as detailed in the accompanying document.

### Scenarios and Screenshots

#### Scenario:

Assume you have changed the vehicle oil and you add the record see Figure 3. Adding Records all details of the record will be added to your records page see Figure 2. Your Records Screen after this application will automatically determine the mileage for the upcoming oil change see Figure 1 Home Screen.



Figure 2 Adding Records



Figure 2 Your Records Screen



Figure 2 Home Screen

#### Alerts types:



#### Showing vehicle location



This project aims to explain the challenges of monitoring shared vehicles, introduce the VMS software as a solution for real-time monitoring and tracking, outline the benefits of the VMS mobile app, and describe the software's ability to track location and provide additional useful features.

هدف هذا المشروع هو شرح تحديات مراقبة المركبات المشتركة، وتقديم برنامج VMS المحمول، ووصف قدرة البرنامج على تعقب الموقع وتوفير مزايا إضافية مفيدة. في المجمل، الهدف هو تبسيط مراقبة المركبات والصيانة من خلال التكنولوجيا المتقدمة.

School: King Hussein School of Computing Sciences

Specialization: Software Engineering

الكلية: الملك الحسين لعلوم الحوسبة

التخصص: هندسة البرمجيات

By: Omar Zabin | Ali Al Nather

Supervisor: Dr. Abdullah Alrefai

Omar Sami Zabin | Ali Ghazi Al Nather  
Supervised by: Dr. Abdullah Alrefai

This project introduces HaTrick; a highly functional and user-friendly Android application specifically designed to cater to the needs of sports enthusiasts who are looking for a hassle-free and efficient way to search and reserve sports fields with ease.

تقدم هذا المشروع تطبيق HaTrick الذي يعدّ تطبيقاً أندرويد عالي الوظائف وسهل الاستخدام مصمم خصيصاً لتلبية احتياجات عشاق الرياضة الذين يبحثون عن طريقة سهلة وفعالة للبحث عن ملاعب الرياضة وحجزها بكل يسر.

School: King Hussein School of Computing Sciences

Specialization: Software Engineering

الكلية: الملك الحسين لعلوم الحوسبة

التخصص: هندسة البرمجيات

By: Farah Al Atteili | Maya Abdelqader

Supervisor: Firas Al Ghanim



# HaTrick

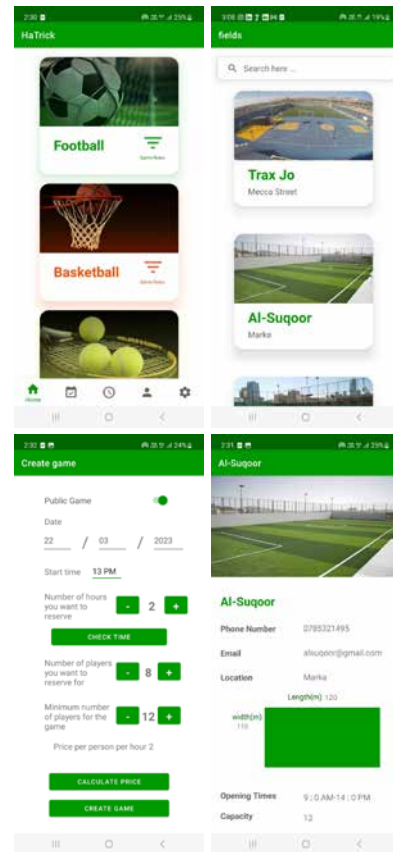
## Abstract

HaTrick is an Android application for Sports Fields reservations, that allows users to search and reserve sports fields easily.

HaTrick can be used by an owner of a field or a customer, owners could add their fields' information, add some photos of their fields, add the location, and many more, to make the fields' information more clear for the customers.

Customers could search for fields, view the fields' information, and reserve fields, the usual reserving of a field is considered as creating a private game using the application. Customers can also create a public game in a field, which means that if the user doesn't have enough players he could create a public game so other users could join his game.

Customers can also view their upcoming and previous reservations, to make it easy for the user to organize their schedule and to recall a field that they have reserved before.



## Towards Fluent Arabic Poem Generation

The graduation project is based on the idea of automatic composition of classical Arabic poetry using artificial intelligence models.

مشروع التخرج يقوم على فكرة التأليف الآلي للشعر العربي الفصيح الموزون والمقفى باستخدام نماذج الذكاء الاصطناعي.

School: King Hussein School of Computing Sciences

Specialization: Computer Science

الكلية: الملك الحسين لعلوم الحوسبة

التخصص: علم الحاسوب

By: Omar Al Aboushi

Supervisor: Dr. Serin Atiani

## الثمار الجنية من أشعار الآلة الذكية التأليف الآلي للشعر العربي الفصيح الموزون والمقفى باستخدام نماذج الذكاء الاصطناعي

وهذه بعض القصائد التي ألفها النموذج إثر تمرير شطر من المستخدم

ولقد شهدت الخليل وفي عوايس .. والبيض تمنع في العجاج الأكدز  
والخسول فعدو بالكتاة كأنها .. غفيسان يوم دجوة لم تسطر  
من كل أخرة سابع ذي مسية .. كالمسبب إلا الله لم تفسر  
ومسمة غسب كسا في لفة .. صنع تسليح تحت لبي مفسر  
وأعز ألسنح ينفضها بوجهه .. كالمسبر ليلة ثمة التمسر  
فستبهم كاس الرذى حتى التترا .. ضرى كآسراب القفا المتخسر

ولي نقر على ونقر آية .. ولقب على الأقوال لا يتضعضع  
وعزم كعد السيف ماض عراز .. وزاكي كنجيم الإسم لا يترزعزع  
وجلم إذا طاشت حلوه ذوي اللقى .. فخر له شئ الأرى والأصابع  
وتعذر عن الحاني وإن كان حانيا .. فإن هو لم ينف اعتدى وهو طابع

العلم يرفع على نيب هين .. والجهل يهدم على نيب غالي  
يا طالب العلية ذونك فاعتبه .. فرض الإيمان وآلات حين تغالي  
واعلم لتفسيك ضالها تجزي به .. يوم الحزب في مؤيق الأقوال  
واعلم بأن العلم ليس بتابع .. ما لم تقابله بحسن فعال

تقول البنتي حين جد الرحيل .. وذمعي على وجنتي متهير  
أفي كل يوم لنا رحلة .. وفي كل أرض لنا معتبر  
فقلت لها لا تردي أسي .. فما لإمرئي راحة في السر  
إذا المرء فارق أحبابه .. فقلتوت خير له من عمر  
ألم تعلمي يا ابنة القوم أن .. لكل امرئ أجل منتظر  
وكل امرئ سوف يجزي بما .. جناه ويجزي بما قد عجز

ولكني سأصير صبر حر .. على ما كان من علم وجوي  
لعل الله يحدث بعد عمر .. يسر منه يفضلك كل صبر  
ألا يا أيها التملك المرعى .. ليدفع ملبته وتوال خير  
لقد أوتيتي نعمًا جسامًا .. تجل عن القناء بصل شكر



# Design and simulations of a classification tool of voltage variations in power systems using a Using Combined Envelope-Neural network Based Approach

This project aims to develop an ANN classification tool for voltage variations in a power system and details the possible impact it could have to the existing system in achieving a better, more resilient, and reliable system for future years to come.

يهدف هذا المشروع إلى تطوير أداة تصنيف ANN لتغيرات الجهد في نظام الطاقة ويوضح التأثير المحتمل الذي يمكن أن يكون له على النظام الحالي في تحقيق نظام أفضل وأكثر مرونة وموثوقية للسنوات القادمة.

School: King Abdullah II School of Engineering

Specialization: Electrical Power and Energy Engineering

الكلية: الملك عبد الله الثاني للهندسة

التخصص: هندسة القدرة والطاقة الكهربائية

By: Yusra Daoud | Nader Aal | Mohamad Shahatit

Supervisor: Dr. Rafat Al Jarrah

## Introduction

This project aims to develop an ANN classification tool for voltage variations in a power system and details the possible impact it could have to the existing system in achieving a better, more resilient, and reliable system for future years to come, by detecting the voltage variations and classifying them into four categories, to help in providing corrective actions.

## Design

Figure 1 shows the process that was followed in building the classifier.



Figure 2, 3, and 4 shows generated signals with three types of voltage variations along with the extracted envelope and targets.

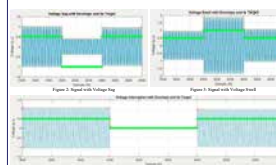
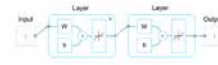


Table 1 shows the error in each phase of building the ANN.

ANN Building Phase	Relative Absolute Error
Training	0.0026
Testing	0.0023
Validation	$0.0779 \times 10^{-1}$

Figure 5 shows the ANN Design structure achieved.



## Results

Figure 6 shows the process that was followed in validating that the classifier was acceptable.

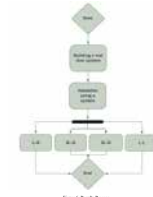
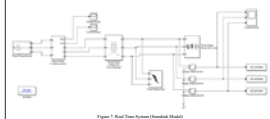
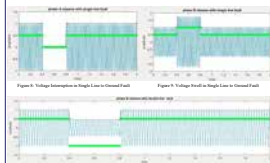


Figure 7 shows the system, that will be used for generating the signals to validate the ANN.



Figures 8, 9, and 10 shows generated signals with three types of voltage variations along with the extracted envelope and targets.



## Conclusion

In this project, a study of the 3 types of voltage variations was discussed along with how to create an envelope for a given signal to be able to use it in training an ANN that can be later used for random signals with similar cases. This was achieved by studying all relevant literature and generating signals with different types of voltage variations individually to create an envelope for them with a classification target for reference and familiarization. After that, an envelope will be taken for a developed signal with various voltage variations which are randomly distributed to simulate a real time signal, which was then introduced into an ANN to train it and use it for other random signals. This developed ANN was then validated using a system built on Simulink with different scenarios to make sure that the ANN is acceptable for further use. This projects aims helping to achieve a better, more resilient, and reliable system for future years to come.

This project proposes a IoT-blockchain system to handle big data generated by a distributed network of sensors and controllers in an interactive manner. The system is designed using the Ethereum platform.

يقترح هذا المشروع نظام IoT-blockchain لمعالجة البيانات الضخمة التي يتم توليدها بواسطة شبكة موزعة من الحساسات والمتحكمات بطريقة تفاعلية. تم تصميم النظام باستخدام منصة Ethereum.

School: King Abdullah II School of Engineering  
Specialization: Networks and Information Security  
Engineering

and Communications Engineering

الكلية: الملك عبد الله الثاني للهندسة

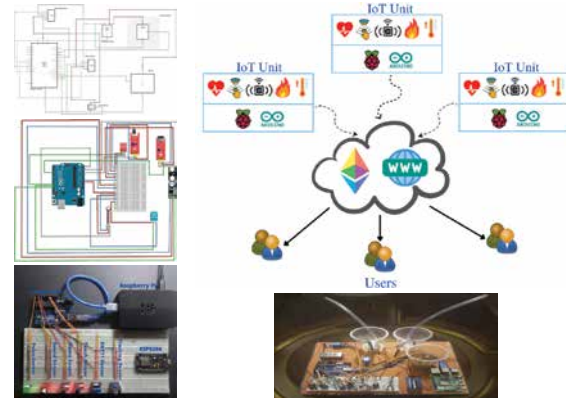
التخصص: هندسة أمن الشبكات والمعلومات وهندسة الاتصالات

By: Tariq Saadeddin | Amjad Shqeidef

Mohammad Hweidi | Luma Adi

Supervisor: Prof. Abdallah Al-Zoubi

## Design of Internet of Things (IoT) Data Storage Blockchain System



### Abstract

An IoT-blockchain system is proposed to handle big data generated by a distributed network of sensors and controllers in an interactive manner. The system is designed using the Ethereum platform, which utilizes smart contracts, programmed in solidity, to execute and manage data generated by IoT sensors and devices such as Raspberry Pi 4 and add-on hardware security modules. The proposed system runs a number of applications hosted by a local machine used to validate transactions. It, then,

sends data to the rest of the network, forming a closed IoT ecosystem mastered by blockchain where a number of distributed IoT devices communicate and interact, thus forming a closed controlled environment. A prototype with three IoT handling units distributed over a wide geographical space was deployed to examine its feasibility, performance, and costs. Initial results indicate that big IoT data are retrieval, storage is feasible, and interactivity is possible when meeting certain conditions of speed, cost, and throughput.

Tariq Saadeddin | Amjad Shqeidef | Mohammad Hwaidi | Luma Adi

Supervised by: Prof. Abdallah Al-Zoubi

Submitted in partial fulfillment of the requirements for the degree of BACHELOR OF SCIENCE in Electrical Power and Energy Engineering at PRINCESS SUMAYA UNIVERSITY FOR TECHNOLOGY, First Semester 2023

The project utilizes a machine learning approach, specifically Convolution Neural Networks (CNN), to create a Web Application Firewall that is trained on a dataset of malicious and non-malicious URLs to accurately classify them.

يستخدم هذا المشروع نهج الذكاء الاصطناعي بالاعتماد على طريقة المنهج القائم على شبكات التعلم العصبي المتسلسل (CNN) لإنشاء جدار حماية تطبيقات الويب. سيتم تغذية هذا النموذج بمجموعة بيانات شاملة تصنف ما إذا كان عنوان URL يحوي أي تهديد أمني أم لا.

School: King Abdullah II School of Engineering  
Specialization: Networks and Information Security  
Engineering

الكلية: الملك عبد الله الثاني للهندسة

التخصص: هندسة أمن الشبكات والمعلومات

By: Razan Alzakarneh | Karam Alnamat  
Supervisor: Eng. Farah Abudabseh



K. Namat, R. Ahwal  
Supervisor: Eng. Farah Abudabseh  
Senior Design Project, Fall 2022  
King Abdullah II School of Engineering  
Princess Sumaya University for Technology

## Design and Implementation of AWS Web Application Firewall Filter with Arabic Language Recognition

### Introduction

Over the past few decades, web attacks and strategies for preventing them have become a significant aspect of information security. This project aims to grasp a machine learning based methodology, using Convolution Neural Networks (CNN). This powerful tool was implemented to build the Web-Application Firewall. This model will be fed a comprehensive dataset that classifies whether the URL is malicious or not. The firewall will also be able to filter URLs containing Arabic characters. The trained model is deployed for testing using Amazon Web Services (AWS) and tested on a vulnerable web application. The final deployed model achieved an accuracy of 90.28%.

### Design

A Lambda function was created to be set as a WAF rule. The function is triggered automatically at each new HTTP/HTTPS request received. Once triggered, the function loads the trained Tensorflow model from the designated S3 bucket and encodes the URL provided by the WAF into a matrix with the shape of the model's input layer. After the model is used to classify the URL, the prediction is returned to the WAF in order to either permit or block the request.



Figure 1: System Overview  
The figure depicts the architecture deployed for setting up the WAF



Figure 2: Unicode Encoding for CL-CNN  
The UNICODE Standard was used to perform the required matrix encoding for each individual record prior to training the model.

### Results

For testing purposes, a vulnerable website was set up. Damn Vulnerable Web Application (DVWA) is a PHP/MySQL web application that is vulnerable. The DVWA supports varying levels of vulnerability, to study the classification of the entire spectrum of attacks the website's security is set to the lowest possible value:



Figure 3: DVWA Test Cases

Table 1: Performance Metrics

No.	Evaluation Metric	Value
1.	Correctly predicted samples	117,559
2.	Incorrectly predicted samples	12,440
3.	Classification accuracy	90.28%
4.	Classification error rate	9.72%
5.	Classification precision	90.28%
6.	Classification recall	90.28%
7.	F-score	90.28%



Figure 4: Model Accuracy Comparison  
The CL-CNN model performed the best out of all models with an accuracy of 93.40%. Moreover, it remained a top performer when using the AALID333 dataset with an accuracy of 90.28%.



Figure 6: URL Heatmap  
Elasticsearch, Logstash, and Kibana (ELK) stack are employed for analysis. URLs' destination heatmap can be seen.

### Conclusion

In conclusion, the main purpose of this system is to provide an effective and sophisticated deep-learning-based solution for web application attacks detection where the design was outlined, created, tested in this study. Using a CNN-based design, the proposed system is able to distinguish between normal and anomalous traffic with a detection accuracy of 90.3%.

The advancement and variety of attacks are becoming more lethal web application. It is a fact that web applications are still subjected to various attacks. These malicious activities could range from SQL injection to Cross-Site Scripting (XSS). In this context, detection systems become necessary. This is an opportunity to implement machine learning techniques capable of handling larger amounts of data and adapting to zero-day attacks.

# Design and implementation of an identification tool for social media accounts using OSINT

# Design and implementation of an identification tool for social media accounts using OSINT

The project presents an OSINT tool that collects and analyzes publicly available information to identify potential impersonators.

يقدم هذا المشروع أداة OSINT التي تجمع وتحلل المعلومات المتاحة للجمهور لتحديد المتظاهرين المحتملين.

School: King Abdullah II School of Engineering  
Specialization: Networks and Information Security Engineering

الكلية: الملك عبد الله الثاني للهندسة  
التخصص: هندسة أمن الشبكات والمعلومات

By: Yazan Abu Ta'a | Rakan Ammari | Mohammed Al-Qaisi  
Supervisor: Dr. Rajaa Alqudah

## Social Cleanser

In recent years, online privacy and security have become major concerns due to the proliferation of social media platforms. Malicious users create fake social media profiles, posing as regular people or public figures to gather personal information, damage reputations, or show off their social engineering skills. To combat this, we have developed an OSINT tool that collects and analyzes publicly available information to identify potential impersonators.

Our tool employs web scraping, machine learning, and web development modules in Python and can be hosted on the AWS cloud for optimal performance and scalability. It accurately scrapes social media platforms (Facebook and Instagram) and presents potential impostor profiles based on a user's uploaded photo only, or the photo with a name, or the photo with the name and a username. We also created a user-friendly web interface to make the tool accessible to non-technical users.

The machine learning model should be trained on a huge dataset of photos to enable the option for the tool to identify the impersonators based on a photo only. To do so, we created a dataset-building mechanism that periodically downloads publicly uploaded images to train the machine learning model. We tested the model's accuracy and found it to be 88%, which we deemed to be good.

If the machine learning model is not trained on the input photo, the tool will prompt the user to provide a name and username. If only the name is provided, the tool will scrape the social media platform to identify potential profiles and ask the user to verify their own account. Any other accounts with the same name and photos are considered impersonators. If both the name and username are provided, the tool follows the same process but skips the verification step. This enables the tool to expose impersonators with greater accuracy.

Figure 1 below explains how the tool work.



The flow of the program from the perspective of the user is shown and explained below:  
This is the image that the user will be using as input to the tool.

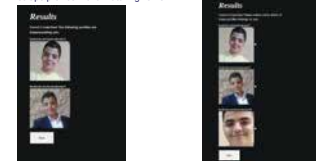
Initially, the user is asked to upload an image:



The user then fills a form where they enter the name, username, and select the social media platforms they want to search on. In this case, the user opted to search on Facebook but did not provide a name or username.



Once the user clicks search, the tool displays the output of the ML and web-scraping process, listing the profiles found. The user is then asked to identify which of the listed profiles belongs to them, then the tool marks the others as impersonators. The ML model outputs a name, which is used to scrape profiles with a matching name.



In a case where the ML model was not trained on the person in the input image, the web-scraping part cannot take place so no further actions can take place. The user is asked to enter a name at least as shown in the below figure:



This project focuses on enhancing the security of Docker containers through the implementation of both static and dynamic analysis techniques. By performing comprehensive analyses, potential security vulnerabilities can be identified and mitigated.

يهدف هذا المشروع إلى تحسين أمان حاويات Docker من خلال تقنيات التحليل الثابت والديناميكي لتحديد والحد من الثغرات الأمنية.

School: King Abdullah II School of Engineering  
Specialization: Networks and Information Security  
Engineering

الكلية: الملك عبد الله الثاني للهندسة  
التخصص: هندسة أمن الشبكات والمعلومات

By: Khaled Al-Amri | Mohammad Abdelnabi

Mohammad Al Qennah  
Supervisor: Dr. Haitham Al-Any



K.Al-Amri, M.Abdelnabi, M. Al Qennah  
Supervisor: Dr. Haitham Al-Any  
Senior Design Project, Fall 2022/23  
King Abdullah II School of Engineering  
Princess Sumaya University for Technology

## Design and Implement of a Docker Container Security Analysis Framework

### Introduction

Docker is a platform that allows developers to easily create, deploy, and run applications in containers. In this project, we focus on the security of Docker containers by performing both static and dynamic analysis. We begin by conducting a static analysis of the container images to identify any potential vulnerabilities and vulnerable packages that could be installed on that container image. Next, we conduct dynamic analysis by running the container images and monitoring the CPU activity, as well as scanning for network attacks on the container by inspecting certain logs and sniffing traffic on specific ports, providing a report for the user about all detected malicious activity and vulnerable files on their container image. The results of our analysis are used to provide recommendations for securing the containers and improving the overall security of the Docker environment.

### Design

The design aims to perform static and dynamic analysis of Docker containers. The framework can produce lists of known vulnerabilities on the scanned container, as well as detecting multiple network-based attacks, as well as monitoring the activity of the container. Written in python script and running a python server created using 'python flask', implementing 'scapy' library and making use of tools such as nmap.

Figure 1: Seedock logo

To start any scan, the framework prompts the user to input the container's credentials and choose the type of scan: ARP/DNS spoofing, DNS type, cronjobs check, among others are the types of dynamic scans that can be conducted.



Figure 2: Developed design

The framework aims to perform static and dynamic scanning on Docker containers. Two main approaches for static scanning are discussed: creating a list of all vulnerable packages regardless if they're present in the container being scanned or scanning the container's packages and comparing them to known vulnerable packages. Dynamic scanning aims to detect ARP spoofing, DNS spoofing, DNS poisoning, DNS type, cronjobs attacks as well as monitor the CPU usage while the container is running, ARP and DNS spoofing and poisoning is detected by capturing the ingress and egress traffic and checking the authenticity of the source and destination MAC/IP addresses. Nmap is used to find open ports that can be exploited. Hashing using SHA256 is also used for validation of containers as well as signing containers or files from the container.

### Conclusion

To conclude, the main purpose of this project and framework is to statically and dynamically scan Docker container images, scanning for various kinds of malicious software on the container, or any malicious or anomalous activities run during the time period of the dynamic scan.

Main tools provide the scope of network scanning a Docker container image, with most implementing a similar design to the one implemented in this project: comparing packages on the container to a predefined database. While some tools perform dynamic scanning on Docker images, as far as we could find, there is no one tool that can detect all the network-based attacks that Seedock can detect. Moreover, the range of malicious activities that Seedock can detect is much larger than most of the tools currently available. Scans on cronjobs/containers, ASLR value, binaries check were not found on any of the tools. In the same vein, to perform all the scans implemented in this project, a wide range of tools must be used, with some needing advanced knowledge by the user and are not a user-friendly as Seedock.

### Results

The results of the scan are shown to the user through the user interface created. Figure 3 shows a sample page of the user interface.



Figure 3: User interface.

Figure 4(a,b,c) shows sample outputs of three different dynamic scanning. Figure 4(a) shows the results of the ARP spoofing detection. Figure 4(b) shows a sample output of DNS type attack. Figure 4(c) shows a sample output of port scanning and showing open ports on the container.



Figure 4: ARP spoofing (a), DNS Type (b), and port scanning (c). The final and most important outcome of the scanning process is the final report, which includes the results of all the performed scans on the container image. The report as shown in Figure 5, summarises all the outputs in one place for user-convenience. All results are also stored in a database for further analysis.



Figure 5: Full report.

The aim of this project is to introduce an online platform that connects users with a variety of workshops and experiences across different fields, serving as a middleman between customers and service providers for leisure activities and educational pursuits.

الهدف من هذا المشروع هو إطلاق تطبيق يربط المستخدمين بمجموعة متنوعة من ورش العمل والتجارب في مختلف المجالات ويعمل كوسيط بين العملاء ومقدمي الخدمات للأنشطة الترفيهية والتعليمية.

School: King Talal School of Business Technology

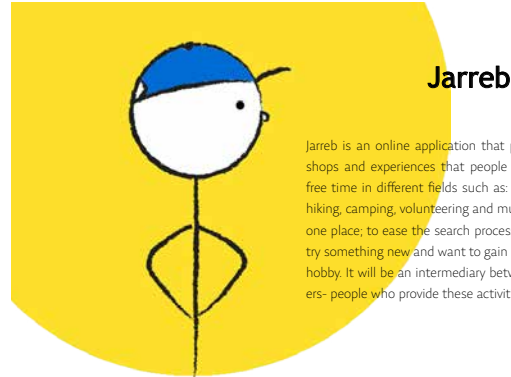
Specialization: E-marketing and Social Media

الكلية: الملك تلال لتكنولوجيا الأعمال

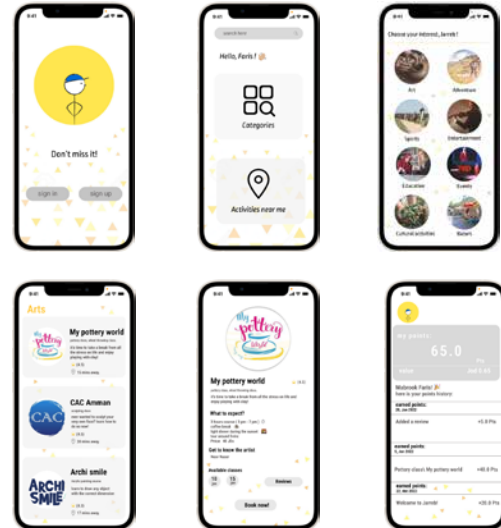
التخصص: التسويق الإلكتروني والتواصل الاجتماعي

By: Nada Shamieh | Dina Al-Lababidi

Supervisor: Dr. Mohammad Al-Rosan



Jarreb is an online application that provides different workshops and experiences that people can experience in their free time in different fields such as: pottery, music, cooking, hiking, camping, volunteering and much more all gathered in one place; to ease the search process for users who want to try something new and want to gain a new skill or find a new hobby. It will be an intermediary between the service providers- people who provide these activities- and the users.



This project aims to market handmade products to all socioeconomic classes in Jordan using innovative strategies. Through the app, a curated selection of unique items is available for customers; making it an ideal option for buyers interested in handmade goods.

هذا المشروع يهدف إلى تسويق المنتجات اليدوية في الأردن لجميع الفئات الاجتماعية باستخدام استراتيجيات تسويقية مبتكرة، كما يوفر التطبيق اختياراً متنوعاً ومميزاً من المنتجات اليدوية للمشتريين.

School: King Talal School of Business Technology

Specialization: E-marketing and Social Media

الكلية: الملك طلال لتكنولوجيا الأعمال

التخصص: التسويق الإلكتروني والتواصل الاجتماعي

By: Alaa Tbaileh | Lara Alhmoud | Dania Alkhatib

Supervisor: Dr. Mohammad Al Khasawneh



## SHAGHAF BUSINESS PLAN

### INTRODUCTION

Shaghaf is an application that uses innovative and successful marketing strategies to spread awareness of handmade products among Jordan's whole socioeconomic spectrum.

It provides a sizable, highly curated selection of one-of-a-kind products, making it the ideal option for buyers who want to purchase handmade goods.



The goal of this project is to directly connect Jordanian students with foreign hospitals/physicians, bypassing third-party fees, and promote affordable international programs via scholarships/exchange opportunities

هدف هذا المشروع هو ربط الطلاب الأردنيين مباشرةً بالمستشفيات والأطباء الأجانب، دون الاضطرار للتعامل مع الجهات الثالثة التي تفرض رسومًا، كما يهدف المشروع إلى الترويج للبرامج الدولية المعقولة التكاليف عن طريق المنح الدراسية وفرص التبادل.

School: King Talal School of Business Technology

Specialization: Business Information Technology

الكلية: الملك طلال لتكنولوجيا الأعمال

التخصص: تكنولوجيا معلومات الأعمال

By: Zeina Nesheiwat | Sinan Amarneh | Elias Naffaa

Supervisor: Dr. Dalia Al-Eisawi

## A Web-Based Social Platform Promoting Automated, Expressive Peer-to-Peer Cooperation and Knowledge Exchange in the Medical Industry.



**Doc'dIn**  
Innovative Health Care for a Better Tomorrow

Project Submitted to Princess Sumaya University of Technology in Partial Fulfillment of the Requirements of the Award of B.Sc. in Business Information Technology  
King Talal School of Business Technology Department of Business Information Technology

### Abstract

Jordanian Universities currently enroll 19,000 medical students at different stages, with a similar number studying internationally. At the same time, the sector can only absorb 1,100 doctors annually, raising concern about these young doctors' training and future employability. To overcome this challenge, opening new potential markets for Jordanian doctors to work and expand Jordan's healthcare sector is critical. Hence, the Ministry of Higher Education encourages medical students to obtain international licenses - such as the United States Medical Licensing Examination (USMLE) and the Professional and Linguistic Assessment Board (PLAB) - and get international work experience through clinical electives. This new approach exposes students to world-class practitioners and best practices and improves their skills. Unfortunately, the costs involved in attending such programs are prohibitive to many students, with program participation fees exceeding \$500 weekly. The proposed platform aims to directly connect Jordanian

students with hospitals and physicians abroad, avoiding third-party program fees. It also seeks to highlight organizations and funds that provide scholarships and exchange program opportunities to enable students to participate in international programs at affordable costs.

Our platform will be a collaborative web-based social platform that encourages meaningful peer-to-peer cooperation and knowledge exchange relevant to the industry, called Doc'dIn. Licensed physicians and students can connect and discuss real-world medical cases, evaluate treatment options, collaborate to solve complex patient cases, support research projects, expand students' networks and share information about different programs and scholarships available. System development will be based on JavaScript as its primary programming language for the user interface, Node JS, and Express JS to create its APIs, and MongoDB for its database. The platform will provide an ecosystem of well-rounded students ready to conquer the challenges of being medical students

Prepared By: Zeina Suleiman Nesheiwat | Sinan Belal Amarneh | Elias Raed Naffaa  
Supervised By: Dr. Dalia Al-Eisawi



This project introduces the mobile app Salameh which allows citizens to report complaints and issues to local authorities such as the municipality, electric and water companies. It offers features like emergency reporting, multimedia attachments.

يقدم هذا المشروع تطبيقًا جوالًا يُدعى «سلامة» والذي يسمح للمواطنين بالإبلاغ عن الشكاوى والمشاكل التي تواجههم للسلطات المحلية مثل البلدية وشركات الكهرباء والمياه. ويوفّر التطبيق مزايا مثل الإبلاغ عن الحالات الطارئة وإمكانية إضافة مرفقات متعددة.



School: King Talal School of Business Technology

Specialization: Business Information Technology

الكلية: الملك طلال لتكنولوجيا الأعمال

التخصص: تكنولوجيا معلومات الأعمال

By: Husam Al Manasreh | Saif Al Omari | Qamar Al Sheikh

Supervisor: Dr. Luay Anaya

#### Introduction

Salameh is a mobile app that enables citizens to report issues and complaints to local authorities, including the municipality, electric power company, and water company. Users can submit emergency reports, receive alerts about recurring issues, and include multimedia attachments in

reports. The app aims to prevent incidents that could harm children and society in Jordan and improve various aspects of Jordanian life, such as service levels and road networks, by making it easier for people to report issues and for authorities to resolve them efficiently.

Submitted By: Husam Al Manasreh | Saif Al Omari | Qamar Al Sheikh

Supervised By: Dr. Luay Anaya

A Graduation Project Report submitted in Partial Fulfillment of bachelor's degree in Business Information Technology, January 2023

This projects aims to introduce SELF; an NGO that develops social-emotional learning programs for public school students, improving emotion management and positive social interaction skills.

يهدف هذا المشروع إلى تقديم منظمة SELF وهي منظمة غير حكومية تطور برامج تعليم الذات الاجتماعية والعاطفية لطلاب المدارس العامة، بهدف تحسين مهارات إدارة العواطف والتفاعل الاجتماعي الإيجابي.

School: King Talal School of Business Technology

Specialization: Business Information Technology

الكلية: الملك طلال لتكنولوجيا الأعمال

التخصص: تكنولوجيا معلومات الأعمال

By: Nour Abughoush | Bana Al Majali

Supervisor: Dr. Mohamamd Al Khasawneh



مصنع الذات - للتعليم العاطفي الاجتماعي  
SOCIAL EMOTIONAL LEARNING FACTORY

## Graduation Project Summary SELF- Social-Emotional Learning Factory

We provide building materials  
مصنع الذات - للتعليم العاطفي الاجتماعي  
توفر الأدوات لبناء الذات

SELF is a nongovernmental organization that creates Social-emotional learning programs for students in public schools. This program is designed to develop skills related to understanding and managing one's own emotions, as well as interacting positively with others. These skills are important for success in school and in life. The program's main product workbook is called Octy the Octopus's Adventures. It is a workbook that is a structured resource that helps children learn social and emotional skills through activities, exercises, and interactive materials. It is localized to fit the target audience and can be used multiple times due to the use of dry-erase paper. The Workbook provides a self-paced way for children to learn and track their progress while keeping them engaged and interested in the program.

The program is implemented in partnership with selected public schools in Amman, and the organization also trains volunteers to deliver the program to children using the workbook. By leveraging the expertise of trained volunteers and utilizing workbooks, SELF aims to provide a comprehensive and effective SEL program for students in public schools. The organization plans to initially focus on implementing the program in Amman but eventually hopes to

expand to other cities and provinces in Jordan as the organization becomes more established and the market becomes more aware of its products and services.

The organization plans to monetize the workbook by offering it to the public for purchase on their website, with all proceeds being allocated as investments back into the organization. In addition to the physical workbook, a digital version of the workbook will be developed into an interactive online course aimed at parents and caregivers with an interest in promoting SEL skills in their children. Through engaging video modules and interactive activities, this online course will provide a comprehensive and convenient means of teaching SEL skills.

SELF aims to empower underprivileged children and communities in Jordan with essential social-emotional learning (SEL) skills through innovative and engaging programs. Through the use of the "Octy the Octopus's Adventures" workbook, trained volunteers, and online courses, SELF provides a fun and interactive way for children to develop self-awareness, self-regulation, empathy, and positive relationships, ultimately improving their academic performance, mental well-being, and overall social skills.

### Related Images:



Figure 2 SELF's logo color adaptation



Figure 3 Workbook Cover

Nour Abughoush | Bana Almajali

Supervised by: Dr. Mohammad Al-Khasawneh

A Graduation Project Report submitted in Partial Fulfillment of bachelor's degree in Business Information Technology, January 2023

This project introduces Fastmarket, a first of its kind store in the heart of Amman, which serves to meet the customers' grocery demands conveniently while solving the unnecessary long queue and parking challenge faced by customers.

يهدف هذا المشروع إلى تقديم Fastmarket ، وهو متجر فريد من نوعه في قلب عمان ، والذي يهدف إلى تلبية احتياجات الزبائن بشأن البقالة بشكل ملائم وحل التحدي الذي يواجه الزبائن الطوابير الطويلة ومشكلة الوقوف بالسيارات بشكل غير ضروري.

School: King Talal School of Business Technology

Specialization: Business Administration

الكلية: الملك طلال لتكنولوجيا الأعمال

التخصص: إدارة الأعمال

By: Farah Alsughair | Ahmad Salem | Yazan Shammout  
Supervisor: Dr. Mohamad Al Shboul



#### Introductory overview

According to a report by the Central bank of Jordan, the supermarket and grocery stores industry is poised to grow incredibly, with the annual rate of 8%. Moreover, the explosion of internet and automated technology is expected to accelerate this market growth. Changing customer preference and demands have further tilted this industry from the traditional retail chain store's approach to a highly refined approach that convenience store provides.

Fortunately for Fastmarket, it is positioned to capture this highly anticipated wave of customer's demand for convenience with its 'drive through shopping experience' approach. This approach atones the grievance that parking space and queuing unleashed upon the busy driving-class group of Amman, Jordan.

Fastmarket, as the first of its kind store in the heart of Amman, is well positioned to meet the customers' grocery demands conveniently while solving the unnecessary long queue and parking challenge faced by customers in previous endeavor. Fastmarket is a limited liability partnership which will operate from a 500m2 drive through retail outlet located at Khalida-a strategic intersection between Eastern and Southern Amman. In recent time, trading company and supply chain industry has exploded, with trading companies desperately seeking for partnership and alliance with promising retail outlets. Fastmarket has developed formidable, excellent working relationships with trusted suppliers.

This project explores how the integration of Artificial Intelligence (AI) into Human Resource Management (HRM) practices affects the efficiency and effectiveness of organizational development in Jordanian commercial banks.

يهدف هذا المشروع إلى استكشاف كيفية تأثير دمج الذكاء الاصطناعي (AI) في ممارسات إدارة الموارد البشرية (HRM) على كفاءة وفعالية التنمية التنظيمية في البنوك التجارية الأردنية.

School: King Talal School of Business Technology

Specialization: Business Administration

الكلية: الملك طلال لتكنولوجيا الأعمال

التخصص: إدارة الأعمال

By: Maimer Salah | Leen al Fayyad | Dana al Sharif

Yara Hijazi

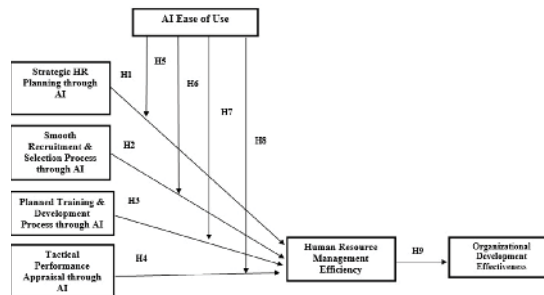
Supervisor: Dr. Ahmad Alnsour

## Perceived impact of Human Resource through Artificial Intelligence on Human Resource Management efficiency and Organizational Development effectiveness

### Abstract

The aim of this study is to explore how the integration of Artificial Intelligence (AI) into Human Resource Management (HRM) practices affects the efficiency and effectiveness of organizational development in Jordanian commercial banks. The research problem being addressed is the potential for inefficiencies, unnecessary costs, and expenses in the pursuit of HRM efficiency and organizational development effectiveness. The study aims to provide solutions to these challenges. The research model was developed based on previous studies and a thorough literature review of the topic. The

survey questionnaire was created using various sources and aimed to effectively cover all the relevant variables. The data was collected from 177 employees in HR departments of commercial banks in Jordan, with diverse demographic backgrounds. Data analysis was done using Amos and SPSS software, including frequency analysis for demographic information, descriptive analysis, reliability test, and regression analysis. The findings indicate a significant impact of AI adoption in HRM on efficiency, which in turn positively impacts organizational development effectiveness. Additionally, the ease of use of AI also plays a moderating role.



This projects aims to explore how the use of big data analytics tools at Bank of Jordan impacts the banking industry and the bank itself. It aims to enhance our understanding of the tools used in the banking sector.

يهدف هذا المشروع إلى استكشاف كيفية تأثير استخدام أدوات تحليل البيانات الكبيرة في بنك الأردن على صناعة الخدمات المصرفية وعلى البنك نفسه. ويهدف إلى تعزيز فهمنا للأدوات المستخدمة في قطاع الخدمات المصرفية.

School: King Talal School of Business Technology

Specialization: Accounting

الكلية: الملك طلال لتكنولوجيا الأعمال

التخصص: المحاسبة

By: Ahmad Alkhatib | Zaina Al Abed | Razan Al Masri

| Abdelrahman Kharfan

Supervisor: Prof. Modar Abdullatif

## The Implementation of Big Data Analytics Tools in the Banking Industry



### Abstract

The aim of this research is to study the implementation of big data analytics tools in Bank of Jordan, in order to enhance our knowledge about the type of data analytics tools used in the banking industry and how using these tools will affect the industry as a whole and the Bank specifically. Then we deeply explored the motivations, benefits and challenges of using such tools. The approach used in this research is a case study approach, with semi-structured interviews which was the most suitable approach for our study. Open-ended questions give the opportunity to obtain detailed insights about the study as well as the chance for the interviewees to put their knowledge and experience in each interview. The findings of this research highlight that Bank of Jordan is currently in the implementation phase of big data analytics tools, which has led to certain challenges. Despite these challenges, the Bank has already experienced the benefits of implementing these tools in specific

departments and resulted in increased efficiency and productivity due to the automation of manual operations. In Additional, with further implementation and refinement of such tools, the Bank can expect to unlock even greater value from their investment in big data analytics tools.

It is recommended for the Bank to accelerate the implementation of big data analytics tools in order to become one of the leaders in the banking industry and gain valuable insights to support the decision-making processes. Moreover, advanced analytical tools shall be implemented across all relevant departments, enabling the Bank to leverage the benefits and advantages gained from these advanced analytical tools. Additionally, the Bank shall prioritize dealing with the inherited old data from outdated records. Once this issue has been addressed in a timely manner, it can significantly improve the accuracy and reliability of available data, leading to more accurate analyzed trends which leads to more informed decisions and improved business outcomes.

# CRYPTOCURRENCES: AN ACCOUNTING PERSPECTIVE

Princess Sumaya University for Technology

## 01. ABSTRACT

The research explores the accounting treatment of cryptocurrencies, focusing on the Central Bank of Jordan's perspective. It examines the challenges faced by accountants in valuing and reporting these digital assets, and discusses the need for regulatory updates to the framework of financial reporting standards. The research concludes with recommendations for standardization of cryptocurrency accounting.

## 02. METHODOLOGY

This study employs a comparative research methodology, analyzing the accounting treatment of cryptocurrencies in Jordan and other countries. The research uses a combination of primary and secondary data sources, including interviews with accountants and analysis of regulatory documents.



## Central Bank of Jordan Perspective

The Central Bank of Jordan provides financial institutions dealing with cryptocurrencies with a clear regulatory framework. This framework includes the issuance of licenses to digital service providers, the implementation of anti-money laundering (AML) and know your customer (KYC) measures, and the requirement for digital service providers to maintain adequate records and reporting standards.

## 04. CRYPTOCURRENCES: CLASSIFICATION EFFECTS

The study focused on the classification of cryptocurrencies as either intangible assets and fixed intangible assets, or as intangible assets and intangible assets. The research aims to identify the accounting treatment of these assets and the impact of classification on financial statements. The study suggests that classification is a critical factor in determining the accounting treatment of cryptocurrencies.

FINANCIAL STATE	NUMBER OF ASSETS	NUMBER OF ASSETS
CURRENT ASSETS	142	101
NON-CURRENT ASSETS	114	149
TOTAL ASSETS	256	250

FINANCIAL STATE	NUMBER OF ASSETS	NUMBER OF ASSETS
CURRENT LIABILITIES	142	101
NON-CURRENT LIABILITIES	114	149
TOTAL LIABILITIES	256	250

## 05. CONCLUSION

The research found that cryptocurrencies are classified as intangible assets and fixed intangible assets. The study suggests that classification is a critical factor in determining the accounting treatment of cryptocurrencies. The research concludes that the current accounting treatment of cryptocurrencies is not adequate and that regulatory updates are needed to address the challenges faced by accountants.

## 06. RECOMMENDATIONS

The research suggests that the current accounting treatment of cryptocurrencies is not adequate and that regulatory updates are needed to address the challenges faced by accountants. The research recommends that the Central Bank of Jordan should update the regulatory framework to include the issuance of licenses to digital service providers, the implementation of AML and KYC measures, and the requirement for digital service providers to maintain adequate records and reporting standards.

This project analyzes how different accounting methods for cryptocurrency can affect a company's financial position. It concludes that the treatment of cryptocurrency can significantly impact financial statements and ratios.

يحلل هذا المشروع كيف يمكن أن تؤثر طرق المحاسبة المختلفة للعملات الرقمية على وضعية شركة مالية. ويخلص إلى أن معالجة العملات الرقمية يمكن أن تؤثر بشكل كبير على البيانات المالية والنسب المالية.

School: King Talal School of Business Technology

Specialization: Accounting

الكلية: الملك طلال لتكنولوجيا الأعمال

التخصص: المحاسبة

By: Abdallah Nofal | Natalie Kalanze | Bashar Al Moghrabi

Shaker Shubair | Eyas Odeh | Jude Al Khalidi

Supervisor: Dr. Rasha Alghazzawi

This project presents a game about Najji; an astronaut that went to space and while he is in space the Earth had WorldWar3 so the earth was destroyed. After 3 years Najji wanted to go back to see if there is life on Earth because he ran out of food and supplies, so his last chance is going back to Earth.

يتضمن هذا المشروع لعبة عن ناجي؛ رائد فضاء ذهب إلى الفضاء، وفي وقت تواجده في الفضاء، اندلعت الحرب العالمية الثالثة على الأرض وتم تدميرها. بعد ٣ سنوات، أراد ناجي العودة لرؤية ما إذا كان هناك حياة على الأرض لأنه نفدت مؤنه وإمداداته، ولذلك فإن آخر فرصته هي العودة إلى الأرض.

School: King Hussein School of Computing Sciences

Specialization: Computer Graphics and Animation

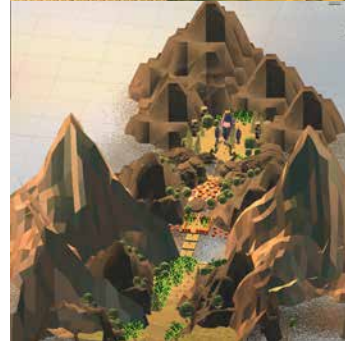
الكلية: الملك حسين لعلوم الحوسبة

التخصص: علم رسم حاسوبي

By: Mohammad Abu Khajil

Supervisor: Dr. Muhanna Muhanna

# NAJJI THE SURVIVOR



## BACKGROUND SUMMARY

I got the inspiration for this graduation project from the Minecraft game, Crush Bandicoot and the 100 series.

When I was 10 years old, I found that most of the games I used to play were hard for me, so I decided to create a game that is easy to play for this age, Also, adults can play this game too and they will enjoy it.

## THE STORY OF THE GAME

Najji is an astronaut that went to space and while he is in space the earth had WorldWar3 so the earth is destroyed. After 3 years Najji wanted to go back to see if there is life on Earth because he ran out of food and supplies, so his last chance is going back to Earth.

after arriving on Earth, he will have some challenges such as attacking the NPC,

Najji has to go to the safe area (the only place on earth with no dangerous creatures or threats) to live there.

By: Mohammad Abu Khajil  
Supervisor: Dr. Muhanna Muhanna

The goal of this project is to introduce a new application in Jordan that can alleviate the tax-filing responsibilities for a significant portion of taxpayers. The application's purpose is to simplify the process of calculating tax obligations for individuals.

هدف هذا المشروع هو تقديم تطبيق جديد في الأردن يمكنه تخفيف مسؤوليات تقديم الضرائب لنسبة كبيرة من المكلفين. يهدف التطبيق إلى تبسيط عملية حساب التزامات الضرائب للأفراد.

School: King Talal School of Business Technology

Specialization: Business Information technology

الكلية: الملك طلال لتكنولوجيا الأعمال

التخصص: تكنولوجيا معلومات الأعمال

By: Haitham Al-Shouli | Mohammad lababidi

Yazan Abu Jazar | Abdelrahman Allouzi

Supervisor: Dr. Dalia Al Eisawi



## A Dedicated Local Application Based system for Automated Regulations for Taxpayers in Jordan.

Project Submitted to Princess Sumaya University Technology in Partial Fulfillment of the Requirements of the Award of B.Sc. in Business Information Technology  
King Talal School of Business Technology Department of Business Information Technology

### Abstract

Filing taxes in Jordan is considered to be a major difficulty with knowing every regulation that relates to every taxpayer since in many cases there could be two individuals who have the same taxable income and still have different tax liabilities, and this is where our role comes, to make sure that every exemption you could have to reduce your tax liability is considered and filled, also the problems don't stop on the ignorance of regulations, the ministry of income and sales website is not friendly to use and it could be a nightmare for some people since there are consequences of delaying their tax return.

The first application in Jordan that will take the burden of filing taxes from a big part of taxpayers, in a very simplified way that just by filing in your information and answering some questions the system will have a conclusion about how your taxes should be filed.

This application is designed to help individuals easily calculate their tax obligations. It considers numerous factors such as income, deductions, and credits to provide an accurate estimate of the tax due. The user-friendly interface will allow users to input their information instantly and efficiently, and the results are presented in a clear and concise manner. Whether you are a seasoned tax professional or a first-time filer, this application is an invaluable tool for understanding and managing your tax responsibilities.

The targeted segment "of the proposed project" is the individuals who got their wages every last month as an employee or have

their own resources of income (freelance) or any work that generates taxable income, the importance of our project lies in providing assistance for those people with a very reasonable price since the industry that provides those services sit a very high price compared to their income due to their simple knowledge of some regulation, not the amount of effort in their work.

In conclusion, systems that calculate taxes for individuals can be useful tools for helping individuals to understand their tax obligations and to prepare and file their tax returns. However, these systems also have limitations, including the need for accurate and up-to-date information, the complexity of the tax code, and the need for personalized advice in some cases.

Finally, building an application that is comprehensive and able to handle every possible scenario and tax regulation for all individuals may seem daunting at first. However, we believe that it is possible to develop such an application. Despite the difficulty that may come with creating a system that is able to address every scenario, we are committed to making the effort to build such a comprehensive tool. This would involve extensive research and development in order to ensure that every detail is covered and that the application can adapt to any changes in tax laws or regulations. Additionally, it would require careful consideration of the user experience in order to make the application as intuitive and user-friendly as possible. However, the ultimate goal is to build an application that can handle any situation, making it a valuable resource for all individuals dealing with tax-related matters.

Prepared by: Haitham Al-Shouli | Mohammad lababidi | Yazan Abu Jazar | Abdelrahman Allouzi

Supervised by: Dr. Dalia Al Eisawi



This project aims to connect buyers and sellers of automotive parts via a website that guarantees quality, honesty, and accessibility. Our platform enables customers to easily locate the specific auto parts they need.

هدف هذا المشروع هو ربط بين بائعي ومشترين قطع السيارات من خلال موقع إلكتروني يضمن الجودة والنزاهة والوصولية. من خلال موقعنا الإلكتروني، يمكن للعملاء العثور على قطع السيارات التي يحتاجون إليها بسهولة.

School: King Talal School of Business Technology

Specialization: Business Administration

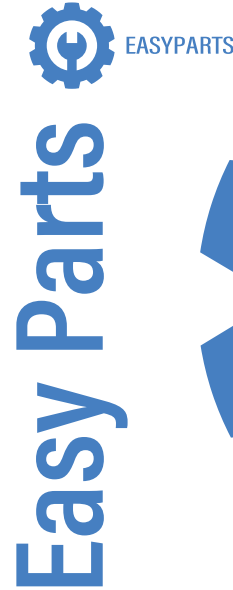
الكلية: الملك طلال لتكنولوجيا الأعمال

التخصص: إدارة الأعمال

By: Omar Esawi | Hamza Abu Al failat | Mira Abdullah

Faris Jallad

Supervisor: Dr. Baker Al Serhan



This project aims to connect buyers and sellers of automotive parts via a website that guarantees quality, honesty, and accessibility. Our platform enables customers to easily locate the specific auto parts they need. هدف هذا المشروع هو ربط بين بائعي ومشترين قطع السيارات من خلال موقع إلكتروني يضمن الجودة والنزاهة والوصولية. من خلال موقعنا الإلكتروني، يمكن للعملاء العثور على قطع السيارات التي يحتاجون إليها بسهولة.

#### Abstract:

EasyParts is an imminent project headquartered in Amman, Jordan...that plans on taking on the automotive parts market in an effective and efficient form. Our goal at easy parts is to integrate sellers and buyers of automotive parts through a website that ensures quality, integrity, and reachability. Through our website, customers can expect to find the auto parts they require such as auto body parts, lighting, engine components, interior accessories, and much more.

Vision: Our vision for EasyParts is to transform the way people buy and sell automotive parts in Jordan and establish ourselves as the industry's preferred online marketplace. The problems: Struggling in finding the right parts, Customers may be concerned about the quality of the car parts. Benefits: Ease in sellers' enrolment, Ease in searching for spare parts, Professional approach to listing spare parts

Introducing our IoT health monitoring system - combining the power of AI and AR to revolutionize patient care. Our system accurately collects and classifies vital signs, achieving a remarkable 98% accuracy. Doctors can monitor patients in real-time via a mobile application, while patients can easily access their results through AR technology. With our solution, we aim to provide an efficient experience that benefits both patients and doctors.

نظام مراقبة صحة IoT يجمع بين الذكاء الاصطناعي والواقع المعزز AR لرعاية المرضى، بدقة تصل إلى 98٪، حيث يمكن للأطباء مراقبة المرضى عبر تطبيق محمول وللمرضى الوصول إلى النتائج بسهولة. هدفنا هو توفير تجربة فعالة تفيد المرضى والأطباء.

School: King Abdullah II School of Engineering

Specialization: Communications Engineering

الكلية: الملك عبد الله الثاني للهندسة

التخصص: هندسة الاتصالات

By: Aya Abunaser | Dana Tannous | Rama Alkhatib

Supervisor: Eng. Mohammad Taha



King Abdullah II  
الملك عبد الله الثاني  
School of Engineering  
الهندسة

## Design of IoT Health Monitoring System using Artificial Intelligence and Augmented Reality

A. Abounaser, D. Tannous, and R. Al-Khatib  
Supervisor: Eng. Mohammad Taha  
Senior Design Project, Spring 2022  
King Abdullah II School of Engineering  
Princess Sumaya University for Technology

### Introduction

During the COVID-19 pandemic, doctors had a new burden on their shoulders and had a huge responsibility regarding the shortage of health workers. For that reason, this project aims to make a health monitoring system to monitor the health of the patient remotely without the need to be directly connected with the patient.

### Design

In this project, the Arduino Uno was used to collect the temperature, blood pressure, heart rate, and oxygen (O2) from the patient and then converted from analog to digital data to be transferred to Raspberry Pi 3 serially. Moreover, a mobile application was created to visualize the outcome classified results in which the doctor can supervise the patient instantaneously. AR was added to the mobile application to enhance the approachability of the results. The data is sent to the ThingSpeak server using Wi-Fi 802.11, which MATLAB will retrieve again for training and classification using the AI algorithm.



Figure 1: Overall System



Figure 2: Training



Figure 3: Mobile application Design

### Results

The project shed more light on designing an IoT health monitoring system using Artificial Intelligence (AI) and Augmented Reality (AR), which is currently a trend in the field. To start with, Arduino Uno was used to collect the temperature, blood pressure, heart rate, and oxygen (O<sub>2</sub>) from the patient by converting the results from analog to digital data to be transferred to Raspberry Pi 3 serially. Moreover, the data is sent to the ThingSpeak server using Wi-Fi 802.11. Meanwhile, MATLAB is used here to train and classify the results into abnormal and normal categories. A pre-trained data is categorized and organized in MATLAB in which the data retrieved will be classified using AI algorithms. After training, an accuracy of 98% was achieved. A mobile application was created to visualize the outcome classified results in which the doctor can supervise the patient instantaneously. From the patient perspective, AR was added to the mobile application to enhance the approachability of the results by showing the analyzed data to the patient whenever the camera is detecting a face through the face recognition algorithm.

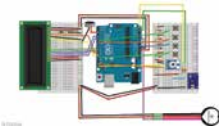


Figure 4: Hardware Interfaces



Figure 5: ECG Signal in ThingSpeak server

### Conclusion

To conclude the project, the proposed system is simple to use by the targeted group, energy-efficient, and simple to comprehend. It provides the connection between the patient and the doctor. The hardware of the project has been installed, and the output results have been successfully confirmed. Also, the system includes a cross-platform application for both doctors and patients. Since the data is displayed in real-time using AR, the specified technology gives both the doctor and the patient the ability to obtain the data without the presence of the doctor. This saves time and energy for both equally. In addition to that, it aids in remote health monitoring as it collects the SPO<sub>2</sub>, temperature, pulse sensor, and the blood pressure. A high accuracy ML model was trained at the end of the project and achieved an accuracy of 98%.

With the rise of populations and congestion in urban environments, the need for intelligent solutions became progressively evident. This project provides the design and implementation of an autonomous parking system utilizing RL methods. The system is designed to manage and control a vehicle to park in a specified parking position.

مع ارتفاع السكان والازدحام في البيئات الحضرية، أصبحت الحاجة إلى حلول ذكية واضحة تدريجياً. يوفر هذا المشروع تصميمًا وتنفيذًا لنظام وقوف ذاتي يستخدم طرق التعلم العميق. تم تصميم النظام لإدارة والتحكم في المركبة للوقوف في موضع وقوف محدد.

School: King Abdullah II School of Engineering

Specialization: Computer Engineering

الكلية: الملك عبد الله الثاني للهندسة

التخصص: هندسة الحاسوب

By: Hamzah Daoud | Ahmad Arrabi

Supervisor: Dr. Amjed Al-Mousa

## Design and Implementation of an Autonomous Parking System using Reinforcement Learning Techniques



كلية  
الملك عبد الله الثاني  
School of Engineering  
الهندسة

A. Arrabi and H. Daoud  
Supervisor: Dr. Amjed Al-Mousa  
Senior Design Project, Spring 2022  
King Abdullah II School of Engineering  
Princess Sumaya University for Technology

### Introduction

The definite results of Reinforcement learning (RL) methods in autonomous driving applications have become more evident than ever. A major obstacle in RL is the deployment of trained models to reality (transfer learning), where noise and uncertainty are inevitable. This work provides the design and implementation of an autonomous parking system utilizing RL methods. The system is designed to manage and control a vehicle to park in a specified parking position. It can be considered an application of a sim-to-real problem, as a trained RL-based model should ultimately be transferred to control the vehicle.

### Design

The parking procedure is completed when the vehicle is first located at the entrance of the parking. Then, complete control of it will be handed to the system. A check on the parking location is conducted where each parking spot would be classified as occupied or free. Later, the vehicle is navigated to a position near the goal parking and the RL model is then deployed to park it.

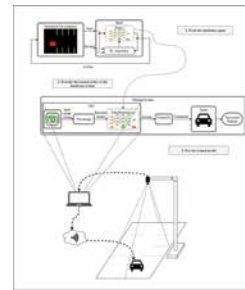


Figure 1: Overall parking design

The input of the system is solely received from a top-view camera placed at the top of the parking. Where a constant object-detection algorithm was developed to detect the vehicle and extract features from it. The extracted features represented the inputs (observations) of the RL model, which are: four relative distances between the vehicle and the parking, rectangular coordinates, and the heading angle of the vehicle. The action space was a discrete one, in which each action represented a combination of speed and steering angle of the vehicle.

### Conclusion

During the development of this work, it was concluded that RL would make a great solution for autonomous parking tasks. The sim-to-real transfer was the most intimidating part, as not much previous research was done on the problem. Even when done, not much tackled the parking task. It is worth mentioning that most literature on autonomous driving would rely on sensors or a combination of sensors and cameras. Every feature that was needed for the model was extracted solely from the top-view image and no sensors were needed. The testing results proved that you do not need the most complex simulation environment to transfer the learned policy to hardware. As long as the policy is optimal, the features (inputs) were extracted accurately, and the model was handled correctly (mapping between simulation and hardware), then the results should not fail. Keep in mind that the design of simulation is crucial as the more it represents the real environment the higher the accuracy of transfer. Future work could focus on the system's enhancements if it was implemented on a real parking space. Also, An optimization idea that could be implemented is to update the policy when testing the model on hardware. This way, the model would adapt to any inconsistencies between simulation and hardware, and the learned policy would become optimal.

### Results

The training time reached 17 hours (1 million iterations), and the agent reached the goal state at around 450k iterations.



Figure 2: Training results (mean cumulative reward)



Figure 3: Training results (mean episode length)

The system was tested on multiple samples and scenarios of the parking setup. The successful parking rate reached 100% with no line collisions on a single parking spot.



Figure 4: Successful parking

When tested on all parking spots, the successful parking rate reached 96% with no collisions with any objects, and the line crash percentage did not exceed 9%. Also, safety tests were implemented to handle unexpected events, e.g., connectivity errors, pedestrians, or hazardous moving objects.



Figure 5: Moving object detection



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جامعة الأميرة سمية للتكنولوجيا - الجبيلة - عمان - الأردن - ص.ب 1438 الجبيلة - عمان 11941 الأردن  
Tel. +962 6 5359949 • info@psut.edu.jo • www.psut.edu.jo



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