



Designing and Implementing Final Year Project *- with Success*

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Foreword by **DIRECTOR**

Associate Professor Dr Keoy Kay Hooi (Alan)
Director
Institute of Computer Science and Digital Innovation
(ICSDI)



Welcome to the Institute of Computer Science and Digital Innovation (ICSDI), UCSI University.

The Final Year Project (FYP) is compulsory for the diploma and undergraduate programmes at ICSDI. This Final Year Project Handbook is designed to provide students with a comprehensive guide for planning, implementing, and documenting project work in accordance with the requirements of the relevant academic programme accreditation bodies.

The goal of FYP is to provide students with the opportunity and exposure to apply and integrate the theoretical knowledge and principles taught in the programme, as well as to solve problems creatively in their final year project.

To maintain the high quality of education at UCSI, we have continuously provided our students with advanced skills, cutting-edge software systems, and industry-relevant teachings by ICT professionals. FYP allows students to demonstrate independence and originality while also planning and organising a project over a set period of time.

I wish to congratulate Assistant Professor Ts. Dr. Kasthuri Subramaniam, FYP coordinator, and all ICSDI supervisors for their effort, dedication, and hard work in supervising the students and producing high quality projects. I hope that this FYP handbook will be set as an example and standard for many more FYP handbooks to be produced and will contribute towards producing quality research work by the students and excellent supervisory skills by the academic staff of the Institute.

Low-light Image Enhancement with Colour Space (Cielab)

Lee Kok Xiong, Kasthuri Subaramaniam, Umm E Mariya Shah

Introduction

Low-light image enhancement is the technique used to increase the brightness of the image. An example of low-light image enhancement can be seen below:



Figure 1: Image before (left) and after (right) the application of low light image enhancement

The main contribution of this paper is to propose a Python based on Tkinter for the interface and cv2 for the method proposed, specific to the color and brightness, that is improved upon in regard to its algorithms which allows for the end product to be used on desktop or apply the same method on others platform.

Objectives

1. To investigate a formula that is able for the system to convert the color of the image from RGB to CIELAB and convert it back from CIELAB to RGB.
2. To develop a formula to improve the low-light images based on the CIELAB values.
3. To evaluate several low-light images as a core dataset and test it with the new system.
4. To design an interface for comparison as it will show the difference between the original image together with the enhanced image.

Methods

The proposed application seeks to combine the color space method and Tkinter for the interface. Color space is for the main objective of the paper and Tkinter is used to do a comparison between the original image and enhanced image.

1. Colour Space Method (Cielab)

CIELAB (Lab*) is a colour space method used to describe all possible colours visible to the human eye. It is device-independent and based on human perception of colour, with L^* representing lightness and a^* and b^* representing colour components. The key benefit of CIELAB is that it is perceptually uniform, meaning that a difference of one unit in L^* , a^* , or b^* represents the same perceived difference in colour, regardless of where in the colour space the colours are located. It is widely used in colour science and technology, including in the printing industry and software applications like Photoshop, to provide a consistent and intuitive way of describing and manipulating colours.

2. Tkinter Interface

Tkinter is a Python library for creating graphical user interfaces. It comes bundled with Python and uses the Tk GUI toolkit. It's easy to use and provides many customization options.

Results

After applying the colour space method, below are the result of the low-light image enhancement system together with the interface used to compare the original image with the enhanced image:

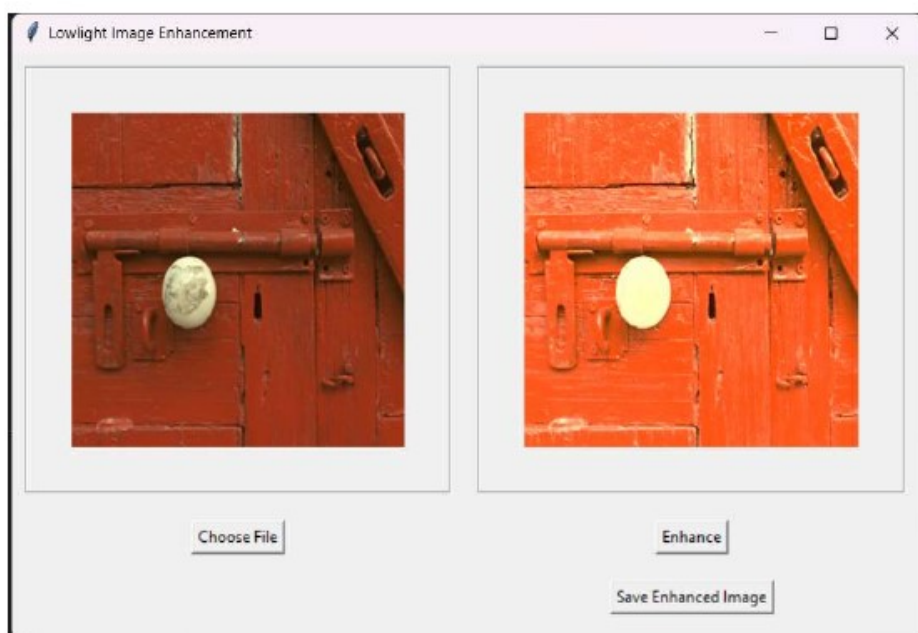


Figure 2: Door lock images

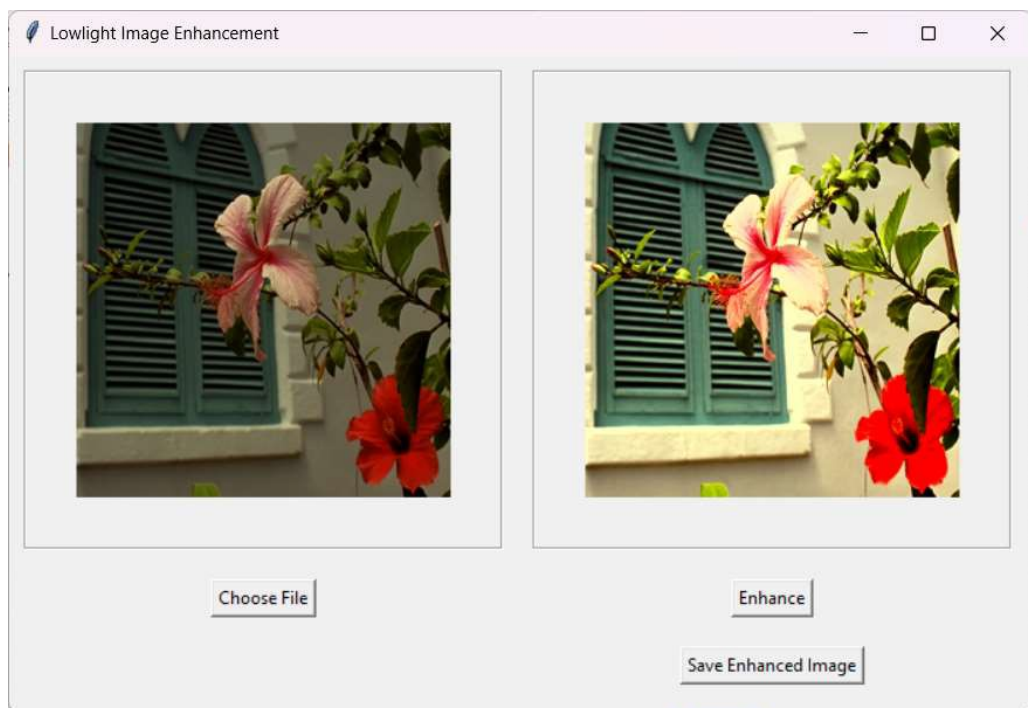


Figure 3: Flower images

Conclusion

The proposed application aims to improve the overall brightness of the image. However, the proposed application is bound and limited to certain images and as such, further research will have to be conducted in order to expand the array of viable range of images.

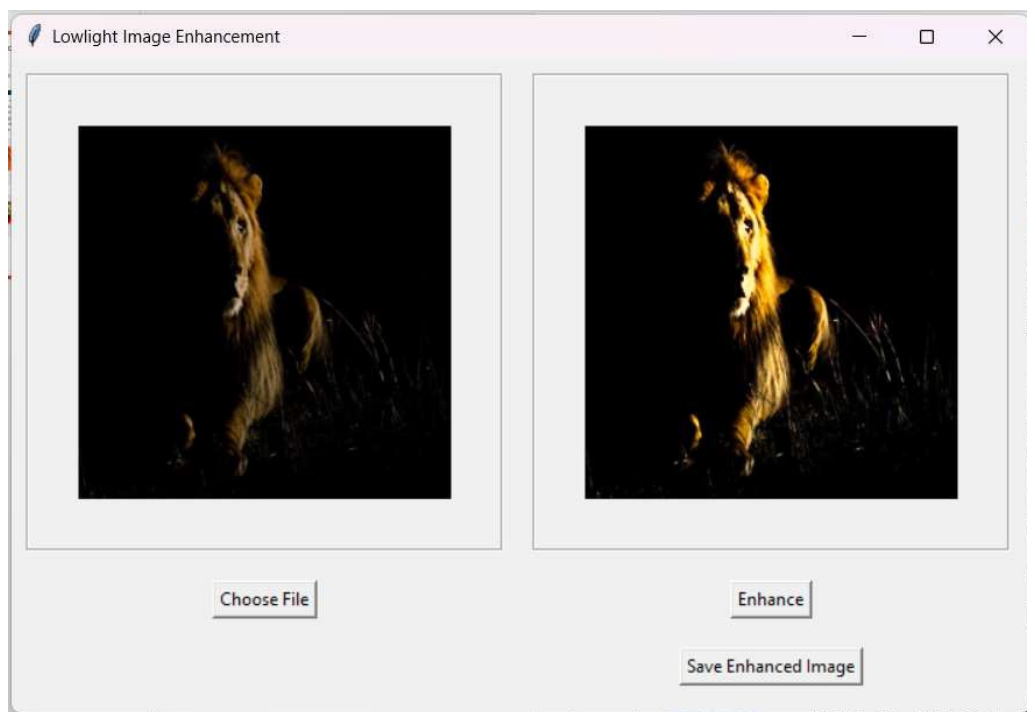


Figure 4: Lion images

Based on Figure 4 above, the lion on the enhanced image is just increasing the brightness of the light part but not increasing the overall brightness of the picture. In conclusion, the result in increasing the brightness of the image help the user to observe the object in the image clearer with the improve of the colour but there are still contains some limitation that will need to improve in the future works.

Attendance Management System using Face-Recognition

Kholmonov Sardor Bakhtiyorovich, Shayla Islam, Chloe Thong Chee Ling

Introduction

This chapter delves into a project that focuses on utilizing facial recognition for monitoring attendance in an educational institution. It explores the problem and motivation behind the project, outlines the research objectives, defines the project scope, identifies its contributions, and provides background information. With the emergence of technology, it has become ubiquitous in various aspects of human life, including the business sector and personal lives with the integration of technology in homes and vehicles powered by non-renewable and renewable energy sources such as solar power.

Objectives

1. To build a portable Smart Attendance System that is self-powered and convenient.

2. To guarantee that the pace of the attendance recording process is faster than the previous system, which could record each student's attendance in as little as three seconds.
3. To offer a user-friendly online interface for administrators to view the attendance database and for non-administrators (parents) to monitor their child's attendance. Let new students or employees to store their faces in the database using a graphical user interface.

Methods

The existing attendance system often lack efficiently and informational exchange. Thus, in those projects, these constraints will be eliminated, significantly enhanced.

Results

This project's influence and contribution are as follows: Students will be more timely in class attendance. This is owing to the fact that a student's attendance can only be taken physically, while the system will note any absences. This not only teaches students to be punctual but also prevents them from engaging in immoral practices such as signing attendance for their friends. The institution can

save a great deal of money because enforcement is now handled by technology rather than human supervision, which wastes a great deal of human resources on an insignificant process. As long as there is a Wi-Fi connection, the smart device can function anywhere, allowing the attendance system to be portable and deployed wherever desired. For example, the gadget may be put at the door of the school to take attendance. It saves a significant amount of money since it has fully eliminated paperwork. Also, the method is time-efficient since all computations are automated. In a nutshell, the purpose of the project is to address the current problems with the previous taking attendance systems.

Conclusion

In conclusion, the findings of this project have shown that the developed student attendance monitoring system is effective in tracking and managing students' attendance in a seamless and efficient manner. The system integrates facial recognition technology with a user-friendly interface that simplifies the registration and attendance monitoring process. However, the study also highlighted some limitations of the system that require further attention to improve its overall performance. One of the main limitations of the system is that it can only be run on a computer and not on tablets or mobile devices. This implies that the system may not be suitable for institutions that have adopted mobile

devices for their daily operations. Another limitation is that the system requires a high-quality camera to function effectively. This may pose a challenge in institutions that cannot afford high-quality cameras or have limited resources to procure them.

A Development of Web-Based Application in E-Commerce Shopping- K. Mart

Vincent Ng Pin Qi, Chloe Thong Chee Ling, Heshalini Rajagopal @ Ramasamy

Introduction

As advanced technology continues to grow exponentially, more individuals are integrating it into their daily lives for convenience. This project aims to create a web-based e-commerce application that enables consumers to directly communicate with buyers regarding their needs and orders. With the help of web-based application buyers and artificial intelligence technology, e-commerce is rapidly expanding in society. This platform is primarily known for purchasing and selling goods and services through the internet, and it encompasses a vast range of data, programs, and applications for both consumers and business owners. As e-commerce becomes increasingly popular, there will be advantages and disadvantages to the platform. Therefore, this paper seeks to identify the challenges that exist within e-commerce and explore future blockchain wallet innovations that will inevitably emerge in every e-commerce platform. Ultimately, finding solutions to marketing issues remains the key goal for e-commerce businesses to remain competitive and successful in the long run.

Objectives

1. To identify the strengths and differences of the eCommerce system's features.
2. To design a web-based application to replace the existing system that is not that user friendly. (Web 3.0 Decentralized and Blockchain Infrastructure)
3. To develop a clear and easy use system for the customers.
4. To evaluate the performance of loyalty programs inside the web-based application e-Commerce.

Methods

To ensure the creation of a top-notch software product, it is essential to follow a specific methodology that outlines the development process. For this project, the chosen methodology is SDLC (System Development Life Cycle). This approach is known for its ability to produce cost-effective, high-quality software within a short production period. SDLC is composed of several phases including planning, design, implementation, testing, deployment, and maintenance. These phases work together to create a well-defined and comprehensive approach to software development that ensures the project's success. By following the SDLC methodology, the development team can streamline the software development

process and ensure that the final product meets all the project's requirements while also being efficient and effective.

Results

Young people, especially those who are loyal customers, are increasingly adopting blockchain payments due to their convenience. Customers find that fast transfers with minimal fees are the most attractive features of e-wallets. Blockchain payments make it easier and safer for users to load funds into their digital wallets. Consequently, using an e-wallet to transfer money takes less time than using cash. For instance, while transferring cash can take up to two days, transferring payments with an e-wallet takes just 10 minutes. Another advantage of using an e-wallet is the security it provides, which encourages students to use digital payments for e-commerce transactions. To attract clients, many businesses are offering coupons, gifts, significant discounts, and other special incentives to consumers who use e-wallets for their purchases.

Conclusion

In conclusion, the development of a web-based application in e-commerce shopping with blockchain payment has the potential to revolutionize the e-

commerce industry. The integration of blockchain technology into e-commerce platforms can enhance the security and transparency of transactions, reduce transaction costs, and improve efficiency. The use of blockchain-based payment systems in e-commerce can provide customers with greater control over their transactions and protect them against fraudulent activities. However, the adoption of blockchain-based e-commerce solutions is not without its challenges. Regulatory issues, interoperability, and user adoption are among the challenges that need to be addressed to enable the widespread adoption of blockchain-based e-commerce solutions. Further research is needed to investigate the impact of blockchain technology on consumer behaviour and adoption and to explore the potential of blockchain-based payment systems to enable new e-commerce models. Overall, the development of a web-based application in e-commerce shopping with blockchain payment represents a significant opportunity for e-commerce platforms to improve the security and efficiency of their transactions and enhance the customer experience. While there are challenges to overcome, the potential benefits of blockchain-based e-commerce solutions make it an area of research and development that warrants continued attention.

A Web-based Development for Co-Op Management System in UCSI

Daniel Ng Rock Qian, Neesha Jothi, Kasthuri Subaramaniam

Introduction

Nowadays, security is the most important to secure our things. Security has secured all our private information and privacy. Currently, UCSI are using Google Forms to collect all the details and information. As we know, google forms are save data in the google drive and the account is linked with the e-mail account. E-mail accounts are private and personal privacy things. To replace Google Forms records with a comprehensive Co-Op Management System and user interface, designers and developers must design and implement a complete Co-Op Management System and user interface. Security is guaranteed by UCSI administrators who manage all data securely on SQL servers. While Google Forms records is not an efficient way of managing student data there are several limitations to this method. Google Forms is not very efficient and secure. During the change to a new Co-Op Coordinator, the ex-Co-Op Coordinator will need to handover all the documents and data to the new Co-Op Coordinator. By using Google Forms, it is hard to handover because the account is a private personal

account. These methods are not very secure and private, so a Co-Op Management System will need to be built to solve the problem. Co-Op Management System can let all the users use in the one system. Co-Op Management System will be more efficient and secure than Google Forms.

Objectives

1. To review existing similar system.
2. To design and develop a web-based of Co-Op Management System.
3. To test and evaluate the develop web-based Co-Op Management System.

Methods

The methodology been used to develop the system is Agile methodology is one of the Software Development Life Cycle (SDLC) model. One of the key reasons is that the application requires the user to understand the features so that they can use it effectively. The user's perspective on how they would use the application and how we can improve the user experience. Additionally, agile development is flexible so changes and error fixes can be easily made. Even though it is difficult to estimate the development time of the application, this methodology helps to reduce the development time as the approach is incremental and iterative.

Results

Security is becoming increasingly important among people and company. Due to security, it can be a very serious issue. Privacy, and personal data is most important to a person, so it will have security to secure it. Co-Op Management System is more secure than using a Google Form. Because of the Co-Op Management System, when the person in charge (PIC) changes to another, it will only be a system change position. But while using a Google Form, there will be a security issue. The Google Form will save all the data on the Google Drive, and it is linked to a person's e-mail account. When it needs to be passed to another PIC, it will need to be given the account. An e-mail account is a very private thing, and when passed to another person, it will have security issues. The Co-Op Management System will successfully solve this problem.

Conclusion

In conclusion, the Co-Op Management System was successfully carried out throughout the project in the multi-stage development process that successfully sets up and achieves the main objectives of the project. The main objective was to review the existing system and develop a web-based Co-Op Management System. A Co-Op Management System can be developed by studying existing systems and literature to fill a discovered gap. It was successful in building and

operating a prototype management system. By conducting a more comprehensive literature review, we can examine the current situation on social media platforms about Co-Op Management System, and we can gain a better understanding of what is needed and where further investigation is necessary. An analysis of the criteria in more depth would also result in an improved product. In addition to knowing the Co-Op Management System users' requirements might change from time to time, making sure that UCSI University can meet their needs with the system being developed.

GUI of an E-Learning System: User-Centred Approach

Bryan Chak Yen Hou, Chloe Thong Chee Ling, Ismail Ahmed Al-Qasem Al-Hadi

Introduction

With this new interface, a number of adjustments to enhance usability & accessibility is made while taking into user feedbacks along the way. The enhanced graphical user interface has a modern & clean design that makes navigation through the platform easier to users of all ages and varying experiences. The interface has been created to streamline user interaction, making it simpler for students to access course materials, finish tasks, and interact with teachers as well as other students. The interface has been optimized to be compatible with various devices, including desktops, laptops, tablets, and smartphones. This makes the learning process more flexible and convenient since you can access the e-learning system from any device with a functioning internet connection. Human Computer Interaction (HCI) is essential in guaranteeing that the interface is user-friendly, intuitive & easy to navigate as it should be created to provide clear, concise & pertinent information in a visually pleasing & interactive way so that there is less cognitive load along with huge learning outcomes.

Objectives

1. To analyze features of existing E-Learning system's & it's capabilities.
2. To gauge the effectiveness of these systems in relation to user satisfaction.
3. To evaluate all users' perception of system usability using various tools & techniques.
4. To develop a user-friendly prototype that fulfils all considerations.

Methods

User-centred design would be the approach taken for the development of this graphical user interface as it involves understanding the needs & requirements of users based on their feedback. The process is split into 7 steps which starts from user research, this is where research is conducted through surveys, interviews & focus groups. This step aims to collect information on user's preferences, expectations & obstructions related to using an E-Learning system. After that will come prototyping where a functional version of the graphical user interface is put to the test by users. User Testing is important because it aids in identifying usability issues & enhances the overall user experience. As the interface is being tested by real users, the design team can make sure that the system is simple to use, intuitive & caters to the needs of the target market through constantly refining it with every feedback.

Results

The existing graphical user interfaces has been identified to have a few of these issues which ranges from being too text-heavy, visually unengaging, limited customization & multimedia to limited interactivity & complex navigation. Therefore, with the help of surveys & interviews from 120 total respondents, it had been found that users prefer a design filled with a blend of different shades of brown as well as unique features paired up with gamification elements. This includes social media integration, where discussion boards can be established inside the E-Learning systems, a leader board style point collection where all the students can know their current standing & strive to be better. Mobile compatibility has also been added as requested to make the design more flexible for users to access course material and resources from, whether it be their smartphones or laptops. With the analysis of System Usability Scale (SUS) scores, this newly developed GUI has scored a perceived usability mean score of 85.6 which was graded A and undoubtedly a rather high score as it had fulfilled all the consideration of the important factors such as perceived ease of use, user interface & system quality.

Conclusion

This research findings show how beneficial an E-Learning system is from a student's point of view. According to the findings and utilization of the System Usability Scale (SUS), majority of the users including both students and lecturers find the newly developed graphical user interface (GUI) to be highly user-friendly and very interesting with the additional features added through user feedbacks. This study makes the claim that perceived system usability is positively and significantly influenced by students' perceptions of their E-Learning system satisfaction, therefore GUI can be seen as a critical component. To ensure that the interface is effective – user friendliness, intuitiveness & visual appeal are factors to be considered.

Fire Detection System based on YOLOV5

Guo Zhengpeng, Shabana Anjum Shaik, Heshalini Rajagopal @ Ramasamy

Introduction

People's use of fire has been throughout the development of society. Today's society, whether it is daily life or the development and progress of industry, is dependent on the use of fire. However, with the development of scientific society, fires frequently occur; fires due to their spreading and destructive nature on the safety of human life and property security have caused a significant threat. For this reason, performing daily fire detection quickly, accurately, and less costly is of great relevance to reducing or avoiding human casualties. In the past decades, the performance of traditional image-based target detection algorithms entered a bottleneck. In recent years target detection technology introduced convolutional networks to finally break the traditional target detection performance constraints, and deep learning-based target detection algorithms are increasingly available. It has become possible to detect forest fires using deep learning techniques to detect the presence of flames in videos. In this paper, the authors will develop a lightweight fire target detection algorithm system based on YOLOv5s, which achieves real-time detection of fire scene alarms by building an environment on

existing detection devices. To solve the problem of significant changes in target scales, an attention inference layer mechanism is added to the feature channel to obtain importance levels, enhance features and suppress features that are not important for the current task without increasing the amount of excessive computation. To prevent overfitting, the SiLU activation function is added. The robustness of the model is enhanced, producing a more substantial regularization effect. Also, the lightness of yolov5 is exploited to improve its average accuracy mean and detection speed.

Objectives

1. To investigate the existing detection systems and analyze their advantages, disadvantages and needs.
2. To develop and improve the YOLOv5s fire detection algorithm model.
3. To design a lightweight fire target detection algorithm system based on YOLOv5s.
4. To the analysis of experimental results, make ablation experiments and comparison experiments.

Methods

In this Research, several published journal research and books. It will be studied through a literature review to get some ideas about machine learning-based fire detection and then summarize the problems and limitations in the current system. To obtain project requirements and data collection, this study will be conducted using a quantitative method to obtain results. A quantitative method is a method of getting the number of results from the questions asked and analyzing the data variables to get the results. This study will be conducted with approximately 41 randomly selected respondents around UCSI University to obtain user feedback on the application. Ablation experiments and algorithm comparison experiments will be carried out for the algorithm. In order to verify the effectiveness of adding CA attention mechanism and modifying localization loss function for YOLOv5 fire detection.

Results

Based on the results of the questionnaire, the Fire detection system based on YOLOV5 has been accepted by most UCSI students, and it is believed that this system will achieve a good detection and warning effect in the early stage of fire. Based on ablation experiment, it has been concluded that adding the CA attention mechanism to the YOLOv5 backbone network can enhance the model's

feature extraction ability while reducing information redundancy from two different perspectives. Additionally, modifying the localization loss function of the YOLOv5 algorithm can improve regression accuracy. As a result, the improved algorithm demonstrates a superior ability to detect fires. Furthermore, comparative experiments suggest that the fire detection algorithm based on YOLOv5 yields remarkably high detection accuracy for flames. This makes the algorithm capable of providing effective detection and early warning in the early stages of a fire.

Conclusion

The proliferation of deep learning technology has facilitated the widespread use of image recognition and target detection in diverse fields, where deep learning-based target detection algorithms have emerged as a crucial component in the current era of swift technological progress and therefore necessitate further exploration and advancement in this domain. This paper proposes a lightweight target detection algorithm based on an improved YOLOv5 to address the drawbacks of fire detection. A home-grown dataset is trained and a target detection network is built so that it can be deployed on embedded devices to achieve lightweight and highly accurate fire detection for prevention purposes. Comparative experiments demonstrate that the proposed network model

improves over existing fire detection algorithms in terms of real-time and accuracy. In today's world, where UAVs need to carry more lightweight embedded devices to detect fires, there is a great need for lightweight and highly accurate target detection models given the limitations of equipment hardware and software, and the authors provide methods for detection and reliable data and models through the experiments in this paper.

Developing a Patient Record Management System

Eng Zhong Han, Ismail Ahmed Al-Qasem Al-Hadi, Raenu Kolandaisamy

Introduction

People's life and physical well-being are handled by medical facilities. Excellent health treatment depends on qualified specialists and caregivers along with top-notch facilities and tools. Data management is essential for providing appropriate health treatment. It is particularly important to take good management of related documents including samples, medication data, and client registrations to take proper care of patients. Patient Record Management System is designed to oversee all treatment procedures and handle hospital's patient data. In order to provide greater and higher effective treatments and procedures, healthcare facilities are growing highly dependent on the capabilities of patient information management systems to help with diagnostic and administration. The development tools that will be used to develop this patient record management web application are Xampp application, PHP and MySQL that will work as database. After the web applications is fully developed and implemented, testing of the system is done through black-box functional testing to find any bugs or errors. Then, the finished applications will also be released to a group of people

for acceptance test. The feedback received can take into consideration and be used for future improvement.

Objectives

1. To study management system that allow patient record management system to manage patient's record and medical history of patient.
2. To design systematic and user-friendly patient record management system
3. To analyst the functionalities of management system that help enhance patient record management system

Methods

Agile Development methodology have been chosen to build the system because it is more flexible than the waterfall approach. Furthermore, it also help produce the best and good quality software efficiently thus this model also help reduce the risks of software incompetent. The analysis is needed to gather the data and to be analyzed to complete the system. There are various ways to gather data such as interviews, questionnaires, and research based on requirement data. The survey is a good way to know the target needs and to collect opinions from users.

The target audience for this survey is people who are students and employees who work in clinic jobs. The survey is released on 15th January 2023 and had already received a total of 50 respondents.

Results

After the survey has been conducted, most of the respondents were benefit from having patient record management system. Most of the respondents thinks that it is essential to have this patient record management system. Some respondents especially student feels the patient record management system is a little bit complicated to use because a lot of them didn't hear about this system before. Thus, other respondents that grown up majority who works in clinic feels it is very comfortable and easy to access its features. There are some improvement that can be made for this system based on the respondents. For instance, the system should add more security features to increase the level of security that able to secure patient's data.

Conclusion

Ultimately, the system has go through all of the project development phases which led to successful development and accomplishment of project main goals.

The main objective was to study current patient management system and develop a patient record management system that allow doctors to manage patient's record and medical history of patient easily. The system was developed after analyst all the respondent opinion through survey questionnaire. Identified gap in the development of patient record management system can be filled in by analyzing current systems and material which is a tiny start in that direction. The system was successful built and it runs perfectly fine on web application. The contribution of the system allow doctors to easily record and keep patient's data fully and helps doctors to easily view and find the information they need for certain patient.

Android Based Development of Mobile Information and Management Application Software for University

Er Kang Seng, Heshalini Rajagopal @ Ramasamy, Shayla Islam

Introduction

The increasing reliance on mobile technology in higher education calls for the development of comprehensive mobile applications that cater to the needs of the university community. The integration of QR code attendance systems and NFC readers in these applications can significantly streamline university management processes, particularly attendance tracking. In this research, we described the development of an Android-based mobile information and management application software for university with an integrated QR code attendance system and NFC reader. Our goal is to create a user-friendly platform that simplifies university management processes and improves the overall campus experience for students, faculty, and staff.

Objectives

1. To improve accuracy and efficiency in recording attendance data.
2. To minimize manual intervention and human error.
3. To have real-time updates to the university database.

Methods

The proposed mobile application follows a client-server architecture, where the client is the Android application installed on the user's smartphone or tablet, and the server is a remote server hosting the university's database and web services. This architecture allows for efficient data retrieval, updates, and synchronization between the client and the server.

Results

The results of the Android-based mobile information and management application software for university with the QR code attendance system and NFC reader for reading student card values have been promising. The implementation of these features has led to a number of improvements in the overall university experience for students, faculty, and staff, as well as streamlined various processes within the institution.

Conclusion

The development of an Android-based mobile information and management application software for university addresses the growing need for accessible and efficient digital tools in higher education. By incorporating innovative features such as the QR code attendance system and the NFC reader for student card interaction, our application not only streamlines access to essential university services but also enhances campus security and promotes accurate attendance tracking. This advanced mobile solution holds the potential to improve the overall university experience for students, faculty, and staff, as well as contribute to the digital transformation of higher education institutions worldwide. As a result, our proposed application sets a new benchmark for university mobile applications and opens up possibilities for further research and innovation in this domain.



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