Initial Business Case – Documentation

Automatic Student Attendance System

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Project Title	Automatic Student Attendance System
Group Members	Matthew Healey, Idries Eagle-Masuak, Samuel Fitzpatrick-Fuller, James Kim, Gia Bach Nhu, Dinh Quoc Huy Nguyen
Sponsor / Supervisor	Dr. Fenghui Ren
Initial Problem Description	At UOW, we have many subjects with a large number of students, i.e., over 200 enrolments. How to effectively collect accurate attendance information for lectures is challenging. This project will help to solve this problem. By using the students' photos and face recognition technology, the proposed system should be able to automatically detect the arrival and departure times of students and complete the attendance record.
Meeting Details	Weekly Meetings (at least 1) either Online or in person (with Dr. Fenghui Ren)

Introduction

Welcome to the Initial Business Case for the Automatic Student Attendance System. We describe the essential elements of our proposed project in this document, including its scope, necessity, market analysis, and initial planning considerations. We also discuss stakeholder analysis, ethical issues, and our methodology for project meeting management and minutes.

Initial Project Scope

Our project's main objective is to develop an automatic student attendance system that is specially designed for large classes— at University of Wollongong (UOW)—where conventional techniques for taking attendance proves to be ineffective. The system will automatically record attendance by using student photographs and facial recognition technology, making the process easier for faculty and students alike.

Project Need

The difficulties in reliably documenting attendance in lectures with a big enrolment—more than 200 students—have led to the need for this project. Manual roll calls and other traditional procedures take a lot of time and are prone to mistakes. Thus, it is evident that an automated system is required to handle attendance data effectively while maintaining accuracy and consistency.

Market Analysis

To evaluate the feasibility and potential impact of the Automatic Student Attendance System, a thorough market analysis will be carried out. This investigation will comprise assessing current attendance tracking systems that utilise facial recognition, identifying major rivals, and contrasting them to comprehend or extract strategies, essential characteristics, and functionalities for our own project.

Initial Planning Process:

Scope Management Planning: To guarantee that the project scope, objectives, deliverables, and important milestones are in accordance with stakeholder expectations, this phase will entail defining them.

Time Management Planning: To efficiently manage project timelines and deadlines, a project timetable will be prepared that outlines important tasks, dependencies, and resource allocation.

Risk Management Planning: An evaluation of possible risks related to the project's execution. Plans for contingency and risk mitigation strategies will be created to reduce negative effects on project outcomes.

Group Project Charter and Ethical Approach

A project charter will be developed that will include the goals, roles, duties, governance structure, and purpose of the project. In addition, an ethical methodology will be used to guarantee that the Automatic Student Attendance System's creation and execution comply with moral standards, data protection laws, and individual rights and confidentiality.

Stakeholder Analysis

Stakeholder analysis will be done to find individuals or groups that have a stake in the project. Understanding stakeholder expectations, concerns, and engagement tactics will be made easier with the aid of this study, which will promote cooperation and support throughout the project lifecycle.

Meeting Agenda and Minutes

There will be arranged regular project meetings to discuss concerns, evaluate progress, and reach important decisions. Meeting minutes will be recorded to record decisions, action items, and responsibilities allocated during the meetings. Agendas will be developed to establish meeting subjects, objectives, and discussion points.

In conclusion, the proposed Automatic Student Attendance System project is covered in detail in this Initial Business Case, which is outlined in its scope, necessity, market analysis, initial planning considerations, ethical approach, stakeholder analysis, and project meeting management. Our goal is to provide a strong solution that satisfies UOW's requirements and improves the effectiveness of large-class attendance tracking through efficient planning and teamwork.

Initial Project Scope

System Development: The project scope includes the development of a web-based application that integrates face recognition technology to automate the attendance tracking process. This encompasses the design, implementation, and testing phases of the system development life cycle.

User Interface Design: A crucial aspect of the project scope is the design of an intuitive and user-friendly interface for lecturers and lab demonstrators. The interface will enable users to view and manage attendance records seamlessly, with features for manual adjustments and reporting.

Face Recognition Algorithm: Implementation of a robust face recognition algorithm is a core component of the project scope. The algorithm will accurately identify students and record their attendance based on facial recognition technology, ensuring reliability and precision in attendance tracking.

Database Management: The project will entail the establishment of a secure database infrastructure to store attendance records and student information. Data integrity and confidentiality will be maintained through robust database management practices, safeguarding sensitive information.

Integration: Seamless integration with existing university systems in lecture rooms is an essential aspect of the project scope. The attendance system will be integrated with student databases and course management platforms to facilitate seamless data exchange and interoperability.

Testing and Quality Assurance: Thorough testing and quality assurance activities will be conducted to ensure the reliability and accuracy of the attendance system. This includes testing for functionality, usability, performance, and security to address any potential issues or bugs before deployment.

Compliance and Security: Implementation of security measures to protect student data and ensure compliance with relevant privacy regulations and university policies is a critical component of the project scope. This includes encryption, access controls, and audit trails to safeguard sensitive information.

Documentation and Reporting: The project scope encompasses the preparation of comprehensive documentation outlining system functionalities, user guidelines, and troubleshooting procedures. Regular reporting on system performance and usage statistics will also be provided to stakeholders.

The defined project objectives and scope provide a clear roadmap for the development of the Automatic Student Attendance System, aligning with stakeholder expectations and ensuring successful project delivery. The project team is committed to achieving these objectives while adhering to the specified scope and timeline.

Project Need

Managing attendance in lectures and labs is a significant challenge in the University of Wollongong's (UOW) current academic environment. Since there are several fields that accommodate many students—often more than 200—the usual techniques of tracking attendance frequently turn out to be ineffective and prone to errors. Not only do manual methods take up significant time and resources, but they also make it more difficult to keep accurate attendance records. Having acknowledged these difficulties, the goal of our project is to create an automatic student attendance system to meet this urgent requirement. Our suggested approach will transform attendance tracking by precisely automating the detection of student arrivals and departures by utilising the capability of student photographs and facial recognition technologies. This effort aims to improve efficiency, accuracy, and accessibility for lab demonstrations and lecturers, as well as to streamline the attendance process. Our solution will meet the specific needs of UOW by means of customisation, integration, and adherence to privacy standards. This will guarantee a seamless implementation and efficient handling of attendance data.

Automate Attendance Tracking: The primary objective of the project is to develop a comprehensive system that automates the process of collecting accurate attendance information for lectures and labs at UOW through the utilisation of face recognition technology. This automation aims to streamline the attendance tracking process, reducing manual efforts and enhancing efficiency.

Increase Efficiency: The project seeks to enhance efficiency for lecturers and lab demonstrators by eliminating manual attendance taking methods. By automating attendance tracking, the system will significantly reduce administrative burden and provide real-time attendance data, enabling instructors to focus more on teaching and academic activities.

Enhance Accuracy: Ensuring the accuracy of attendance records is paramount. By leveraging face recognition technology, the system will automatically detect the arrival and departure times of students with precision, minimising errors and discrepancies in attendance tracking.

Improve Accessibility: A key objective is to create a user-friendly interface accessible via web browsers. This interface will allow lecturers and lab demonstrators to easily access and manage attendance records from any location, providing convenience and flexibility in attendance management.

Customisation and Integration: The system will provide customisation options to adapt to specific departmental needs and infrastructure at UOW. Additionally, seamless integration with existing university systems, such as student databases and course management platforms, will be ensured to facilitate data exchange and interoperability.

Facilitate Compliance: Compliance with privacy regulations and data security standards is imperative. The system will incorporate robust security measures to protect student information and maintain confidentiality, ensuring adherence to relevant privacy regulations and university policies.

Market Analysis

This market analysis research will evaluate the face recognition attendance systems that are currently in use, identify our main competitors, and examine their key features, tactics, and project-specific functionality. This report will specifically look at six prominent and contemporary products, assigning each one to a group member for in-depth analysis. These products will act as benchmarks, offering details about their product and company background, Purpose of use, intended audience, advantages, and disadvantages. The most appropriate solution for our project and maybe for UOW's implementation will be determined with the use of a comparative analysis table that will highlight important features and functionalities.

The products that the team researched are as follows:

FaceX   Matthew Healey

https://www.integrated.com/platforms/facex-face-recognition-system/

Timeero   Gia Bach Nhu

https://timeero.com/

QuickBooks Time   Samuel Fitzpatrick-Fuller

https://quickbooks.intuit.com/app/apps/appdetails/quickbooks_time/en-au/

Buddy Punch   Dinh Quoc Huy Nguyen

https://buddypunch.com/

Truein   James Kim

https://truein.com/

Jibble   Idries Eagle-Masuak

https://www.jibble.io/

FaceX

Background
Integrated Corporation's FaceX is a noteworthy attendance tool incorporating facial recognition software designed for small and medium-sized businesses to be simple and powerful. This web-based tool first published in 2018, offers an extensive feature set when partnered with additional tools, simplifies the process of managing attendance by integrating live face detection, rapid face processing, and the ability to create concise templates for facial characteristics. Most notably, it assesses the facial image quality to guarantee precise recognition outcomes. The Chinese firm Integrated Corporations, well-known for its proficiency in software integration, access control, and security technologies, branched out into artificial intelligence research, concentrating on IoT solutions, cutting-edge AI technologies, and the integration of facial recognition systems (*About Us* 2021). FaceX and the additional product iPlatform, offers companies a dependable solution for improving security and tracking attendance, is evidence of the company's dedication to innovation. With FaceX serving as a pillar product in their portfolio, Integrated Corporation has established itself as a leader in the creation and application of face recognition technologies through strategic alliances and acquisitions.

Purpose
The main goals of FaceX, the facial recognition system from Integrated Corporation, are closely related to how it integrates with Integrated Corporation's flagship product iPlatform, a powerful management and security system. FaceX facial recognition technology strives to improve security protocols, authentication procedures, and offer users customisable experiences through a smooth integration with iPlatform. FaceX offers ultra-accurate facial recognition capabilities through the employment of cutting-edge AI algorithms that can be analysed in iPlatform's complex multi-tier architecture, guaranteeing quick and reliable user identification verification (*iPlatform Smart Security Management | Integrated Corporation* 2018). Businesses may more easily handle attendance, access control, and security monitoring thanks to this interface, which enables seamless compatibility and integration between organisational sites and network applications. Furthermore, FaceX gives companies the ability to personalise user experiences and security procedures (*FaceX analytics | Integrated Corporation* 2018) to their own needs and preferences by supporting both standard and custom apps within iPlatform. FaceX and iPlatform integration improves operational effectiveness, fortifies security protocols, and enables an even more seamless and customised user experience for clients.

Audience
FaceX and iPlatform targets a broad range of industries and organisational contexts, such as corporations, academic institutions, governmental organisations, and retail establishments. The software serves a range of users, from security individuals to facility managers and administrators, with a primary focus on professionals and decision-makers in charge of security management and access control. The target audience is diverse in terms of age and profession, rather being aimed at organisations looking for cutting-edge security measures to properly protect their properties and assets. Furthermore, FaceX's adaptability and user-friendliness makes it appealing to a wide range of users, from small and medium-sized businesses to major corporations, who want to improve security protocols, streamline identification procedures, and offer customised experiences for clients, staff, and guests.

Advantages
FaceX's cutting-edge AI algorithms allow for the simultaneous comparison of 106 facial attributes, guaranteeing unmatched accuracy rates (*FaceX Face Recognition System | Integrated Corporation* 2018). FaceX uses iPlatform's scalability and flexibility to ensure quick identification processes. Its quick 0.3-second face recognition time improves operational efficacy throughout the company In addition, FaceX's real-time warning system automatically identifies anomalous activity (*FaceX Face Recognition System | Integrated Corporation* 2018), fortifying security procedures and facilitating quick responses to possible threats. This system is completely linked with iPlatform's security management platform. Furthermore, FaceX provides a free trial period so that users can firsthand experience its advanced features and capabilities before committing.

When FaceX and iPlatform are combined, FaceX's extremely precise facial recognition capabilities and iPlatform's lightning-fast processing speed (*FaceX SERIES* 2018) work together to provide dependable verification in a variety of contexts in the business environment apart of security and human resources. Additionally, Integrated Corporation provides a variety of camera and identification solutions in the form of additional products that are specifically designed to work in alongside with FaceX's features and capabilities (*Access Control Systems* 2018), guaranteeing compatibility and optimal performance, even if FaceX is unable to smoothly integrate into current CCTV camera systems.

FaceX, which is incorporated into iPlatform, uses strong security measures to guard user information and stop illegal access. FaceX raises the bar for facial recognition technology by utilising AI deep learning algorithms and unique liveness detection technologies (*FaceX SERIES* 2018) inside the protected and manageable iPlatform environment. This guarantees a trustworthy and safe solution for access management, attendance tracking, and personalised experiences. By combining state-of-the-art security measures with exceptional performance (*iPlatform Smart Security Management | Integrated Corporation* 2018), iPlatform offers users a dependable solution that satisfies the strictest security and compliance requirements.

Disadvantages

Given the lack of concrete information (last public record 2018) on current existing disadvantages, FaceX's potential disadvantages include rare accuracy problems brought on by external circumstances like poor lighting or obscured facial views, while improvements in AI systems are intended to ease these concerns. Some additional issues could arise with the use of CCTV camera systems as the system itself could limit FaceX's capabilities and require the use of Integrated Corporation's specific camera / identification products to be used which may not be accounted for in a budget.

The potential for biases in facial recognition algorithms to give rise to discriminatory practices if they are not adequately addressed by means of rigorous testing and bias mitigation measures may be at the centre of ethical concerns. Furthermore, privacy issues may surface in relation to the collection and retention of facial data, hence requiring strong data protection protocols to guarantee adherence to laws like the General Data Protection Regulation (GDPR).

One of the regulatory challenges that confronts the face recognition technology sector is the constant evolution of laws and standards, which necessitates constant monitoring and adjustment to maintain adherence to industry- and region-specific regulations. In spite of these possible obstacles, precautionary steps, continuous technological and regulatory developments, and responsible and ethical use of facial recognition software, FaceX, can help reduce threats. Another concern is that FaceX is governed by Chinese law, but in this case a possible implementation in Australia necessitates careful compliance with Australian legal frameworks, including privacy laws and data protection standards. In order to mitigate the dangers connected with cross-border data transfers and foreign software usage, negotiating these regulatory discrepancies requires careful adaptations to assure compliance with Australian standards regarding data processing, consent processes, and security protocols.

Summary

FaceX's unmatched combination of cutting-edge technology, extensive functionality, and strong security measures sets it apart from its rivals. FaceX has superior accuracy rates than other facial recognition systems because of its sophisticated AI algorithms, which allow for the simultaneous comparison of 106 facial components. Its 0.3-second recognition time and robust real-time alert system (*FaceX Face Recognition System | Integrated Corporation* 2018) guarantee quick and effective person identification, improving security and operational effectiveness. Furthermore, FaceX being integrated with iPlatform distinguishes itself as a pioneer in facial recognition technology by providing distinctive features including liveness detection technology and AI deep learning algorithms (*FaceX SERIES* 2018). Its personalised experiences and smooth interaction with the security management systems in iPlatform (*iPlatform Smart Security Management | Integrated Corporation* 2018) set it apart from the competition in security and make it an excellent option for businesses looking for a dependable, effective, and safe facial recognition solution. However, FaceX's extra capabilities, such as heat maps and VIP customer management, add to its adaptability and appeal in a variety of industries for security management, for an attendance system specific for handing lectures, where precise and effective attendance tracking is the main goal, now find it

unnecessary to further research these features and try including them. While these characteristics and systems could be useful in some situations, educational institutions should prioritise aspects that are necessary, such as quick facial recognition and easy interaction with attendance tracking systems. As a result, even though FaceX excels at providing a wide range of features and the ability to use iPlatform to properly utilise it, its applicability for an attendance system at UOW may depend on the particular needs and preferences of the institution and from our project description fall short for this product's needs. While FaceX excels in security management capabilities, its inclusion of complex and redundant features, as well as lack of clear public information and testing may potentially complicate the streamlined process of utilising this facial recognition system solely for attendance tracking purposes as there is not public guarantee of this product working flawlessly for our intending proposal and requirements.

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Timeero

Background

Timeero is focused on revolutionising employee management for businesses by developing a suite of tools designed to streamline time tracking, scheduling, and monitoring processes (*Timeero Review 2024: Best GPS Time & Mileage Tracker,* 2024). A notable addition to their features is the integration of facial recognition technology, which enhances the accuracy and security of employee clock-ins and outs. This introduction signifies a pivotal advancement in Timeero's mission to offer efficient workforce management solutions. As part of their growth strategy, Timeero has forged partnerships with key industry players and strategically acquired technologies to further expand their capabilities and market reach.

Purpose

Timeero's facial recognition product is designed to streamline and fortify the employee time tracking process in a business. By leveraging the power of facial recognition technology, the product prioritises to eradicate reliance on conventional timecards or PIN codes, thereby significantly augmenting and enhancing security and operational efficiency (*Timeero - Best Face Recognition Attendance System,* 2024). Its core objectives encompass not only streamlining identification processes but also optimising workforce management practices and ensuring stringent compliance with attendance policies, thus empowering businesses with a comprehensive solution for efficient and secure time tracking.

Audience

Timeero's facial recognition product caters to businesses of all sizes and industries, particularly those with remote or mobile workforces. The target audience encompasses individuals from various demographic backgrounds, including diverse age groups, genders, and occupations. This inclusivity ensures that Timeero's facial recognition technology can effectively serve a wide range of industries, including retail, healthcare, construction, and field services, where workforce mobility and remote operations are prevalent.

Advantages

Timeero's facial recognition technology ensures compatibility across a diverse range of skin tones and facial features, ensuring dependability and accessibility for all users (*Timeero - Face Recognition Time Clock*, 2024). Moreover, Timeero offers the capability to prevent unauthorised clock-ins and outs. Administrators can establish virtual boundaries around designated work sites, allowing workers to clock in or out only within predefined areas. This measure ensures strict adherence to the organisation's attendance policies and effectively mitigates time theft. For businesses with mobile workforces or multiple locations, Timeero allows for customisable geofencing (*Timeero - Face Recognition Time Clock,* 2024), providing tailored solutions that offer flexibility and enhanced control over time tracking procedures.

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Timeero promptly notifies managers or administrators in real-time of any irregularities in clock-ins or clock-outs, enabling swift action to minimise workflow disruptions (*Timeero - Face Recognition Time Clock,* 2024). Administrators can configure notification settings to receive alerts via email or mobile notifications, ensuring timely resolution of time tracking anomalies. These real-time notifications foster accountability and transparency in employee time tracking, enhancing compliance culture within the company. Timeero automatically flags time entries with inconsistencies, facilitating efficient examination of employee time sheets. This feature allows administrators to quickly identify and address issues, ensuring accountability and accuracy in time monitoring procedures (*Timeero - Best Face Recognition Attendance System,* 2024). Visually distinguishable flagged time entries enable administrators to promptly spot inconsistencies and take necessary action. Furthermore, Timeero's capability for flagged time entries provides a comprehensive audit trail, aiding in compliance with internal and regulatory regulations.

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Timeero provides an offline mode (*Timeero - Best Face Recognition Attendance System,* 2024), ensuring uninterrupted time tracking in areas with limited internet connectivity. Employees can easily clock in and out, even in remote or poorly connected worksites. Time entries are stored locally on the device and automatically synchronised once internet connection is restored, ensuring data integrity and preventing loss of time tracking data.

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Timeero's facial recognition technology showcases exceptional accuracy and reliability, guaranteeing

precise time tracking and minimising errors (*Timeero - Best Face Recognition Attendance System,* 2024). The company places a paramount emphasis on data security, implementing measures to protect user information. By adhering to privacy regulations and proactively ensuring compliance, Timeero provides businesses with peace of mind regarding the protection of sensitive data.

Disadvantages

The product and its facial recognition app currently operates exclusively on iOS devices, leaving Android users unable to access its features, which can restrict its market reach and possible user base (*Jibble*, 2024). Without cross-platform compatibility, this platform constraint may present difficulties for companies or individuals whose primary mobile device is an Android device, and it may prevent the product from being widely adopted.

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Some users may express concerns regarding privacy and fairness in the use of facial recognition technology, highlighting potential ethical considerations. There may be issues with the collection, storage, and possible misuse of facial data in addition to the possibility of prejudice or discrimination in the algorithmic procedures. It is imperative to tackle these ethical issues to guarantee openness, responsibility, and confidence in the application of facial recognition technology.

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Timeero faces regulatory challenges related to data privacy and security, necessitating compliance with relevant laws and regulations to maintain trust and legality. Adhering to regulations like the CCPA or GDPR to protect user data, putting strong security measures in place to stop illegal access or data breaches, and making sure data handling procedures are transparent are some examples of compliance activities. Maintaining regulatory compliance, reducing legal risks, and building confidence with users and stakeholders all depend on overcoming these obstacles to regulation.

Summary

While Timeero's facial recognition product offers a comprehensive feature set, including facial recognition, time tracking, and mileage tracking (*Timeero - Face Recognition Time Clock,* 2024), its inclusion of numerous features may not align with the specific requirements of our project. Our project may not necessitate all the functionalities offered by Timeero, potentially leading to unnecessary complexity and resource allocation. Therefore, further research into alternative solutions that better align with the specific needs and scope of our project may be warranted. Timeero's advanced facial recognition technology guarantees compatibility with a variety of features like real-time notifications and blocking unwanted clock-ins improve workflow efficiency and accountability. Its offline capability makes it appropriate for adaptable projects by enabling continuous time tracking at remote locations. Timeero is a solid candidate for consideration in our project review because of its attention on data security, user-friendly design, and excellent customer support.

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QuickBooks Time

Background
TSheets was a company founded in 2006 by Matt Rissell and Brandon Zehm, fuelled by their desire to have a more modernised digital punch clock system, as opposed to handwritten timesheets and physical punch clocks. Since this did not exist yet, they decided to create it themselves. Their flagship product (their employee time tracking application) was released for iPhone in 2008. It took some effort over the years, but the product eventually caught on (*Rissell M*, Dec 9, 2014). In 2012, they added support for QuickBooks, a popular accounting software, and soon became partnered with them, as time-tracking software was a useful feature that could be integrated into the software with the help of TSheets (*Bertrix A.*, Apr 29, 2017) . QuickBooks' parent company Intuit ended up acquiring TSheets in 2018 and rebranded it as QuickBooks Time, which is what the product is known as today (*Business Wire*, 2017). In December 2016, they released an app named QuickBooks Time Kiosk, which was specifically designed for tablets to be used as a time clocking kiosk for employees, complete with facial recognition, which was added as a feature in October 2017.

Purpose
TSheets was originally designed to fill the niche of a digitalised punch clock software, allowing employees to clock in to work and have their attendance tracked and stored digitally. The software has the ability to track and submit employee hours, create timesheets (with crew clock-in and project tracking) using the QuickBooks Workforce app, roster employee shifts and utilise GPS tracking for remote teams (*QuickBooks Time* 2021). The intended benefit for this software is to replace old-fashioned pen and paper time tracking solutions, which are slow, high effort, and often rely solely on an honour system, which makes them highly exploitable. The QuickBooks Time system allows a much more cost-efficient method and scalable method for keeping track of employee work times. For the kiosk software specifically, the main purpose is to replace costly mechanical punch clock machines with a simple tablet-built app that serves the same purpose but without a lot of the hassle and resources of a traditional punch clock.

Audience
The QuickBooks Time systems are generally seen to be targeting small businesses with their products. The low cost and higher efficiency seen with QuickBooks' digital systems is meant to benefit businesses who can't necessarily afford either the pen and paper style of employee time tracking, nor a large-scale or in-house database to track employee work hours. As well as this, as can be probably seen from the previous descriptions, QuickBooks Time is meant for businesses in general, not other attendance-based systems such as school/university systems like the one we're trying to develop. While attendance can be tracked with facial recognition using the kiosk, a majority of features are with work hour tracking in mind.

Advantages
Gathering information on the performance and security of the app can be challenging, primarily relying on user reviews for insights. Despite this, QuickBooks Time, and even before then TSheets offers seamless integration with QuickBooks' flagship accounting software, a widely used platform in the industry. QuickBooks Time also provides a mobile app, enhancing accessibility for users.
sad

While unbiased accounts of the software's security are scarce, Intuit assures users of robust security measures, including protection against various threats such as XRF, CSRF, and SQL injection. The software operates on multiple servers housed in Tier-3 data centres, ensuring reliability and resilience. Data handling complies with the Payment Card Industry's Data Security Standard, and geographically diverse data centres are safeguarded against both man-made and natural disasters. Regular backups are performed to maintain data integrity (*How secure is my data with QuickBooks Time?* 2022) . QuickBooks Time Kiosk simplifies the process of face scanning with an easily accessible device, promoting user-friendliness and understanding among users.

Disadvantages

The facial recognition part of this product is not the forefront of Intuit's focus or development. It merely acts as a quality-of-life feature for their kiosk program. As such, results may vary for the quality and adaptability of its technology. As said previously, many complaints can be found on reviews for the products about the performance and stability of the app. The same complaints of performance carry over to the kiosk app, although it being a sub-application of QuickBooks Time, it does not have as many reviews to support it.

Many reviewers have also voiced general disdain for the QuickBooks acquisition, with many claiming the original TSheets software used to be a lot more functional before Intuit acquired them. This service is specifically for employees and businesses, rather than educational institutions. There is some crossover, but the two don't adapt completely seamlessly. In order to track people's attendance, it requires the employees and/or users to have their own account with a 4-digit pin. The kiosk also requires active use by the users, whereas our project is looking for an automated solution. The actual face tracking used by the kiosk is presumably closed source, with no way to find out which it uses (or whether it's proprietary) and no documentation on how to use it if at all (outside of the kiosk in-app)

Summary

Overall, this software doesn't seem to be what the team is looking for. While it does boast a lot of features relevant to workplace time tracking of employees and their statistics (*QuickBooks Time,* 2021), its goals don't align very well with our education attendance-based system. It has a lot of integration with industry standard products under the QuickBooks brand, and a lot of advantages specifically for small businesses looking to have a lower cost punch card option. But for our goals, its purpose, as well as its closed source nature, don't align completely with what our team wants to do. On top of this, based on many user reviews, there seems to be many issues regarding performance, stability and functionality, especially after the QuickBooks acquisition. Positive opinions on the software were honestly hard to come by.

In conclusion, while this software offers features relevant to workplace time tracking and integrates well with industry-standard products. It does not justify its utilisation when there seems to be many better, more generalised options out there with better documentation and more adaptability to different situations to use face-recognition in.

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Buddy Punch

Background

Buddy Punch was founded in 2013 by a team of entrepreneurs who recognised the need for modern, efficient solutions in employee time tracking and scheduling. The company's goal was to streamline the process of tracking employee hours, enhancing, accuracy and ease of use. Key milestones in Buddy Punch 's development include the launch of its initial time tracking software, which provided businesses with cloud-based tools for managing employee attendance and schedules. Over time, Buddy Punch continued to refine its product, incorporating new features and functionality based on customer feedback and technological advancements.

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Buddy Punch has also established partnerships with other software providers, payroll services, and business management platforms to offer integrated solutions for its customers (*Business Owner | Buddy Punch,* 2024). These partnerships have helped expand Buddy Punch's reach and capabilities, allowing businesses to seamlessly manage various aspects of their operations from a single platform. As the demand for flexible work arrangements and remote management tools has grown, Buddy Punch has adapted its product to meet these evolving needs. This includes the development of mobile apps for on-the-go time tracking and scheduling, as well as integrations with popular communication and collaboration platforms. Overall, Buddy Punch has evolved into a leading provider of employee time tracking and scheduling solutions, helping businesses of all sizes optimise their workforce management processes.

Purpose

Buddy Punch, primarily known for its employee time tracking and scheduling solutions, and utilises facial recognition only for easy access to user accounts, but is not directly related for attendance within the product itself.

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Implementing facial recognition technology in Buddy Punch enhances security measures by providing an additional layer of authentication for employee clock-ins and access to sensitive areas within a workplace. Facial recognition can help ensure that only authorised personnel are granted access, reducing the risk of unauthorised entry or time theft. By incorporating facial recognition into its time tracking system, Buddy Punch could streamline the identification process for employees. Instead of relying solely on manual entry of login credentials or physical time clocks, employees could simply use their faces to clock in and out, saving time and effort for both employees and managers.

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Facial recognition technology improves the accuracy of time tracking by verifying the identity of employees based on their unique facial features for account access (*Facial Recognition Feature | Buddy Punch* 2024). This reduces the likelihood of buddy punching (where one employee clocks in or out on behalf of another) and ensures that time entries are associated with the correct individuals, enhancing accountability within the workforce. Introducing facial recognition to Buddy Punch can enhance the overall user experience for both employees and administrators. Employees may appreciate the convenience of using facial recognition for clocking in and out, while managers benefit from simplified time tracking processes and reduced administrative overhead. Facial recognition data collected by Buddy Punch could potentially be leveraged to provide personalised features and insights. For example, the system could analyse employee attendance patterns based on facial recognition data to offer personalised scheduling recommendations or identify trends in employee punctuality.

Audience

Buddy Punch targets a diverse demographic of users across various industries and occupations, primarily focusing on businesses and organisations that require employee time tracking and scheduling solutions. Here are some demographic characteristics of the users or audience typically targeted by Buddy Punch:

asd

Buddy Punch caters to SMBs across different sectors, including retail, hospitality, healthcare, manufacturing, and professional services. These businesses often have a workforce ranging from a few employees to a few hundred and require efficient time tracking and scheduling tools to manage their workforce effectively. The primary users of Buddy Punch are typically managers, administrators, and HR personnel responsible for overseeing employee attendance, scheduling, and payroll processing. These individuals often hold positions such as HR managers, operations managers, businessowners, or department supervisors (*HR Manager Time Tracking Software | Buddy Punch,* 2024). Buddy Punch serves businesses and organisations across different geographic regions, including the United States, Canada, and other countries where English is widely spoken. The platform's cloud-based nature allows it to be accessible to users regardless of their location, making it suitable for businesses with distributed or remote workforces. While Buddy Punch is designed to be user-friendly and accessible to users with varying levels of technical proficiency, its audience typically includes individuals comfortable using technology and software solutions. This demographic may include employees and managers who are familiar with using computers, smartphones, and web-based applications in their daily work activities.

Advantages

Buddy Punch provides an extensive feature set intended to make staff time monitoring and management procedures more efficient. Buddy Punch offers a range of mobile applications to meet the various demands of businesses, including work costing, on-demand reporting, and time off tracking and accruals (*HR Manager Time Tracking Software | Buddy Punch,* 2024). Advanced features of the system include GPS coordinates for employee location verification, facial recognition for secure clock-ins and clock-outs, and geofencing to limit punches to certain regions, improving accountability and compliance (*HR Manager Time Tracking Software | Buddy Punch* 2024).

Buddy Punch also includes cutting-edge features like IP address locks, automated break deductions, and QR code scanning to further simplify timekeeping and guarantee data security (*Facial Recognition Feature | Buddy Punch* 2024). Webcam photos on punches, overtime alarms, and timecard approvals are helpful tools for administrators to use for effective monitoring and verification. The system's seamless integration with current systems and workflows is made possible by its support for single sign-on authentication and API integration (*Facial Recognition Feature | Buddy Punch* 2024), which boosts productivity and efficiency all around.

Overall, Buddy Punch offers companies a strong and adaptable option for efficiently tracking employee time and attendance. Buddy Punch's extensive feature set and intuitive interface enable businesses to streamline their time tracking procedures, increase accuracy, and guarantee labour law compliance.

Disadvantages

The largest disadvantage, particularly in relation to our research, is Buddy Punch's absence of facial recognition technology for tracking attendance. Although the platform has several features for staff tracking and time management, its appeal to enterprises looking for increased security and convenience in attendance monitoring may be limited due to its lack of facial recognition capabilities. Due to this omission, Buddy Punch might not offer as much security and precision as systems that use facial recognition, which could make users more susceptible to incidences of buddy punching or time theft.

Buddy Punch has an abundance of features; however, it might not be scalable for large businesses or organisations with complicated labour management requirements. The size or complexity of processes in such situations may be beyond the capability of the system, which could result in inefficiencies or functional gaps. Furthermore, its applicability to companies with particular or specialist needs may be limited by the absence of some sophisticated features or customisation choices.

Buddy Punch may encounter difficulties in complying with labour laws and data protection regulations, particularly around the collection, storage, and utilisation of employee data. Companies who have inadequate privacy and data security policies or procedures run the danger of facing penalties and legal action. In addition, the absence of specific features or functionalities necessary for conformity with industry norms or standards may hinder acceptance or usage in regulated industries, such as healthcare or banking. Regulatory compliance is necessary to protect legal liability and preserve stakeholder trust.

Summary

Buddy Punch provides a full range of features for managing employee time, including reporting capabilities, job costing, time off monitoring, and mobile apps (*HR Manager Time Tracking Software | Buddy Punch,* 2024). Although the platform offers a plethora of features to optimise labour management procedures, one prominent limitation is the lack of facial recognition technology specifically for attendance tracking. Buddy Punch can't match the cutting-edge security and ease of use provided by other products on the market without this feature. Its attraction is further diminished by issues with regulatory compliance, ethical concerns about employee privacy, and scalability restrictions. While Buddy Punch has several helpful features overall, competing applications with more sophisticated facial recognition capabilities surpass it in attendance monitoring.

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Truein

Background
Truein was founded in 2017 by Ankit Tanna and Jigar Pujara with a clear mission to address the persistent challenges within time and attendance management in the workforce. Ankit's prior experiences had revealed the shortcomings of existing systems, particularly in handling remote staff and employees across different locations. Manual processes led to complicated and disorganised timesheet calculations, resulting in errors such as incorrect clock-ins and miscalculated overtime, leading to revenue losses (*About Us | Truein* 2024).

Ankit and Jigar then began their journey addressing and fixing these issues by creating Truein, an application that centralises the time and attendance system into one organised process that promotes versatility and productivity. With the use of facial recognition tools and AI technology, Truein further pushes their goal of optimising time and attendance systems within the workforce to its limits (*YourStory* 2017).

Purpose
Truein utilises facial recognition technology to provide the workforce with a practical and accurate way of clocking in attendance (*Truein Time & Attendance* 2024). Key features of Truein include facial recognition through masks, selfie attendance using geofencing, attendance policies and report automation, and leave management. Truein offers a variety of features to keep attendance simple and efficient. Truein is supported for any devices running on IOS or Android, providing easy accessibility. Truein utilises AI technology and facial recognition technology to clock in/out accurately even when facial features change such as a new hairstyle or beard. Truein is also capable of recognising faces through face masks which is important for work fields that require the use of masks (*Face Recognition Attendance System For Employees | Truein* 2024).

Truein also features geofencing to make sure employees are clocking in only at permitted locations which is great for retail and contractual workers. Policies such as overtime, and late-marks can be set and Truein can calculate and produce reports in real-time automatically, saving precious time. Staff can also request for leave on the app and receive notifications of approval or rejection at the comfort of your phone (*Face Recognition Attendance System For Employees | Truein* 2024).

Audience
Truein is targeted towards contractual and distributed workforces that need an easy-to-use and fast attendance system for their staff. Contractual and distributed workforces are high paced environments that benefit from speed and efficiency and Truein resolves this need by utilising facial recognition to quickly and reliably keep track of attendance. Truein benefits a wide range of audiences and users, including construction workers, retail staff, janitorial service workers, contractual workers, supply chain staff, and businesses of all sizes, from small enterprises to large corporations (*Truein Time & Attendance* 2024).

Advantages
The facial recognition system offers high precision recognition using advanced AI algorithms, even with masks, and can accurately detect changes in facial features and aging. Operating through mobile devices, it provides convenience and accessibility. Additionally, it generates automated real-time reports and supports group face detection, enhancing efficiency and usability (*Face Recognition Attendance System For Employees | Truein* 2024).

Truein's facial recognition technology is outstanding, with extremely high precision and accuracy allowing users to feel safe using it. The truein app has great optimisation for mobile devices and runs smoothly on most modern devices. Truein's facial recognition system runs flawlessly with high-speed scanning, accuracy and reliability thanks to its advanced AI based facial recognition system.

Truein's facial recognition system is capable of scanning small differences in a person's appearance such as beards or hairstyles, providing safety and preventing unauthorised access. Geofencing technology prevents clock-ins from unauthorised locations preventing potential fraud (*Face Recognition Attendance System For Employees | Truein* 2024).

Disadvantages

Truein is a mobile and tablet-based app that is only available to devices running Android and IOS. This limits the use of desktop computers and other foreign mobile operating systems. Since facial recognition requires a mobile device with a camera, devices with damaged or broken cameras cannot operate the facial recognition system.

Since facial recognition relies on technology and artificial intelligence, there are possibilities of racial bias and discrimination. The use of facial recognition also concerns privacy issues that arise from the collection of camera and location information. Additionally, Truein handles lots of private and sensitive data and therefore must store them securely. However, if the data ever becomes breached, it can cause devastating damage to both the business and the user's privacy.

Summary

Truein's main strength that differentiates itself from other facial recognition attendance systems is its advanced facial recognition system that can recognise faces through masks, changes in facial features, age and the ability to detect multiple faces in one picture. Truein's abundance of features, ease of use, easy accessibility and versatility makes it a strong competitor in the field of facial recognition-based attendance systems.

Truein's features are mainly catered towards contractual and distributed workforces (*Truein Time & Attendance* 2024) which would become redundant in an attendance system made for use in lectures or workshops in UOW. Building a system based on Truein would become unnecessarily complex and time consuming however, Truein does contain many features that can benefit an attendance system in a school setting such as group face detection (*Face Recognition Attendance System For Employees | Truein* 2024) where in the scenario of two students arriving at the same time, both student's attendance is marked. However, Truein's attendance system requires users to download the app on their phones and individually clock their attendance which wouldn't be viable in a school setting. Its manual operation wouldn't solve the issues that come with marking attendance in labs or lectures with a large number of students. Schools would benefit most from an automated attendance system using facial recognition to identify students that are present. While Truein proves to be a powerful attendance tool packed with many useful features, its purpose and goals don't align with what is needed from an attendance system in UOW.

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Jibble

Background

Jibble, a flagship product of Jibble Group, has revolutionised time tracking for businesses since its inception. Established with the vision of simplifying attendance management, Jibble has evolved into a market leader with a diverse clientele spanning various industries. Over the years, Jibble has forged strategic partnerships with renowned companies such as Salesforce, Oracle, and Google, amplifying its reach and influence in the market. Notable milestones include accolades from industry awards, recognition for innovation, and continuous enhancements to its features and functionalities. Jibble's commitment to excellence and customer satisfaction has solidified its reputation as a trusted solution for businesses seeking efficient time tracking solutions. (*Attendance Tracker*, 2024)

Purpose

Jibble's facial recognition product is designed to cater to the evolving needs of businesses and educational institutions seeking seamless attendance management solutions. By leveraging cutting-edge 3D face scanning technology, Jibble aims to streamline the clock-in process for employees and students alike. The primary objective is to enhance security and accuracy in attendance tracking while simplifying identification processes for users. With features such as face spoofing prevention and geofencing integration, Jibble ensures maximum security and compliance with regulatory standards. The product's versatility makes it suitable for a wide range of industries, from corporate enterprises to educational establishments, seeking to optimise their attendance management workflows (*Attendance Tracker*, 2024).

Audience

While Jibble's facial recognition product primarily targets businesses aiming to streamline attendance management processes, its appeal extends to educational institutions seeking efficient student tracking solutions. Businesses of all sizes, ranging from startups to multinational corporations, benefit from Jibble's user-friendly interface and robust security features. Similarly, educational institutions like Harvard University leverage Jibble's intuitive platform to monitor student attendance effectively (*Attendance Tracker*, 2024). The product caters to a diverse demographic of users, including administrators, HR professionals, educators, and students, seeking reliable and innovative solutions for attendance tracking. Jibble's adaptability and scalability make it a preferred choice for organisations looking to optimise their time tracking processes (*Attendance Tracker*, 2024).

Advantages

Jibble's facial recognition product offers a range of distinctive features and capabilities designed to enhance attendance management. With its effortless setup process, users can quickly configure face recognition, simplifying the tracking of attendance. The system's robust security measures, including advanced depth estimation to prevent unauthorised access and face spoofing, ensure the integrity of attendance data. Additionally, geofencing integration allows for precise control over attendance locations, ensuring that clock-ins occur only from authorised premises. These key features make Jibble's facial recognition product a comprehensive solution for streamlined attendance management (*Face Recognition Attendance,* 2024).

In terms of performance, Jibble's facial recognition product excels in accuracy, speed, and reliability. Utilising advanced AI technology, the system achieves high accuracy in recognising facial biometrics, minimising errors in attendance tracking. Moreover, the system operates swiftly, allowing users to clock in and out seamlessly without delays. Its reliability is further enhanced by offline functionality, enabling continuous attendance tracking even in remote areas without internet connectivity. Overall, Jibble's facial recognition product delivers consistent and dependable performance, meeting the demanding requirements of attendance management (*Jibble,* 2024).

Security is paramount in Jibble's facial recognition product, with robust measures implemented to protect user data and prevent unauthorised access. The system utilises advanced depth estimation technology to safeguard against face spoofing and fraudulent attempts at clocking in. Additionally, stringent security protocols ensure the encryption and secure storage of facial biometric data, mitigating privacy risks. Moreover, the system incorporates features such as geofencing and automated reminders to enhance security measures and maintain compliance with regulatory standards. With its comprehensive security

framework, Jibble's facial recognition product provides users with peace of mind regarding the confidentiality and integrity of attendance data.

Jibble's API offers a versatile solution for automating student attendance with facial recognition technology. By leveraging endpoints for member operations and time tracking, educational institutions can seamlessly integrate Jibble's facial recognition capabilities into their attendance systems. Utilising features such as geofencing and advanced depth estimation, the API ensures accurate and secure attendance tracking, minimising errors and unauthorised access. With its support for offline functionality, students can be accurately tracked even in areas with limited internet connectivity. By following REST architecture and providing comprehensive documentation, Jibble's API enables efficient development and integration of automatic student attendance systems. With its emphasis on security, reliability, and scalability, Jibble's API emerges as an ideal choice for educational institutions seeking to streamline attendance management processes through facial recognition technology.

Disadvantages

While Jibble's facial recognition product offers numerous benefits, it also comes with certain limitations. One of the primary concerns is accuracy issues, as facial recognition systems may sometimes struggle with recognising faces accurately, leading to potential errors in attendance tracking. Additionally, privacy concerns may arise due to the collection and storage of facial biometric data, raising questions about data security and user consent. Compatibility issues with certain devices or software may pose challenges for seamless integration, potentially impacting the user experience. These limitations highlight areas where further refinement and improvement may be necessary to enhance the overall effectiveness of the facial recognition product (*Jibble,* 2024).

The use of facial recognition technology raises significant ethical considerations, particularly regarding potential biases or discriminatory practices. Facial recognition systems may exhibit biases based on factors such as race, gender, or age, leading to unfair treatment or exclusion of certain individuals. Concerns about consent and autonomy arise regarding the collection and use of facial biometric data, prompting discussions about user privacy and control over personal information. Addressing these ethical concerns requires careful consideration of the societal implications of facial recognition technology and the implementation of measures to mitigate biases and protect user rights.

In addition to ethical considerations, regulatory challenges and compliance issues may impact the adoption and usage of Jibble's facial recognition product. Depending on the jurisdiction, there may be regulations governing the collection, storage, and use of biometric data, requiring organisations to adhere to strict compliance standards. Failure to comply with these regulations can result in legal consequences and reputational damage for both Jibble and its clients. Evolving regulatory landscapes and varying interpretations of privacy laws pose challenges for ensuring consistent compliance across different regions. Addressing regulatory compliance requires ongoing monitoring of relevant laws and regulations and proactive measures to ensure adherence to legal requirements.

Summary

Jibble's facial recognition product stands out in the market due to its innovative features and robust capabilities, setting it apart from competitors. Unlike traditional attendance management systems, Jibble offers effortless setup, robust security measures, API for automating student attendance, and advanced AI technology for accurate attendance tracking (*Attendance Tracker,* 2024). Its unique selling points include geofencing integration, offline functionality, and comprehensive dashboard analytics (*Face Recognition Attendance* 2024), providing users with unparalleled control and insights into their attendance data. Jibble prioritises ethical considerations, implementing measures to mitigate potential biases and discriminatory practices associated with facial recognition technology. The product ensures regulatory compliance, addressing challenges related to data privacy and security regulations. With its track record of reliability, performance, and user-friendly interface, Jibble's facial recognition product emerges as the premier choice for businesses and educational institutions seeking a comprehensive attendance management solution. All points considered, while a few key features could be rendered unnecessary for a possible implementation at UOW, this product does offer the widest usability out of all of the current products on the market, making it a strong candidate for us to use as a benchmark with our own proposal and creation of this project (*Face

Recognition Attendance 2024).

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Comparison Table

Product	Advantages	Disadvantages	Summary
FaceX	Cutting-edge AI algorithms with 106 facial attributes for unmatched accuracy. Real-time warning system for anomalous activity. Smooth integration with iPlatform for enhanced security and scalability. Free trial period for firsthand experience.	Potential accuracy problems in certain conditions Ethical concerns regarding biases and privacy issues Regulatory challenges and compliance with laws across two different counties	FaceX offers advanced technology and strong security measures, but its extensive features may not align with the specific requirements of our attendance system project. It may introduce unnecessary complexity and potential regulatory issues. Despite its advantages, further research into alternative solutions may be warranted.
Timeero	Facial recognition technology ensuring compatibility across diverse features. Real-time notifications for irregularities Offline mode for uninterrupted time tracking	Limited to iOS devices. Privacy and ethical concerns regarding biases and data protection. Regulatory challenges and compliance with laws.	Timeero offers comprehensive features to allow for multiple different scenarios, it however may not align perfectly with our project's needs due to platform constraints and privacy concerns. Further research into alternatives might be necessary to find a solution that meets your requirements more effectively.
QuickBooks Time	Integration with QuickBooks flagship accounting software which is widely used in the industry. Assured security measures by Intuit.	Facial recognition not the primary focus. Performance and stability issues reported by users. Limited adaptation for educational institutions.	QuickBooks Time may not be suitable for our project due to its primary focus on workplace time tracking and integration with accounting software. Its limitations in adaptation and performance issues reported by users make it less suitable for your specific requirements. As well as numerous sources stating numerous issues behind the app and systems.
Buddy Punch	Extensive feature set for staff and time monitoring. Integration with concurrent systems and workflows in today's businesses.	Absence of facial recognition technology for attendance tracking. Limited scalability for large businesses. Compliance issues with data protection regulations.	Buddy Punch offers a comprehensive set of features but lacks facial recognition technology crucial for attendance tracking. It may not provide the level of security and precision required for our project requirements. Hence exploring an alternative product with facial recognition capabilities is preferrable.
Truein	High precision facial recognition with advanced AI algorithms. Mobile accessibility and automated reporting.	Limited to Android and iOS devices. Privacy concerns and potential biases.	Truein offers advanced facial recognition technology but may not be suitable for our project due to platform constraints and privacy concerns. Its manual operation for students and lack of compatibility with desktop systems computers might not

			align with your project's requirements.
Jibble	Effortless setup and robust security measures. High accuracy and speed in recognition. Offline functionality for continuous tracking.	Possible accuracy issues and privacy concerns. Compatibility issues with certain devices or software. Ethical and regulatory challenges.	With innovative features and robust capabilities, Jibble's facial recognition product offers effortless setup, robust security, and advanced AI for accurate attendance tracking. It prioritises ethics, ensuring regulatory compliance and providing unparalleled control over attendance data. It emerges as a premier choice for comprehensive attendance management solutions.

Jibble stands out as the most promising option when compared to other products when compared because of the variety of cutting-edge features, strong security capabilities, and history of reliability. It is an excellent option because of its remarkable features, which include simple setup, precise tracking with advanced AI algorithms, and seamless attendance automation through API integration. Our project requirements are met by selecting Jibble as our benchmark product for further research and development, despite possible privacy, accuracy, and compatibility issues.

We aim to use Jibble's advanced features to promote innovation and successfully achieve the objectives of the project by using it as our benchmark product and conducting careful, comprehensive research on it. As we move on with our project development efforts, this advice provides the groundwork for strategic planning and informed decision-making.

Initial Planning Process

Scope Management Planning

The project is currently defined by specific goals outlined in alignment with the key objectives and specifications. However, as with any project, there may arise scenarios where certain tasks within the defined scope may need adjustment due to various factors such as changing requirements, resource constraints, or technological limitations. In such cases, our approach to scope management will involve careful evaluation and consideration of the impact of proposed changes on project objectives and deliverables.

Additionally, while the project's primary focus revolves around the key objectives, there may be opportunities to incorporate additional sub-features that could enhance the overall functionality and value of the system. These potential enhancements will be evaluated against project priorities and feasibility to determine their inclusion within the scope.

There may also be instances where certain features or sub-features are deemed infeasible within the current scope but could potentially benefit the project in the future. For example, features related to security enhancements such as heatmaps, user access restrictions to specific rooms or lectures, or flagged alerts for unusual attendance patterns may be valuable additions. However, if these features are not feasible to implement within the current scope, they will be documented for future consideration and prioritisation in subsequent project phases.

Drawing insights from similar products and benchmarking against industry standards, such as the functionality provided by Jibble's API, will also guide our scope management approach. The utilisation of APIs or integration with external systems may present opportunities to extend the project's capabilities and enhance its overall value proposition. Therefore, we will remain adaptable and open to adjustments in the project scope to ensure alignment with stakeholder expectations and successful project outcomes.

Time Management Planning

At the moment, our team is using an online application called "Notion", which has capabilities as a collaboration platform for task management, to-do lists and real-time collaboration. It also houses features for scheduling and tracking project tasks, as well as assigning them to specific team members.

For making a timeline/gantt chart, we're planning to use the free software ProjectLibre, which is an open source alternative to the popular Microsoft Project. Since we have experience with ProjectLibre/Microsoft Project, using them is the best option. On top of this, in case we want to switch to MS Project in the future, ProjectLibre files are completely compatible with MS Project's files, meaning our workflow will not be disrupted. Same goes for the UI and features of ProjectLibre, which parallel MS Project's features as well.

Currently we're doing weekly online meetings. Notion is what we use in an official project capacity, but our group members are a part of a Discord server, which allows us to meet weekly for an online meeting to discuss our progress and subsequently plan any further meetings/work. Furthermore, we've organised with our sponsor to aim for weekly physical meetings with him in order to communicate with each other about the project.

Risk Management Planning

The foremost concern lies in technical challenges that may emerge during system development and deployment. These encompass system downtime, software bugs, and integration complexities. Moreover, the effectiveness of facial recognition technology depends on a number of variables, including lighting, dataset quality, image quality, and facial expressions. Inaccuracies in attendance tracking could result from these variables.

The security and privacy of student data collected by facial recognition technologies may potentially provide ethical and legal difficulties. Effectively addressing these issues is essential to guaranteeing adherence to rules and upholding stakeholder trust.

Significant barriers stand in the way of developing and implementing the automated attendance system in the appropriate amount of time, including a lack of hardware, personnel, and time. Using efficient resource management techniques is essential to reducing these limitations and guaranteeing project success.

Scope creep, which causes uncontrollably changing project objectives or going beyond original specifications, can cause schedule delays. Vigilant scope management practices must be employed to prevent such deviations and maintain project alignment with predefined goals.

Unexpected delays in the project's development, testing, or deployment phases could cause schedule disruptions and jeopardise the completion of important milestones. It takes proactive risk assessment and mitigation techniques to reduce schedule hazards and guarantee project delivery on time.

Project achievements may be jeopardised by team members' lack of cooperation, poor communication, or disagreements. It is crucial to guarantee effective team communication, foster a collaborative work environment, and offer the proper training and support in order to improve team dynamics and overall project success.

The project's effective completion depends on the project team's proficiency and experience across a variety of disciplines and technologies. It's necessary to recognise skill gaps and provide the necessary resources and training to bridge them in order to overcome challenges resulting from insufficient competence.

Through a thorough examination of these critical risk factors and the application of suitable risk mitigation techniques, the project may be positioned to maximise opportunities and minimise risks.

Risk Register

Risk ID	Risk Description	Category	Likelihood	Impact	Risk Level	Management Strategy
R1	Technical Challenges may lead to system issues	Technical	High	High	High	Conduct thorough testing to understand the area of issue and fix it.
R2	Facial recognition technology may be affected by dataset quality	Technical	Medium	High	Medium - High	Invest in high-quality Images and optimise dataset to include clear photos.
R3	Security and privacy concerns regarding student data collection	Ethical / Legal	High	High	High	Implement robust data encryption and privacy protocols.
R4	Resource limitations may hinder project completion for deadlines	Resources	High	High	High	Prioritise resource allocation and consider outsourcing.
R5	Scope creep may lead to uncontrollable changes in project objectives	Scope	Medium	High	Medium - High	Establish clear project scope and change management procedures.
R6	Schedule disruptions due to unexpected delays in project phases	Schedule	Medium	High	Medium - High	Develop contingency plans and regularly monitor project progress.
R7	Team dynamic issues, impacting the project cooperation and communication	Team	Low	Medium	Low - Medium	Foster team building activities and open communication channels.
R8	Skill gaps within the team may temporarily halt project progression	Team	High	High	High	Provide training and development opportunities for team members.

Quantitative Risk Matrix

Quantitative risk analysis involves assigning numerical values to the probability and impact of each risk, and then calculating the overall risk score. Here's how we can perform a quantitative risk analysis based on the RACI matrix:

Risk ID	Likelihood (1 – 5)	Impact (1 – 5)	Risk Level
R1	5	5	High
R2	4	4	Medium - High
R3	5	5	High
R4	5	4	High
R5	3	4	Medium - High
R6	3	4	Medium - High
R7	2	3	Low - Medium
R8	4	4	High

Risk score = Likelihood x Impact

Risk ID	Likelihood	Impact	Risk Score
R1	5	5	25
R2	4	4	16
R3	5	5	25
R4	5	4	20
R5	3	4	12
R6	3	4	12
R7	2	3	6
R8	2	4	8

Finally, let's rank the risks based on their risk scores:

1. R1 and R3 - High Risk (25)
2. R4 - High Risk (20)
3. R2 - Medium Risk (16)
4. R5 and R6 - Medium – High Risk (12)
5. R8 - Low Risk (8)
6. R7 - Low Risk (6)

This quantitative risk analysis provides a numerical assessment of the risks, allowing for prioritisation and allocation of resources based on their severity and likelihood of occurrence.

Group Charter and Ethical Approach

Budget and Resources

Determine Budget during Project Planning – The project budget will be established by a thorough evaluation of financial resources throughout the planning stage of the project. Analysing the expenses of various project components, including labour, supplies, equipment, and outside services, will be part of this assessment. The establishment of a reasonable and achievable budget will consider various factors, including the project scope, timetables, and projected hazards.

Allocating Resources Once Budget is Established - After the project budget has been established, resources will be distributed in line with the needs and project plan. Allocating financial resources to project activities and tasks in accordance with their importance and priority is known as resource allocation. To maximise resource utilisation, allocation decisions will consider variables including resource availability, skill needs, and project dependencies.

Cost Control Throughout the Project - Constant cost control strategies will be used to keep an eye on and efficiently manage project expenditures. To find any discrepancies or deviations, real spending will be regularly monitored against budgeted amounts. To improve overall project effectiveness, budget performance will be reviewed on a regular basis and the lessons learnt will be used into future resource management and budgeting procedures.

Mission and Objectives

Large class sizes at the University of Wollongong provide an important issue for attendance management, necessitating the use of labour-intensive, error-prone manual tracking techniques. The objective of our project is to create an automated student attendance system to remedy this. We want to improve the efficiency, accuracy, and accessibility of lecture and lab attendance tracking through precision automation using student pictures and facial recognition. Tailored to meet the demands of UOW, customisation, integration, and adherence to privacy rules guarantee an effortless setup and effective handling of attendance data.

Communication

Meetings - Regularly scheduled meetings, both in person and online, occur at least once a week with our client / sponsor. Comprehensive meeting minutes and notes are diligently recorded during these sessions.

Notion - Our project management tool, utilised for task assignment, tracking deadlines, storing meeting minutes and recordings, and final document uploads and upkeeps.

Discord - A dynamic communication platform serving as our collaborative space for online meetings, document sharing, team member coordination, personal communication, and more.

Questions – Direct emails for questions about our project progression and / or tasks can be made with the sponsor or personal messages can be sent to the project leader and members.

Work Processes

1. Objectives Analysis - Define objectives, scope and tasks related to the next step of the project / phase.

2. Assigning Tasks - Tasks will be assigned based on individual expertise and availability and will be done by the project leader.

3. Deadline Confirmation - Realistic deadlines will be set collaboratively, with flexibility for unforeseen circumstances. Proactive communication of any delays will be stated if needed.

4. Collaboration - Collaboration will occur through regular check-ins and collaborative work sessions.

5. Documentation - Project documentation will be managed using Notion for easy access, with all team members responsible for keeping records updated.

Team Roles

Project Leader and Manager

Technical Lead

Software Developer

Database Manager

Systems Developer

Support Generalist

Performance Evaluation

To maintain consistent alignment with project goals and efficiently track project progress, the team will carry out frequent performance evaluations. A thorough examination of the objectives and scope, including schedule compliance, deliverable quality, stakeholder and client satisfaction, will be part of these assessments. The team will obtain important insights into the general state and performance of the project through these evaluations.

In addition, the evaluation procedure will incorporate qualitative input from stakeholders and team members in addition to quantitative measurements. We will ask for their thoughts and opinions to find any underlying problems or difficulties as well as areas that need to be improved. The team will be able to gain a variety of viewpoints and insights thanks to this collaborative approach, which will promote creativity and an environment of constant improvement.

The project strategies and approaches will be updated and modified as needed considering the evaluations' results. By using an iterative process, the project is guaranteed to adapt to changing conditions and be ready to overcome any obstacles that may arise. Through the utilisation of insights obtained from performance evaluations, the team can increase project efficiency and effectiveness.

These performance evaluations' ultimate objective is to promote improvement and enhance project results. Through an organised method comprising of feedback collection, and strategy refinement, the team may optimise outcomes and achieve or exceed stakeholder and client expectations.

Conflict Resolution

Sustaining a positive group dynamic and creating a supportive work environment requires an effective conflict resolution. We acknowledge that disagreements will always arise in any cooperative endeavour, and our mission to resolve them peacefully and efficiently. Our method of resolving disputes places a high value on open communication, attentive listening, and respect for one another among team members.

Within our team, we cherish the diversity of ideas and viewpoints, and we see disagreements as chances for development and innovation. Since their opinions are appreciated, all members are encouraged to express their issues in an open and beneficial manner. By use of courteous and transparent conversation, our objective is to identify the fundamental problems that cause for disputes and together resolve to positive resolutions.

In instances where resolution proves challenging, the project manager and/or sponsor will facilitate discussions to ensure that all viewpoints are heard and considered. Mediation may be employed to help facilitate constructive dialogue and reach a consensus that aligns with the interests of the team and project objectives.

Our overarching goal in conflict resolution is to effectively address issues while preserving the cohesion and morale of the team. By fostering an environment of trust, open communication, and mutual respect, we strive to resolve conflicts in a manner that strengthens team relationships and contributes to the overall success of the project.

Group Rules

Our team created group rules to guarantee accountability and clarity. These policies place a high value on communication and participating fully in meetings. Respect for each other and confidentiality are stressed, and contributors are appropriately acknowledged. All team members are expected to collaborate and act professionally, creating a happy and encouraging atmosphere that helps the project reach its objectives.

Signatures

Matthew Healey	Samuel Fitzpatrick-Fuller	Idries Eagle-Masuak
James Kim	Gia Bach Nhu	Dinh Quoc Huy Nguyen

Potential Project Skills Needed

An extensive range of specific technological skills will be necessary for the successful design and implementation of the Automatic Student Attendance System. This broad skill set will be crucial for managing the wide range of variables included in the project and guaranteeing seamless operational integration of both the hardware and software components.

Facial Recognition - An understanding in creating and executing facial recognition algorithms to precisely recognise students' faces while monitoring attendance.

Test Data for Image Processing - To improve the accuracy of face recognition, it is essential to know how to use test data specific for image processing techniques for preparing student images, extracting facial features, and optimising image quality.

Software Development - Proficiency in programming languages and frameworks, particularly Python, Java, C++, HTML, CSS, JavaScript, etc is important for constructing the attendance system's backend infrastructure and frontend interfaces.

Database Management - To maintain and manage attendance records securely, guaranteeing effective data retrieval, reconfiguration, and additions, database administration skills including database architecture, querying, and optimisation are essential.

Machine Learning - Through persistent learning and student face adaptation, machine learning algorithms and frameworks can be used to improve the performance and accuracy of facial recognition models.

Security - To set strong security measures in place to safeguard sensitive student information and guarantee compliance with data protection legislation, privacy regulations within the cybersecurity concepts are essential.

Hardware Usage - Installing the attendance system in lecture settings requires hardware integration and usage skills, including troubleshooting hardware components and debugging hardware-software interactions.

Quality Assurance - To guarantee the dependability, functionality, and performance of the attendance system in a variety of settings and scenarios, we must be proficient in testing methodologies for quality assurance such as user acceptability testing, integration testing, and unit testing.

We can successfully handle the challenges of creating and implementing the Automatic Student Attendance System, guaranteeing its successful deployment and adoption at the University of Wollongong, by putting together a diverse team with experience in these technical disciplines.

Student Skills and Responsibilities

We explore each team member's unique area of expertise and contributions to the successful development of the Automatic Student Attendance System project. The many skill sets, experiences, and viewpoints that each participant offers to the table enhance the project's development process as a whole. We seek to harness current proficiencies while also finding areas for skill growth to meet the project's changing needs through a thorough assessment of our team's capabilities.

Student Skills

Matthew Healey	Programming languages in Java, Python and C++ and web-based languages HTML, CSS, JavaScript. Most experience in Web-based languages. Multimedia skills in animation, video, sound and image editing Blender Scripting for processing and rendering with the Python language API.
Samuel Fitzpatrick-Fuller	Programming languages Java, C++, Python, and C#, as well as web-design languages HTML/CSS/JavaScript. The ones I have most experience in are Java and C++. App development, specifically with making apps in Android Studio, both for making functional apps and for image processing. Multimedia skills, namely audio, video and image processing specifically in the context of android apps. Graphics processing and rendering, specifically with OpenGL. Game development with Unity, and subsequently C# which is Unity's programming language of choice. Sound Design and Music, with experience in Ableton Live. This includes mixing, synthesis and composition.
Idries Eagle-Masuak	Proficient in programming languages such as Java, C++, SQL, HTML, JavaScript, Node.js, PHP, and Python, with a focus on both frontend and backend web development. Skilled in Blender for 3D modelling and animation. Experienced in game development using Unity, with expertise in C# for scripting and game mechanics implementation. Knowledgeable in Python, including its application in cybersecurity, demonstrating proficiency in securing systems and networks.

Gia Bach Nhu	Java, Python and C++ and web-based languages HTML, CSS, JavaScript. Github, bashscript, shell script Machine Learning, Cross platform like Linux, Windows, Mac Producing and mixing music on Fl studio
James Kim	Proficient in Programming Languages being: Java, C++, Python, HTML, CSS, Javascript Backend API and Microservice development using Spring Boot Frontend development using React
Dinh Quoc Huy Nguyen	Proficiency in Java, C++, JavaScript or HTML, CSS Knowledge of database concepts with relational databases (e.g., SQL) and NoSQL databases (e.g., MongoDB) Experience in web development technologies such as HTML, CSS, JavaScript. UI/UX design and prototyping with Figma

Expected Skills to Learn

Participating in the development of the Automatic Student Attendance System presents an invaluable opportunity for our team members to acquire a diverse set of skills that extend beyond technical competencies. Some of the potential skills we may learn from this project include:

Project Management - Through coordinating tasks, timelines, and resources, team members will gain experience in project planning, organisation, and execution, enhancing their project management skills.

Communication - Collaborating with team members, stakeholders, and end-users will improve communication skills, including effective listening, collaboration of ideas, and presentation skills.

Problem-Solving - Addressing challenges encountered during the development process will foster problem-solving abilities, encouraging critical thinking, creativity, and resourcefulness.

Collaborative Skills - Working within a multidisciplinary team will cultivate teamwork and collaboration skills, promoting cooperation, mutual support, and respect for diverse perspectives.

Through the development of the Automatic Student Attendance System, we expect to develop a broad spectrum of skills. While we have specifically discussed our current proficiencies in image processing, database management, web design and software development. We also hope to improve leadership, teamwork, communication, and problem-solving skills. Managing issues related to law, ethics, and cybersecurity to also help us comprehend pertinent frameworks better. With every aspect considered, the project offers a thorough learning experience that expands our skill set.

Responsibilities

RACI Matrix

Task / Activity	Project Leader	Technical Developer	Software Developer	Database Manager	Systems Developer	Support Generalist	Stakeholders
Define Project Scope and Objectives	R	A	I	I	I	I	-
Conduct Market Analysis	R	R	A	R	A	I	C
Assess Technical Requirements	R	A	A	A	A	A	I
Develop Facial Recognition Algorithms	R	A	A	-	I	I	-
Image Processing Techniques	R	A	A	I	I	I	-
Design and Develop Backend Systems	R	A	A	-	A	I	-
Create Interfaces	R	-	A	-	-	A	-
Configure and Manage Databases	R	-	-	A	C	C	-
Quality Assurance	R	A	A	A	A	I	-
Address Legal and Ethical Concerns	R	A	A	A	A	I	C
Communicate with Stakeholders	R	A	A	A	A	A	R

Legend

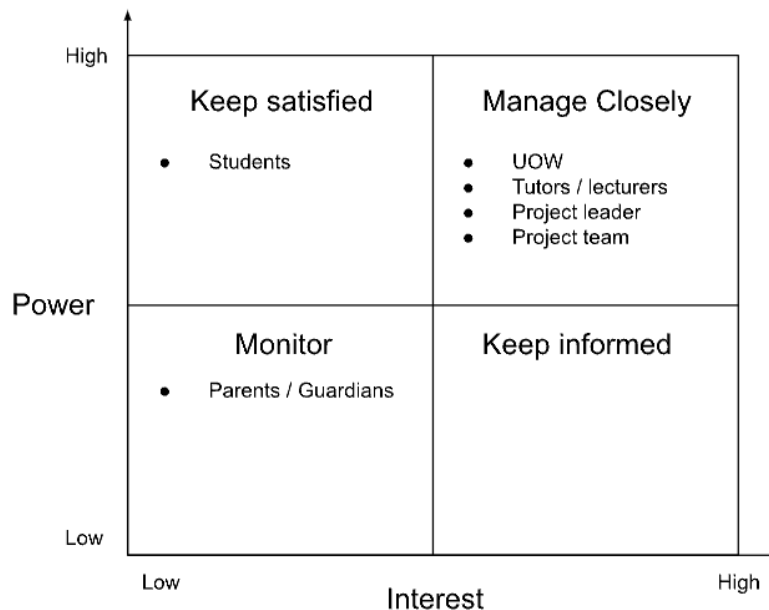R: Responsible (Person responsible for completing the task)

A: Accountable (Person ultimately accountable for the task's success)

C: Consulted (Person or group to be consulted before the task is completed)

I: Informed (Person or group to be informed after the task is completed)

-: Not Applicable

Stakeholder Analysis

UOW and other Universities

UOW currently doesn't have an effective solution to marking the attendance of lectures and workshops that contain a large number of students. UOW currently uses the traditional pen and paper method of attendance and in some cases an online method, however these methods require manual operations and consume both the lecturer's and student's time. The automatic attendance system is the proposed solution to combat this issue and to provide a better experience in UOW. UOW provides the team with resources such as computers and rooms for the development of the system. As the automatic attendance system is designed to combat UOW's niche issue, they take priority as our main stakeholder and hold high influence and high interest in the final product.

UOW Tutors and Lecturers

The tutors and lecturers hold high superiority as a stakeholder and are the main controllers and decision makers of the development of the automatic attendance system. As there are currently no effective solutions in UOW for marking attendance in lectures/workshops with a large number of students, the implementation of an automated attendance system will directly help tutors/lecturers by developing an efficient method of keeping track of student attendance. We must ensure the tutors and lectures are satisfied with the product and meet their wants and needs for functionality and usability. As one of the primary users and the supervisors of the development of the automatic attendance system, the tutors and lecturers take highest priority as a stakeholder and frequent communication is mandatory in order to succeed.

Project Leader and Project team

The project leader has high influence and high interest as they hold the responsibility of guiding the team and allocating tasks appropriately to ensure effective development. Similarly, the project team are high power and high interest stakeholders that make the development of the automatic attendance system possible. The project leader and project team are responsible for managing all development operations and have the skills and knowledge to complete allocated tasks, identify

risks and resources and more. The success or failure of meeting the requirements and standards of the automatic attendance system is completely the responsibility of the project leader and team.

Students

As the main users of the automatic attendance system, the student's opinions and feedback should be taken seriously. Although the implementation of an automatic attendance system would greatly benefit the university, the same cannot be said for students. The students may encounter issues with ethical or privacy concerns from the use of a camera to recognise their faces. Additionally, students may argue that it removes their freedom which could result in increased stress levels. While the students may not hold high interest in the automated attendance system, their influence will determine the success or failure of the system implementation and therefore should be kept satisfied.

Parents / Guardians

Parents and guardians may be interested or curious about their children's attendance in university to make sure they're on track and attending their classes. However, university students tend to have more responsibility and independence in their education and therefore parents/guardians may not have much influence in the decision-making processes. Although they lack power and interest, parents should be at least monitored during the development of the automatic attendance system.

Meeting Minutes

Meeting 1

[Week 2] 5/3/2024: 5:35pm - 21 Minutes - In Person: Matthew, James, Idries, Sam, Bach

The objective of this meeting was to convene all members of the group, deliberate on various proposed project options aligned with our collective interests and proficiencies, and allocate provisional responsibilities taking into consideration individual strengths, areas of expertise, and preferences, and even depending on the selected project. After careful deliberation, we opted for a primary project along with two back up projects: the Automatic Student Attendance System, My Life in One App, and the Virtual Reality Escape Room, respectively. For each of the projects, we also came up with ideas.

Roles:

- Matthew - Project Leader and Documentation

- Idries - Technical Developer

- Sam - Software Developer

- James - Systems Developer

- Bach - Database Manager

- Mason - Support Generalist

While these roles were decided, they are interchangeable to account for dividing team efforts and assets to other parts of the project if needed.

Meeting 2

[Week 2] 8/3/2024: 11:37am - 28 Minutes - In Person: Matthew, James, Idries, Sam, Bach, Dr Fenghui Ren
RECORDED

The aim of this meeting was to engage with Dr. Fenghui Ren, the sponsor of the Attendance project, in order to discuss project specifications, discuss our current gathered information and notes, outline next steps, and establish an overarching project timeline. Dr. Ren provided invaluable insights, guiding us on the specific tasks that warrant immediate attention as we progress to the next phase of the project, as well as general project conduct and rules that should be expected of us.

We didn't get into details about the project as we would not receive the specifications document until our group had been assigned to this project. We instead showcased our current research and resources we have gathered as of right now and started looking into a few tools to aid in this project, with the first being a Project Management Tool.

Part of the meeting was recorded when discussing by Matthew, and notes of the meeting / information were written in our Project Discord by Idries.

Meeting 3

[Week 3] 12/3/2024: 5:09pm - 14 minutes - Online: Matthew, James, Idries, Sam, Bach, Mason

The objective of this meeting was to introduce Notion as our designated project management tool, delegate roles corresponding to specific sections of Assignment One, and address action items derived from the previous meeting's notes.

During the meeting, Matthew presented the latest advancements in the Notion management tool, showcasing the progress achieved thus far and explaining the plans for further enhancements. His focal point was to highlight the components developed for the initial phase of the project, particularly focusing on Research and Planning. The specific tasks essential for completing Assignment One were discussed, with particular emphasis placed on the pivotal role of the marketing report. This report serves as the cornerstone for gathering crucial information and facilitating comparisons for subsequent tasks, underscoring its significance. Matt subsequently delegated responsibilities within the group for each section of the assignment, with the following tasks assigned:

- Marketing Analysis and Report - All members (sections inside the report would be assigned Once it has started)

- Define Objectives and Scope - Idries (Would commence after meeting with Client)

- Identify Project Stakeholders - James

- Time and Quality Management - Sam

- Risk Assessment - Bach

- Identification of All Members Skills - All Members (would be reported in the Discord in a separate chat)

- Group Project Charter and Group Ethics - Mason

- Record of Minutes and Meetings - Matthew

Matthew stated to aim for the Market Analysis report to be completed by Thursday (21/3) which would give ample time to finish the other sections by the assignment due date of the 29/3.

We ended by setting the next meeting time of Friday (15/3) to confirm the specification details of the project that is assigned to us. We also confirmed our next meeting with Fenghui will be next Tuesday (19/3) and would be our first experience figuring out the scope of the project. Afterwards, on the weekend, is when we'll commence the start of the Research and Planning Phase for the project.

Meeting 4

[Week 3] 17/3/2024: 12:10pm - 16 minutes - Online: Matthew, James, Idries, Sam, Bach, Mason

The primary objective of this meeting was to outline our strategy for completing the Market Analysis Report, a crucial component of Assignment 1. While awaiting confirmation on the assigned project, we proactively decided to commence work on this significant task. Matthew took the lead in delegating specific responsibilities to each team member for conducting research on various products available in the market. Each member was tasked with analysing one product based on predefined criteria, being:

- Background - History of the Product and Company

- Target of Product - What does the product aim to do / benefit

- User/Audience - Targets users that are intended to use the product

- Advantages

- Disadvantages

- Comparison Statement – Summary to highlight what sets it apart from other products

Upon completion of individual product analyses, Matthew will consolidate the findings to create a comprehensive comparison report. This report will assist in determining the most suitable product to address the project's requirements and cater to the needs of UOW. Further steps and decisions will be formulated in subsequent meetings based on the outcome of this analysis.

Idries provided valuable insights by sharing prior research findings related to facial recognition software. Notably, he identified five products serving as attendance systems and eleven products utilising facial recognition technology. Matthew will now focus on evaluating the efficacy of existing attendance systems, and subsequently assign specific products to team members for in-depth analysis.

The assigned products are as follows:

- Bach - Timeero

- Sam - QuickBooks

- Idries - Jibble

- James - Fareclock

- Mason - Buddy Punch

- Matthew - FaceX (originally 2 Attendance products that didn't include Facial Recognition)

Matthew confirmed he would create a standardised template to guide team members in conducting their research effectively.

The meeting concluded with a clear understanding of individual responsibilities and a collective commitment to delivering high-quality research outputs. The next steps will involve diligent execution of assigned tasks and active participation in upcoming discussions.

Meeting 5
[Week 4] 21/3/2024: 4pm - 16 minutes - In Person: Matt, Dr. Fenghui Ren **RECORDED**

The purpose of this meeting was to provide Dr. Fenghui Ren with an update on our progress regarding Assignment 1. Due to unforeseen issues with the project allocation, we encountered a delay in our timeline, necessitating a new deadline for the Market Analysis Report to 25/3 to compensate for the lost time. The report was initially aimed to be completed on the 21/3, followed by a comprehensive analysis and confirmation meeting, which would've been this exact meeting.

Market Analysis Rundown
During this meeting, Matt provided an overview of our current progress with the market analysis, highlighting Idries' research efforts in identifying the five main products, along with additional products related to attendance, thus the allocation of products for research among team members.

A key challenge we encountered during the research phase was the difficulty in identifying the advantages and disadvantages of the products due to the lack of reviews or direct access to the software and information. In many cases, our insights into these areas were inferred or derived from the product branding or limited resources. For instance, Matt faced challenges with his product, FaceX, which lacked any reviews or publicity and available resources. However, through a meticulous analysis of the software's key features and external references, he was able to infer its advantages. Conversely, James encountered significant difficulties in obtaining information about his assigned product, necessitating a change to another product from originally FareClock to now Truein.

Another primary issue we faced was the absence of tutorials or direct resources showcasing the technical capabilities of facial recognition systems, making it challenging to determine the most suitable and advanced product for our project needs unless comparing against facts from the company making it feel biased. However, Idries had success in his research on Jibble, a widely-used facial recognition system, finding information relatively easily. Despite this, he still was having issues uncovering advantages and disadvantages remained a challenge.

It is worth noting that while these products were designed for use in attendance systems, their primary focus was on business environments, particularly in Human Resources applications. Additionally, many of these products, such as those from FaceX, included advanced technologies beyond the scope of our project requirements for lecture attendance tracking.

Dr. Fenghui expressed satisfaction with our current progress but provided feedback on refining our market analysis approach. Understanding the difficulty in sourcing comprehensive information for comparison, he emphasised the importance of focusing on the technical aspects of the software rather than a general overview of the product and company. As an example of Matt's research, FaceX is a module or essentially a sub-product inside a security platform called iPlatform and is only accessible through use of this system, while Matt has focused his efforts on the FaceX product, this technical side of the product involving iPlatform should be stated to give a further understanding of this product. This strategic shift will enable us to prioritise essential criteria for evaluating and selecting the most suitable product for our project objectives.

Overall, while challenges persist in our research efforts, we remain committed to delivering a comprehensive market analysis that aligns with Dr. Fenghui's feedback and project objectives.

Next Meeting
Matt outlined the key topics he intends to discuss with Dr. Fenghui during our upcoming session. Specifically, he emphasised the importance of transitioning from theoretical discussions to practical client scenarios, aiming to elicit key information crucial for the subsequent tasks following the Market Analysis Report.

The forthcoming meeting held next Tuesday (26/3) holds significant importance as it will serve as a pivotal point in shaping the direction and understanding of the product. It will also serve as a valuable test in

communication between our team and a professional client, fostering collaboration and ensuring alignment with project objectives.

Meeting 6

[Week 4] 22/3/2024: 6:33pm - 21 minutes - Online: Matthew, James, Sam, Bach, Mason

The objective of this meeting was twofold: to relay key insights from the previous meeting with Dr. Fenghui (Meeting 5) and to assess the current status of each team member's progress on the Market Analysis Report. Matthew commenced the meeting by reiterating critical points discussed in the previous session, emphasising the importance of incorporating technical details about the assigned products to facilitate informed decision-making.

The first part was, Matthew underscoring the necessity of including technical information about the products in the Market Analysis Report. This involves presenting comprehensive insights into the capabilities of the products, including details on external software integration, tailored tools, and product lineage. Discussion ensued regarding the placement of this information within the document, with suggestions to integrate it within the advantages section or create a dedicated section focusing on product technicalities. Despite challenges in sourcing technical data for some products, it was acknowledged that this could offer valuable insights into community perceptions and usage patterns.

Matthew then conducted a thorough review of each team member's progress on their assigned product research:

Sam expressed confidence in his research progress on QuickBooks Time, having compiled a substantial amount of information for each section of the document. However, he acknowledged encountering challenges in delineating the technical capabilities of the product due to a lack of clear documentation or practical usage examples. Additionally, the product lacks explicit information regarding its external properties and alternative applications, further complicating the analysis.

Bach, currently employing a pen-and-paper approach to refine his writing skills, shared his experience with researching Timeero. While the product provides insightful data on GPS tracking and mileage, Bach noted the presence of numerous superfluous functions and features irrelevant to our project objectives. Consequently, he expressed reservations about continuing research on this product.

James, previously assigned FareClock, opted to switch to Truein due to the former's insufficient research material. Truein offered a wealth of useful information and documentation, enabling James to make significant progress on his report. Matt advised James to focus on reviewing the technical aspects of the product and incorporate relevant changes accordingly.

Mason faced challenges in researching Buddy Punch, a product primarily associated with payroll management. Mason raised concerns regarding the inclusion of technical information, considering the product's integration with another tool. Matt suggested highlighting the utilisation of this additional tool and its pertinent functions, while exercising discretion in omitting irrelevant details to maintain the report's focus and relevance.

The concluding segment of our meeting entailed outlining the agenda for our forthcoming meeting with Dr. Fenghui on Tuesday, March 26th. Matt emphasised the significance of this meeting, highlighting its dual purpose of discussing the next steps for completing Assignment 1 and conducting a comprehensive client interaction. However, it was acknowledged that certain tasks, excluding Objectives and Scope, and Time Management, may not necessitate extensive client input. These aspects will be addressed internally, with Dr. Fenghui providing guidance on other remaining tasks. Additionally, Matt confirmed the scheduling of additional meetings for the following week to delve into collaborative tasks such as skill set alignment and project approach refinement. The specific timings for these meetings will be communicated next week.

Meeting 7

[Week] 26/3/2024: 9:29pm - 32 minutes - In Person: Matthew, James, Sam, Dr. Fenghui Ren, Bach (late), Mason (late) **RECORDED**

The objective of this meeting had slightly changed since what we last planned in meeting 6. Unfortunately, we were unable to handle a 1 on 1 client meeting with Dr. Fenghui as Idries who was handling the project scope and objectives was away. To counter, we still spoke about structure of the report, as well as what information we should be directing towards. To add to this meeting, we still did manage to stay on track by showing Dr. Fenghui our progress on the marketing analysis, what product we had determined was best to focus as a benchmark.

Our initial focus was on reviewing the progress made by the group thus far in crafting the initial business report. Matthew provided insights into the completion of the marketing analysis task, highlighting our selection of Jibble as the benchmark product, pending approval from Fenghui following his review. Unfortunately, technical difficulties arose as Matthew's computer containing the draft document had crashed, hindering our ability to directly showcase our work. However, Matthew assured the group that he would promptly share the draft at a later time. Our primary objective entails each member diligently working on their assigned tasks, with potential revisions to certain areas of the report as deemed necessary, such as changes to the market analysis research. We have set a deadline of Thursday (28/3) to ensure ample time for final adjustments, with Friday (29/3) reserved as a buffer day for compiling all components into the comprehensive report.

Additionally, Sam informed the group of his progress on the Time Management task, having initiated work on a preliminary Gantt chart. Fenghui expressed no need of detail in the chart for now, emphasising the importance of a more intricate Gantt chart in the later stages of the project. While recognising the challenges associated with creating a detailed Gantt chart, Fenghui stressed its necessity to effectively manage the project's complexities as it progresses.

The ensuing discussion was led by Fenghui, who explained the upcoming steps for the project following the submission of the report by this Friday (29/3). Specifically, Fenghui underscored the need to delineate potential functionalities in the project's requirements section, encompassing elements such as camera specifications, database architecture, software integration, budgetary considerations, and the possibility of additional features like an online service, among others. It was emphasised to align these ideas retrospectively with the products researched, ensuring coherence with successful features that could serve as key components in our project. Fenghui reiterated the notion that these supplementary ideas should be approached as non-essential tasks, with the primary focus remaining on ensuring the core functionality of the product meets UOW's requirements seamlessly, without necessitating additional features that cater to a niche subset of functionalities.

Following the establishment of requirements, the subsequent phases encompass designing, building, and testing the project. Of utmost importance is the recognition that the building and testing phases will adopt an agile approach, incorporating various methodologies and structures, including Kanban, owing to the compressed timeline. Kanban methodology entails assigning two team members to collaborate on the same task concurrently, thereby mitigating time constraints and associated risks. Typically implemented during the building and testing phases, this approach involves one member focusing on design and updates while the other is tasked with testing data and evaluating the build, consequently expediting the overall process.

From this information we started discussing the next upcoming assignments which would involve these detailed specification and requirement reports, specifically in assignment 2 and 3, both happening this first semester.

Following that, Matthew presented our findings from the market analysis report, highlighting Jibble as the standout product for potential integration into our project or broader implementation within UOW. Our research led us to conclude that Jibble offers the most advantages with minimal drawbacks compared to other products. Matthew also elaborated on why the other products were deemed less suitable for our

project, primarily due to their focus on business environments and inclusion of unnecessary features. Given that Jibble is available as a freemium product, Dr. Fenghui encouraged us to consider incorporating it into our design process for thorough testing. This recommendation underscores the importance of practical evaluation and hands-on experience to inform our decision-making process effectively.

Matthew next outlined the team's upcoming focus areas, which include individual assigned tasks and several collaborative endeavours, such as reporting each of our member skills and responsibilities. These discussions are to be discussed in meetings scheduled throughout the week. Moreover, Fenghui highlighted that the next meeting with Fenghui will revolve around essential features and potential functions to be integrated into the product. Currently, our ideas are broad and encompassing, such as "Improve Accessibility." However, to bring to the next meeting, we will delve deeper into the specifics of how we intend to achieve these objectives, refining our strategies and solidifying actionable plans.

As we neared the conclusion of our meeting, Dr. Fenghui informed us about the potential opportunity to obtain hardware resources for our project. This entails the possibility of acquiring tools and resources that could significantly enhance the development and testing phases of our project. To initiate this process, we would need to inform Dr. Fenghui, who would then oversee the approval process. Potential resources under consideration include booking a dedicated classroom for camera setup and / or obtaining a GPU to use for data testing processes.

The meeting ended to confirm if there are any questions before the submission date of assignment 1 to email Fenghui. By addressing these key discussion points, the team aims to enhance the quality and comprehensiveness of the Initial Business Report, ensuring alignment with the project and client expectations.

Meeting 8

[Week 5] 26/3/2024: 7:31pm - 16 minutes - Online: Matthew, James, Sam, Bach, Idries

The objective of this meeting was to reinforce our individual responsibilities in preparation for the submission of the initial Business Report. Central to our discussion was the emphasis on completing our assigned tasks by Thursday, March 28th, to allow for ample time on Friday to fine-tune, rectify errors, and consolidate all resources into the final draft of the report.

We reviewed the Initial Business Case template and explored the possibility of utilising the "canvas" website as a collaborative workspace for task explanation and confirmation, excluding initial planning tasks. Matthew clarified that members assigned to these tasks have the option to utilise this space, and if they choose to do so, they should provide him with screenshots of their work for inclusion.

Next, Matthew emphasised the importance of maintaining a consistently professional tone throughout the entirety of our project. It was previously affirmed by our subject coordinator that professionalism is paramount in all tasks and in the tone reflected within our reports and project. The intention behind this clarification arose from a discussion regarding Sam's inclusion of information about our student schedule, which was deemed to detract from the professional nature of the time management section. Additionally, concerns were raised regarding the use of referencing and citations in our report. It was determined that our market research, which includes the use of links, must now be properly referenced and accompanied by respective citations. Matthew outlined the plan to initially focus on completing assigned tasks and, at a later date, revisit each member's market product to incorporate citations formatted according to the UOW Harvard referencing guidelines.

Matthew informed the group that tasks such as assessing member skill sets and assigning responsibilities would be addressed collectively as our final agenda item. We intend to facilitate this process, possibly using a canvas during an upcoming meeting, although the specifics of this session will be confirmed at a later date.

In conclusion, this meeting emphasised individual responsibilities for the initial Business Report due March 28th. We discussed using "canvas" for collaboration, maintaining professionalism, and implementing proper referencing. Next, we'll collectively assess skills and assign tasks using canvas.

Meeting 9

[Week 5] 28/3/2024: 6:12pm - 15 minutes - Online: Matthew, James, Sam, Bach, Mason

The objective of this meeting was to conduct a comprehensive progress check on each member's assigned task and to outline the subsequent tasks to be undertaken upon completion.

Matthew initiated individual discussions with each member to assess their progress, focusing initially on James and Bach, having previously spoken with Sam and Mason. James expressed some confusion regarding the scope of his stakeholder analysis, feeling that additional groups could be included. However, Matthew clarified that the current list comprehensively covered all relevant stakeholders for the project's specific focus on UOW. James was commended for his thorough analysis. Moving to Bach, similar questions arose regarding the inclusion of specific risks in the risk management section. Matthew emphasised the importance of considering all potential risks, both project-related and team-related, in this initial overview, and also reassuring Bach not to stress about detailed risk management strategies at this stage.

Transitioning to future tasks, Matthew outlined the importance of compiling individual skill sets to be added in the student skills section. While factual skills that pertain to this project are preferred, Matthew encouraged members to include additional skills that, while not crucial to the project, are worth considering. To illustrate, he provided examples of his and Sam's skills.

Attention then shifted to the final task of completing in-text citations. Matthew would distribute the Market Analysis sections with attached references and corresponding in-text citations for each member to review and insert into their work. Once completed, members were instructed to resend their sections to Matthew for finalisation.

In closing, Matthew reminded everyone of the importance of integrity in academic work, announcing his intention to run the report through plagiarism and AI checker tools to ensure originality. He assured members that any necessary revisions would be communicated promptly to facilitate collaborative efforts in refining the report. Matthew also stated that this would be the last collaborative meeting before the assignment submission, and any more questions would be directly sent to him or other members.