UNI–LINK: AN INTEGRATED CAMPUS MANAGEMENT APP

An Undergraduate Thesis
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of the requirements for the degree of
Bachelor of Science in Computer Science

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ABSTRACT/OVERVIEW

Title:	Uni-Link: An Integrated Campus Management App
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This thesis is geared toward developing a user-friendly application, ‘Uni–Link: An Integrated Campus Management App.' It focuses on creating a comprehensive mobile application designed to streamline various facets of campus life. The app introduces functionalities such as location-sharing, facilitating users in sharing their whereabouts, and enabling faculty to post assignments, quizzes, and activities, thus allowing students to submit their work digitally. Additionally, it incorporates a user-friendly chatbox feature, promoting effortless communication among peers directly within the application.

The primary objective is to enhance user engagement by offering a centralized platform that augments both social connectivity through location-sharing and messaging, as well as academic organization through schedule alerts. The aim is to create a cohesive tool that contributes to a more connected and organized campus experience.

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INTRODUCTION

In the rapidly evolving landscape of higher education, institutions are continually seeking innovative solutions to enhance student engagement and engaging campus experiences. In response to this dynamic environment, the proposal for a " Uni-Link: An Integrated Campus Management App" emerges as a strategic initiative to address the evolving needs of students, faculty, and administrators alike.

Traditional campus management systems often struggle to keep pace with the demands of a modern, interconnected academic community (Schindler et al., 2020). This project recognizes the challenges posed by inefficient communication, lack of centralized platforms for academic tasks, and missed opportunities for streamlined academic engagement. To tackle these issues head-on, the primary objectives have been carefully formulated, aiming to create a comprehensive solution that not only addresses current challenges but also propels campuses into a future where technology acts as an enabler rather than a barrier.

The goal of this proposal was to create a user-friendly Integrated Campus Management App with features like real-time location sharing, a chatbox for smooth communication, and tools for uploading and managing schoolwork, including activities, quizzes, and assignments. Every goal, from improving academic performance to expediting

cooperation and communication, is thoughtfully created to provide a seamless and technologically advanced campus experience.

Statement of the Problem

The general problem of the study centered on ***"How to increase student engagement, improves social connectivity, and academic organization"*** which is a hindrance in the management of various facets of campus life.

Specific Problems:

- Inability to receive timely notification alerts: Students may miss critical updates, such as class schedule changes or assignment deadlines. ***"How can the app provide real-time notifications to ensure students stay informed about their academic activities?"***
- Inefficient Communication: Traditional campus management systems do not fully address the need for seamless communication. **"*How can the app foster direct communication between students and faculty to improve collaboration?"***
- Challenges in Navigating Campus Resources: Students, especially new ones, often find it difficult to locate peers, classrooms, or other campus facilities**. "*How can the app leverage location-sharing and map features to enhance campus navigation?"***

Objective of the Study

The objectives in this proposal are intended to guide the development of a user-centric Integrated Campus Management App that provides tools for managing academic tasks, such as posting and submitting schoolwork, to transform how students and faculty interact within their academic environment.

Specific Objectives:

- Enhance the efficiency of academic task management by enabling faculty to post assignments, quizzes, and activities, and allowing students to submit their work digitally.
- Improve communication between faculty and students through integrated messaging features that facilitate discussions, feedback and location sharing.
- Ensure secure access to academic features through role-based controls and a reliable login system, maintaining the integrity of user data.

Significance of the Study

This study focuses on the conceptualization of an integrated campus management app. Insights derived from the data will play an important role in refining and tailoring the application, aligning it with the specific needs and preferences expressed by the respondents. Furthermore, the significance of this study extends to:

1. **Students of Cavite State University – Imus Campus**

It provides a seamless platform for them to connect socially through real-time location sharing, fostering stronger bonds among peers. Simultaneously, the class schedule alerts feature enhances academic organization by ensuring students are timely and prepared for their classes, contributing to improved academic performance.

2. **Faculty members**

Through features like class schedule alerts, instructors can efficiently relay important information to students, streamlining communication and promoting a more engaged and punctual student body. The chatbox feature also facilitates direct communication, offering a platform for quick and effective interaction between faculty and students.

3. **Future researchers**

This study provides a foundational understanding of the impact and effectiveness of integrated campus management apps, offering a roadmap for further investigations and improvements.

Time and Place of the Study

The research was conducted at Cavite State University – Imus Campus during the academic year 2024–2025, under the supervision of Mr. Ramil Huele, Professor of Undergraduate Thesis I. The focus of the study centered on the creation of a mobile application encompassing functionalities such as location-sharing, class schedule alerts, and a

chatbox, facilitating seamless user connections throughout the campus environment.

Scope and Limitation of the Study

The scope of the Integrated Campus Management App encompasses the provision of essential features designed to enhance the overall campus experience. This application aims to unify and simplify various aspects of campus life, fostering efficient communication, academic organization, and social connectivity.

Modules:

1. **Access Module:** Ensures tailored and controlled interaction with the application's features, safeguarding user privacy and security while maintaining the integrity of the campus community.

2. **Dashboard Module:** Offers users a centralized view of crucial information, such as real-time location-sharing, a chatbox for communication, and academic tools for posting, managing, and submitting schoolwork. This module allows instructors to post assignments, activities, and quizzes directly through the system, while students can view and submit their work conveniently. The dashboard prioritizes user account management by offering quick access to profiles, settings, and personalized notifications.

3. **Work Management Module:** Facilitates seamless interaction between instructors and students regarding schoolwork. Faculty can post assignments, quizzes, and activities with deadlines, while students can

submit their responses directly through the system. This module also allows faculty to review submissions, provide feedback, and track student progress.

4. **Communication Module:** Serves as a pivotal component designed to facilitate seamless and efficient communication. Features like an integrated chatbox enable direct, real-time interactions between users, fostering both academic and social engagement. The module also integrates with the Work Management Module, allowing users to discuss assignments and activities within the platform.

5. **Location–Sharing Module:** Allows users to share their real-time locations, fostering social connectivity and enabling better coordination for meet-ups or group activities.

6. **Notification Module:** Notifies users about newly posted assignments, quizzes, or activities and alerts them about upcoming deadlines. This feature ensures timely communication and helps students stay organized.

7. **Login Module:** Prioritizes security and authenticity, requiring valid credentials for access. User accounts are role-specific, ensuring that students and faculty access only the features pertinent to their roles.

8. **Map Module:** Enhances navigation by providing a map interface that displays real-time locations of peers and identifies campus buildings.

While the study aims to provide valuable insights, certain limitations should be acknowledged. the success of the

application relies on user adoption and active participation, which may vary among individuals. Technical constraints, such as device compatibility and network availability, could impact the app's accessibility.

Definition of Terms

Uni–Link – A proposed mobile application designed to streamline various aspects of campus life, including social connectivity, academic organization, and user engagement.

Social Connectivity – The degree to which individuals within the campus community can interact, share information, and connect with one another.

Academic Organization – The systematic arrangement and management of academic-related activities, including class scheduling, assignment tracking, and academic event notifications.

User Engagement – The active involvement and participation of users within a digital platform, encompassing features like location-sharing, group discussions, and event participation.

User Acceptance – The willingness and readiness of users to adopt and integrate a digital tool into their daily activities, influenced by perceived utility, user experience, and overall satisfaction.

Contextual Factors – External elements, such as organizational culture, existing technological infrastructure, and individual characteristics, that may impact the acceptance and usability of a digital tool.

Theoretical Framework – The foundational concepts and theories, such as Social Network Theory and Technology Acceptance Model, guiding the study and understanding of user behavior in the context of the proposed app.

Conceptual Framework – A visual representation illustrating the key components, relationships, and hypotheses guiding the proposed 'Uni–Link' app, encompassing both theoretical and contextual aspects.

Anticipated Perceived Ease of Use – The expected perception that users will have when interacting with the planned features.

Anticipated Perceived Usefulness – Represents the intended value and benefits that users are expected to derive from the app. This includes the features proposed in the app's design, such as location-sharing, class schedule alerts, and the chatbox, which are anticipated to fulfill users' needs.

User-Centric – Focused on meeting the needs and preferences of end-users, ensuring the application is designed with a strong emphasis on user experience and satisfaction.

Sense of Community – The feeling of belonging and connection among individuals within a community, fostered by features that encourage interaction and communication.

Pain Points – Specific challenges or difficulties faced by users that the application aims to address and alleviate.

Seamless Platform – A smooth and integrated digital environment that provides users with easy access to various features, enhancing overall usability and user experience.

System – A collection of interconnected elements designed to serve a specific purpose without requiring additional human design intervention.

Module – An adjunct to a primary program encompassing distinct functions tailored for a specific assignment. Modules have the capability to be integrated collectively to construct a system.

Dashboard – A method of presenting diverse visual data in a unified location. Typically, it consolidates all the features of an application into a single panel or web page, presented in a format that is easily comprehensible.

Academic Work Management - The systematic handling of assignments, quizzes, and activities through a centralized platform where faculty can post tasks, and students can submit their work.

Assignment Submission - A feature enabling students to upload their work digitally for review and grading by their instructors.

Theoretical and Conceptual Framework

State universities aim to improve student engagement, social connectivity, and academic organization through innovative solutions. This study proposes the development of Uni-Link: An Integrated Campus Management App, which centralizes critical campus functions to address these needs effectively.

The theoretical foundation of this study is based on the Technology Acceptance Model (TAM) by Davis (1989) and Constructivist Learning Theory. TAM highlights the importance of perceived usefulness and ease of use in technology adoption, explaining how students and faculty are more likely to engage with the Uni-Link app if it meets their expectations. Constructivist Learning Theory emphasizes the role of active participation and collaborative tools in enhancing learning experiences, making features like the chatbox, work management, and location-sharing modules critical to the app's design.

This conceptual framework describes the app's integrated approach to campus management. The system's interconnected modules enable efficient academic task management, streamlined communication, and enhanced social connectivity, ensuring a cohesive campus experience.

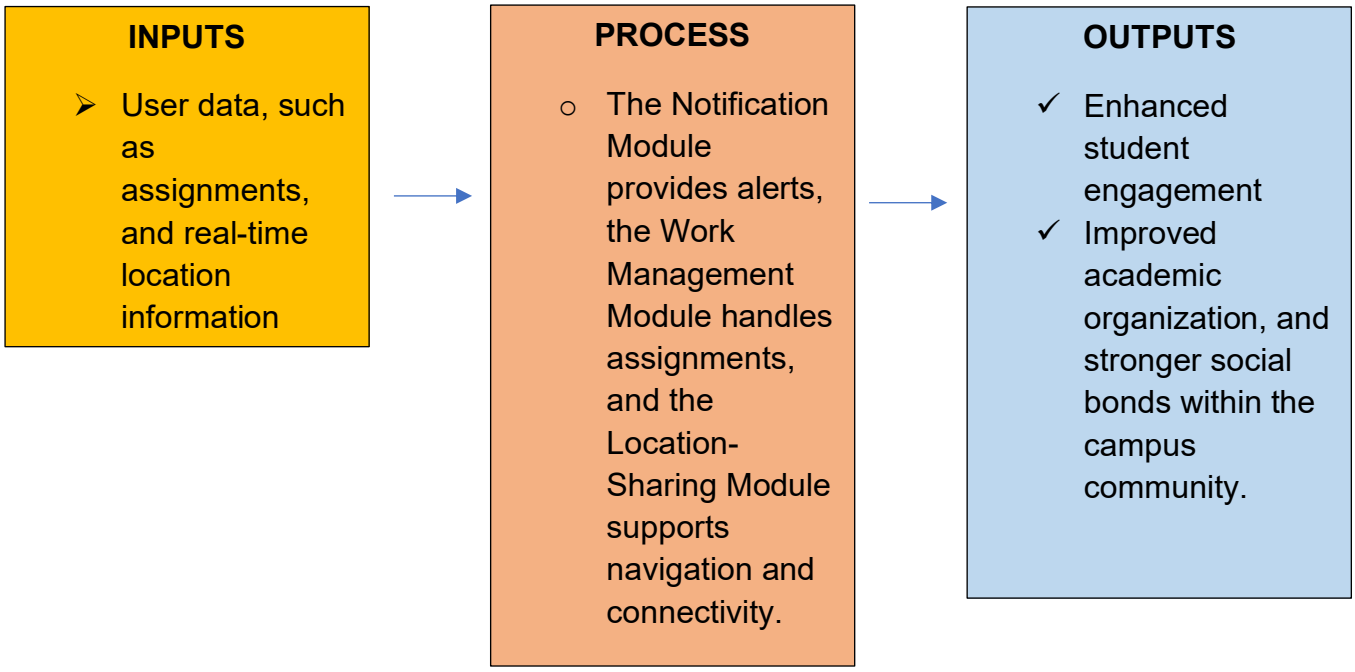

Figure 1. Conceptual Framework

REVIEW OF RELATED LITERATURE

This chapter presents insights from recent studies in higher education, with a focus on campus management applications. The goal is to identify current trends, challenges, and best practices. Local studies provide insights into Philippine universities, while global perspectives broaden understanding. The aim is to gather valuable lessons to lay the foundation of the study and guide the development of a customized campus management app tailored to the specific needs of the educational environment.

Technology Management Framework for Smart University System in the Philippines

The authors of the study, Fernando Raguro, M. C., Lagman, A. C., & Juanatas (2021), provided a "Technology Management Framework for Smart University System in the Philippines," which clarified the strategic use of technology in higher education in the Philippines. The proposed integrated campus management app's goals are in line with the framework's comprehensive approach to integrating smart technologies. The study's conclusions provide insightful information that can be used to improve the functionality of the app and solve issues with the larger technology environment that Philippine universities are situated in. Through the utilization of the framework's strategic perspectives, the suggested application has the potential to improve its compatibility with modern technology and increase the effectiveness and creativity of Philippine university administration systems.

Integration of Information and Communications Technology

According to Son and Amparado (2018), "Integration of Information and Communications Technology (ICT) Tools in the Instructional Program of a University," published in the International Journal of Social Sciences & Educational Studies, the authors explore the impact of integrating ICT tools into a university's instructional program. The findings highlight the effectiveness of incorporating these tools for a more dynamic and interactive learning environment, providing valuable insights for educators and institutions seeking to enhance pedagogical practices through technology. The study emphasizes the significance of adopting ICT tools as integral components in modern educational strategies.

Students' Perception on Use of Technology

In the study conducted by Carbonilla Gorra and Bhati (2018) on "Students' Perception on Use of Technology in the Classroom at Higher Education Institutions in the Philippines," the authors delve into the perspectives of students regarding the integration of technology in higher education settings. The research explores students' attitudes, preferences, and experiences with technology in the classroom, shedding light on their perceptions of the role of technology in academic environments. This study is pertinent to the proposed topic of developing an integrated campus management app, offering valuable insights into the expectations and needs of students concerning technology use. The findings from Carbonilla Gorra and Bhati's research can inform the

design and functionality of the campus management app, ensuring it aligns with the preferences of students in the Philippines and enhances their overall engagement and experience within the higher education setting.

Online Student Engagement and Sense of Community

The study conducted by Al Francis (2021) explores the realm of online education, specifically focusing on online student engagement and the cultivation of a sense of community within a Philippine online university. The research aims to understand the dynamics and intricacies involved in fostering meaningful engagement among students in a digital learning environment, and how this contributes to the development of a sense of community. By delving into these aspects, the study provides valuable insights into the challenges and successes of online education in the context of the Philippines. The findings of this research can offer pertinent perspectives for the development of educational tools, such as an integrated campus management app, by shedding light on the factors influencing student engagement and community-building in the evolving landscape of digital higher education.

Location Sharing

According to Grecia (2019), the 'live location sharing' is practical for meet-ups, aligning with the proposed campus management app. It emphasizes real-time location sharing for seamless on-campus rendezvous, enhancing user connectivity and facilitating group

interactions. This feature's ease of use is particularly beneficial for individuals unfamiliar with specific locations, addressing the proposed app's objective to improve campus navigation and collaborative experiences.

Technology and Student Engagement

According to Schindler et al. (2017), in their review titled "Computer-based technology and student engagement," published in the International Journal of Educational Technology in Higher Education, the authors critically examine the impact of computer-based technology on student engagement. The review synthesizes existing literature, providing insights into the effectiveness of technology tools, their influence on student motivation, and implications for teaching practices. This review serves as a valuable foundation for understanding the relationship between technology and student engagement, pertinent to the proposed development of an integrated campus management app aiming to enhance student experiences through technological interventions.

The Impact of Class Schedule on Student Performance

According to Henebry (2017), in her study on "The impact of class schedule on student performance in a financial management course," published in the Journal of Education for Business, she explores the connection between class schedules and student performance. Analyzing factors like timing and structure, the study provides insights

into how class schedules may affect academic outcomes. This research is pertinent to the proposed integrated campus management app, as it underscores the importance of understanding scheduling's impact on student success. Implementing such insights can help design features that optimize learning experiences, aligning with the app's goal to enhance overall student performance and engagement.

The Role of Technology in Student Engagement in Higher Education

In their study, Günüç and Kuzu (2016) investigate factors influencing student engagement and the role of technology in higher education, presenting the "campus-class-technology theory". The study explores how students interact with their campus, classrooms, and technology to understand engagement. This research is relevant to the proposed integrated campus management app, guiding the incorporation of technology to enhance student engagement and overall experiences in higher education settings.

The Use of Mobile Application in Promoting Student Engagement

Duprey, Hutchings, and Mamishian (2020) investigate the promotion of student engagement through the use of mobile applications. The study, accessible at the Nursing Repository, explores the impact of mobile apps on fostering student engagement in

educational contexts. By examining the utilization of mobile applications, the research aims to identify effective strategies for enhancing student participation and interaction. Insights from this study can inform the development of features within an integrated campus management app, emphasizing the role of mobile technology in promoting student engagement for a more interactive educational experience.

Usability of Mobile Applications

Weichbroth, P. (2020) systematic literature study investigates the usability of mobile applications and is available in IEEE Access. The research explores various aspects of mobile application usability, providing a comprehensive analysis of existing literature in this domain. By delving into factors influencing usability, user experience, and design considerations, the study contributes valuable insights to the enhancement of mobile applications. This study sheds light on usability considerations crucial for creating a user-friendly and effective mobile application. Leveraging the findings from Weichbroth's study can inform the development of features within the app, ensuring a seamless and user-friendly experience for students engaging with the platform.

E-Vision: A Campus Locator Map Mobile Application using A* Algorithm

Ramos, A.L.A., Matienzo, K.L.C., Casunuran, JM.D., Nervida, C.M., Rosal, J.M.S., & Bederico, A.V. (2018) study aims to provide a solution specifically be used by the school to guide students to locate specific place in a campus which provide shortest possible route

method which also include relevant information about the school offices, building and class schedule. The study adopts the Rapid Application Development model and used ISO9126 to evaluate the application in terms functionality, reliability, usability, efficiency, maintainability and portability with a result of 4.36 “Excellent” which means the application is acceptable and meet all the requirements.

JUANDER: A Study from Traditional Philippine Navigational Map and Aguhon to Waze

The study conducted by Bigayan, C.C.B. (2023) examines the transformational upgrade of strategies in terms of using equipment such maps and compasses to electronic navigational application for travelling that includes the description, comparison of the approaches and analyzation according to its purposes. Bigayan studies demonstrate that different eras highlight the need of a travel guide and equipment. Despite this, it desires to provide both a location and the correct path. The study established that the novel method spiced up previous versions of equipment and made it more accessible, convenient, and extremely useful. The effectiveness of navigational apps from this time is enjoyed by citizens, whether in their micro or macro activities. Aside from that, Filipinos' adaptability to modernization assisted millions of workers, drivers, services, and families in ensuring safety, fulfilling their responsibilities, and conserving energy.

Athena: A Mobile Based Application for Women's Safety with GPS Tracking and Police Notification for Rizal Province

The research of Vinarao, E.D.G., de Guzman, M.N.B., Fernandez, E.A., Quije, D.J.V., Gorres, R.C., Francisco, Jr. E.D., Delizo, R.A. & Cruz, E.N. (2019) intends to create a mobile-based program for women's safety that will assist authorities in tracking criminals by delivering real-time SMS notification, GPS tracking, and a direct emergency call to a nearby police station within the province. During this phase, the province of Rizal was chosen to benefit from this study. The device will also assist authorities in preventing crimes before they occur based on user responses. The study is best suited for people who commute to uncomfortable places. The study concludes that the existence of this smartphone app benefits many people, particularly women. Thus, the existence of the proposed integrated campus management app, will also be beneficial from the students and professors.

A Mobile Application of a Geo-map Informatics Blast for Emergency Response

The study of Yatco Jr. J.V. & Marquez, P.S. (2019) focused on creating an emergency response application with mobile technology and crowdsourcing. The project used GPS technology to map emergency situations and crowdsourcing to acquire crucial information. To create the system, the researchers used a descriptive-developmental approach. It used a five-point Lickert Scale statistical method to assess the system's performance. Furthermore, the constructed system

received an overall mean rating of 4.49, indicating that respondents were satisfied with its functionality and performance. The approach was found to benefit residents of Barangay San Antonio in Biñan City, Laguna, as well as its officials and emergency response teams. This research is relevant to the proposed integrated campus management app, guiding the incorporation of technology to enhance system's functionality and performance.

TIP EXPRESS: An Android School Navigation Application.

The author of the study, Castillo, R.E., Castro, P.J.M., Aragon, M.C.R., Macugay, H.C. (2018) is intended for new students and visitors. It helps them to explore and navigate the campus grounds thru a mobile application. The mobile application serves as a guiding tool in navigating around the school campus grounds. In the study, the mobile application used Google Map to track the current location of the user and plot the route from the origin to the destination inside the Technological Institute of the Philippines Quezon City campus using fuzzy logic algorithm to get the shortest route and channel selection algorithm to get the nearby user within a perimeter. The study used the Rapid Application Development model in order to deliver expected outputs. It was concluded that the mobile application is an effective tool in giving navigation and campus information for its users. For the result, the average mean of all the criteria yields 4.12 interpreted as very effective using the 5-point Likert's Scale. Thus, the mobile application is useful reliable, functional, and efficient to serve its purpose.

Semi-Automated Time Scheduling Management System for University Classes.

Joydhar,G., Ahmed, I., & Masum, A.A. (2018) proposed a developed system web-based application. The project originated from the instructors' experience developing, overseeing, and maintaining a semester-long class schedule in the university's CSE department. The department's practices provided the information for the requirement specification. In the front-end portion of the system, HTML, CSS, and Bootstrap were used. Conversely, the back-end uses Laravel, PHP, and JavaScript. In the near future, an Android mobile application will also be developed. Here, an accurate and effective solution is found via a genetic algorithm. Because this algorithm effectively checks for mistakes and preserves data in accordance with design. The technique decreases the time of a student and teacher. Since the suggested system aids in the dynamic discovery of a routine by both the teacher and the student. A teacher can quickly examine their schedule. The primary objective of this automated schedule is to enable students to read teacher details and access the schedule from any location. his project gives an easy class schedule of all the university students. As a result, this project saves the time of all the students and teachers to find their schedule. The study can help in the system specification and source code of the management app.

Trajectory Hiding and Sharing for Supply Chains with Differential Privacy

The paper of Tianyu, L., Xu, L., Zekeriya, E., & Lagendijk, R. L. (2024) propose a privacy-preserving real-time location sharing system including (1) a differential privacy-based location publishing method and (2) location sharing protocols for both centralized and decentralized platforms. The location publishing approach is based on an actual map and varied privacy degrees for receivers, unlike other location perturbation solutions that simply take privacy into consideration theoretically. The studies and proofs by Tianyu, L., Xu, L., Zekeriya, E., & Lagendijk, R. L. demonstrate that the suggested location publishing approach offers superior privacy protection than previous efforts under actual maps against potential threats.

Additionally, a thorough study of the privacy parameter selection and how it affects the recommended noisy location outputs is provided. The experimental results show that our suggested approach can provide more accurate arrival prediction than using time slots in existing delivery systems, and that it is feasible for both centralized and decentralized systems. The study can be helpful as it focuses on the privacy concerns of the location sharing app, as for the proposed idea of the management app also may encounter data privacy concerns.

Millennial Attitudes Towards Sharing Mobile Phone Location Data with Health Agencies: A Qualitative Study

A qualitative study by Murphy, H., Keahey, L., Bennett, E., Drake, A., Brooks, S.K., & Rubin, G.J. (2020) was carried out before and after extensive news reports about the leaking of personal data on social media and a significant public health incident in the UK. The study involved six focus groups with forty millennials (those born between 1981 and 2000), found five subthemes and four primary themes that alluded to the key ideas surrounding attitudes and concerns. These themes were "Control," "Trust," "Risks to sharing," and "Pros and cons of data sharing." Millennials were generally willing to share various forms of location data with ambulance services and a public health agency as long as they could provide explicit consent and retain some personal control over how their data was utilized. The findings indicate that governments who want to use aggregated and anonymized mobile phone location data to improve healthcare services should prioritize reassurance about how data will be used and fostering public trust.

Location Privacy in Spatial Crowdsourcing

The thesis of To, H. (2018) aims to help SC companies (i.e., Uber, TaskRabbit) to protect location privacy of the users (both workers and requesters) participating in their SC platforms. To, H.'s propose privacy-aware frameworks for task assignment in SC as follows. It first focusses on a tasking scenario where the tasks are public and the protection focus is on the workers' locations. Introducing the first framework relies on a trusted third party (TTP) to sanitize the workers' raw location data. It proposes a mechanism based on differential privacy (a mathematically

rigorous definition of privacy) and geocasting that achieves effective SC services while offering privacy guarantees to workers. Consequently, focuses on a more realistic scenario where the location privacy of both workers and requesters' tasks needs to be protected. Lastly, a protocol based on geo-indistinguishability (notion of location privacy based on differential privacy) and reachability that achieves effective SC services while offering privacy guarantees to the users. In both scenarios, the study investigates analytical/empirical models and task assignment strategies that balance multiple crucial aspects of SC functionality, such as task completion rate, worker travel distance and system overhead.

Portable Smart Emergency System Using Internet of Things (IOT)

A pre-test tool implemented using a set of modern devices and technologies to monitor the patient's health by Jamal, B., Al-Saedi, M. A. H., & Parandkar, P. (2023) proposed to send reports of the patient to the doctor treating the patient as well as to the relatives, close friends of the patient in real time. Health parameters of the patient viz. heart rate, blood oxygen and temperature are monitored using electronic devices viz. WEMOS D1, MAX30100, DS18B20, SIM808 on the LCD screen and stored using the MySQL database. PHP script is used to connect MySQL database for easy tracking and analysis of medical data. Doctors are facilitated to monitor the health update in real time, at the same time, communicate the same to the patient and their relatives, close friends

through a dynamic web site constituted of HTML, CSS and JavaScript for the purpose of easy tracking and analysis of the medical data.

To aid further, as a part of value addition, an Android based mobile app is also developed by using App Inventor to further facilitate patients, family members & close friends to monitor sensor data, receive messages and access medical history details, all in real time. Terminal cases, where the health update received from the sensor shows alarmingly high or low readings, then web enabled computing system, also sends a high alert message by playing a warning sound to the doctor, at the same time, also communicates patient's location to him via text message to enable immediate help.

By using Wi-Fi technology and the SIM808 module, the patient's location can be monitored in emergency situations and a text message containing the patient's geographical location can be sent to the treating doctor. This application also includes an option to enter the patient's medical history information using a PHP script into the database.

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