Universiti Teknologi MARA
Cawangan Melaka

In partnership with
Tadulako University

i-JaMCSIIX
2023

EXTENDED ABSTRACT BOOK

Publication Date: 30 March 2024
ISBN: 978-967-15337-0-3

https://jamcsiix.uitm.edu.my

i-JaMCSIIX 2023

INTERNATIONAL JASIN MULTIMEDIA & COMPUTER SCIENCE INVENTION AND INNOVATION EXHIBITION (I-JaMCSIIX) 2023

EXTENDED ABSTRACT

ISBN: 978-967-15337-0-3
i-JaMCSIIX
Universiti Teknologi MARA Cawangan Melaka Kampus Jasin 77300, Merlimau, Melaka

Web: https://jamcsiix.uitm.edu.my

In partnership with
Tadulako University

ORGANIZING COMMITTEE

PATRON	PM DR ISMADI MD BADARUDIN
ADVISOR I	TS DR JAMALUDDIN HJ JASMIS
ADVISOR II	DATO' DR MOHD HAJAR HASROL JONO
PROGRAM DIRECTOR	**DR. NUR SUHAILAYANI SUHAIMI**
DEPUTY DIRECTOR	TS DR NURUL HIDAYAH BINTI MAT ZAIN
SECRETARY I	**ANIS SHOBIRIN ABDULLAH SANI**
SECRETARY II	FAIQAH HAFIDZAH HALIM
TREASURER I	**SITI AISYAH ABD KADIR**
TREASURER II	UMMU MARDHIAH JALIL
PUBLICATION	**NURBAITY BINTI SABRI** DR. SITI FEIRUSZ AHMAD FESOL DR. AHMAD FIRDAUS BIN AHMAD FADZIL SITI NURAMALINA BINTI JOHARI ROSNIZA ROSLAN
JURY	**Ts DR. ALYA GEOGIANA BUJA** NORBAHIYAH AWANG Ts. DR. NOR AFIRDAUS ZAINAL ABIDIN DR. RAIHAH AMINUDDIN NOOR AFNI DERAMAN
REGISTRATION	**SITI FAIRUS BINTI FUZI** BUSHRA BINTI ABDUL HALIM NORDIANAH BINTI JUSOH@HUSSAIN AINON SYAZANA BINTI AB HAMID SITI NURSYAHIRA BINTI ZAINUDIN
SYSTEM	**FADILAH EZLINA SHAHBUDIN** HAJAR IZZATI MOHD GHAZALLI FADHLINA IZZAH SAMAN NOR AZIDA MOHAMED NOH
INVITATION AND PROMOTION	**SHAHITUL BADARIAH SULAIMAN** IZNI SYAMSINA SAARI NOR ADILA KEDIN

	ADI HAKIM BIN TALIB
	MOHD AMIRUL BIN ATAN
MULTIMEDIA	**Ts. NURUL NAJWA ABDUL RAHID@ABDUL RASHID**
	NOOR ASHITAH ABU OTHMAN
	ANWAR FARHAN ZOLKEPLAY
AWARD	**ANITA BINTI MOHD YASIN**
	NURUL EMYZA ZAHIDI
	FATIMAH HASHIM
	SITI RAMIZAH JAMA
	DR NURUL HUDA NIK ZULKIFLI
	MARIATHY BINTI KARIM
CERTIFICATE	**KHAIRUL NURMAZIANNA ISMAIL**
	NUR NABILAH ABU MANGSHOR
	ZUHRI ARAFAH ZULKIFLI
	HAZRATI ZAINI
INTERNATIONAL RELATIONS	**Ts. DR. SITI RAHAYU ABDUL AZIZ**
	ALBIN LEMUEL KUSHAN
	SHAHADAN SAAD
LIAISON OFFICER	**SYAFNIDAR ABDUL HALIM**
	AJK WAKIL UNTAD
SPONSORSHIP	**ANIS AMILAH SHARI**
	MOHD RAHMAT MOHD NOORDIN
	DR YUZAIMI YUNUS
	DR SURYAEFIZA KARJANTO
SECRETARIAT & APPRECIATION BANQUET	**RAIHANA MD SAIDI**
	NUR SYUHADA BINTI MUHAMMAT PAZIL
	ANIS AFIQAH SHARIP
	SITI MAISARAH MD ZAIN
	HAZWA HANIM MOHAMED HAMZAH

UNTAD'S COMMITTEE FOR I-JAMCSIIX 2023:

PROF. IR. MARSETYO, M.AG., PH.D.

PROF. I WAYAN SUDARSANA, S.SI., M.SI.

PROF. JUNAIDI, S.SI., M.SI., PH.D.

ELISA SESA, S.SI., M.SI., PH.D.

MUKRIM, M.ED., PH.D.

ZARKIANI HASYIM, S.PD., M.ED.

DR. HJ. ANI SUSANTI, M.SI.

DR. ISKANDAR, M.HUM.

DR. IR. ROIS., MP.

SYARIFUL ANAM, S.SI., M.SI., PH.D.

DR. NAHARUDDIN, S.PD, M.SI.

DR. DRG. ELLI YANE BANGKELE, M.KES.

HERMAN, SKM., M.MED.ED.

DR. IR. SAMLIOK NDOBE, M.SI.

DR. RAHMAT BAKRI, S.H., M.H.

DR. HAERUL ANAM, SE., M.SI.

DR. IR. BAKRI, S.T., PG. DIPL. ENG., M.PHIL.

DR. IR. MUHAMMAD YAZDI PUSADAN, S.KOM., M.ENG.

IR. SYAIFUL HENDRA, S.KOM., M.KOM.

RIZANA FAUZI S.T., M.T.

MOHAMMAD FAJRI, S.SI., M.SI.

NURUL FISKIA GAMAYANTI, S.SI., M.SI.

DR. NUR'ENI, S.SI., M.SI.

IMAN SETIAWAN, S.SI., M.SI.

FADJRIYANI, S.SI., M.SI.

LIST OF SPONSORS

External Company Sponsors

Klinik Dr Jamaluddin
Klinik Mawar Jasin
Nasi Ayam Ala Cina Zul
ADS Oasis Enterprise
Noorys Enterprise
Che Ramli bin Che Ismail
Beria Maju Enterprise
Rintiz rezeki
H&K food cafe
HS Gerak Wawasan

Individual Sponsors

En. Muhammad Hanif bin Abdul Aziz
Nor Suhaida binti Karjanto

Table of Contents

Cawangan Melaka
International Jasin Multimedia & Computer Science Invention and Innovation Exhibition
i-JaMCSIIX 2023
In Partnership with: Tadulako University

Developing Emergency Application for LRT Passengers with Decision Tree Algorithm (RailAlert!)

Ezrren Natasha Binti Baddru'l-Sham[1], Ts. Nurul Najwa Binti Abdul Rahid @ Abdul Rashid[2], Ezzad Bin Ab Malek[3], Salman Bin Pahruradzi[4] , and Muhammad Rizzuan Ariff Bin Subano[5]

[1,2] College of Computing, Informatics and Media, Universiti Teknologi MARA (UiTM) Malacca, Malaysia

2021114247@student.uitm.edu.my, najwa193@uitm.edu.my, 2021119191@student.uitm.edu.my, 2021340729@student.uitm.edu.my, 2021126255@student.uitm.edu.my

***Abstract*— Emergencies occur suddenly on public transportation daily. In an emergency, however, there are no explicit means for passengers to submit a report to the LRT authorities. In addition, it is difficult for authorities to discover people in emergency situations, and it takes some time to convey information regarding station and LRT emergencies. With geolocation and decision tree algorithms, this project aims to design and develop an emergency application for LRT passengers. The waterfall approach will be adopted because it is more suitable for this project and will help resolve the issue. Thus, the solution is to design an application capable of sending an immediate report to authorities so that they may simply track down passengers and swiftly notify all users of the emergency in a three station LRT such as Sentul, PWTC and Masjid Jamek. Functional testing to ensure the application work properly.**

Keywords—Emergency Application, LRT Passengers, Geolocation, Decision Tree Algorithms, Notification System, Emergency Response

I. INTRODUCTION

Emergencies in public transportation, particularly within the Light Rail Transit (LRT) system, demand efficient response mechanisms. This project addresses this imperative by developing an advanced emergency application. The application integrates geolocation technology, enabling passengers to report emergencies with pinpoint accuracy. Furthermore, a decision tree algorithm is employed to categorize and prioritize emergencies for immediate response. The system will facilitate swift communication with LRT authorities, ensuring rapid assistance and enhancing passenger safety. In a time when public transportation security is paramount, this project strives to provide a robust solution that benefits both passengers and authorities, enhancing overall LRT system preparedness and response capabilities.

This section identifies three key challenges in the context of emergency response within the Light Rail Transit (LRT) system. Firstly, there is a lack of an efficient reporting mechanism for passengers to alert LRT authorities, resulting in time-consuming and cumbersome procedures. Secondly, the timely location of passengers in distress within LRT stations and trains poses difficulties, leading to delayed responses from security personnel. Thirdly, the slow dissemination of emergency information through the website increases passenger risk due to a lack of timely awareness [7]. These challenges impact passengers negatively by causing reporting delays [9], impeding timely assistance for those in distress [5], and hindering effective emergency response [9]. To address these issues, this project proposes the development of an emergency application integrating geolocation and a decision tree algorithm, aiming to streamline reporting, enable rapid location tracking, and facilitate prompt alerts to both authorities and passengers, ultimately enhancing LRT passenger safety [3].

The project's scope is focused on developing a native emergency application tailored for LRT passengers, aiming to provide valuable information, enhance alertness, and facilitate better decision-making during crisis situations. Three specific LRT stations from the Ampang Line—LRT Sentul, LRT PWTC, and LRT Masjid Jamek—have been selected to serve as test locations, simplifying the implementation of crowdsource-based incident solutions. The application targets three primary user groups: LRT passengers aged 18 to 50, LRT security guards, and LRT authorities responsible for incident reports. Key functions

of the application include location tracking, incident reporting, automatic notification to authorities, triggering alarms for immediate attention, sharing experiences, and using geolocation to disseminate incident information. The project employs the decision tree algorithm to predict the necessity of incident notifications, prioritizing passenger safety.

Firstly, it simplifies the reporting process for LRT passengers, allowing direct accident reporting and assistance requests, including automatic location identification, resulting in prompt actions by LRT authorities. Secondly, the geolocation-based application tracks passengers and enables incident reporting, reducing manual search efforts and facilitating quicker response from security guards. Lastly, the RailAlert! application expedites the dissemination of emergency notifications to geolocation-specific users, enabling quick alarm triggering and alerting authorities and fellow passengers. It functions as a discreet, background-operating life tracking system that activates only during emergencies, thereby enhancing passenger safety and improving response times within the LRT system.

II. LITERATURE REVIEW

A. Emergency situation

An emergency situation signifies an abrupt disruption to the norm, often posing challenging information scenarios, including criminal incidents [1]. An emergency application holds significant value, expediting responses, enhancing warning delivery, and ensuring clear communication during critical events [3]. Public transport, including trains and LRT systems, faces an array of emergency cases, encompassing criminal events, technical breakdowns, natural disasters, and train collisions [4]. Criminal incidents highlight security concerns, breakdowns necessitate rigorous maintenance, natural disasters underscore the need for preparedness, and train collisions emphasize safety protocols and training requirements, collectively highlighting the importance of proactive measures and effective response mechanisms within the realm of public transportation emergencies [8].

B. Geolocation

Geolocation technology enables the tracking of device locations through GPS, cell towers, and Wi-Fi access points, providing latitude and longitude coordinates or practical physical addresses [12]. Geolocation's applications extend to unmanned aerial vehicles (UAVs) for tracking and geolocating moving vehicles, offering potential benefits in traffic safety inspection, road monitoring, traffic flow analysis, and urban security enhancement, particularly due to UAVs' ability to bypass ground traffic congestion and operate effectively in various domains [12].

C. Decision Tree Algorithm

Push notifications are brief, automatic messages displayed on mobile device screens, often sent by servers to specific users without user requests, providing real-time updates, such as news alerts [10]. The decision tree algorithm is employed to categorize data into tree-like structures, with internal nodes representing attributes, branches signifying test outcomes, and leaves denoting class labels [11]. It serves both classification and regression purposes, with mechanisms to handle noisy training data and enhance user experience by focusing on essential application features [11]. In this project, it is implemented to evaluate the necessity of spreading notifications to LRT passengers, contributing to effective incident management and passenger safety within the LRT system.

D. Related Work

One of the applications which is Life360 mobile application focuses on family tracking, communication, and safety, offering geo-fencing features and accident detection alongside location sharing [3]. SOSerbia, on the other hand, emphasizes emergency communication through a unique volume button combination, enabling users to send SOS messages via SMS [2]. It operates in both network and GPS modes, forwarding user information to authorities [2]. SafeCity Application serves as a crowdsourcing platform for reporting sexual harassment and abuse, aggregating data to identify hotspots and offer self-defense resources [6]. In contrast to emergency applications, SafeCity does not directly involve authorities but aims to raise awareness and encourage local action based on reported incidents [6]. These projects provide valuable insights and features that inform the development of the RailAlert! application, enhancing its functionality and effectiveness in addressing emergency situations within the LRT context [6].

III. METHODS

This section discusses the phases of the Waterfall methodology, as well as the activities and deliverables that must be completed to meet the project's goals. The first three phases of the project, requirement analysis, application design and development. In this methodology, the output of one phase is often used as the input for the following step in sequential fashion.

A. Phase 1: Requirement Analysis

The use case diagram for this project outlines the interactions of three user types: LRT passengers, authority employees, and security guards. Although each group has distinct requirements, they share common functionalities like registration, login, logout, and profile management. LRT passengers can activate and deactivate alarms, comment on incidents at specific stations, manage their reports, and receive notifications about emergencies in their geofencing area. The LRT authority and security

guards can view alert notifications, review passenger reports, assign security personnel, and provide updates to passengers, with some variations in permissions and responsibilities.

The survey, which engaged 67 individuals to gauge perceptions of crime rates and challenges within the LRT system, unveiled three significant hurdles. A majority, constituting 59.3% of respondents, cited the absence of a defined incident reporting mechanism to the LRT authority as a prominent issue. Many found the process burdensome and expressed a desire for an application-based reporting system. Additionally, 75.9% of respondents identified crime as a substantial problem in the LRT, emphasizing the need for a geolocation-based crime tracking system within the station. Furthermore, 83.6% of users relied on social media to stay informed about LRT-related issues, signifying an opportunity for RailAlert! to provide real-time updates to passengers, authorities, and security. Lastly, 74.6% of users expressed concern about missing pertinent news, highlighting the importance of a dedicated platform like RailAlert! to streamline LRT-specific information dissemination and reduce missed news incidents.

B. Phase 2: Application Design

Implementing the program's design phase required the creation of storyboards, flowcharts, system architecture, an entity-relationship diagram (ERD), and an algorithm. The storyboard was created by guiding the development of an idea and narrative corresponding to the intended audience. A comprehensive storyboard served as a preliminary guide during the project planning phase.

C. Phase 3: Development

The application was developed using the latest technology during the development phase. During this phase, code from other mobile applications served as references. The product program code was constructed according to the design document's specifications. The earlier planning and outlining should, in principle, make the actual development step simple. Plan the project's programming language, database, and other high-level technical components. The geolocation was the primary element of this project, as the geolocation mechanism will determine whether the location may utilize the application. To classify notification into their respective categories uses a decision tree algorithm. The notifications will be categorized according to unread, spam, and days. The objective was to generate a training model that can predict the notification of the target variable by learning basic decision rules drawn from primary data.

IV. RESULTS AND FINDINGS

The full functionality of the application must be tested and examined to ensure that the system can solve the problem and meet the user's needs. It will demonstrate the user interface design that is utilised by RailAlert! Application. The interface design shows the front end of the system view that will be interacted with by the user to manipulate and control the application. The interface is part of the system designed to give the user a better experience when using the application. RailAlert! has been successfully developed, and all the interface design has been completed. All figures shows the first user interface when the user installs the application.

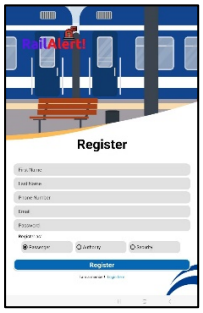

Fig. 1 Registration page

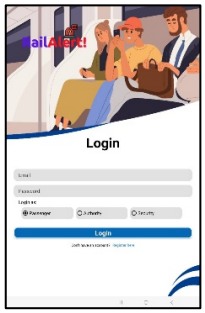

Fig. 2 Login page

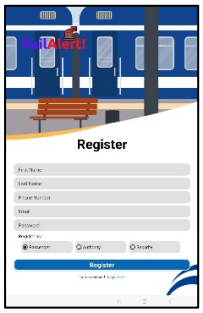

Fig. 3 Home page passenger

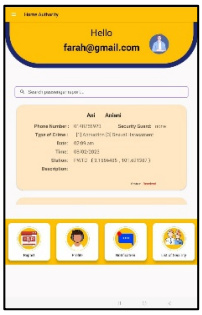

Fig. 4 Home page authority

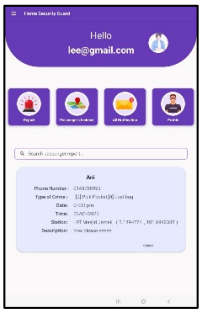

Fig. 5 Home page security guard

Fig. 6 List of report page

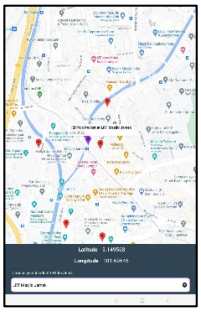

Fig. 7 Incident map page (Draggable marker)

Fig. 8 Receive notification

V. CONCLUSIONS

The RailAlert! project successfully achieved its objectives of developing an emergency application for LRT users using geolocation technology to address challenges related to reporting incidents, locating individuals in crisis situations, and disseminating emergency information. The project's systematic approach included problem statement analysis, system architecture design, and functional testing. While the project has concluded, there is room for future enhancements, such as implementing artificial intelligence for filtering notifications based on severity, integrating image capture for reporting, and refining geofencing capabilities to provide more precise user locations. These recommendations can further improve RailAlert! and enhance its efficiency and user-friendliness for LRT passengers, authorities, and security guards in the future.

REFERENCES

[1] Chen, J., Shi, T., & Li, N. (2021). Pedestrian evacuation simulation in indoor emergency situations: Approaches, models and tools. *Safety Science, 142*(December 2020). https://doi.org/10.1016/j.ssci.2021.105378

[2] Jovanovic, M., Babic, I., Cabarkapa, M., Misic, J., Mijalkovic, S., Nikolic, V., & Randjelovic, D. (2018). SOSerbia: android-based software platform for sending emergency messages. *Complexity*, 2018. https://doi.org/10.1155/2018/8283919

[3] Life360 (n.d.). https://www.life360.com. Accessed 20 June 2022.

[4] Martínez-Rojas, M., Pardo-Ferreira, M. del C., & Rubio-Romero, J. C. (2018). Twitter as a tool for the management and analysis of emergency situations: A systematic literature review. *International Journal of Information Management*, 43(July), 196–208. https://doi.org/10.1016/j.ijinfomgt.2018.07.008

[5] N. Shiwakoti, R. Tay, P. Stasinopoulos, P.J. Woolley. (2016). Exploring passengers' behaviour in an underground train station under emergency condition. Publication website: http://www.atrf.info

[6] Safecity. (2021). *Safecity*. Safecity. https://www.safecity.in/

[7] Shahrudin, H. S. (2017, December 2017). 22 sexual harassment cases recorded on Prasarana public transport in 2017. New Straits Times Online. https://www.nst.com.my/news/nation/2017/12/315786/22-sexual-harassment-cases-recorded-prasarana-public-transport-2017

[8] Syed Zaffar Iqbal, & Muhammad Idrees. (2017). Z-SDLC_Model_V4.1-with-cover-page-v2. International Journal of Engineering and Advanced Research Technology (IJEART), 3(2)

[9] Solhi, F. (2022, March 5). Rapid Rail to beef up security at all LRT, MRT, monorail stations. *New Straits Times Online*. https://www.nst.com.my/news/nation/2022/03/777154/rapid-rail-beef-security-all-lrt-mrt-monorail-stations

[10] Sulastri, H., Sevtiyuni, P. E., Rahmatulloh, A., Made, N., & Sanjiwani, K. (2020). *The Effect of Implementing Web Push Notification and Customer Relationship Management in E-Commerce of Silver Craft MSME*. 172(Siconian 2019), 581–585. https://doi.org/10.2991/aisr.k.200424.089

[11] Vinothini, K., & Jayanthy, S. (2019). IoT based flood detection and notification system using decision tree algorithm. 2019 International Conference on Intelligent Computing and Control Systems, ICCS 2019, Iciccs, 1481–1486. https://doi.org/10.1109/ICCS45141.2019.9065799

[12] Zinghini, F. (2021*) What are geolocation technology uses and benefits in 2021?* https://www.linkedin.com/pulse/what-geolocation-technology-uses-benefits-2021-frank-zinghini/

i-JaMCSIIX 2023

PUBLISHED BY:
i-JaMCSIIX
Universiti Teknologi MARA Cawangan Melaka
Kampus Jasin
77300 Merlimau, Melaka

Tel: 062645000
Email: jamcsiix@uitm.edu.my
Web: https://jamcsiix.uitm.edu.my/