Research Project Proposal

ENHANCING THE EFFICIENCY OF POLICE SERVICE THROUGH WEB-BASED LOST AND FOUND REPORTING SYSTEM

Index No: **23030** Registration No: **104037**

Index No: **23046** Registration No: **104025**

Index No: **23022** Registration No: **104051**

B.Sc. Honours in Business Information Systems

Year III Semester II

Department of Information Technology

Faculty of Management Studies and Commerce

University of Sri Jayewardenepura

December 2024

Enhancing The Efficiency of Police Service Through Web-Based Lost and Found Reporting System (LFRS)

Abstract

The inefficiencies and challenges associated with the current lost item reporting systems in Sri Lanka's police department highlight the need for an improved approach. The existing manual system lacks critical features, such as image upload, real-time status updates, and a user-friendly interface, contributing to delays in recovering lost items and diminishing public trust in law enforcement. This research proposes a web-based Lost and Found Reporting System (LFRS) designed to address these shortcomings, improve efficiency, and enhance user satisfaction. By leveraging modern technologies, particularly the MERN stack (MongoDB, Express.js, React, and Node.js), the system will provide an intuitive platform for reporting, tracking, and recovering lost items. It aims to streamline the reporting process, incorporate real-time updates, enable image uploads, and foster feedback mechanisms for users. Through a combination of research-oriented and development-oriented approaches, this study will identify the key limitations of existing systems and develop a robust solution tailored to Sri Lanka’s context. Ultimately, the proposed system seeks to improve the relationship between the public and the police, offering a transparent, accessible, and effective tool for reporting lost items, thereby fostering greater public trust and enhancing police operational efficiency.

Keywords: Web-based Application, Lost & Found System, Sri Lanka Police, MERN Stack

Declaration of the Supervisor

I hereby declare that the research proposal prepared by Venura, Shashika, and Sandun has been prepared under my supervision and is true and correct to the best of my knowledge.

N. T. C Jayawardana

……. Date: 2024-12-15

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SECTION 01: INTRODUCTION/BACKGROUND

Currently, effective end-user reporting systems are essential to modern law enforcement, enhancing efficiency while reducing complaints. The Sri Lankan police have an online complaint reporting system for general complaints; however, it is not optimized for lost item reporting. Missing critical features, such as image uploads and real-time updates, severely undermines its usability. Furthermore, the current system's poor user interface discourages usage, while paper-based elements remain prone to errors and inefficiencies, preventing the system from addressing user needs effectively. Consequently, public confidence in such systems remains low.

Misplaced or missing items cause numerous challenges, both for the individuals involved and the authorities tasked with managing them (Bulut & Szymanski 2017). Staff find it difficult to manage lost-and-found items due to the lack of a proper process for handling found objects, verifying rightful ownership, and ensuring items are returned to their owners (Al-Bataineh et al. 2015). Additionally, in many cases, it is impractical for individuals to revisit the place where belongings were lost, leaving them uncertain if the items remain there (Zhou et al. 2024). The proposed LFRS aims to address these issues, providing an efficient and user-friendly solution to facilitate the recovery of lost items.

Globally, the most prevalent methods for dealing with lost items have been manual reporting and centralized databases (Syaziella & Ismail 2009a; Hossain et al. 2021). While these methods have helped, they face several limitations, including delayed recoveries, limited search capabilities, ineffective communication, and an overreliance on the owner to identify the lost property (Dutta et al. 2024). Internationally, countries such as the United Kingdom, France, Japan, and Germany have developed comprehensive information management systems to address these challenges (Kumar et al. 2022). For instance, Missing Money, established by the US National Association of Unclaimed Property Administrators (NAUPA), provides services for loss reporting, retrieval and management (Altmann & Gray 2002). Similarly, China's platforms, such as "China Lost-and-Found," highlight the importance of accessible, technology-based solutions (Zhou et al. 2024).

In Finland, cities have offices dedicated to recovering and storing lost items. However, a significant portion of these items remain unclaimed, suggesting that more accessible recovery methods could improve collection rates (TURKU UNIVERSITY OF APPLIED SCIENCES 2013). The inefficiencies in recovery methods indicate a critical gap, necessitating systems that simplify the retrieval process for end users (Castro et al. 2022).

Technological advancements have shown significant potential in addressing these challenges. For instance, Bluetooth-enabled tags alert users within a 30-meter range, helping locate lost items (Poly et al. 2017). Additionally, community-based systems encourage collective efforts in tracking and retrieving lost items, emphasizing collaboration among individuals. Despite these innovations, many solutions remain hidden from consumers, while the demand for efficient systems continues to grow (Ahmad et al. 2015).

In Sri Lanka, traditional systems for reporting lost property remain largely ineffective, failing to account for various scenarios. Economic barriers posed by some international systems and a lack of tailored solutions make it challenging for the public to access effective alternatives. The Sri Lankan Police, as the primary law enforcement agency, plays a critical role in public order and lost item management. However, challenges such as outdated technology, data duplication, delays, and inefficient workflows hinder their operations (Yapa et al. 2021).

To address these issues, the proposed LFRS aims to deliver a free, user-friendly platform that ensures accessibility for all, regardless of financial status. Key features include real-time updates, image uploads, and feedback systems to enhance public trust and user satisfaction.

Behavioral research on lost item recovery highlights common strategies employed by individuals. These strategies include locus search (33%), exhaustive search (24%), retracing search (19%), memory search (11%), and delegated search (11%) (Guinard, Baecker & Michahelles 2008; Srinivasan et al. 2014). By aligning the system's design with these natural tendencies, the LFRS can improve recovery rates and usability.

Modern web applications offer another advantage in addressing these challenges, allowing users to access services anytime and anywhere without requiring additional software or hardware (Suchana et al. 2021). This approach is particularly useful in environments like schools, where

missing items are common, and low-cost, web-based solutions can effectively bridge the gap between losers and finders (Peters et al. 2016; MUHAMAD ILIAS 2020).

Traditional approaches to lost-and-found management often result in inefficiency, with retrieval rates reported to be less than 10% in some cases (Poly et al. 2017b). The manual process of filing police reports is laborious and inaccessible to those unfamiliar with the system (Choudhary et al. 2021). Even with the availability of online platforms, a lack of knowledge and poor user interface design further hinder adoption. The proposed system will address these weaknesses by incorporating user-centered features, ultimately improving public engagement and recovery rates (Fenwick, Tashakkori & Hoepfl 2023).

To guide the development process, the project will employ the System Development Life Cycle (SDLC) methodology (Syaziella & Ismail 2009). This approach ensures that the system is developed systematically, addressing user requirements while responding to the challenges identified in the existing literature.

While sophisticated systems exist globally, Sri Lanka currently lacks a dedicated platform for reporting lost items. This absence represents a missed opportunity to enhance public-police relations and improve operational efficiency. Features such as image uploads, real-time updates, and feedback mechanisms will be instrumental in modernizing lost item reporting, revitalizing public trust in law enforcement services.

The analytical rationale for this study is driven by the growing dissatisfaction with traditional lost item reporting processes, the increasing demand for user-friendly systems, and the urgent need for the Sri Lankan Police to adopt technologically enhanced solutions. Through a comprehensive, context-specific platform, this research seeks to revolutionize lost item reporting in Sri Lanka. The system will improve operational efficiency, foster public confidence, and encourage collaboration between the public and law enforcement.

SECTION 02: RESEARCH PROBLEM

Currently, the lost item report management in the Sri Lanka police department is handled manually which has several drawbacks and weaknesses such as the unorganized database system increases the time taken to search for lost item reports, absence of clear online public access to update lost item reports' status and so on. It has a Module for General Complaints but lacks an efficient system for making reports of Lost Items. This system is a general-purpose system that is not designed for efficiency and usability and therefore poses a major weakness for the task. Features that are assumed to be critical including image uploading, real-time project status updates, and mechanisms that allow feedback from users are completely lacking, which only adds to the problem and slows down the recovery process in the process. Moreover, the system has an unintuitive interface design hence stopping the potential users from engaging in the system through constant frustration. The inability to make orders in those two systems clearly has the effect of eroding the general public's trust in the police's capacity to address lost property reports. If these are the current approaches then there are clearly significant currents to the two, stressing the importance of a narrow but deep, web-based information system. The result of applying such a system would be a profound change of the state of transparency and operational effectiveness not only of police work but also of strengthening public trust in law enforcement agencies. Through changing the reporting of lost items, this system may alter the way people relate to police services, by making sure that lost item cases are solved more efficiently.

SECTION 03: RESEARCH QUESTIONS & OBJECTIVE

3.1 Research Objectives

Therefore, this research was conducted with the following basic objectives.

- To explore the limitations of manual reporting system.
- To develop an LFRS to overcome the limitations of manual system.
- To validate the developed LFRS how the limitations of manual system are solved.

3.2. Research Questions

1. What are the limitations of the current manual systems?
2. How can an LFRS address the limitations of manual systems?
3. How effective is the proposed system in solving the challenges identified in the manual reporting process?

SECTION 04: METHODOLOGY

The methodology for this research project is divided into two main approaches: a Research-Oriented Approach and a Development-Oriented Approach, each contributing to the successful identification and resolution of the research problem.

4.1. Research-Oriented Phase

This first phase revolves around determining the actual issues related to the use of lost item reporting systems within the Sri Lankan Police force environment. The process starts with problem definition, which requires an analysis of the present manual and online complain system to identify bottlenecks and drawbacks. After the literature review analysis of recent academic publications and past /present industry practices/logical case studies of lost and found systems implemented worldwide is done to identify and assess international standards/best practices for successful implementation of the lost and found reporting system. Initial research is done using Interviews among the police force and the public, and case studies to get practical data about system deficiencies as well as user requirements. Further, the collected data will be used to uncover common problems, areas of ineffectiveness, and overall user expectations that will inform the new system.

4.2. Development-Oriented Phase

Considering the findings that were made during the research-oriented phase, the development phase will concentrate on developing a solution with the help of the MERN stack, which is MongoDB, Express.js, React, and Node.js. The process involves system design where the framework is built with MongoDB, as the database, Express.js with Node.js for back-end functions, and React for front-end development. The design methodology focuses on scalability, security, and ease of use. An Agile development methodology is used to keep making progress in cycles, with testing and integration of feedback from the stakeholders taking place at different stages. Porotypes of all the core

requirements are developed with the use of MERN stack to include registration of users, uploading of images, live update of status and feedback mechanisms. The improved LFRS is further constructed, both the frontend and the backend are implemented and enhanced, the data structure of database is also built with emphasis on its fluency when used with the other counterparts. Last, the system goes through a series of tests which include usability test, function test, and Security checking test; collected feedback from the stakeholders are obtained to popularize the solution into the right one for the users and the fulfillment of the goal and aim of the project. This has a clear structured format also helps to follow the protocol and a scientific method approach in solving a complex problem together with implementing the modern and effective solution to the Sri Lankan Police and Its People.

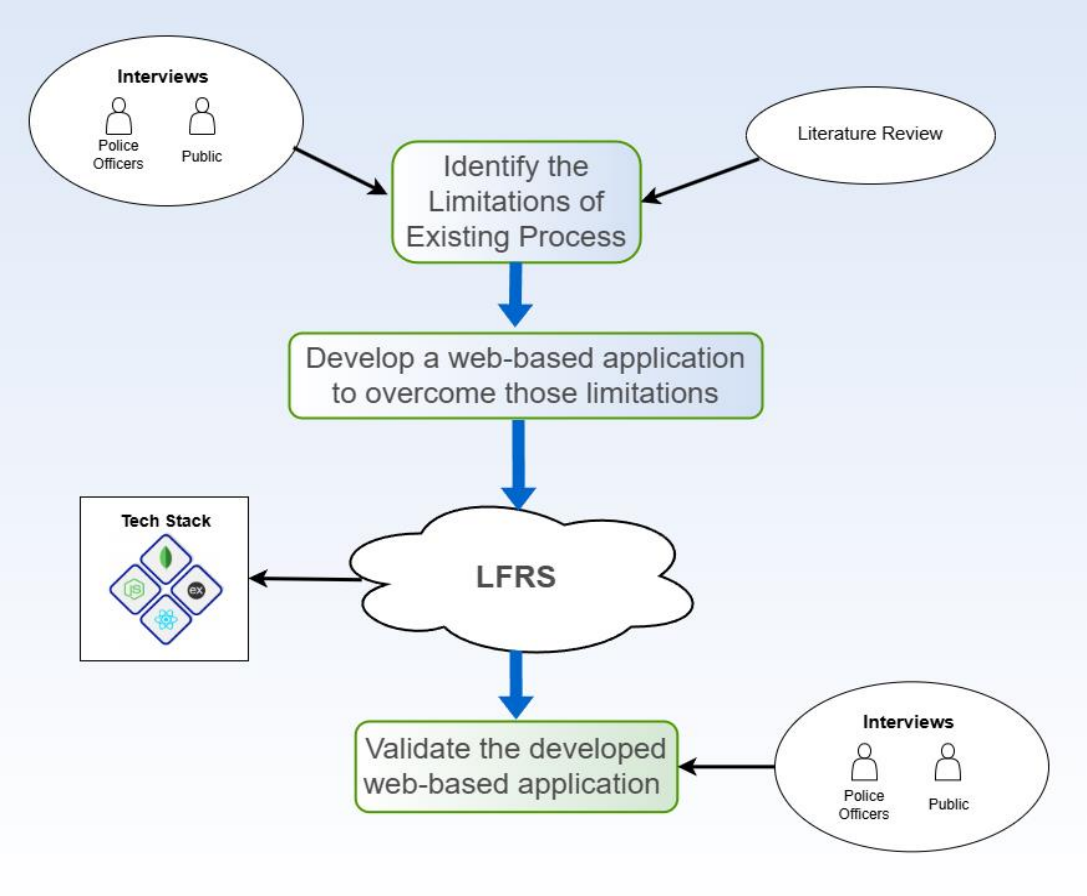

Fig 1: Overview of study design

SECTION 05: SIGNIFICANCE OF THE STUDY

The relevance of this study is based on the chance to fill the gaps and inadequacies of the existing reporting systems at the Sri Lankan Police. As this research outlines the need to develop a web-based system that would cater for the use of both the public and the law enforcement agencies in reporting cases of lost items, tracking, and recovery this work seeks to change the way the public and the police work in this vital aspect. This paper has pointed out several weaknesses of the existing systems and proposed a new system that will overcome challenges and enhance user experience as well as efficient operation of the police force. Using the MERN (MongoDB, Express.js, React.js, and Node.js), the platform will provide several benefits, improving the excess, full, short & claim (EFSC) reporting the whole lost-and-found experience and providing a more efficient solution to the problem. This will also enhance efficiency and effectiveness in the lost item reporting system. Since it will involve imposing Automated processes where there are currently manual ones, it will preclude the mistakes and cumbersome data entry and will hence make the system faster and more reliable. Batch processing and notifications will also make it easier for users to know the status of their reports at a particular time thus greatly reducing the level of frustration and increasing the level of transparency. These features will collectively give a strong and easily navigable foundation upon which the reporting and tracking of lost items will be carried out regarding their recovery. One of the major advantages of the system is to find out that it provides the best solutions to improve the user accessibility and usability. The functions such as the upload of images and real-time status updates will make this system vastly easier to use for the public in filing and tracking lost items. Most importantly, the enhancement of the attributes to minimize complications and increase usability will increase the level of public participation and thus improve the satisfaction level with the lost item reporting platform. This will facilitate many people gaining from the system and hence more subjects will be taught.

The proposed system also seeks to improve communication and disclosure between the public and police. Through feedback mechanisms and periodical real-time reports, the users will always be informed of the progress of their cases. Such a clear channel of communication will assist in enhancing public trust with police since dissatisfaction and skepticism have been the order of the day regarding existing manual or generic complaint systems. From the viewpoint of the police,

however, the system provides many operational benefits. Inefficiencies associated with manual preparations of lost item reports will be eliminated through automation and centralization of the process. Officer case processing will be less time consuming and approachable, and result in increased resources and more time for other, higher-priority law enforcement work. These efficiencies in operations will result in higher service delivery to the public whereby cases will be handled and solved proficiently. Apart from the practical relevance of the study to Sri Lanka, the recommendations made as part of this research could be useful in combating the identified challenges in other nations. The findings along with the specified and developed system may help in enhancing lost-and-found reporting systems all over the world especially those countries having similar problems in managing public services and police force. Furthermore, this research provides a guide to the enhancement of current and future technologies in the policing environment, the implementation of modern technologies in law enforcement service delivery model and the adaptation of web-based application for police work. The thought was that such advancements may lead to similar categories of revolution in public service and administrative utility systems.

All in all, this study might be seen as a paradigm shift for updating the lost item reporting paradigm. As a more effective, user oriented, and scalable solution it is in the interests of the public and legal forces to increase confidence and satisfaction among users. Moreover, it provides the basis for the improvement of law enforcement and public service technologies with prospects of further developments in information systems and operation improvements.

SECTION 06: PRELIMINARY PROJECT PLAN

- The following outlines the key activities and expected outcomes for the development of the web-based Lost and Found Reporting System. The project plan is divided into distinct phases, each contributing to the overall goal of developing an efficient and user-friendly system.

6.1. Gantt Chart for Project Plan

Here's a Gantt chart that visually represents the timeline and key activities for the project.

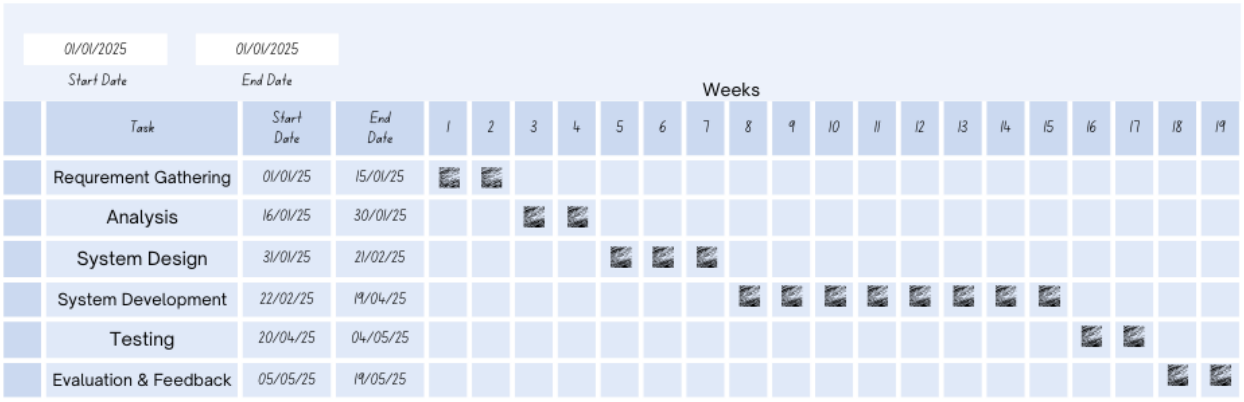

Fig 2: Gantt chart for project plan

This Gantt chart offers a clear visual representation of the timeline and activities for the successful completion of the project, ensuring all tasks are completed on time and in alignment with the project's overall goals.

6.2. Expected Outcomes

- A fully developed and deployed web-based Lost and Found Reporting System.
- A working prototype with key functionalities, including report creation, image uploads, real-time updates, and feedback mechanisms.
- A comprehensive report based on testing results, user feedback, and recommendations for further improvements.

SECTION 07: PLANNED CONTRIBUTIONS OF EACH GROUP MEMBER

- System Design – Venura,Sandun,Shashika
- Coding – Venura,Sandun,Shashika
- Testing – Venura,Sandun,Shashika
- Documentation – Venura,Sandun,Shashika
- Presentation – Venura,Sandun,Shashika

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