DEPARTMENT OF COMPUTING
USER EXPERIENCE ENGINEERING

KARTHIK ILAMURUGU PORCHELVAN
33762176

SMART MAILBOX
A SOLUTION TO MITIGATE PACKAGE THEFT

ABSTRACT

This thesis proposes a smart mailbox solution to address the growing problem of package theft and damage during delivery. The study includes a literature review, online survey, and user testing to identify the challenges and potential solutions to package delivery security. The proposed smart mailbox solution offers a secure and convenient delivery location for packages and includes features such as real-time monitoring, locking mechanisms, and contactless delivery. The study's findings indicate that the implementation of smart mailbox solutions has the potential to revolutionise package management, enhance security, and boost user satisfaction. The implications of the study extend beyond package delivery, offering valuable insights into the integration of technology in daily life. The thesis concludes with recommendations for future research and steps to take in the implementation of smart mailbox solutions.

INTRODUCTION & BACKGROUND

The Smart Mailbox thesis study aims to solve the problem of package theft and damage during delivery. The proposed solution is a smart mailbox that provides a secure delivery location. The project's objectives are to conduct user research, design a user-friendly interface, and evaluate the effectiveness and usability of the solution.

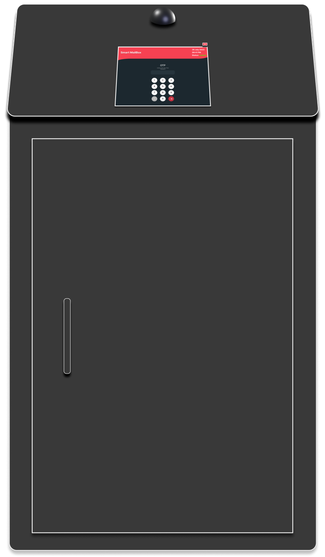
The literature review shows that over 1.7 million packages gets stolen which accounts to an 19.5 billion dollar loss every year and current prevention methods, such as lockboxes and surveillance cameras, have limited effectiveness. The proposed smart mailbox solution aims to improve package delivery and security for customers and delivery personnel.

The thesis aims to provide a secure and efficient solution for package delivery and address the problem of package theft and damage. Smart mailbox solutions can improve delivery efficiency, mitigate package theft, and boost user confidence and satisfaction. The project's findings suggest that a well-designed smart mailbox can enhance the security and convenience of package delivery.

STUDY METHODOLOGY

The methodology employed for this study involved a multi-faceted approach to thoroughly evaluate the usability and effectiveness of the Smart Mailbox prototype. The study consisted of three main components: usability testing, Wizard of Oz simulation, and post-study surveys.

- **Usability Testing:** Usability testing was conducted using an online platform called Maze. Participants were given a series of tasks to perform within the Smart Mailbox mobile app interface prototype. Their interactions were recorded and analysed to identify usability issues, user behaviour patterns, and task success rates. This testing provided valuable insights into the user-friendliness and navigability of the interface.
- **Wizard of Oz:** The Wizard of Oz method was employed to simulate real-world interactions with the Smart Mailbox prototype. Participants were asked to complete tasks as if they were using the actual product, while a researcher operated the prototype behind the scenes. This simulation allowed for the evaluation of the prototype's functionality and the identification of any challenges faced by users.
- **Post-Study Surveys:** After completing the testing phases, participants were asked to provide feedback through surveys. These surveys gauged participants' overall experiences, satisfaction levels, and opinions about the Smart Mailbox concept. The survey responses were analysed to gain insights into users' perceptions, preferences, and suggestions for improvement.



RESEARCH RESULTS

The research results of this study underscore the effectiveness and potential impact of the Smart Mailbox solution in enhancing package delivery security and convenience. Through rigorous testing and evaluation, several key findings emerged that validate the solution's viability:

- **Usability Testing:** Usability testing of the mobile app interface revealed high user satisfaction with its ease of use, clear navigation, and intuitive design. Participants appreciated the labeled menu options, indicating successful interface design aligned with user expectations.
- **Wizard of Oz:** The Wizard of Oz simulation validated the functionality of the physical Smart Mailbox prototype. Participants successfully interacted with the prototype, unlocking it with OTP, placing packages, and notifying owners. This confirms the prototype's usability and potential to mitigate package theft.
- **Post-Study Survey:** Post-study surveys provided participant insights that complemented usability testing results. Participants' willingness to use the Smart Mailbox in the future and their confidence in its ability to secure packages underscore the solution's positive impact on package delivery.

The research results validate the Smart Mailbox's potential to revolutionise package delivery by providing a secure, user-friendly, and technologically advanced solution. These findings pave the way for further development, implementation, and real-world adoption of the Smart Mailbox concept.

CONCLUSIONS & FUTURE WORK

The proposed solution of a smart mailbox to mitigate package theft and damage during delivery has significant implications for package delivery and security. The findings of the study suggest that the implementation of a well-designed smart mailbox solution can improve package delivery efficiency, mitigate package theft, boost user confidence and satisfaction, and enhance collaboration and user feedback. The implications of this study extend beyond the immediate context of package delivery and security, providing valuable insights into the adoption of technological solutions in addressing real-world challenges.

Future research should focus on real-world deployment, security measures, collaboration with delivery services, user education, and iterative design improvements. The results of the study suggest that user-centred design iteration and collaboration with delivery personnel helped identify strengths and areas for improvement, ensuring that the solution meets the needs of those who interact with it on a daily basis.

In conclusion, the proposed smart mailbox solution aims to provide a safe and convenient delivery location for packages, especially for those who are not at home during the day to receive deliveries. The implementation of smart mailbox solutions can improve package delivery efficiency, mitigate package theft, boost user confidence and satisfaction, and enhance collaboration and user feedback. Future research should focus on real-world deployment, security measures, collaboration with delivery services, user education, and iterative design improvements to address the identified problem of package theft and damage during delivery.

DESIGNS