CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

Photoelectric beam systems operate by emitting invisible infrared light beams across a designated area, typically where intrusion is a concern. By stacking two or more beams, the system enhances its coverage area, making it more difficult for intruders to evade detection. Unlike the visible red lines often depicted in movies, laser beams used in security systems are typically invisible to the naked eye. This stealthy approach adds an extra layer of security, as intruders may not even realize they've triggered an alarm.

The beauty of laser security beams lies in their subtlety. When the beam is disrupted—whether by an object, person, or animal—it sets off an alarm or prompts a security response. This swift reaction is crucial for both home security systems and high-security facilities, where unauthorized access or movement can pose significant risks. Moreover, the covert nature of laser beams ensures that intruders have minimal opportunity to evade detection or disable the system before authorities can intervene. Thus, laser security technology provides a proactive and effective means of safeguarding property and assets, offering peace of mind to homeowners and facility managers alike.

1.2 BACKGROUND OF PROJECT

The Reverend Augustus Russell Pope (1819-1858), of Somerville, Massachusetts, patented the alarm in 1853 (Samuels & Kimball,1897). Edwin Holmes purchased Pope's patent rights in 1857 for $1500 and manufactured the device at his factory in Boston, Massachusetts (Brennan,2009). He began selling them in 1858. His son, Edwin Thomas Holmes, took over his father's business following his death and recounted the events in his memoir, A Wonderful Fifty Years. People were initially

wary of utilizing electricity for alarms, and the firm struggled (Durden,1975). As a result, in search of a larger market, Holmes relocated his firm to New York in 1859, which was then regarded as a place where "all the country's burglars made their “home alarms” and launched successful marketing among commercial organizations. In 1877, he constructed the first network of alarms monitored by a central station in New York and sent his son to replicate the system in Boston. However, Edwin Thomas realized that the network could use existing phone cables rather than creating its own. In this fashion, he swiftly created a 700-alarm network, which his father later imitated in New York. In 1878, Holmes was appointed president of the newly formed Bell Telephone Company.

While he sold his holdings two years later for $100,000, he retained the right to use the company phone lines for personal alarm systems. The introduction of electricity for lighting around 1880 shifted the market, as consumers began to adopt electrical models. In 1905, the American Telephone and Telegraph Company purchased the Holmes Burglar business and connected it to emergency call networks for summoning police and firefighting services. During World War II, several inventions were introduced into the home alarm system industry. The system became less expensive and more versatile for use in the 1980s, and by the mid-1990s, it had become a standard feature. The most advanced anti-burglary systems incorporate motion detectors, surveillance equipment, and electronic tracking devices.

1.3 PROBLEM STATEMENT

In recent years, youth crimes in Malaysia have been on the rise. Unfortunately, these crimes are becoming more violent and alarming. It is shocking to learn that young people are responsible for 40% of crimes committed today, such as theft, burglary, and robbery (Felson & Boba, 2010). These things not only affect an individual's wealth but also the soul of people. A lot of murder cases happen just after the burglary. The main reason for this issue is that no proper security system makes the residents aware of the thief.

According to the Royal Malaysia Police Crime Statistics Report (2024), Malaysia has witnessed a concerning trend of escalating robbery incidents, with

reported cases surging by 25% (Ravindhran Kutty ,2009). This persistent rise underscores the persistent challenges in maintaining public security and emphasizes the urgency of implementing effective strategies to combat crime and safeguard communities.

1.4 OBJECTIVE OF PROJECT

This project aims at exploring development of laser security alarm beam system prototype in complying with IR4.0:

i. to design a system to prevent robberies and the presence of outsiders and intruders inside the housing area at uneven times.
ii. to develop a prototype of the laser security alarm beam using IR 4.0 technology
iii. to evaluate the efficiency and the functionality of the prototype of the laser security alarm beam

1.5 PROJECT QUESTION

The genesis of this project stemmed from the urgent need to address the rampant issue of burglaries plaguing Malaysia. With an alarming surge in break-ins, the safety and well-being of homeowners and communities were increasingly compromised. In response, the initiative to develop a prototype of a laser security alarm beam system was born, with the overarching goal of furnishing a robust solution to fortify residential security.

The implementation of this innovative system promises not only heightened home security but also the added benefit of remote monitoring capabilities. This technological advancement empowers homeowners with the ability to maintain a vigilant watch over their properties, even from a distance. By incorporating such cutting-edge measures, the project endeavours to significantly reduce the frequency of thefts and intrusions, thereby contributing to broader initiatives aimed at mitigating crime rates across Malaysia.

Beyond its immediate impact on individual households, the deployment of laser security technology holds the promise of fostering safer and more secure communities

at large. Through collaborative efforts and the adoption of proactive security measures, it aspires to cultivate an environment where residents can enjoy peace of mind and a sense of safety in their homes and neighbourhoods. By addressing the root causes of insecurity and bolstering defences against criminal activities, our project represents a pivotal step towards realizing this collective vision of a safer Malaysia for all.

1.6 RESEARCH QUESTION

Five research questions can be asked:

Question 1: How is this project applied in daily use?

Question 2: What is IR 4.0 used in this project?

Question 3: What are the positive effects of using this project?

Question 4: How far is the sensor to be effective?

Question 5: Who are the influential users involved in this project?

1.7 SCOPE OF PROJECT

This project's scope extends far beyond conventional security measures, ushering in a new era of technological innovation to combat the persistent challenge of housebreaking. In the current landscape where technology drives revolution, our project harnesses the power of laser beams to offer a novel approach in safeguarding homes. By integrating cutting-edge technology into security systems, we aspire to significantly reduce the incidence of housebreaking and provide peace of mind to countless residents.

Laser beams fortify defences against intrusions and enable seamless monitoring of movements in and out of the house from remote locations. This project addresses the immediate need for enhanced security and sets a precedent for leveraging technology to tackle societal challenges effectively. Through its scope, it holds the potential to transform the way we perceive and mitigate security risks, ultimately fostering safer and more secure communities in the modern era.

1.8 IMPORTANCE OF PROJECT

The laser security alarm beam prototype is a significant improvement in home security measures, aimed at ensuring the safety and protection of inhabitants and their property. This technology provides unmatched precision and accuracy in producing laser beams by utilizing semiconductor lasers, resulting in a strong perimeter defense against prospective intruders. The use of semiconductor lasers allows the beams to retain an exceptionally straight course, increasing the security system's dependability and effectiveness.

Furthermore, the adoption of the laser security alarm beam prototype has the potential to drastically reduce the number of burglaries, especially while homeowners are present. With its accurate detection capabilities and speedy response mechanism, the system functions as a proactive deterrent against intruders, giving residents increased peace of mind and security. Using cutting-edge technology and innovative design ideas, the prototype provides a robust defence against unwanted access, contributing to the general safety and well-being of homeowners and their families.

1.9 DEFINITION OF OPERATION

In this operation's definition, the residents' convenience, comfort, and pleasure has been evaluated. Based on the positive effects found in the project developed which is the prototype of laser security alarm beam that the residents or a company can use to prevent intruders from entering and bad events that acts like a bandit that causes the loss of valuables and even lives. The project uses sophisticated, high-quality technology, including a laser that can trace the enemy transparently. In addition, there is a system where a person or the user can switch on and off the security using a button or phone call, with a laser installed in every corner of the area. It is because the function created can provide many benefits and convenience to residents or a company.

1.10 SUMMARY

Following all the conversations and considerations, building the laser security alarm beam prototype provides a simple and controllable approach for improving household security. Residents can effortlessly control and maintain the security system thanks to its user-friendly interface and cutting-edge technologies, delivering peace of mind and assurance of safety. Furthermore, the adoption of this system allows for proactive monitoring and identification of intruders, giving people a greater sense of security and control over their environment.

Furthermore, the laser security alarm beam prototype is undeniably successful in offering guaranteed safety against attackers. The system's ability to emit sounds and messages enables early intervention, allowing residents to respond quickly to security breaches while maintaining tight control over possible dangers. By using advanced technology, the residents may be certain that their houses are protected against unwanted entrance and intrusion, resulting in a safer and more secure living environment for everyone.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

The primary worry about crime has highlighted the crucial need of home security systems, resulting in coordinated attempts to resist incursion. Against this backdrop, the project is set to conduct a thorough examination of twelve different publications covering issues such as GSM technology, safety systems, Arduino Nano, and more. This thorough investigation provides vital insights into the varied environment of home safety systems, illuminating the complexities inherent in their creation and deployment.

By immersing ourselves in this lengthy literature analysis, we not only obtain a solid understanding of the project's scope, but also crucial insights into its overall goals. At its core, the project aims to stimulate innovation in the field of home safety systems, with a particular emphasis on harnessing emerging technology to improve household security.

Furthermore, the methodical analysis of historical precedents and contemporary issues presented in these papers provides a solid foundation for determining the project's course. By recognizing important challenges and potential hazards, we may better negotiate the complexity of establishing a strong and effective home safety system.

In essence, the literature evaluation serves as a cornerstone in determining the project's path, providing a plethora of knowledge and views to guide our approach. Armed with this thorough information, we are ready to go on an innovative path to improve home safety and security in the face of new dangers.

2.2 HISTORY OF LASER SECURITY BEAM

The history of laser security beams dates to the mid-20th century, marked by the advent of laser technology and its subsequent applications in various fields. While the specific timeline may vary, the evolution of laser security beams can be outlined as follows:

2.2.1 Emergence of Lasers (1950s-1960s):

The invention of the laser in the 1960s by researchers like Theodore Maiman laid the foundation for new applications of laser technology. Initial applications were mainly scientific, medical, and military, with researchers exploring the unique properties of lasers.

2.2.2 Early Security Applications (1970s-1980s):

In the 1970s and 1980s, researchers and security professionals began experimenting with lasers for security applications. Basic laser tripwire systems were developed, using a simple beam interruption mechanism to trigger alarms.

2.2.3 Advancements in Modulation (1990s):

During the 1990s, significant advancements were made in laser modulation techniques, allowing for more sophisticated security systems. Modulated laser beams became a standard to enhance sensitivity and reduce false alarms caused by ambient light.

2.2.4 Integration With Sensors (2000s):

The early 2000s saw the integration of lasers with advanced sensors, such as infrared detectors and photodetectors. These improvements increased the reliability and accuracy of laser security beams, making them more suitable for various environments.

2.2.5 LiDAR And Technology Integration (2010s):

LiDAR (Light Detection and Ranging) technology started being incorporated into laser security systems, enabling three-dimensional sensing and improved detection capabilities. Integration with other technologies, including surveillance cameras and smart security systems, became more prevalent.

2.2.6 Current Trends (2020s):

As of the 2020s, laser security beam systems continue to evolve with a focus on minimizing false positives and improving adaptability to diverse environments. Quantum key distribution and other advanced encryption methods are explored to enhance the cybersecurity aspects of laser-based communication in security systems. Throughout this history, laser security beams have transitioned from rudimentary systems to sophisticated, high-performance solutions. They play a crucial role in modern perimeter protection, providing a reliable means of intrusion detection for various applications, including residential, commercial, and industrial security.

2.3 REVIEW FROM PREVIOUS RESEARCH

According to Hemane and Sen (2022), security is critical in today's environment, when technology is continually evolving. Unfortunately, criminal organizations' strategies evolve alongside technology. To effectively combat criminal activity, security technology must keep up with these advances. Recognizing this requirement, we began a security initiative with laser light as the primary technique. Laser light has unique qualities, such as the capacity to travel great distances without dispersing and visibility limited to the source and incidence site, making it a perfect alternative for current security systems.

The invention, suitably titled "laser security," takes advantage of these qualities to form an invisible border around sensitive regions. The system consists of two primary components: the transmitter and the receiver. The transmitter generates a laser beam that is powered by dry cell batteries and controlled by an on/off switch. In contrast, the receiver has a focusing Light Dependent Resistor (LDR) sensor that continuously

checks the laser beam. The sensor is linked to a main driver circuit, which filters the signal for discontinuities in the laser beam and activates the alarm circuit when an intruder is detected.

This alarm circuit notifies security workers or homeowners of the incident, ensuring quick action is performed. The system allows for adjustable alarm length, with preset timing and manual reset options. Mirrors can also be strategically placed at corners to reflect a laser beam, allowing it to cover a broader area. Despite its excellent performance, the system is low-cost and energy efficient. We hope to deliver a dependable and efficient answer to modern security concerns by utilizing this unique laser technology.

Crime is a prevalent societal issue affecting communities all over the world, involving a wide range of offenses from property crimes to violent crimes such as murder and robbery. Many factors influence crime patterns, including mental health, unemployment rates, educational achievement, and policing techniques. This paper focuses on property crime datasets for Malaysia from 2007 to 2017. These figures were compiled from reported cases from district police stations and contingent headquarters at the state and federal territory levels, as reported by the Malaysian Police Reporting System (PRS). The data fall into five categories: theft, automobile theft, motorbike theft, van/lorry/heavy machinery theft, and housebreaking. During the ten-year period, 1,361,320 property crime instances were reported, with theft and motorcycle theft ranking as the most common types of property crime in Malaysia.

Hakim et. al. (2022) has stated that despite the prevalence of property crime, reported incidents have decreased significantly over time, from 163,317 in 2007 to 77,562 in 2017. This drop can be ascribed to government measures and proactive policing policies targeted at reducing criminal activity. Notably, this downward trend is consistent across states and federal territories, owing mostly to a reduction in theft and motorbike theft incidents. Law enforcement agencies' concentrated efforts, combined with community engagement and crime prevention programs, have contributed to an overall decrease in property crime rates, underscoring the necessity of collaborative methods to addressing societal concerns.

According to Abhadiomhen et. al (2021) explained that the rapid evolution of technology emphasizes the critical need for strong home security systems to properly address common security concerns in residential properties, such as intrusion and fire breakouts. Traditional manual security systems are being replaced by automated solutions that use cutting-edge technologies like Passive Infrared (PIR) sensors, smoke detectors, microcontrollers, and remote monitoring features provided by Android apps. These automatic devices outperform their manual counterparts in terms of total home security.

One of the key advantages of automated home security systems is their capacity to provide homeowners real-time alerts and notifications in the case of unwanted access or a fire. These systems use PIR sensors and smoke detectors to detect possible hazards and inform homeowners, allowing for rapid response and mitigation steps. Furthermore, the integration of microcontrollers enables the smooth coordination and control of multiple security components, hence improving system performance and reliability.

Furthermore, the addition of remote monitoring tools enabled by Android applications improves the effectiveness of these security solutions. Homeowners can use their cell phones to remotely view live camera feeds or DVR channels, allowing them to monitor the security status of their property from anywhere and at any time. This remote monitoring option gives homeowners peace of mind while also allowing them to take rapid action in the case of suspicious activity or an emergency. Overall, implementing advanced home security systems is a huge step in reducing security threats and protecting residential properties in an increasingly interconnected world.

Sharma and Goen (2018) has elaborated that one area where technology has made great progress is in home security. The paper explained a system that uses the Arduino Uno microcontroller board to improve door lock security by implementing two high-level passwords. The system also includes a GSM Module, which connects to the owner's mobile phone and allows for remote door control.

When attempting to unlock the door, authorized users are requested to provide two separate passwords. If the correct passwords are entered, the door will unlock. However, if an erroneous password is entered, the system triggers an alert mechanism and sends a message to the owner, urging them to validate the access attempt. This

proactive strategy guarantees that the owner is aware of any illegal access attempts and can respond appropriately.

This system is ready to serve as a vigilant guardian in a variety of contexts, including homes, businesses, banks, and institutions. By integrating modern security measures with remote access, it provides a comprehensive solution for protecting premises and assets, giving owners more control and peace of mind over their security infrastructure.

To summarize, the research findings highlight the growing importance of IoT-based smart security alarm systems in modern security strategies. The integration of Internet connectivity into alarm components allows for easy remote control via mobile applications, giving homeowners more flexibility and control over their security measures. However, implementing these systems involves significant hurdles, particularly in guaranteeing technical compliance and resolving cybersecurity concerns related to data exchange and network security. Despite these challenges, the use of IoT alarm systems promises significant security benefits by using enhanced connectivity and advanced capabilities to strengthen overall home protection.

Moving forward, more research and development efforts are needed to address the difficulties and problems associated with IoT-based smart security alarm systems. This includes improving technological standards to ensure interoperability and compatibility across devices and platforms, as well as implementing strong cybersecurity measures to protect against potential threats and vulnerabilities. By overcoming these hurdles and realizing the full potential of IoT technology, smart security alarm systems could transform home security practices, providing homeowners with better peace of mind and protection against changing security threats.

2.4 SUMMARY

In conclusion, the significance of home security cannot be overstated in a world where crime is a pressing concern for individuals and communities. The need for effective and innovative solutions to ensure the safety of our homes has become paramount. Through an in-depth exploration of twelve articles encompassing topics such as GSM technology, safety systems, and Arduino nano, the research has provided valuable insights into the multifaceted landscape of house safety.

This comprehensive review not only equipped us with a foundational understanding of the project but also allowed us to delve into the historical evolution of house safety systems. The knowledge gained from this exploration has been instrumental in shaping our perspective and guiding us toward the development of a cutting-edge product for home security.

The journey through literature has not only expanded our awareness of existing technologies and methodologies but also highlighted the challenges inherent in creating an effective house safety system. Armed with this knowledge, we are better prepared to navigate the complexities of our project and address the specific issues that may arise during its development.

In essence, the amalgamation of historical context, technological insights, and the identification of challenges has provided us with a solid foundation to innovate a product that addresses the contemporary needs of home security. As embarking on the practical implementation of the project, it carries a wealth of knowledge that will undoubtedly contribute to creating a robust and effective house safety system.

CHAPTER 3
RESEARCH METHODOLOGY

3.1. INTRODUCTION

The Laser Security Alarm Beam (LSAB) prototype is at the forefront of revolutionary perimeter security solutions, providing a sophisticated and reliable way for intruder detection in a variety of scenarios. This device works by detecting disturbances in a laser beam to identify illicit entry or movement within a designated region. This cutting-edge security approach not only improves the effectiveness of perimeter surveillance but also reduces false alarms, optimizing security operations and resource utilization.

The LSAB prototype's robust design and advanced features make it a versatile solution for a wide range of security applications, including residential and industrial properties. Its accurate detection capabilities and real-time alerting mechanism allow for rapid response to security breaches, reducing the danger of illegal entry or property damage. Furthermore, the integration of smart technologies and remote monitoring capabilities improves the system's ability to provide 24-hour surveillance and full defence against potential threats.

As the LSAB prototype continues to be refined and developed, it has the potential to revolutionize perimeter security methods and set new standards for intrusion detection. By merging cutting-edge technology with powerful detection algorithms, this system provides a dependable and proactive solution to asset protection and environment security. As security problems change in an increasingly complex environment, the LSAB prototype emerges as an essential weapon in the arsenal of security professionals, allowing them to stay ahead of evolving threats and defend what is most important.

3.2 RESEARCH DESIGN

The research design refers to the overall strategy that has been chosen to integrate the different components of the study in a coherent and logical way, thereby, ensuring the effective address of the research problem, prototype development, it constitutes the blueprint for the data collection, measurement, and analysis of data. Figure 3.1 presented the methodology flowchart of LSAB.

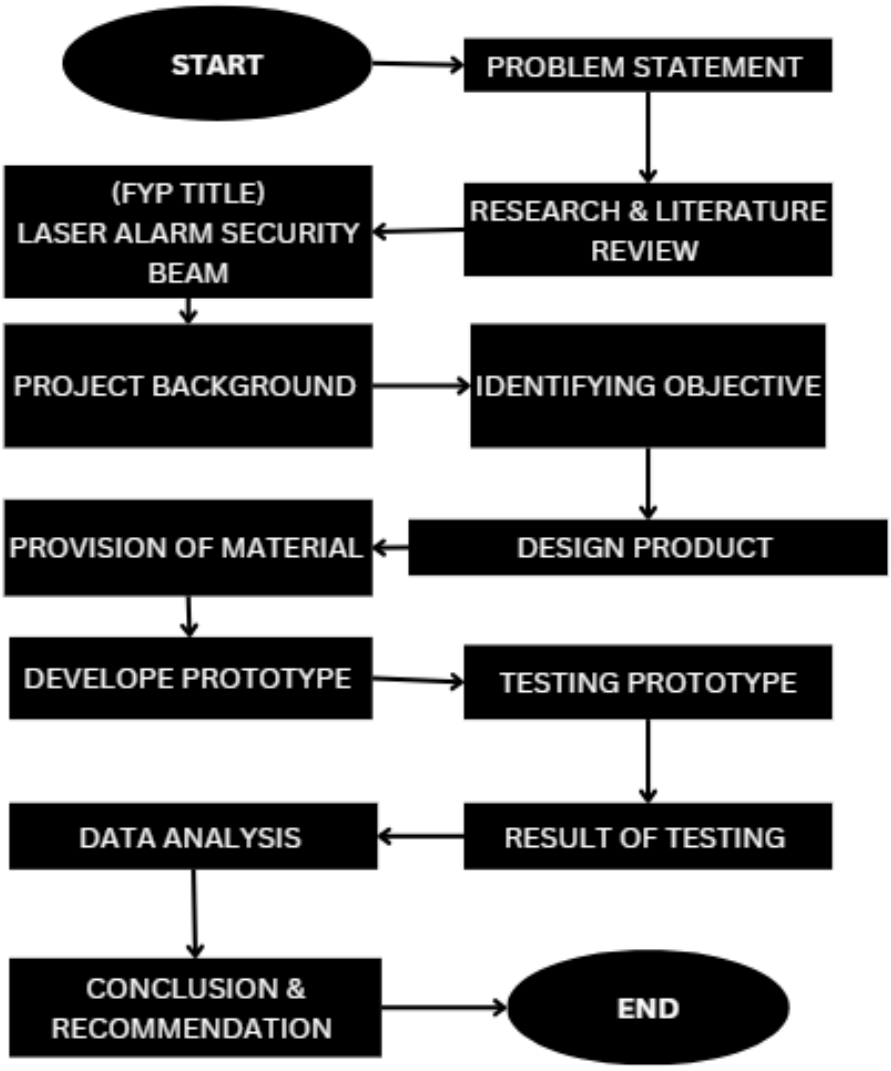


Figure 3.1 Methodology Flowchart

3.3 DESIGN CONSIDERATIONS

The prototype of LSAB represents an advanced and effective approach to perimeter security, employing laser technology to detect and respond to potential intrusions swiftly and reliably. By adhering to meticulous design considerations and methodology, this system offers enhanced security measures for diverse applications, safeguarding critical assets and premises.

i. Laser Emission and Detection

The system consists of a transmitter and a receiver unit positioned across the protected area. The transmitter emits a laser beam towards the receiver, creating a continuous invisible beam.

ii. Beam Interruption Detection

When an object or person crosses the path of the laser beam, it interrupts the beam's trajectory. This interruption triggers the receiver to detect the change in the beam's continuity.

iii. Signal Processing and Alarm Activation

Upon detecting the interruption, the receiver processes the signal and activates an alarm or alerts the security monitoring system, signalling a potential intrusion.

iv. Laser Beam Characteristics

Selecting an appropriate laser type (visible or infrared) based on the application requirements, environmental conditions, and desired detection range.

v. Beam Alignment and Calibration

Ensuring precise alignment and calibration between the transmitter and receiver units to establish a consistent and reliable laser beam path.

vi. Environmental Adaptability

Accounting for environmental factors such as weather conditions, ambient light, and potential obstacles that could interfere with the laser beam's integrity.

vii. Integration with Security Infrastructure

Integration capabilities with existing security systems or alarms to provide prompt responses in case of an intrusion.

viii. Detection Sensitivity and Range

Adjusting the system's sensitivity and detection range to accurately detect intrusions while minimizing false alarms.

ix. Power Backup and Redundancy

Incorporating power backup systems or redundancy measures to ensure continuous operation even during power outages or system failures.

x. User Interface and Control

Implementing user-friendly interfaces for system configuration, monitoring, and maintenance by security personnel.

3.4 MATERIAL AND EQUIPMENT

Several materials and equipment that were required in developing the prototype of laser security alarm beam (LSAB). There are Arduino Uno, GSM Module SIM900A, laser module board, light sensor module, buzzer and wire.

3.4.1 Arduino Uno

The Arduino Uno as shown in Figure 3.2 is a microcontroller board industry standard, known for its versatility and accessibility. At its heart is the ATmega328P microcontroller, which orchestrates the execution of Arduino-programmed instructions. This board has a variety of input/output (I/O) pins, both digital and analogue, allowing for smooth interaction with a wide range of external components such as sensors, actuators, and displays. With its analog-to-digital conversion capabilities, the Uno efficiently converts analog signals from sensors into digital data for processing, increasing its usefulness in a variety of applications.

Furthermore, the Arduino Uno's powerful power supply mechanisms and support for numerous communication protocols—including Serial, SPI, and I2C—make it an excellent tool for interacting with external devices and networks. When combined with the Arduino Integrated Development Environment (IDE), which provides a user-friendly environment for code development, debugging, and deployment, the Uno enables creators to complete their ideas with amazing ease and efficiency. In essence, the Arduino Uno's functionality originates from its capacity to act as a versatile hub for connecting, processing, and controlling a wide range of electronic components, paving the way for innovation and discovery in embedded systems and beyond.

Figure 3.2 Arduino Uno

3.4.2 GSM MODULE SIM900A

The GSM module SIM900A connects electrical devices and cellular networks, allowing for seamless communication across long distances as in Figure 3.3. Its incorporation of a GSM/GPRS modem provides critical functionality for voice conversations, SMS messaging, and GPRS data transmission, making it indispensable in applications that require distant connectivity. With support for numerous frequency bands, the SIM900A is compatible with a wide range of cellular networks around the world, ensuring dependable connectivity regardless of geography.

Beyond basic communication functionality, the SIM900A module includes sophisticated capabilities like TCP/IP stack support, allowing developers to enable internet connectivity via GPRS. This opens new options for applications that require remote monitoring, control, and data transfer via the internet, broadening the module's utility across a wide range of tasks. The SIM900A's smooth integration with microcontrollers and embedded systems via UART connection enables the development of novel solutions ranging from IoT devices to remote monitoring systems, demonstrating its versatility and adaptability in today's interconnected world.

Figure 3.3 GSM Module SIM900A

3.4.3 Laser Module Board

Figure 3.4 shows the laser module board is a small electrical device that uses a laser diode and related electronics to produce a concentrated beam of light. Because of their precise and concentrated light output, these modules are used in a variety of applications, including robotics, engraving, and distance measurement. The laser diode is located at the heart of the laser module board and turns electrical energy into coherent light using a process known as stimulated emission. The board often has driver circuitry that regulates the current going through the laser diode, guaranteeing stable operation and preventing damage. Furthermore, some laser module boards have features such as changeable focus or modulation capabilities, allowing users to customize the laser beam's qualities for specific purposes. Overall, laser module boards offer a dependable and adaptable solution for projects that require high-intensity light sources with pinpoint precision.

In addition to its primary function of creating focused laser beams, laser module boards frequently incorporate safety safeguards to reduce the risks associated with laser radiation. These could include built-in devices for power regulation, overcurrent protection, and temperature monitoring to prevent overheating. Furthermore, some laser modules have interlock mechanisms or key switches to ensure that the laser is only engaged under specified settings, lowering the risk of unintentional exposure to laser radiation. Laser module boards provide users with piece of mind while working with potentially hazardous laser technology, making them invaluable tools in research, industrial, and hobbyist applications where precision and safety are critical.

Figure 3.4 Laser Module Board

3.4.5 Light Sensor Module

A light sensor module, also known as a photoresistor or photocell module, has the primary function of detecting the intensity of ambient light in its surroundings. These modules, which consist of a photoresistor and associated circuitry, vary their resistance in response to the quantity of light falling on them. This resistance change is subsequently translated into an electrical signal that microcontrollers and other electronic devices can process. Light sensor modules are widely used in autonomous lighting systems, solar tracking mechanisms, and environmental monitoring devices. Their capacity to correctly assess light levels allows them to perform actions such as turning lights on and off, altering display brightness, and controlling solar panel operation to enhance energy efficiency.

Furthermore, light sensor modules as in Figure 3.5 contribute significantly to the functioning and energy efficiency of numerous electronic devices. These modules enable intelligent decision-making processes by delivering real-time feedback on ambient lighting conditions, allowing devices to alter their behaviour in response to changing lighting settings. Light sensor modules, whether used in smart home automation, outdoor lighting control, or industrial monitoring systems, provide a low-cost and dependable solution for integrating light-sensing capabilities into a wide range of applications, resulting in increased energy conservation and user convenience.

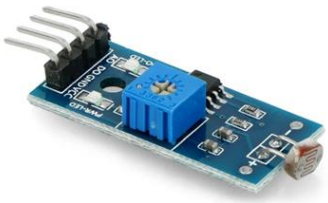


Figure 3.5 Light sensor module

3.5.5 Buzzer Module

Figure 3.6 presented the buzzer module is a tiny and adaptable audio signalling device that is frequently used in electronic projects and systems to offer auditory alerts or notifications. These modules, which include a piezoelectric buzzer and associated circuitry, generate sound waves when an electrical signal is applied. The frequency and length of the sound produced can be changed by varying the input signal, allowing for customisation to meet specific application needs. Buzzer modules are commonly used in alarm systems, timers, and user interface feedback mechanisms, where their distinctive sound is an excellent means of communicating information to users.

In addition to their basic role of producing auditory alerts, buzzer modules frequently include functions like volume control, tone adjustment, and sound pattern modulation to increase their adaptability. These modules are simple to integrate into electronic circuits and microcontroller-based projects, making them an ideal alternative for providing audio signalling capabilities. Buzzer modules, whether used to signal system status, warn of potential risks, or provide user feedback, play an important role in improving the usability and performance of a variety of electronic devices and systems.

Figure 3.6 Buzzer module

3.4.6 Wire

Male to female jumper wires are vital components for electronics prototyping and circuit design. They have a male connector on one end and a female connector on the other, allowing for simple connections between male header pins and various electronic components or breadboard sockets. These jumper wires make quick and temporary connections within circuits, allowing for rapid prototyping and experimentation without the need for soldering. Their versatility and ease of use make them essential tools for amateurs, students, and professionals alike, as they allow for easy interface with microcontrollers, sensors, displays, and other electronic modules.

Furthermore, male to female jumper wires are available in a variety of lengths, colours, and combinations, allowing for the effective arrangement and control of complex circuits as shown in Figure 3.7. Their versatility goes beyond basic connections; they can also be utilized to produce unique cable assemblies or extend the reach of existing wires inside a project. Whether used for basic breadboarding or more complex circuit designs, these jumper wires provide a dependable and adaptable option for connecting components, expediting the prototyping process, and promoting the development of unique electrical projects.

Figure 3.7 Wire

3.5 PROTOTYPE DEVELOPMENT

A flowchart is a picture of the separate steps of a process in sequential order. It is a generic tool that can be adapted for a wide variety of purposes and can be used to describe various processes in a project plan. Figure 3.8 represents the flowchart in prototype development of laser security alarm beam (LSAB).

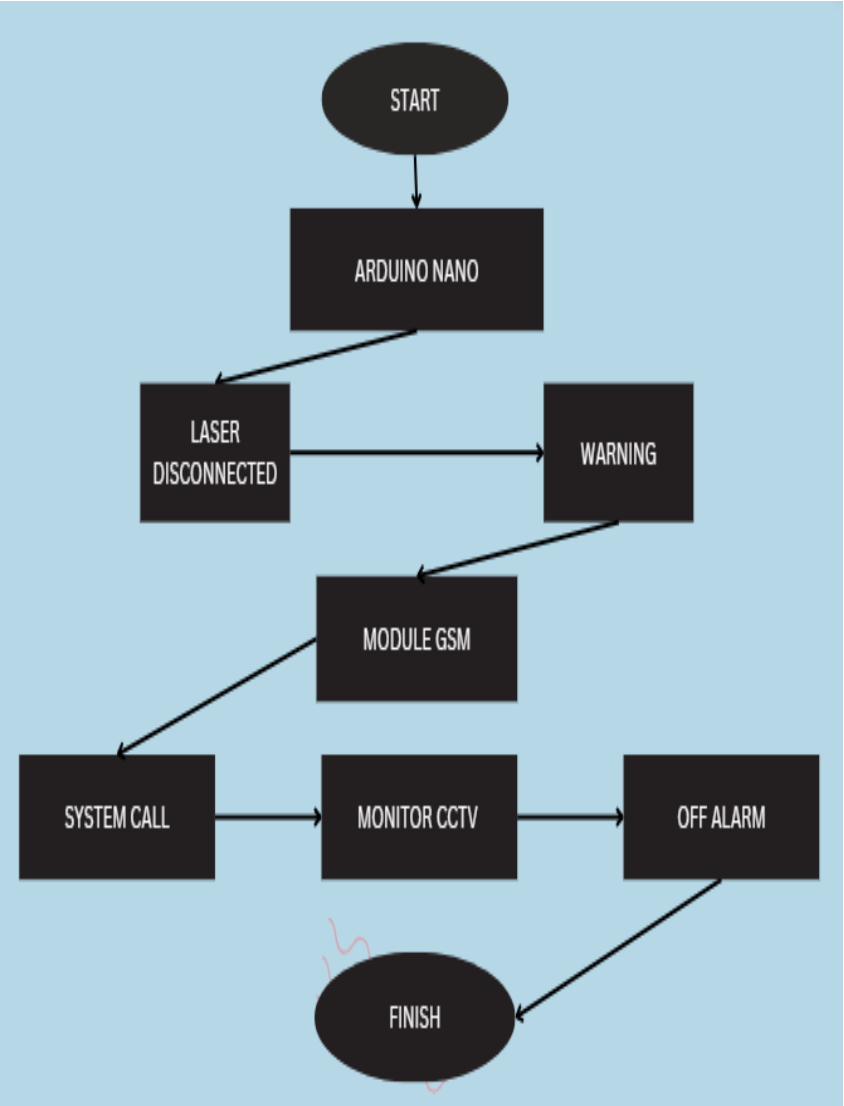


Figure 3.8 Flowchart of prototype development of LSAB

3.6 DATA COLLECTION

The objective of data collection is to assess the reliability and effectiveness of the prototype in detecting intrusions and its practical applicability in various environments.

i. Sampling Technique

The data collection using questionnaires which are distributed to the target respondents. The respondents will be the security personnel which are trained in security operations to evaluate the system's performance and responsiveness. The intrusion simulation will be using controlled scenarios involving individuals simulating intrusions to test the system's detection accuracy.

ii. Sampling Locations

Select diverse locations representing different environmental conditions (e.g., indoor office spaces, outdoor open areas, locations with varying light intensities or weather conditions).

iii. Experimental Setup:

Install the laser security beam system in selected locations, ensuring proper alignment and calibration as per design specifications. Implement controlled intrusion scenarios to test the system's detection capabilities in various environments.

iv. Data Collection

Record and analyse system responses to intrusion simulations, capturing data on the detection accuracy, false alarm rate and response time. The detection accuracy to measure the system's ability to accurately detect intrusions in different environmental settings. Meanwhile, the false alarm rate will assess the frequency of false alarms

triggered by non-intrusive elements such as the animals and environmental factors. The response time will record the system's response time from intrusion detection to alarm activation.

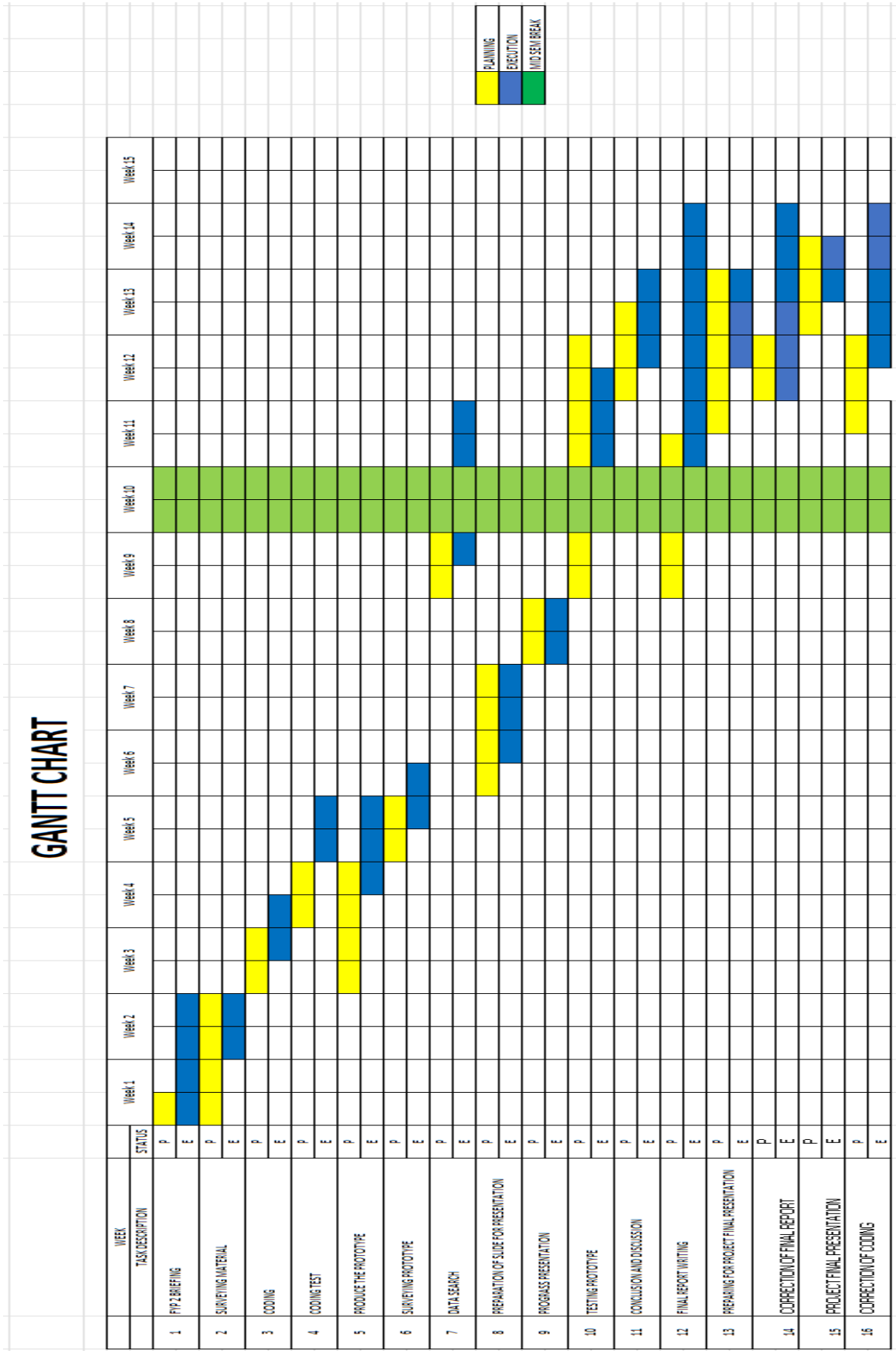
v. Statistical Analysis

The data collection will be analysed using statistical methods and presented in a pie chart to represent data in a pictorial form, making it easier to visualize and understand the proportionate parts or composition of a data set. This process aims to systematically evaluate the performance of the prototype across diverse environments using controlled experiments and statistical analysis. The data collection process aims to systematically evaluate the performance of the laser security beam system across diverse environments using controlled experiments and statistical analysis. By implementing a stratified sampling approach and comprehensive data collection methods, the study seeks to provide insights into the system's reliability and practical applicability for real-world security needs.

vi. Interpretation and conclusions

Analyse qualitative feedback or observations from security personnel regarding the system’s usability, reliability, and practical applicability in real-world scenarios. Interpret findings from the data analysis to draw conclusions regarding the prototype of laser security beam system's performance. Provide insights into system strengths, weaknesses, and areas for improvement based on statistical outcomes and correlations between performance metrics and environmental factors. The conclusion with recommendations will be made for system optimization or enhancements to improve overall effectiveness and reliability in various settings.

3.7 GANTT CHART



3.8 SUMMARY

The data collection procedure for assessing the effectiveness of the Laser Security Alarm Beam (LSAB) prototype is meticulously planned to provide extensive insights into its performance in a variety of situations. Sampling strategies will be carefully chosen to provide representative samples from various demographic groups and environmental situations, hence increasing the validity and generalizability of the results. Experimental sets will be constructed in controlled surroundings as well as real-world scenarios to imitate a variety of conditions and evaluate the system's flexibility and reliability.

Structured surveys will be provided to both security professionals and system users to acquire input on their experiences, perspectives, and suggestions for the prototype's usability and efficacy. These surveys will be aimed to provide specific insights into users' experiences with the LSAB system, such as simplicity of installation, use, and maintenance, as well as the system's responsiveness and accuracy in detecting intrusions. Furthermore, open-ended questions enable participants to contribute qualitative feedback, allowing for a more nuanced assessment of their experiences and recommendations for change.

The acquired data will be analysed using statistical approaches, resulting in quantitative assessments of the LSAB prototype's performance indicators such as detection accuracy, false alarm rates, and response time. The evaluation method seeks to produce a comprehensive knowledge of the prototype's strengths, limits, and opportunities for improvement by combining quantitative data analysis with qualitative insights derived from survey replies. Overall, the data gathering technique described assures a comprehensive and systematic evaluation of the LSAB prototype, establishing the groundwork for informed decision-making and iterative modification of the system to satisfy users' changing needs and security requirements.

CHAPTER 4
RESULT ANALYSIS

4.1 INTRODUCTION

The result analysis section serves as a critical juncture in exploring the prototype of LASB project. The data collection from various tests, experiments, and user interactions to extract meaningful insights and draw informed conclusions. Through a systematic analysis of the results, it aims to evaluate our prototype's performance, reliability, and usability. This section not only sheds light on the effectiveness of our solution but also lays the groundwork for identifying areas of strength and opportunities for improvement. As delve into the intricacies of the findings, it is uncovering valuable knowledge that informs the trajectory of the project and contributes to the advancement of security technology.

4.2 RESULT ANALYSIS

4.2.1 Demographic Information

Demographics are the characteristics of a population that have been categorized by distinct criteria such as age, gender and employment status to study the attributes of a particular group. The data was collected through a questionnaire from 40 respondents based on the prototype of LSAB. Starting with demographic information, the gender distribution showed that 57.9% of the participants identified as male, while 42.1% identified as female. When examining employment status, most respondents were students, constituting 57.9% of the sample. Additionally, 5.3% of participants reported being retired, and 36.8% identified as employees in various roles as in Figure 4.1.

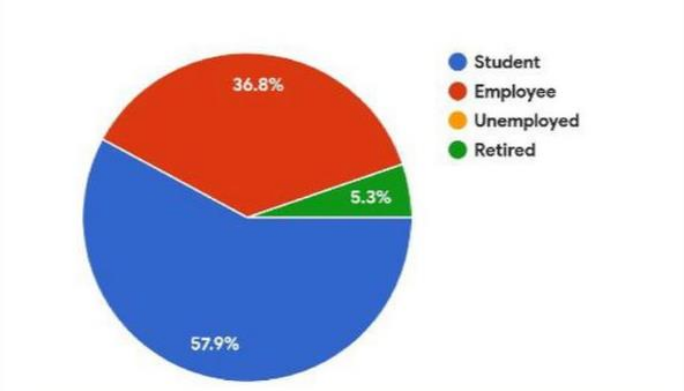


Figure 4.1 Employment status of the respondents

4.2.2 Home Security

A significant portion of respondents, 57.9%, reported having experienced home invasion incidents affecting either themselves or their families. Figure 4.2 highlights the prevalence of such occurrences within our sample population. When asked about the timing of intruder activity, the majority, comprising 68.4% of respondents, identified the late-night to early-morning period, from 12:01 a.m. to 5:59 a.m., as the most active time for home invasion. Additionally, 10.5% mentioned the morning hours from 6:00 a.m. to 12:00 p.m. as a period of heightened risk.

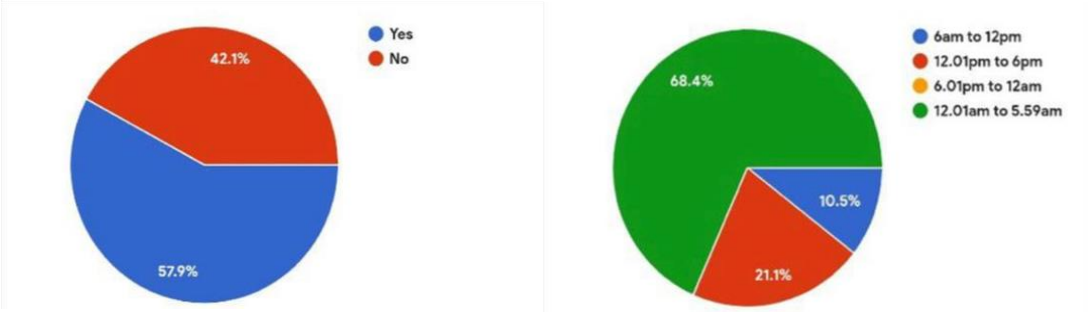


Figure 4.2 Mostly active time in-home invasion activity

Perceptions of the widespread nature of home invasion cases in Malaysia were varied but notable. While 57.9% of participants agreed with this statement, indicating acknowledgment of the issue, a significant 31.6% strongly agreed, underscoring deep concern about the prevalence of such incidents. Regarding the potential danger posed

by intruders, a substantial portion of respondents, 36.8%, agreed that intruders pose a threat to property and endanger lives. A significant majority, 52.6%, strongly agreed with this sentiment, highlighting a solid awareness of the risks involved as in Figure 4.3.

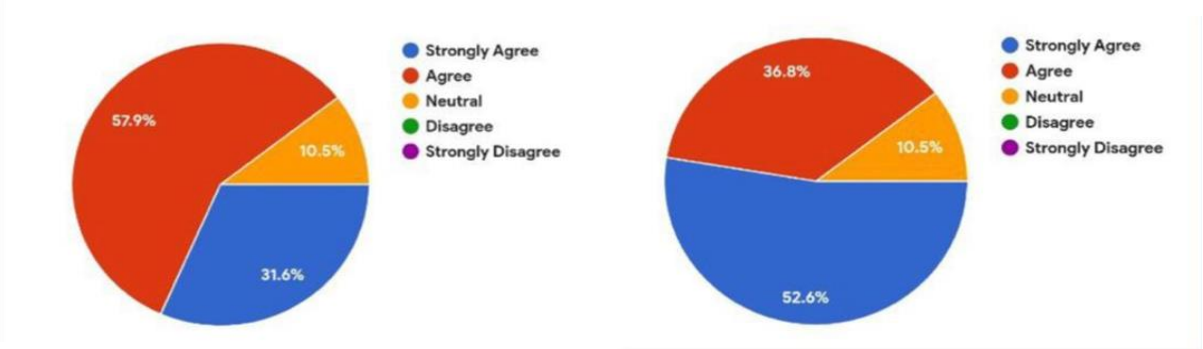


Figure 4.3 Home invasion cases awareness

Figure 4.4 shows the overwhelmingly supported from the respondents on the importance of security systems in homes, with 57.9% strongly agreeing and 31.6% agreeing that such systems are essential. It underscores the perceived necessity of security measures to protect against home invasion.

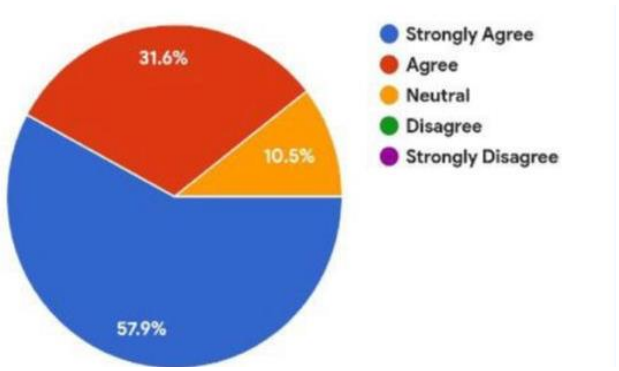


Figure 4.4 The importance of security systems in homes

Opinions varied regarding the effectiveness of current home security systems, with 42.1% expressing neutrality, 15.8% disagreeing, 21.1% strongly agreeing, and another 21.1% agreeing. This indicates a diverse range of perspectives on the efficacy of existing security measures among our participants as in Figure 4.5.

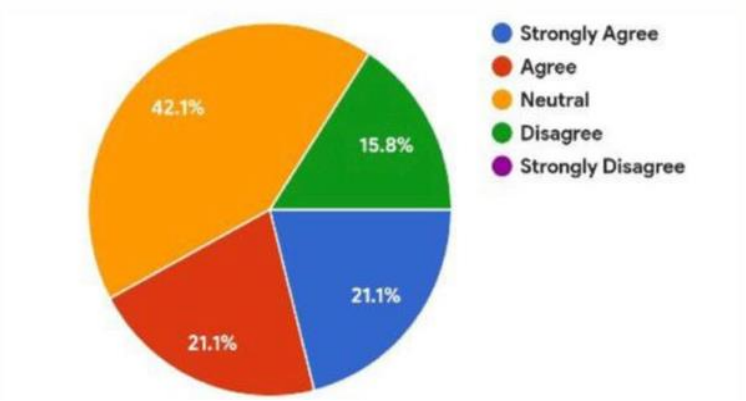


Figure 4.5 The effectiveness of current home security systems

4.2.3 Efficiency and Functionality

Approximately 42.2% of participants agreed or strongly agreed to their familiarity, indicating some prior exposure. Concerning understanding the safety system's concept and workings, a majority, totalling 53.7%, either agreed or strongly agreed, indicating a substantial understanding among respondents. Most participants were familiar with the fundamental principles of our prototype as in Figure 4.6.

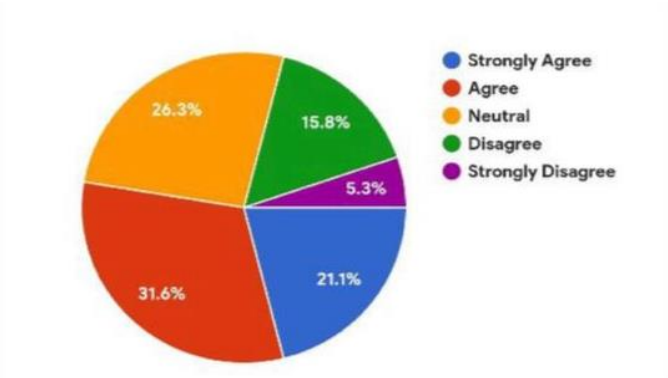


Figure 4.6 Familiarity to concept and working method.

Figure 4.7 assessing the user-friendliness of our prototype, a significant majority, comprising 42.1% of participants, strongly agreed, indicating a high level of satisfaction with its ease of use. This positive feedback suggests that the prototype was well-received in terms of usability. Opinions were more varied regarding the convenience and efficiency of the prototype for intelligent living. While 36.8% agreed

or strongly agreed, indicating satisfaction with its performance, a notable 42.1% either disagreed or strongly disagreed. It suggests a divergence of opinions regarding how the prototype enhances convenience and efficiency in everyday living.

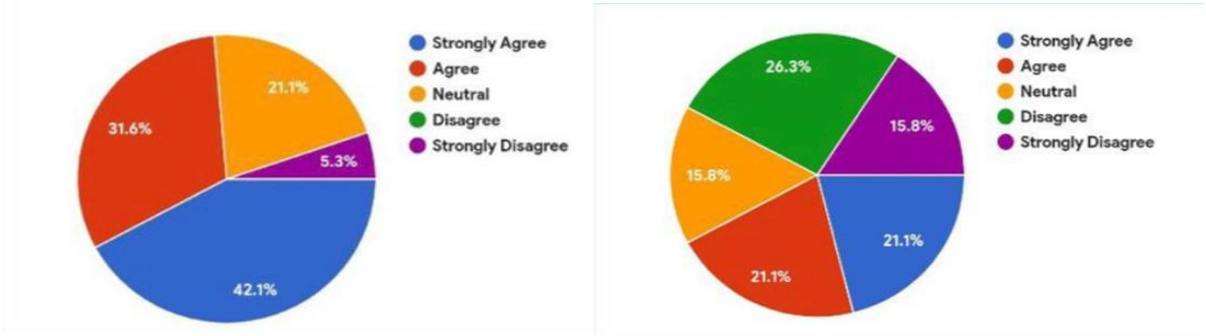


Figure 4.7 User-friendliness

However, in comparing the prototype to conventional security systems like door locks and CCTV, most participants, totalling 78.9%, either agreed or strongly agreed on its effectiveness. It indicates a widespread perception that the prototype offers superior security measures to traditional systems in Figure 4.8.

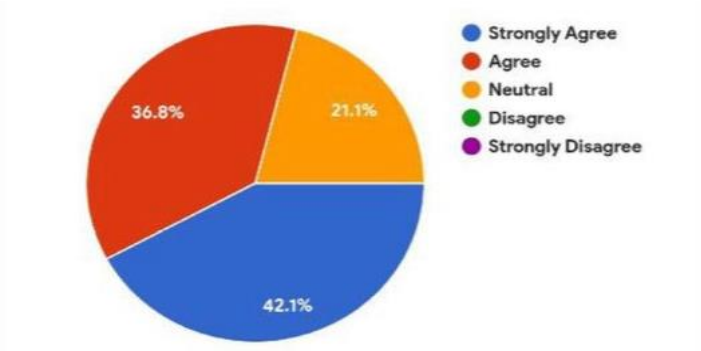


Figure 4.8 Security measure

Moreover, participants expressed confidence in our prototype's preventive capabilities, with 84.2% either agreeing or strongly agreeing that it could reduce and prevent home invasion cases such in Figure 4.9. It indicates a high level of trust in the effectiveness of our security solution.

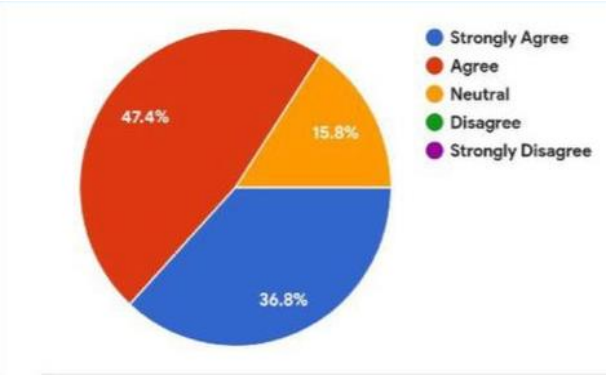


Figure 4.9 Preventive capabilities

Additionally, regarding the feature enabling users to detect intrusions and alert owners through phone calls, a substantial majority, 89.5%, either agreed or strongly agreed on its value as in Figure 4.10. It underscores the perceived importance of real-time alerts in enhancing home security.

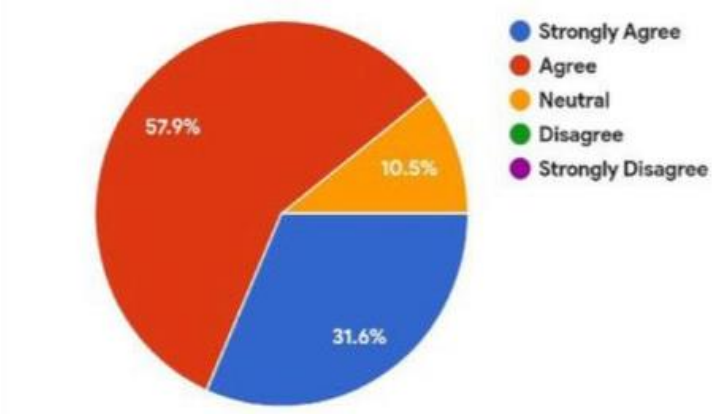


Figure 4.10 Phone call feature

Finally, Figure 4.11 shows the integrating of IoT technology for optimized performance received widespread approval, with 89.5% of participants agreeing or strongly agreeing on its effectiveness. It suggests that participants recognized the potential of IoT technology to enhance the performance and functionality of our prototype.

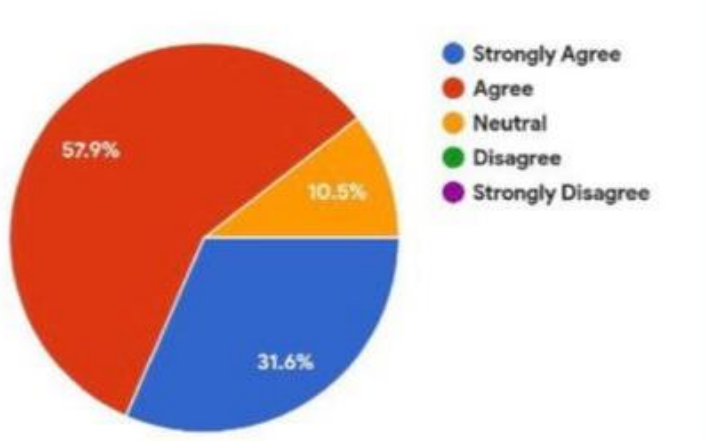


Figure 4.11 IoT technology integration

4.3 CONCLUSION

To summarize, the full input obtained from participants provides strong validation for the prototype laser security alarm beam. Regardless of previous experience with laser security systems, participants' comments demonstrated a thorough comprehension of the prototype's functionality and potential impact on improving home security. The overwhelming positive feedback on its user-friendly design and performance when compared to traditional security measures highlights its potential as a practical solution to the critical issue of household security. Particularly striking was the general enthusiasm for features like real-time intruder detection and easy interaction with IoT platforms, indicating that the prototype has the potential to bring in a new era of smart and proactive home security solutions.

As we move forward, the insights gained from participant comments will be useful in developing and optimizing the prototype. By adding recommendations and correcting any identified areas for improvement, we want to improve the prototype's efficacy and usability. Finally, our goal is to provide a laser security alarm beam system that not only meets but surpasses homeowners' expectations, providing greater protection and peace of mind in an ever-changing security scenario.

CHAPTER 5
CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

The confluence of ideas gleaned from questionnaire replies marks an important milestone in our laser security alarm beam research. As we progress through this chapter, we discover the invaluable viewpoints offered by respondents, which throw light on areas ripe for refinement and enhancement. We identify common themes and proposals from the feedback, which act as guiding beacons for the creation of our prototype. By combining these findings, we hope to improve the functionality and usability of our laser security system while also ensuring its efficacy in real-world security circumstances.

The strategy is based on the recognition that user feedback may spur innovation and growth. As we work through the numerous recommendations made by responders, we remain committed to leveraging this collective wisdom to generate meaningful progress in our project. Each tip, from interface enhancements to detection sensitivity optimization, serves as a foundation for a more robust and reliable security system. By listening to our users, we position ourselves to create a laser security alarm beam system that not only meets but surpasses expectations, providing individuals and communities with increased safety and peace of mind.

The feedback from the questionnaire respondents serves as a compass, directing us to the next stage of the project's growth. We embark on a road of continuous improvement by carefully considering their observations and comments, aiming to refine our prototype and maximize its influence in the field of home security. As we embrace the collaborative spirit of invention, we remain strong in our mission to producing a laser security system that not only satisfies the needs of users but also establishes new benchmarks for industry excellence.

5.2 RECOMMENDATION

The respondents received two future recommendations regarding the improvements in the project's prototype. Firstly, a notable recommendation is to incorporate camera feed capabilities for entry points using smartphones. This addition would offer users real-time visual access to their home's entry points, empowering them with enhanced surveillance and monitoring capabilities. By leveraging the ubiquity of smartphones, this feature would enable users to remotely monitor their home's security status, providing peace of mind and increased control over their environment.

Secondly, participants suggest a redesign to adopt a more futuristic or minimalist design approach. This aesthetic enhancement aims to modernize the prototype's appearance, aligning it with contemporary preferences and interior design trends. A sleek and minimalist design enhances the prototype's visual appeal and promotes seamless integration into various home environments. This aesthetic refinement reflects users' evolving expectations for smart home devices, emphasizing both functionality and style in equal measure.

Incorporating these recommended changes would address current user preferences and needs and position the prototype as a cutting-edge solution in the realm of home security. Combining the enhanced functionality with a modern design aesthetic, the prototype can offer users a comprehensive and visually appealing security solution for their homes.

5.3 CONCLUSION

As the culmination of the final year project, the development of the prototype of laser security alarm beam represents a significant achievement in security technology. Through the collective efforts in diligent research, meticulous design, and rigorous testing, it has successfully constructed a prototype that effectively detects intrusions and safeguards the designated area. The integration of laser technology offers a sophisticated yet practical solution for enhancing security measures.

Implementing a comprehensive questionnaire provided valuable insights into the usability and functionality of our prototype, ensuring that it meets the needs and expectations of potential users. The positive feedback that received underscores the relevance and potential impact of our project in real-world security applications. There is ample opportunity for further refinement and optimization of the laser security alarm beam system in the future. Future iterations could explore enhancements such as increased detection range, improved sensitivity, and seamless integration with existing security infrastructure.

In conclusion, the prototype of the laser security alarm beam project serves as a testament to the academic journey and holds promise for addressing contemporary security challenges. We are proud of accomplishments and optimistic about the possibilities for continued innovation in this field.

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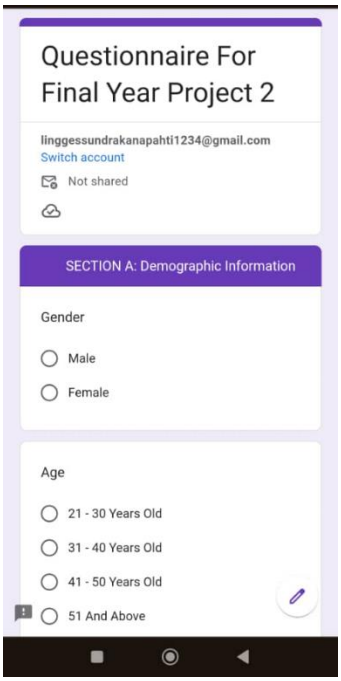
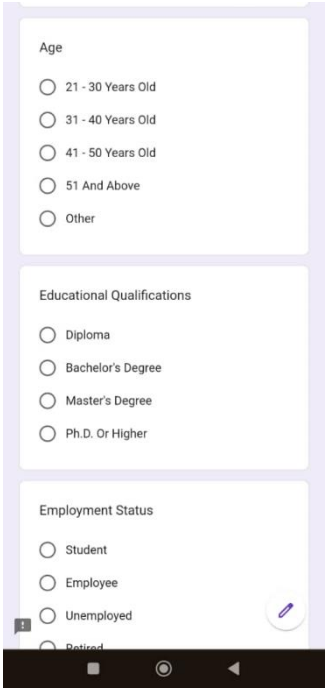
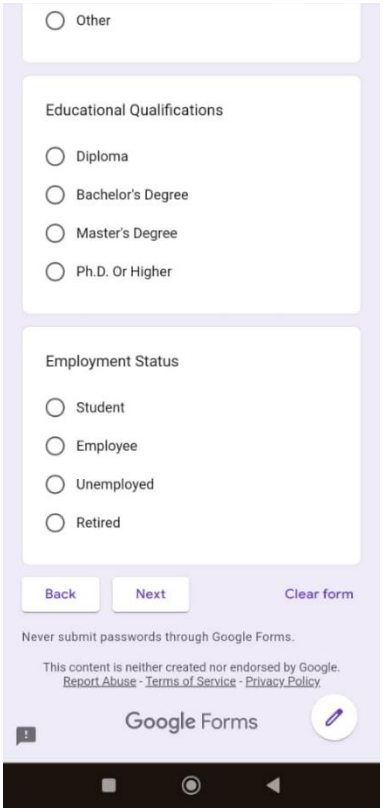
APPENDICES

APPENDIX A

Questionnaire






Other
Educational Qualifications
Diploma
Bachelor's Degree
Master's Degree
Ph.D. Or Higher
Employment Status
Student
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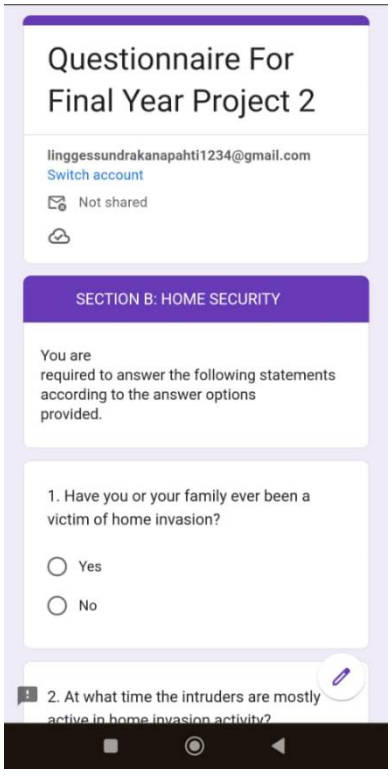
Questionnaire For Final Year Project 2
linggessundrakanapahti1234@gmail.com
Switch account
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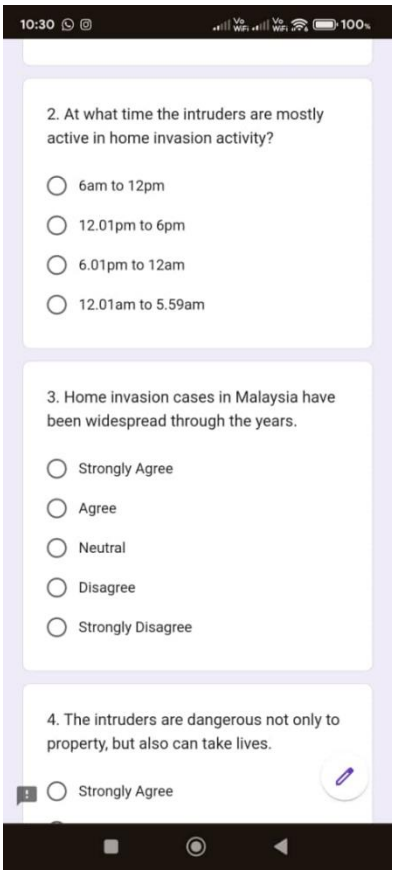
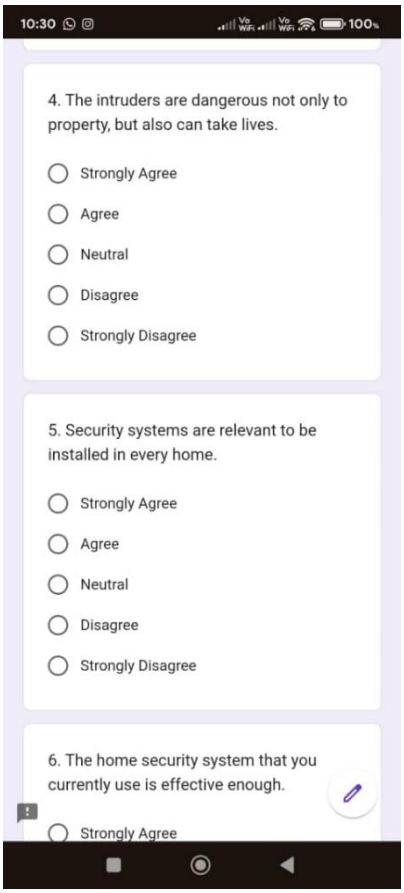
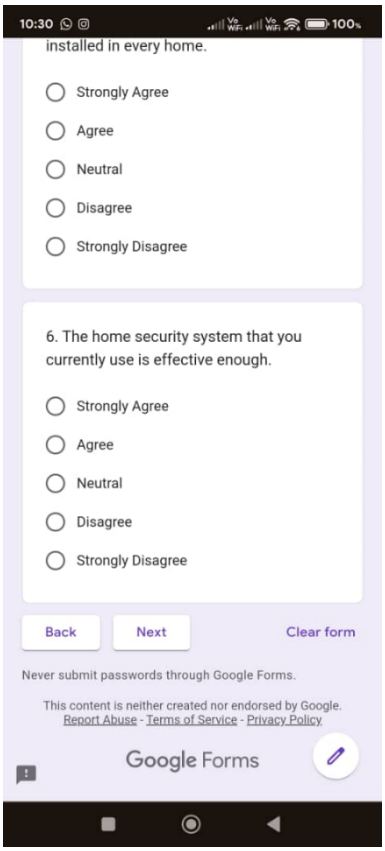
SECTION B: HOME SECURITY
You are required to answer the following statements according to the answer options provided.
1. Have you or your family ever been a victim of home invasion?
Yes
No
2. At what time the intruders are mostly


10:30
2. At what time the intruders are mostly active in home invasion activity?
6am to 12pm
12.01pm to 6pm
6.01pm to 12am
12.01am to 5.59am
3. Home invasion cases in Malaysia have been widespread through the years.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
4. The intruders are dangerous not only to property, but also can take lives.
Strongly Agree


10:30
4. The intruders are dangerous not only to property, but also can take lives.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
5. Security systems are relevant to be installed in every home.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
6. The home security system that you currently use is effective enough.
Strongly Agree


10:30
installed in every home.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
6. The home security system that you currently use is effective enough.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
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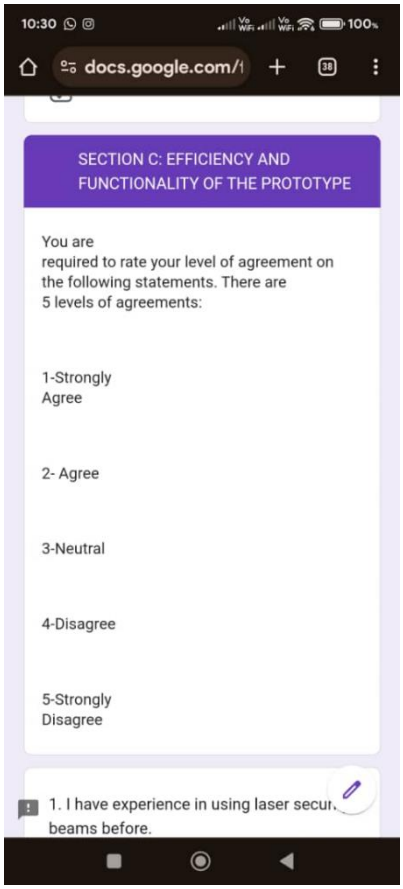
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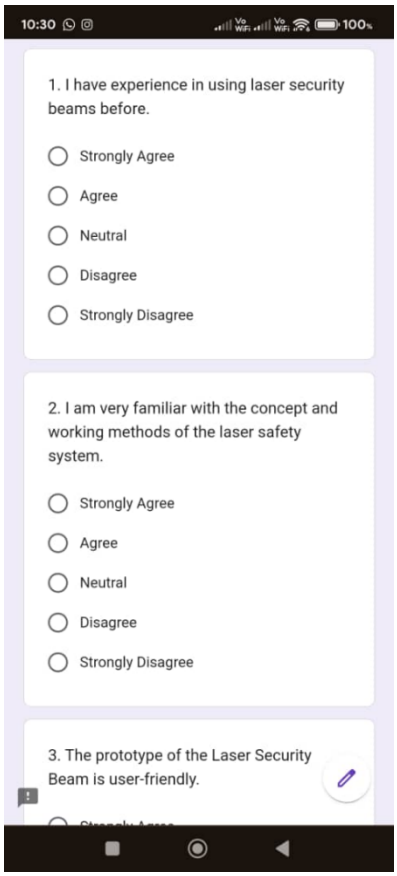
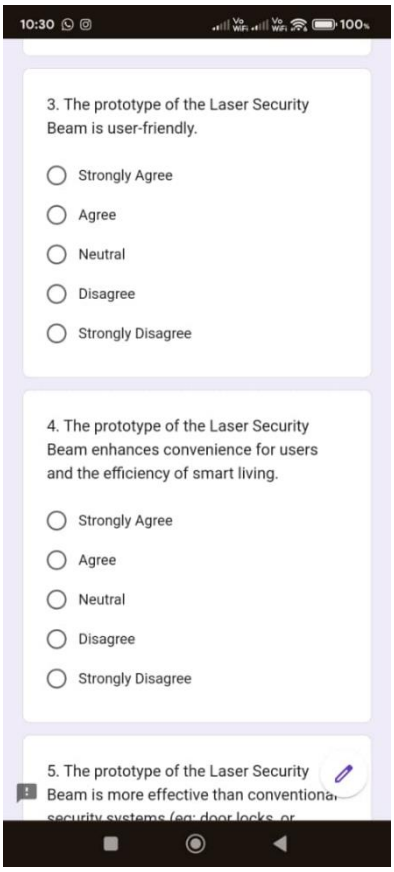
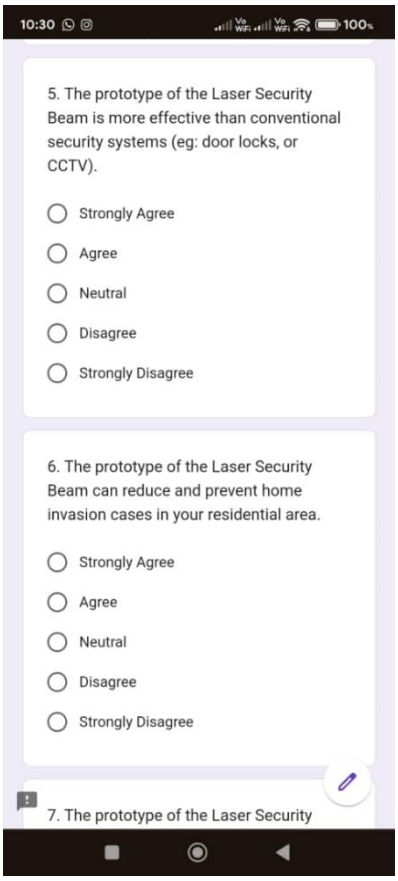
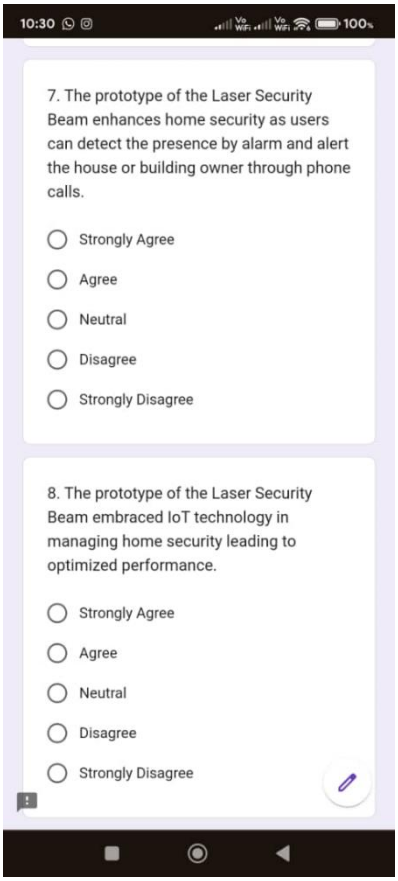
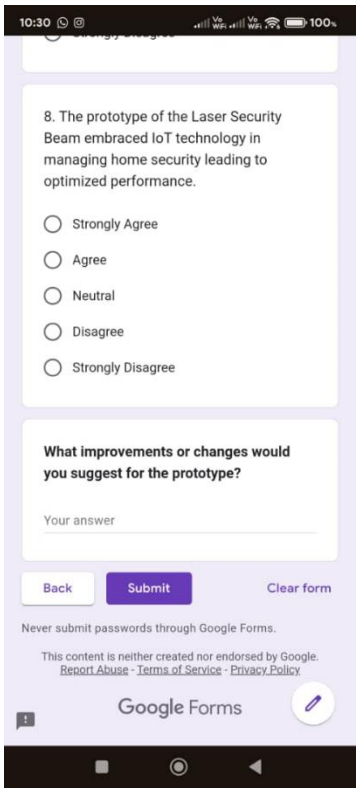
SECTION C: EFFICIENCY AND FUNCTIONALITY OF THE PROTOTYPE
You are required to rate your level of agreement on the following statements. There are 5 levels of agreements:
1-Strongly Agree
2- Agree
3-Neutral
4-Disagree
5-Strongly Disagree
1. I have experience in using laser secur
beams before.


10:30
1. I have experience in using laser security beams before.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
2. I am very familiar with the concept and working methods of the laser safety system.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
3. The prototype of the Laser Security Beam is user-friendly.


10:30
3. The prototype of the Laser Security Beam is user-friendly.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
4. The prototype of the Laser Security Beam enhances convenience for users and the efficiency of smart living.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
5. The prototype of the Laser Security Beam is more effective than conventional


10:30
5. The prototype of the Laser Security Beam is more effective than conventional security systems (eg: door locks, or CCTV).
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
6. The prototype of the Laser Security Beam can reduce and prevent home invasion cases in your residential area.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
7. The prototype of the Laser Security


10:30
7. The prototype of the Laser Security Beam enhances home security as users can detect the presence by alarm and alert the house or building owner through phone calls.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
8. The prototype of the Laser Security Beam embraced IoT technology in managing home security leading to optimized performance.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree


10:30
8. The prototype of the Laser Security Beam embraced IoT technology in managing home security leading to optimized performance.
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
What improvements or changes would you suggest for the prototype?
Your answer
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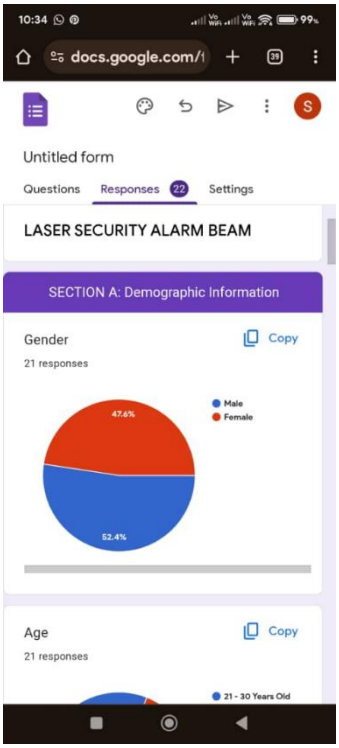
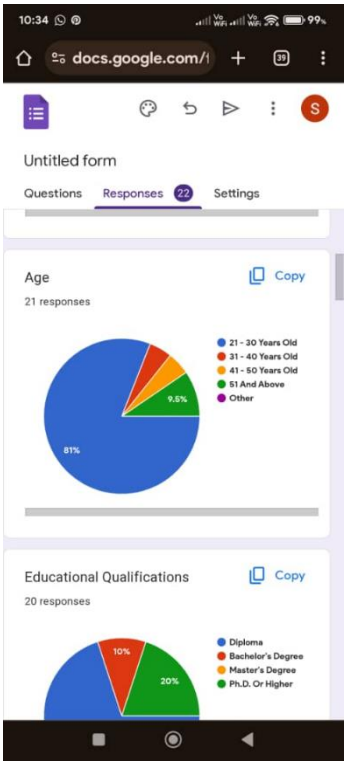
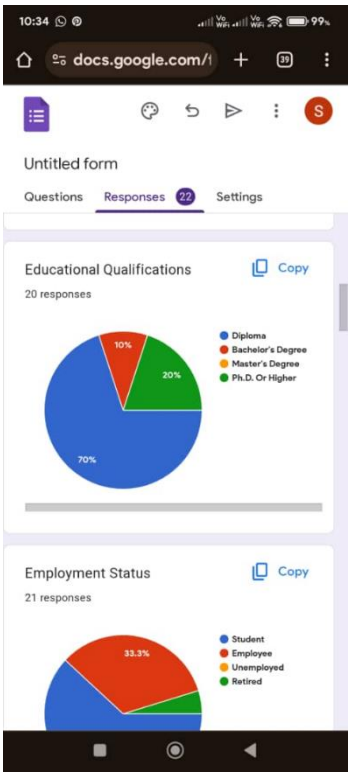
APPENDIX B

Respondent List



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10%
20%
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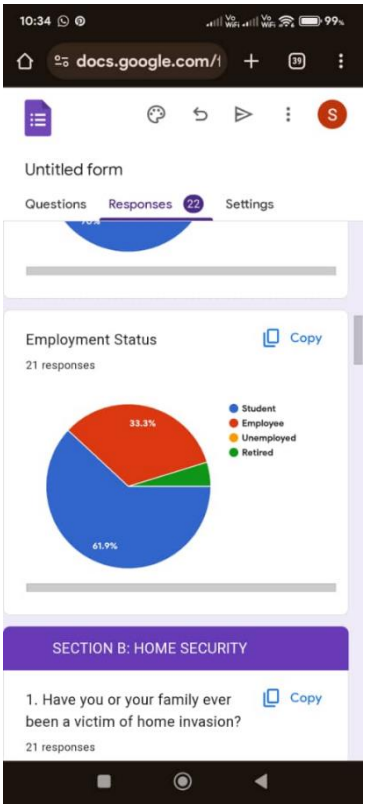
Master's Degree
Ph.D. Or Higher
Employment Status
Copy
21 responses
33.3%
Student
Employee
Unemployed
Retired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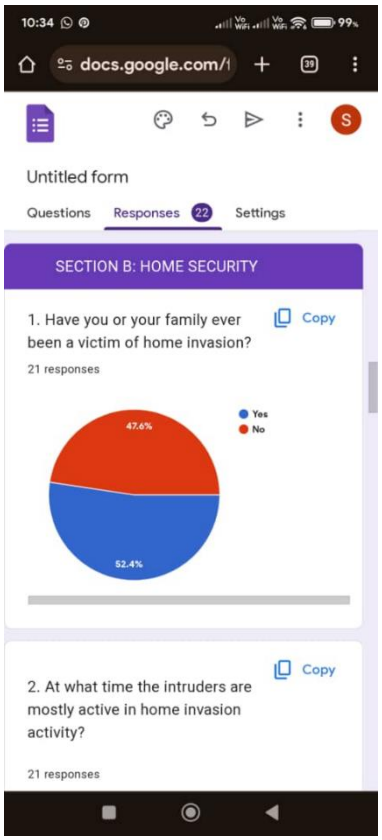
Untitled form
Questions
Responses 22
Settings
Employment Status
Copy
21 responses
33.3%
61.9%
Student
Employee
Unemployed
Retired
SECTION B: HOME SECURITY
1. Have you or your family ever been a victim of home invasion?
Copy
21 responses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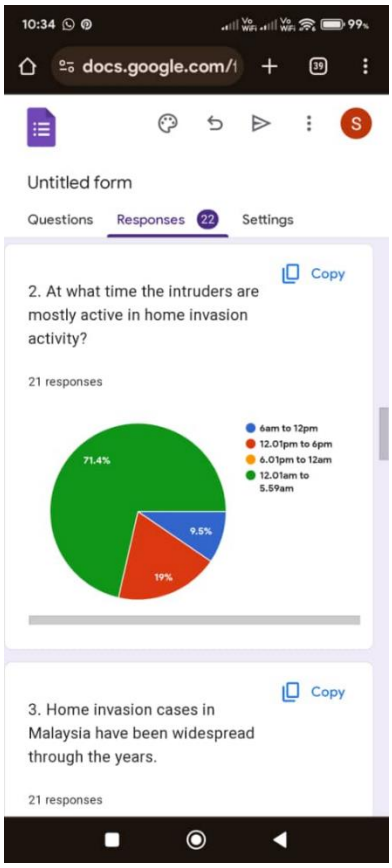
Untitled form
Questions
Responses 22
Settings
SECTION B: HOME SECURITY
1. Have you or your family ever been a victim of home invasion?
Copy
21 responses
Yes
No
47.6%
52.4%
Copy
2. At what time the intruders are mostly active in home invasion activity?
21 responses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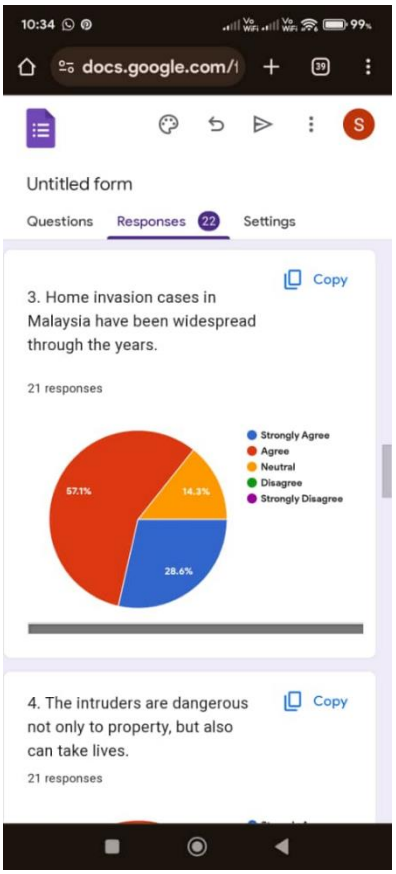
Untitled form
Questions
Responses 22
Settings
Copy
2. At what time the intruders are mostly active in home invasion activity?
21 responses
6am to 12pm
12.01pm to 6pm
6.01pm to 12am
12.01am to 5.59am
71.4%
9.5%
19%
Copy
3. Home invasion cases in Malaysia have been widespread through the years.
21 responses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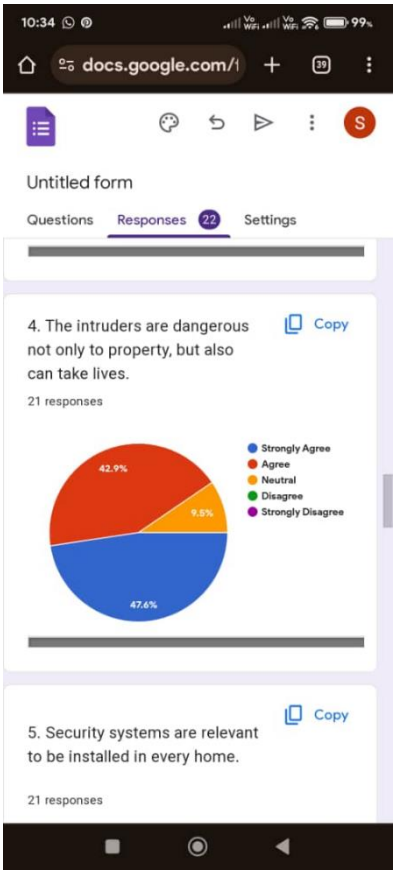
Untitled form
Questions
Responses 22
Settings
Copy
3. Home invasion cases in Malaysia have been widespread through the years.
21 responses
57.1%
14.3%
28.6%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
Copy
4. The intruders are dangerous not only to property, but also can take lives.
21 responses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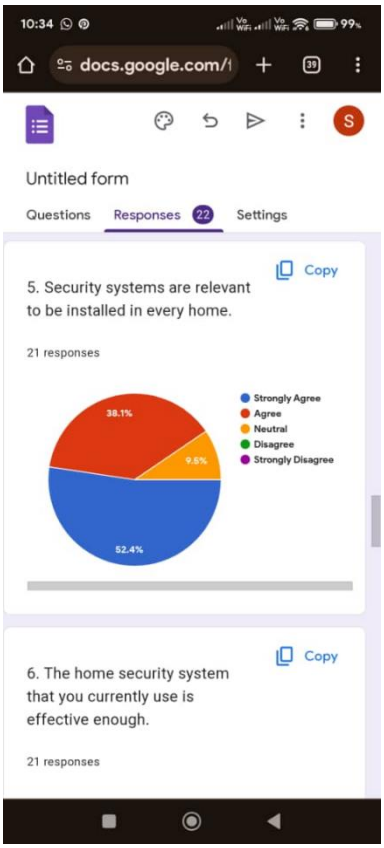
Untitled form
Questions
Responses 22
Settings
Copy
4. The intruders are dangerous not only to property, but also can take lives.
21 responses
42.9%
9.5%
47.6%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
Copy
5. Security systems are relevant to be installed in every home.
21 responses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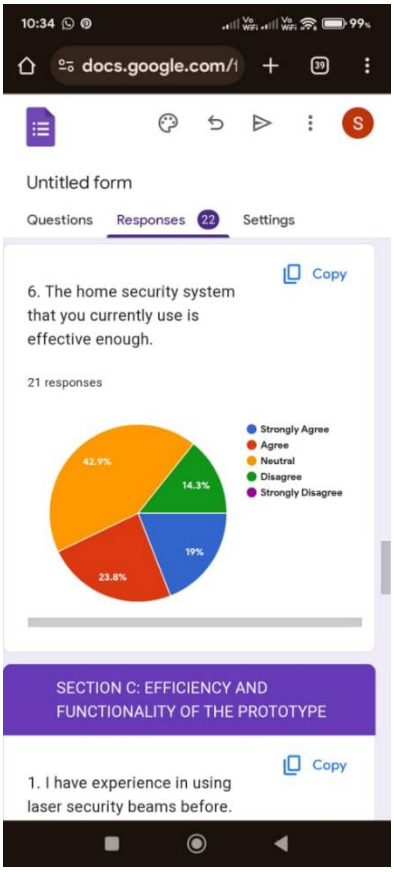
Untitled form
Questions
Responses 22
Settings
Copy
5. Security systems are relevant to be installed in every home.
21 responses
38.1%
9.5%
52.4%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
Copy
6. The home security system that you currently use is effective enough.
21 responses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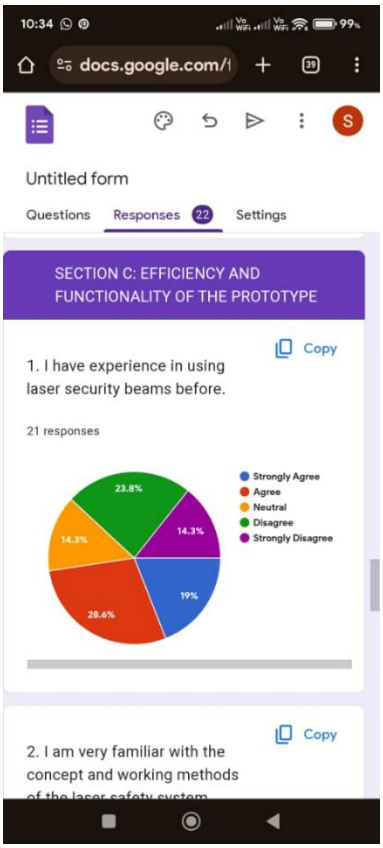
Untitled form
Questions
Responses 22
Settings
Copy
6. The home security system that you currently use is effective enough.
21 responses
42.9%
14.3%
19%
23.8%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
SECTION C: EFFICIENCY AND FUNCTIONALITY OF THE PROTOTYPE
Copy
1. I have experience in using laser security beams before.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Questions
Responses 22
Settings
SECTION C: EFFICIENCY AND FUNCTIONALITY OF THE PROTOTYPE
Copy
1. I have experience in using laser security beams before.
21 responses
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
23.8%
14.3%
14.3%
19%
28.6%
Copy
2. I am very familiar with the concept and working methods


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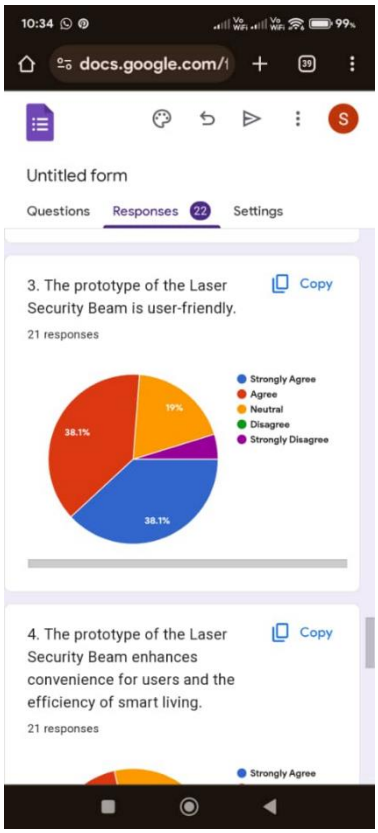
Questions
Responses 22
Settings
Copy
2. I am very familiar with the concept and working methods of the laser safety system.
21 responses
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
23.8%
14.3%
38.1%
19%
Copy
3. The prototype of the Laser Security Beam is user-friendly.
21 responses
Strongly Agree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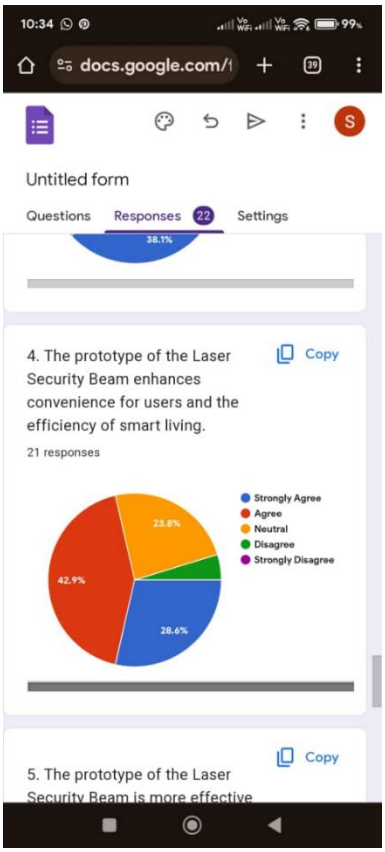
Questions
Responses 22
Settings
3. The prototype of the Laser Security Beam is user-friendly.
Copy
21 responses
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
38.1%
19%
38.1%
4. The prototype of the Laser Security Beam enhances convenience for users and the efficiency of smart living.
Copy
21 responses
Strongly Agree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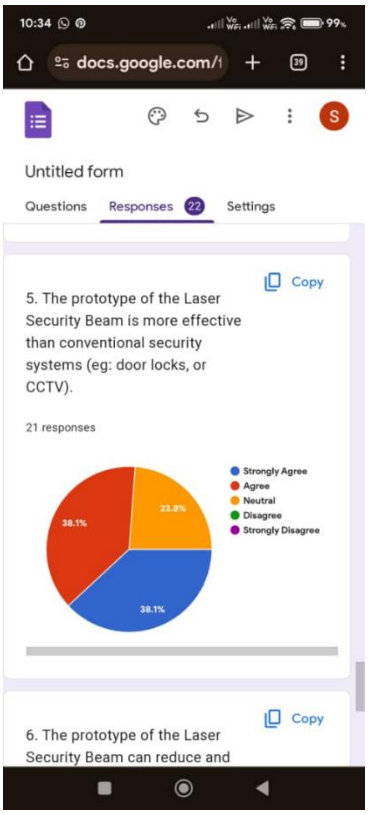
Questions
Responses 22
Settings
38.1%
4. The prototype of the Laser Security Beam enhances convenience for users and the efficiency of smart living.
Copy
21 responses
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
23.8%
42.9%
28.6%
5. The prototype of the Laser Security Beam is more effective
Copy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Questions
Responses 22
Settings
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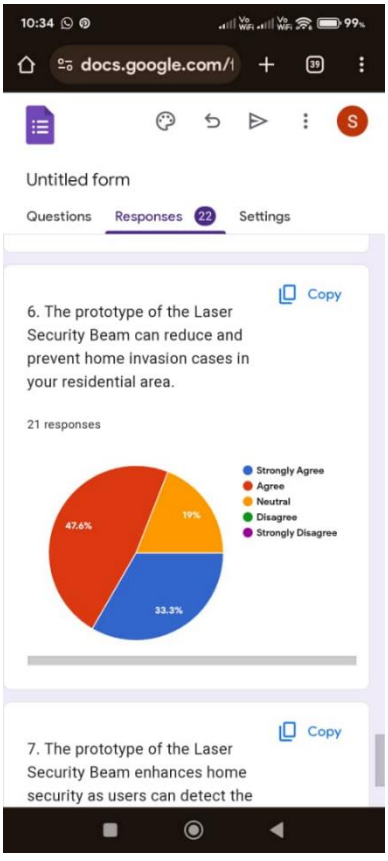
5. The prototype of the Laser Security Beam is more effective than conventional security systems (eg: door locks, or CCTV).
21 responses
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
38.1%
23.8%
38.1%
Copy
6. The prototype of the Laser Security Beam can reduce and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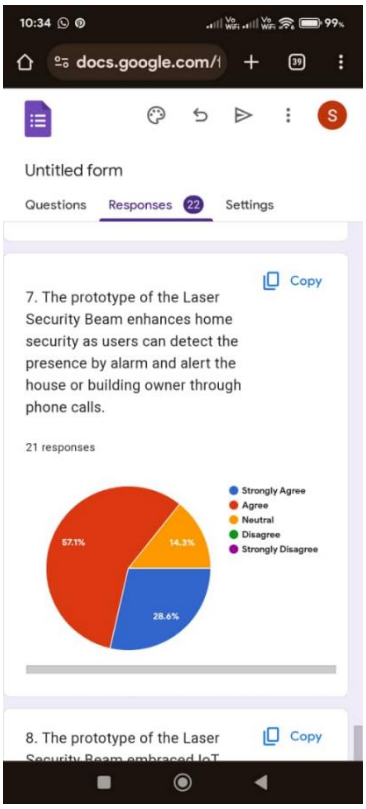
Questions
Responses 22
Settings
Copy
6. The prototype of the Laser Security Beam can reduce and prevent home invasion cases in your residential area.
21 responses
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
47.6%
19%
33.3%
Copy
7. The prototype of the Laser Security Beam enhances home security as users can detect the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Questions
Responses 22
Settings
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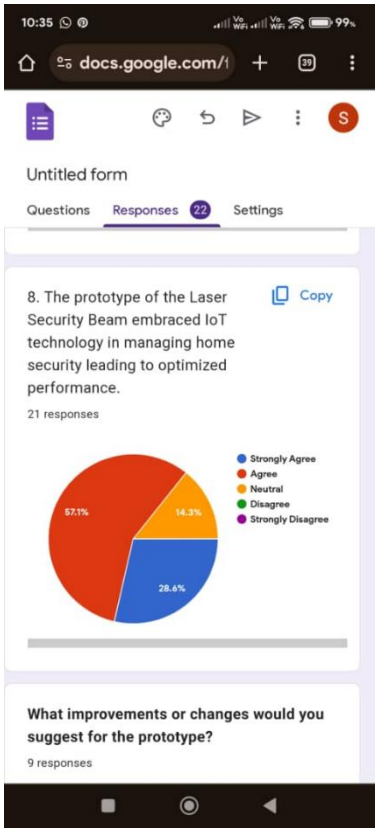
7. The prototype of the Laser Security Beam enhances home security as users can detect the presence by alarm and alert the house or building owner through phone calls.
21 responses
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
57.1%
14.3%
28.6%
Copy
8. The prototype of the Laser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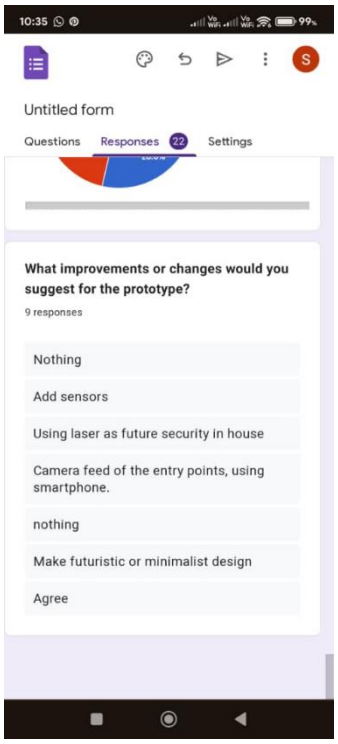
Untitled form
Questions
Responses 22
Settings
Copy
8. The prototype of the Laser Security Beam embraced IoT technology in managing home security leading to optimized performance.
21 responses
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree
57.1%
14.3%
28.6%
What improvements or changes would you suggest for the prototype?
9 responses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Untitled form
Questions
Responses 22
Settings
What improvements or changes would you suggest for the prototype?
9 responses
Nothing
Add sensors
Using laser as future security in house
Camera feed of the entry points, using smartphone.
nothing
Make futuristic or minimalist design
Agree