E-PROCEEDINGS

INTERNATIONAL TINKER INNOVATION & ENTREPRENEURSHIP CHALLENGE (i-TIEC 2025)

"Fostering a Culture of Innovation and Entrepreneurial Excellence"

23 January 2025
PTDI, UiTM Cawangan Johor
Kampus Pasir Gudang

ORGANIZED BY:

Electrical Engineering Studies, College of Engineering
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A-ST019: BAYMAX: GUARD COMPANION

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ABSTRACT

Despite a notable decline in Malaysia's overall crime rate in recent years, burglary remains a pressing concern, particularly in urban areas such as Kuala Lumpur. Traditional CCTV systems often fail to provide the level of security and deterrence needed to address this issue effectively. BayMax: Guard Companion is a mini-CCTV product specially designed to ensure enhanced home security. With unique characteristics, such as a high-resolution camera, artificial intelligence capabilities to recognize individuals' faces, a direct connection to the police station and a security alarm system. BayMax is a state of the art security solution designed to meet the growing need for advanced, reliable protection in an increasingly digital world. Combining cutting-edge technology with user-friendly features, BayMax offers enhanced security for both homes and businesses. At the core of the system are high-resolution cameras that deliver crystal-clear video footage, ensuring that every detail is captured with unmatched precision. This high-definition imaging enhances facial recognition capabilities, making it easier to identify individuals even in low-light conditions or at a distance. Users can trust that every moment of surveillance is captured with clarity, leaving no room for error when it comes to security, thereby reducing property crimes and instilling greater confidence among residents in Malaysia.

Keywords: burglary, guard companion, alarm, police station, CCTV.

1. Product Description

The heart of BayMax's functionality lies in its powerful artificial intelligence (AI) system. This advanced AI technology is capable of recognizing the faces of individuals registered by the owner, offering a highly personalized and secure surveillance experience. By using AI to differentiate between familiar faces and unfamiliar ones, BayMax reduces the risk of false alarms and ensures only legitimate threats are flagged. This intelligent system continually learns and adapts to improve its recognition accuracy over time, providing long-term reliability and peace of mind. BayMax: Guard Companion is a state-of-the-art mini-CCTV designed to provide enhanced home security in a compact and reliable package. Featuring a high-resolution camera, it captures crystal-clear footage, ensuring no detail is missed, even in low-light conditions. Equipped with advanced artificial intelligence, BayMax can recognize individuals' faces, distinguishing between familiar visitors and potential threats. In case of emergencies, its direct connection to the police station ensures rapid response, while the integrated security alarm system acts as a powerful deterrent against intruders. Combining

smart technology with user-friendly functionality, BayMax offers seamless protection for your home, giving you peace of mind every day. Keep your loved ones and property safe with this innovative security companion.

2. Pictures

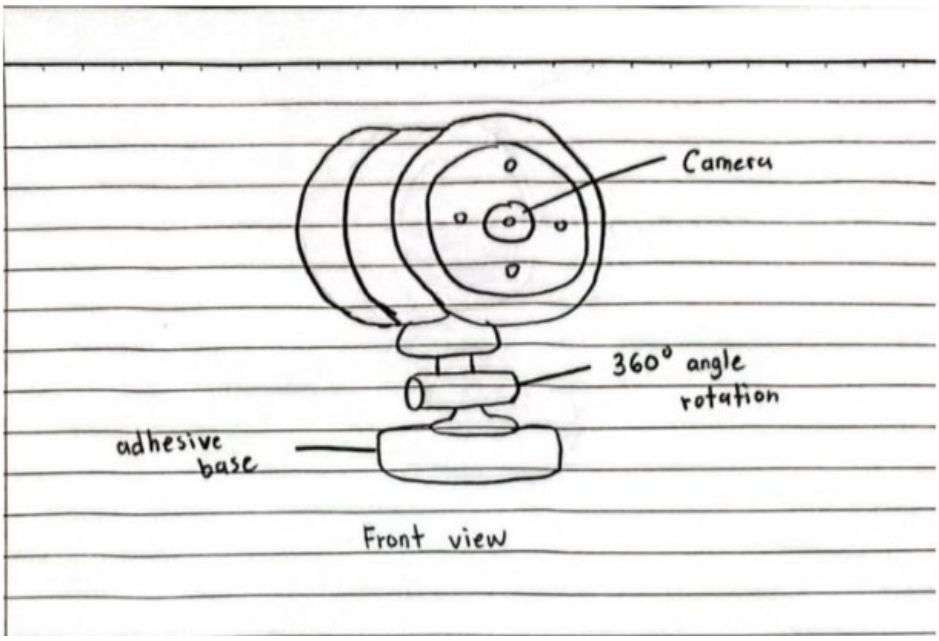

Figure 1. BayMax Front View

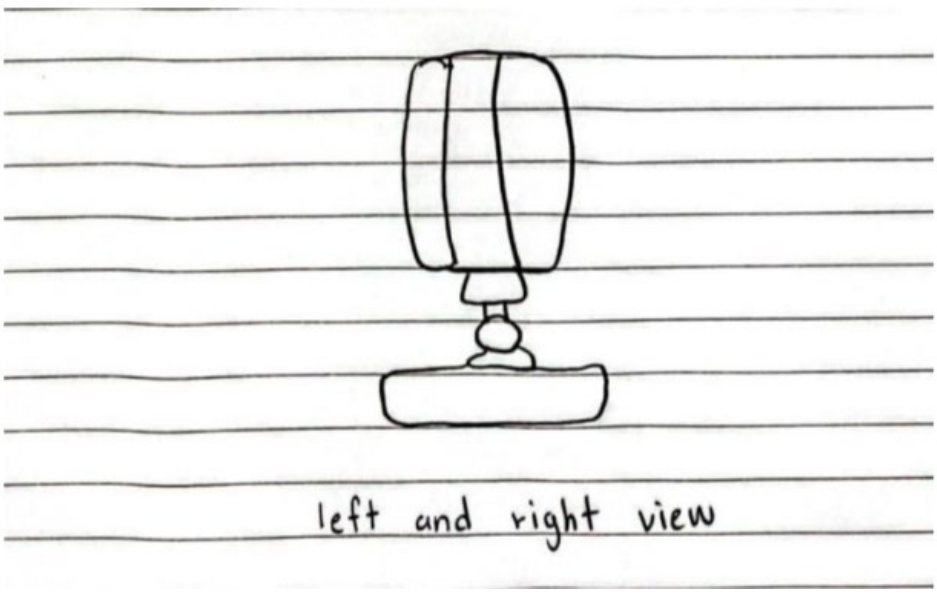

Figure 2. BayMax Left and Right View

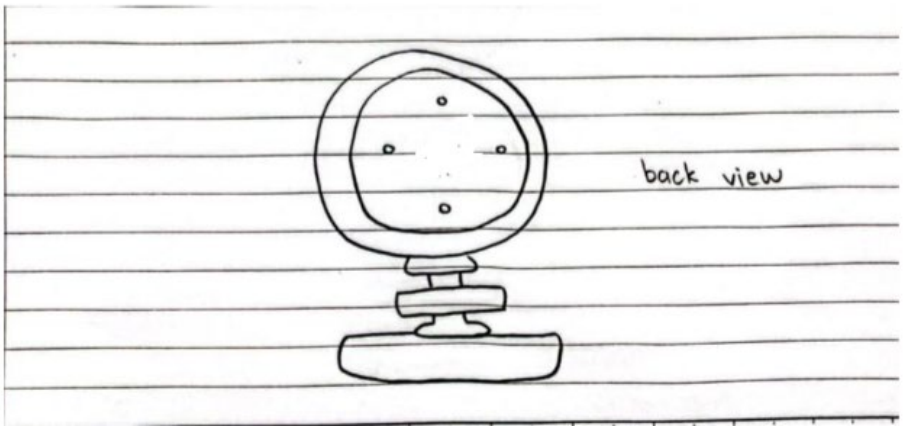

Figure 3. BayMax Back View

Figure 4. Prototype of BayMax: Guard Companion

Figure 1 shows that the camera is equipped with HD resolution camera that captures clear video that can recognize the faces that is registered by the owner. The camera can rotate 360 for a full view. **Figure 2** shows the left and right view, the sizing is small and compact making it easier for the homeowner to place the camera anywhere they want. **Figure 3** shows back view that is equipped with the alarm that can triggered once the button in the application is push. **Figure 4** shows the prototype of BayMax that we have been working on.

3. Novelty and uniqueness

BayMax is more than just a security system – it's designed to give you control and peace of mind. With AI technology, which can recognize the faces of individuals registered by the owner, offering a highly personalized and secure surveillance experience. By using AI to differentiate between familiar faces and unfamiliar ones. Unlike regular CCTV systems, BayMax connects directly to the nearest police station and features a smart alarm system that you can control through the BayMax: Guard Companion app. If there's a break-in, you can quickly choose between two options in the app: notify the police or sound the alarm to alert your neighbors. The app also lets you register your family, friends, or trusted contacts. Anytime someone approaches your house who isn't on your list, you'll get a notification. This combination of instant alerts, easy control, and advanced AI makes BayMax a truly unique and reliable home security solution.

4. Benefit to mankind

BayMax revolutionizes home security by offering smarter, faster, and more effective protection. It reduces the risk of burglary and enhances safety by connecting directly to the police and providing instant notifications about unrecognized visitors. The appcontrolled alarm system empowers users to take immediate action, helping deter intruders and alerting neighbors to potential threats. By fostering a sense of control and security, BayMax reduces stress and fear associated with home safety. Its ability to create safer homes and neighborhoods contributes to a more secure society, promoting peace of mind and a higher quality of life for all.

5. Innovation and Entrepreneurial Impact

The BayMax project fosters innovation by integrating advanced AI technology, smart alarm systems, and app-based controls into a compact security solution, setting a new standard in home safety. Its unique features encourage creative problem-solving and inspire the development of smarter, user-focused products in the security industry. By addressing real-world concerns, BayMax demonstrates how technology can be leveraged to meet community needs effectively. The project also contributes to a culture of entrepreneurship by encouraging collaboration, critical thinking, and the pursuit of market-driven solutions. Its potential for scalability and commercialization inspires individuals and institutions to explore new ideas and invest in tech-driven ventures, ultimately driving growth and innovation in the broader industry.

6. Acknowledgment

First and foremost, praises and thanks to the Almighty Allah SWT, for His showers of blessings throughout our research work to complete our project. We would like to express our deep and sincere gratitude to our advisor, Dr. Syahrul Hezrin Bin Mahmud for giving us the opportunity and for Dr Syahrul great cooperation in completing this project with his guidance. his dynamism, vision, sincerity, and motivation have deeply inspired us. It was a great privilege and honor to work and study under his guidance. Dr Syahrul always gives us

full support on how to complete the project and the main purpose in having good results from the study studied

7. Authors' Biography

Dr. Syahrul Hezrin Bin Mahmud is a Senior Lecturer of Faculty Business and Management UiTM. He specializes in mindful consumption behavior and marketing by holding a PhD in that field. With over 24 years of experience, he has taught a few courses and published numerous academic papers in index and non-index journals. He works bridges academia and industry by participating in conferences and supervising postgraduates, undergraduates and internship students. He is active in joining product innovation and winning several awards competitions and winning several awards such as gold, bronze and silver.

Muhammad Danial Hakimi Mohd Shukri is currently in his 4th semester. He is a dedicated student pursuing a degree in Mathematical Modelling and Analytics at UiTM Terengganu, Kuala Terengganu Campus. With a passion for leadership, he views every opportunity to lead as a chance to grow and make an impact. Specializing in Mathematics and Data Analysis, he consistently achieves outstanding academic results each semester, reflecting his commitment to excellence.

Muhammad Afiq Irfan Ahmad Tarmizi is a 4th semester student specializing in Mathematical Modelling and Analytics at UiTM Terengganu, Kuala Terengganu Campus. He has a strong talent for problem-solving and is known for his ability to find practical solutions to complex challenges. Afiq works well with his group members, always offering support and showing a great understanding of different perspectives within the team. His skills in collaboration and analytical thinking help him excel both individually and as part of a team. Afiq is dedicated to learning and consistently performs well in his studies.

Nur Ana Mardiana Muhammad Shukri is a 4th semester student specializing in Mathematical Modelling and Analytics at UiTM Terengganu, Kuala Terengganu Campus. Known for her excellent teamwork skills, she works well with her peers and actively contributes to group projects. Nur Ana is also eager to learn new things, constantly seeking opportunities to expand her knowledge and improve her skills. Her dedication to her studies and openness to growth make her a promising student in her field.