ONLINE
Internet-of-Things

HACKATON

11 SUSTAINABLE CITIES AND COMMUNITIES

SMART DOOR LOCKING SYSTEM

SMART CITY

UNIVERSITI TEKNOLOGI MARA

Background

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Theme
Smart City

Solution
Smart Door Locking System

Objective
To enhance the security of door locking system

University
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Current Situation

Safety

According to The Crime Statistics, Malaysia, 2021, property crime namely house break-in & theft declined by 14.9 percent to 14,040 cases in 2021, compared to 16,497 cases in 2019. As a result of people have been remaining at home for the past two years due to the nationwide Movement Control Order (MCO), it resulted in fewer break-ins, according to Sentul district police commander, ACP Beh Eng Lai. As the country enters the endemic phase, home break-ins are predicted to rise this year and many homes are expected to be unoccupied this year particularly during the holiday season. In addition, almost all existing door locking systems use traditional keys or RFID (Radio-Frequency Identification) chips to gain access to the system. If the doors are closed and the owner is unavailable, a friend or a guest cannot enter. If the keys are lost, you'll need to get a locksmith or break the lock.

In concerns of the security issue, with the latest advances application in the IoT Technology, through smart door locking system, the owner can control the door remotely and allows the house’s door to be automated and therefore provides better safety as well as added benefits for disabled individuals and the elderly.

Current Situation

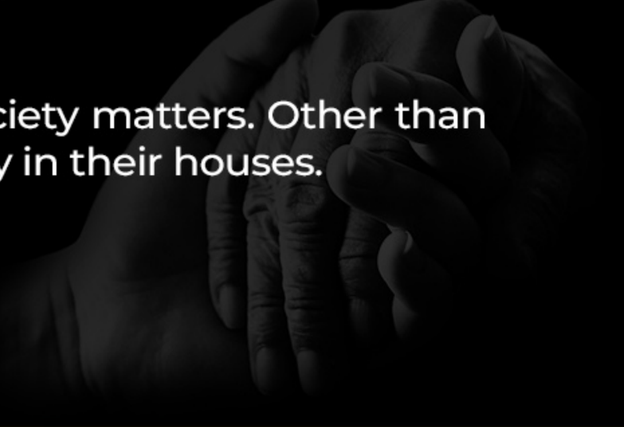
Society

According the TechTarget, Smart House is a residence that uses internet-connected devices to enable the remote monitoring and management of appliances and systems, such as lighting, heating and security.

By focusing the society aspect, Sheron Shea said the advantages that related with society matters is providing peace of mind to homeowners. Other than that, it can help seniors to remain at home comfortably and safely, rather than moving to a nursing home or requiring 24/7 home care. Furthermore, it help the homeowners to monitor the visitors when they enter and out from their houses.

At the same time, SCAND, an IT outsourcing company, also acknowledge that IoT have a lot of benefits that related with the society. One of the points that should be highlighted is Cost and Energy Savings. They said with the detailed statistics about the work and energy consumption of each smart device, it can easily optimize the usage and adjust the smart home settings in a more cost-saving way. It can also allow the smart home system to do everything on its own. The system will shut down the devices which are not in use and reduce power consumption if there is no one at home.

Regarding with two articles, it shows that the Internet of Things (IoT) is related with the society matters. Other than that, it can help our society to reduce their workload and make them more safety when they in their houses.

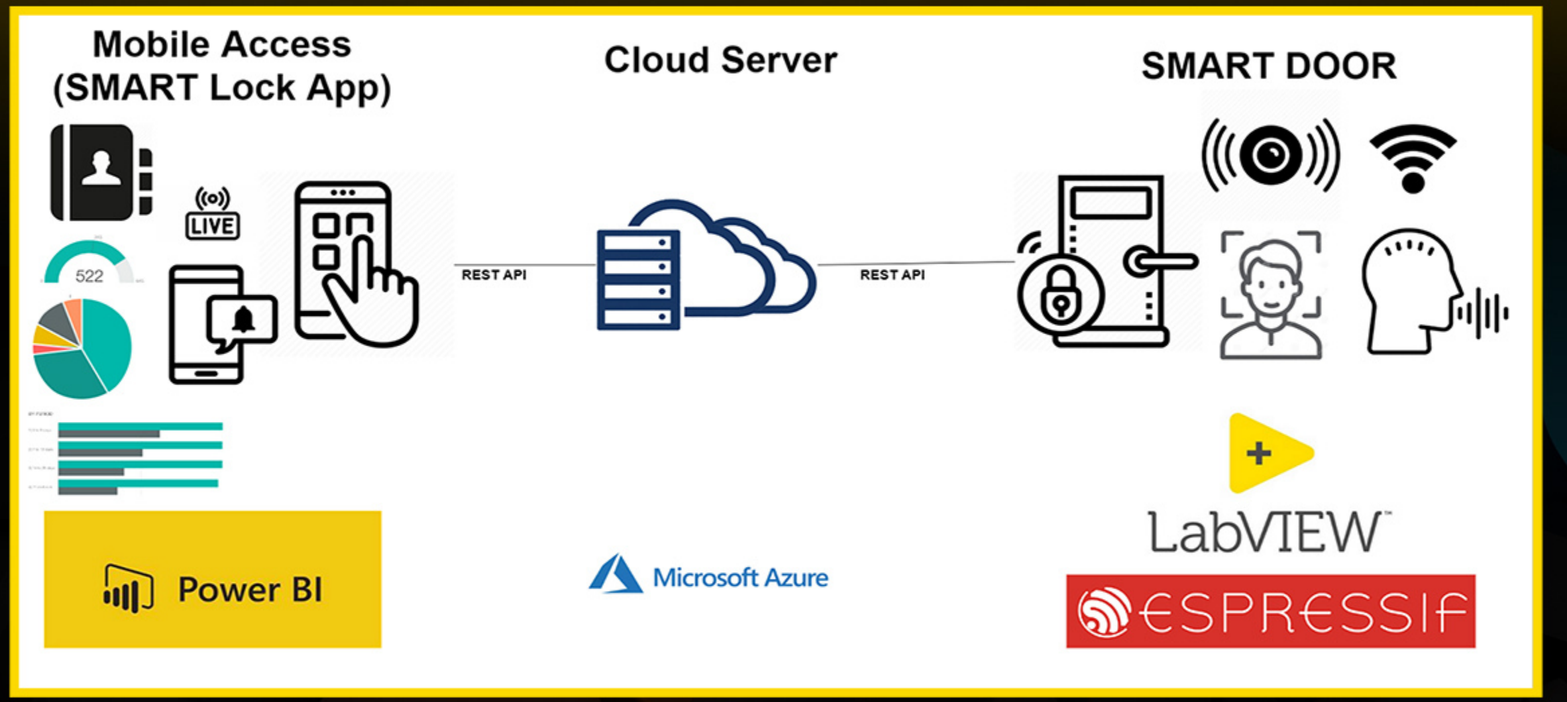


Current Situation

Technology

There are various methods to ensure human security, be it at home, in the office or anywhere else. The old school method is through the usage of a manual door lock however as the name suggest, an old school method have many disadvantages such as misplacing where the keys, time consuming, and a hassle to know the right key you have lots of keys at hand. Other modern methods include wired or wireless alarms, RFID keys, Bluetooth, and biometrics recognition. However, the first two methods also have several disadvantages, such as losing keys and forgetting passwords. Password protection at the entrance using RFID between the door and the control panel is cheaper, but it can be readily defeated utilizing advanced technologies like intercepting data, deciphering commands, and replaying them to the control panel at will. The RFID signal can also be jammed to prevent it from triggering an alert by sending radio noise to stop the signal from reaching the control panel from the sensors. Bluetooth at long range faces connectivity issues. Facial recognition is the most popular method in biometric recognition technologies. The goal is to locate a face in the database with the greatest resemblance to the person's face. Unlike many of the technologies listed above, face recognition does not necessitate physical touch and can help to avoid the manual operation that prevents touching the surfaces (prevent the spread of coronavirus). The system can detect a human face in the form of an image or video, then compare and analyze the face's pre-determined attributes recorded in the database to unlock the door and because of its ease of use, this technology has become quite popular for a variety of applications, including device locking systems and national security systems.

Solution Process Diagram



The SMART DOOR Locking system will acquire data from the sensors on site and transfer and save the data into cloud services. The data will then be shown in a dashboard that the user can view through a mobile app. This solution will help the user by automatically unlock the door without the need of a physical key. To make sure that user do not have unexpected guests, the user can pick the days and times that their friends can get in. The user can also opt in for a push notification that will let them know whenever someone is at the door. From the Smart Lock app, users have access to a livestream of their front door. This feature allows users to let their guests in with a simple tap of a button, even if these guests have not been added beforehand. Furthermore, users can keep track of everyone using the system with a dedicated view that shows every action performed on the door, including the time and day of the action, as well as the person performing it.