

Mobile Security System

Derek Myers
Utah Valley University
College of Engineering
Orem, Utah
10642340@uvu.edu

Carlos Moreno
Utah Valley University
College of Engineering
Orem, Utah
10009842@uvu.edu

Colby Eyre
Utah Valley University
College of Engineering
Orem, Utah
10642340@uvu.edu

Afsaneh Minaie
Utah Valley University
College of Engineering
Orem, Utah
minaieaf@uvu.edu

Abstract

Loss prevention security is becoming evermore needed as theft and vandalism cases are on the rise. Security is now needed where power is not available or reliable. The Mobile Security System solves these problems by implementing a solar panel, Raspberry Pi, smart sensors and iOS application to prevent theft and damage.

Block Diagrams

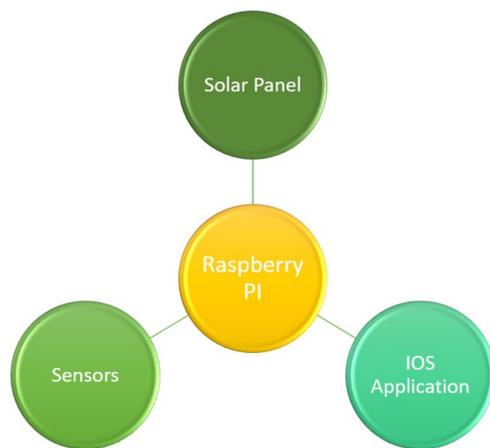


Figure 1. System Block Diagram

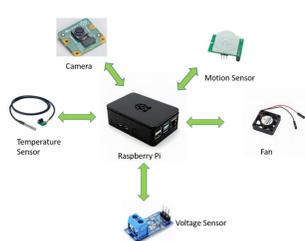


Figure 2. Raspberry Pi Block Diagram



Figure 3. Image of System

Design



Our mobile security system was designed by inspiration of a local city government. They have a golf course that was built before security or lighting was needed for security. For this reason, there is no access to power and because of the location of the course, running power will be about 50 thousand dollars. Our system was designed to be a smart system that optimizes the design and power use. The system starts with a monocrystalline solar panel. This is the core of the power dependent system. This feeds a charge controller which keeps track of the battery and the amount of power that is being produced. This is connected to a 250-watt hour lithium-ion battery that is designed to be durable and perfect for security. Our system converts this DC power source into AC so that the raspberry pi can run easily. This is accomplished by using a 400-watt inverter. The sensors that the pi relies on is a voltage sensor that allows the user to keep track of the amount of power that is being produced. The Pi will also use a motion sensor for detection and a camera to capture videos for security purposes. This is part of how the system is able to only be in use when it is needed. We also have used a temperature sensor that will only turn on to reduce the amount of power use. By using this we have reduced one of the largest draws of power in our system. The final part is the iOS app that allows the end user to monitor the power and usage of system as well as keep track of videos.

Figure 3. Assembled Project

Application

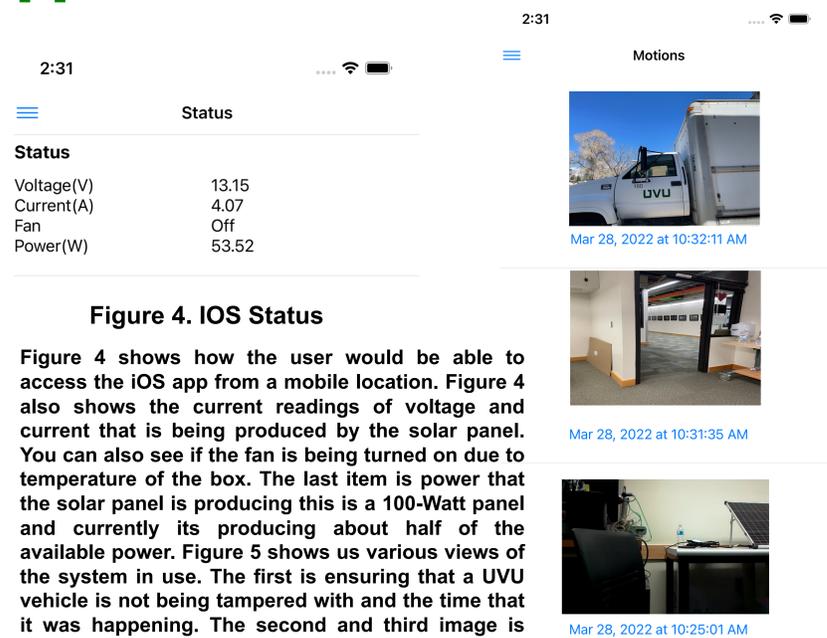


Figure 4. IOS Status

Figure 4 shows how the user would be able to access the iOS app from a mobile location. Figure 4 also shows the current readings of voltage and current that is being produced by the solar panel. You can also see if the fan is being turned on due to temperature of the box. The last item is power that the solar panel is producing this is a 100-Watt panel and currently its producing about half of the available power. Figure 5 shows us various views of the system in use. The first is ensuring that a UVU vehicle is not being tampered with and the time that it was happening. The second and third image is watching the entrance to the lab at UVU as well as some of the equipment at UVU. The times were the timestamps that the image was recorded.

Figure 5. IOS Motions

Materials

- **100W Solar Panel**
- **Raspberry Pi 4**
- **Voltage Sensor**
- **Temperature Sensor**
- **Camera**
- **Component Case**
- **Motion Sensor**
- **250Wh Lithium-ion Battery**
- **400W Power Inverter**
- **Charge Controller**

Conclusion

Mobile Security System Project has accomplished our goal to create an inexpensive security system that allows the end user to keep track of the events that they want to monitor. In specific, the golf course that inspired this project answers the exact question that was asked. Our application allows the end user to monitor and keep track on real time valuable assets. Mobile Security System is also an adaptive system that allows the system to keep power demand as low as possible. Our system provides a reliable solution to mobile security and has other applications such as providing security where power has yet to be established. For instance places like cabins and sheds are a great places for our system to be used.