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Module Code: PUSL2022

Module Name: Introduction To IOT

Coursework Title: Vehicle Protection System

Deadline Date: 24<sup>th</sup> of May 2023

Member of staff responsible for coursework: 05

Programme: BSc (Hons) Computer Science

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Group work: please list all names of all participants formally associated with this work and state whether the work was undertaken alone or as part of a team. Please note you may be required to identify individual responsibility for component parts.

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***We confirm that we have read and understood the Plymouth University regulations relating to Assessment Offences and that we are aware of the possible penalties for any breach of these regulations. We confirm that this is the independent work of the group.***

Signed on behalf of the group:

*Senuda*

Individual assignment: ***I confirm that I have read and understood the Plymouth University regulations relating to Assessment Offences and that I am aware of the possible penalties for any breach of these regulations. I confirm that this is my own independent work.***

Signed :

*Senuda*

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## **Background**

We have created a vehicle protection system. We have created this device based on the cover of a company. For example, the bus service belonging to NSBM Green University can be mentioned. Our aim is to provide some solutions to the problems of such unauthorized vehicles. When accidents happen, when there is no system to identify the drivers who are searching for the vehicles daily, it is not possible to find the engine temperature of the vehicles.

The first problem is that the vehicle cannot be located in case of theft or accident. Vehicle theft is a common problem nowadays. In such a case, we thought it would be good if there was some method to find the vehicle's location. It is also important to find the location of the vehicle in the event of an accident.

The second problem is the excessive speed of vehicles. Then there are many accidents. In some cases, the speed increases due to sleepiness of the driver and accidents occur. We think it would be very useful to have some solution in the vehicle to indicate when the speed limit is exceeded.

Another problem is a system to identify the driver of corporate vehicles and mark the driver's attendance. It is also useful to make sure who drives the vehicle on a daily basis. If there is a problem with a vehicle, it is important to make sure who drove the vehicle that day. It can be described as a vehicle-related problem. We created our device by providing solutions for these common problems. Bhat and Upadhyaya, (2017)

## **Methodology and Approach**

Developing a methodology and approach for a vehicle safety IoT device may involve some of the same considerations as a traditional vehicle safety system but focuses more on the unique characteristics and capabilities of IoT technology. Here are some key factors to consider:

**Device design:** The IoT device must be designed to fit inside the vehicle and to collect and transmit data about the surrounding environment, including things like its location, movement, and sensor readings.

**Connectivity:** The IoT device will need to be connected to the Internet to transmit data and receive commands. This may require using a cellular or satellite network, or it may involve leveraging a nearby Wi-Fi network. In any case, the device must be designed to maintain a reliable connection and transmit data securely.

**Data processing and analysis:** The IoT device must be able to process and analyze real-time data using machine learning or other techniques to identify potential threats or anomalies. The device may also need to communicate with other devices in the vehicle or with a central monitoring system.

**Security:** Security is a critical concern for any IoT device, especially one designed to protect a valuable asset like a vehicle. The device should be designed with robust security features, including data encryption in transit and at rest, secure boot and firmware updates, and secure access controls.

**Integration with other systems:** The IoT device may need to be integrated with other systems, such as the vehicle's onboard computer or a remote monitoring and control system. This requires careful attention to compatibility and interoperability, as well as the development of clear protocols and interfaces for communication between systems.

Overall, developing a vehicle safety IoT device requires careful consideration of a range of technical and operational factors. By taking a comprehensive approach to device design, connectivity, data processing, security and integration, an effective and reliable security system can be created that leverages the unique capabilities of IoT technology. Kamble, (2012)

## **Solution**

We have created an IoT device to solve the above problems. As a solution to the problem of car theft and not being able to find the vehicle in the case of an accident, if the vehicle is stolen, the device that we are creating can track the location of the vehicle through one's mobile phone, and for that we used a GPS module. Also, if the vehicle is involved in an accident, an SMS message is sent to one or more connected mobile numbers.

This device emits a beep sound when the speed of the vehicle exceeds the speed limit. Then the driver can know that the speed is too high. Then accidents can be prevented.

Since this was created based on corporate vehicles, the driver's data is stored in a database by using a fingerprint sensor to detect the drivers of the vehicles of those companies. Then the attendance of those drivers can be determined. And the temperature is also displayed. We think this device is a good solution for vehicles that do not display the engine temperature. Bhat and Upadhyaya, (2017)

## **Testing and Evaluation**

Link

[https://liveplymouthac-my.sharepoint.com/:v:/g/personal/10820263\\_students\\_plymouth\\_ac\\_uk/EZXD7XJH5z9DuUskzzDCgpMBGK31qINX2JyoRfUcG8vAvw?e=6O5vgS](https://liveplymouthac-my.sharepoint.com/:v:/g/personal/10820263_students_plymouth_ac_uk/EZXD7XJH5z9DuUskzzDCgpMBGK31qINX2JyoRfUcG8vAvw?e=6O5vgS)

## **Conclusion**

Future enhancements

- Integration with AI and machine learning algorithms to improve the accuracy of the device in detecting anomalies and potential threats.
- Improved communication capabilities to enable real-time alerts and notifications to the vehicle owner in case of any security breaches.
- Incorporation of advanced sensors and cameras for enhanced surveillance and threat detection.
- Integration with blockchain technology for secure and tamper-proof data storage.

## **Conclusion**

The Vehicle Protection IoT device is an innovative solution to ensure the safety and security of vehicles. With the integration of various sensors and communication technologies, the device can detect and alert owners of any suspicious activities in real-time. The device can prevent theft, vandalism, and other security breaches, providing peace of mind to vehicle owners. In the future, as technology continues to advance, there is immense potential for the device to become even more sophisticated and effective in protecting vehicles. Kamble, (2012)

## **Appendix**

Link :

[https://liveplymouthac-my.sharepoint.com/personal/10820263\\_students\\_plymouth\\_ac\\_uk/\\_layouts/15/onedrive.aspx?id=%2Fpersonal%2F10820263%5Fstudents%5Fplymouth%5Fac%5Fuk%2FDocuments%2Fgroup%20K%20%28iot%29%2Fsmart%20vehical%20code&ga=1](https://liveplymouthac-my.sharepoint.com/personal/10820263_students_plymouth_ac_uk/_layouts/15/onedrive.aspx?id=%2Fpersonal%2F10820263%5Fstudents%5Fplymouth%5Fac%5Fuk%2FDocuments%2Fgroup%20K%20%28iot%29%2Fsmart%20vehical%20code&ga=1)

## **Workload Metrix**

Name	Plymouth Index	Contribution
Rathnayaka Samarakoon	10820263	Coding Wiring Prototype Designing and making
Galappaththi Dinujaya	10820276	Database Connection Coding Prototype designing and making
Maleesha S Ramasinghe	10820265	Designing and planning Coding Make all Reports
Rankoth Jayasekara	10820280	Designing and planning Coding Make all Reports
Navoda Manamperi	10820266	Coding Reports making