IOT Based : Vehicle Monitoring System

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ABSTRACT

This research paper is about the driving pattern, i.e., the time-speed profile of a vehicle is analyzed in relation to the parameters in the environment system. All the subject vehicles were equipped with data logging devices which could log the parameters viz, position, speed and accelerometer. In this study, driver characteristics are analyzed with a focus on analysis of driving parameters. The system is designed to improve the safety of driving by detecting and analyzing the driving patterns of a vehicle in real-time. The speed of a vehicle is a key factor in the risk of accidents and the severity of injuries that may result from a crash. By collecting data on various parameters such as speed, acceleration, and braking, the system can identify abnormal driving behaviors that may lead to accidents. This allows the system to provide real- time feedback to the driver, alerting them to potential dangerous scenarios and offering recommendations to enhance the safety of mobility. The system is based on a node that gathers information on driving patterns and uses this data to recognize the driving style of the driver.

KEYWORDS: *Driving behavior, driving pattern, parameters, real -time detection , Driving styles.*

1. INTRODUCTION

Feasibility analysis is an important step in the process of systems development. It involves a thorough evaluation of the need, value, and practicality of a particular course of action. This analysis is critical in making transparent decisions at crucial points during the developmental process. By assessing the operational, economic, and technical feasibility of a proposed course of action, we can determine whether Feasibility analysis is an important process that assesses the viability of a particular course of action by evaluating its financial, technical, and operational capabilities. It can be applied at various stages of development to identify potential challenges and make necessary adjustments before proceeding. By conducting feasibility analysis, organizations can make informed decisions and minimize risks associated with their projects or initiatives. This analysis helps to ensure that the chosen course of action is practical and achievable, leading to better outcomes in the long run significant time and resources are invested. Ultimately, the goal of feasibility analysis is to ensure that a proposed course of action is both practical and achievable, and that it will provide the intended benefits to the organization or stakeholders involved.

We are using sensors like:

- Accelerometer: An accelerometer is a sensor that measures acceleration forces in a specific direction, both static and dynamic. These forces can be caused by various movements, such as vibrations, tilts, and impacts. The output of an accelerometer is an electrical signal that can be used to detect changes in velocity, position, and orientation of an object. Accelerometers are commonly used in various applications, including automotive, aerospace, consumer electronics, and healthcare. These forces can be caused by movements or vibrations in any direction, including the x, y, and z axis. The device is commonly used in mobile phones to measure the tilting motion and orientation of the device. The accelerometer measures the acceleration associated with the weight experienced by any test mass at rest in the frame of reference of the accelerometer device. For example, an

accelerometer on the surface of the earth will measure an acceleration force of g = 9.81 m/s2 straight upwards due to the force of gravity. However, accelerometers in free fall or at rest in outer space will measure zero. In other words, accelerometers measure g-force acceleration, which is the acceleration that an object experiences as a result of the force of gravity. This measurement can be used to track movement, monitor activity levels, and gather data for a variety of applications, including sports and fitness tracking, navigation, and industrial monitoring.

- Positioning System (GPS): GPS stands for Global Positioning System, and it is a satellite- based navigation system that provides location and time information anywhere on or near the Earth's surface. GPS works by transmitting signals from a network of satellites in orbit around the Earth to GPS receivers on the ground.

Types of feasibility :

Feasibility analysis is an important part of evaluating the potential success of a proposal or project. There are three key types of feasibility that are typically considered: financial feasibility, technical feasibility, and operational feasibility. Financial feasibility involves assessing whether the proposed project or system is financially viable and sustainable. This involves considering the costs of the project or system, as well as the potential benefits andreturns on investment. Technical feasibility involvesassessing whether the proposed project or system is technically feasible and can be implemented using available resources and technology. This involves considering issues such as compatibility with existing systems, availability of necessary resources, and technological limitations. Operational feasibility involves assessing whether the proposed project or system is operationally feasible and can be effectively implemented within the organization. This involves considering issues such as user acceptance, impact on work practices, and the level of support from management and staff. Assessing these three types of feasibility is critical in determining whether a proposed project or system is worth pursuing. Business managers and IT analysts typically work together to conduct a feasibility analysis and prepare a cost-benefit analysis to determine the economic feasibility of the proposed system or project.

- Operational Feasibility: Operational feasibility is one of the types of feasibility that is assessed in a feasibility analysis. It refers to the ability of a proposed system to meet the needs and expectations of an organization and its users. User acceptance is a key factor in determining operational feasibility, and this requires careful consideration of various factors, such as the in order to successfully implement a new system, it is important to consider various factors such as the corporate culture, staff's willingness to embrace change, level of management support, degree of user involvement in the development and implementation process, and potential impact on work practices. Additionally, it is important to evaluate the expected performance and outcomes of the new system compared to the existing one, as well as identify training requirements and develop effective change management strategies. Overall, a thorough analysis of these factors can help ensure a smooth transition to the new system and maximize its success., also need to be evaluated to determine operational feasibility.

- Technical Feasibility: Technical feasibility is the assessment of whether a proposed system can be developed, installed, operated, and maintained with the available technical expertise and infrastructure. This involves evaluating the organization's capacity to leverage current and emerging technologies to develop the proposed system, and whether they have in-house staff with the necessary technical skills to manage the project and maintain the system. In addition, the organization must evaluate their current infrastructure to determine if it can support the development and maintenance of the system or if additional resources will be needed. The system must also be capable of accommodating increasing levels of use over time and be flexible enough to accommodate new functionality as needed.

- Economic Feasibility: Economic feasibility refers to the assessment of whether the benefits expected from a systems development project outweigh the costs associated with it. The costs involved may include various resources such as time, budget, staff, infrastructure, support, training, and maintenance. Quantifying these costs accurately can be challenging, especially when dealing with complex systems and new technologies. To assess the economic feasibility of a project, organizations may use advanced cost-benefit analysis tools that help them make informed decisions based on reliable financial projections.

2. ARDUNIO IDE

The Arduino is a popular open-source hardware and software platform used for building electronic devices and projects. It consists of a microcontroller board, development environment, and a large community of users and developers who contribute to its growth and development. The Arduino boards are designed to be easy to use and accessible to beginners, while also providingenough flexibility and power for more advanced projects.

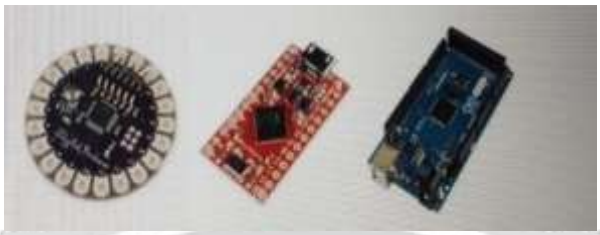

Fig-1: Lilypad, Sparkfun Pro Micro, Arduino Mega

Arduino is a microcontroller board that is available in various development board packages. It can be programmed using the Arduino Integrated Development Environment (IDE) which is based on the C programming language. The IDE provides access to a large library of code developed by the open-source community. However, it is important to note that the Arduino IDE is not the same as AVR Studio, which is used for programming in Assembly Language.

Fig-2: Arduino IDE

3. EXPERIMENTATION

1. Download and install the Arduino IDE 1.6.4 or a later version. You can download the IDE from the official Arduino website. If you already have the IDEinstalled, you can skip this step. Alternatively, you can download a ready-to-go package from the ESP8266-Arduino project if you are having issues with the proxy.

2. Install the ESP8266 board package. To do this, you need to enter the following URL: http://arduino.esp8266.com/stable/package_esp8266com_index.json into the "Additional Board ManagerURLs" field in the Arduino v1.6.4+ preferences. After that, you can go to the "Boards Manager" in the"Tools" menu of the Arduino IDE, search for "ESP8266", and install the board package. Once the board package is installed, you can start using the ESP8266 library in your Arduino projects.

3. Next, use the Board manager to install the ESP8266package.

4. To summarize the remaining steps to install the ESP8266 library and set up support in Arduino IDE.

5. Click on "Tools" in the Arduino IDE and select "Board" from the dropdown menu. Choose "Generic ESP8266 Module."

6. Select the baud upload speed of 115200.

7. Open the Windows "Device Manager" to find theassigned COM Port for the "USB-Serial CH340" interface. Select the matching COM/serial port in the "Tools" menu under "Port."
After completing these steps, you should be ready to start working with the ESP8266 module in the Arduino IDE.

4. EXISTING SYSTEM

- In the existing system based on thecollected data analysis is made.
- A system is developed for identifying driving pattern, behaviors based on the data obtained from the various sensor which provides efficient results.

Drawbacks:

- Most of the systems use the sensor data from mobile phones which are not usually accurate compared to an IOT based system.
- Different sensors may produce differentvalues based on the type of mobile models, however this iot system produce values similarly for different vehicles itsbeing used on.
- Existing system may require additional installations.
- It may not be possible get GPS values from mobile phones in certain regions without proper network access this can beover come with the IOT based system.

5. PROPOSED SYSTEM

- The proposed solution through ourproject will ease out the process of acquiring data of vehicles using IOT system with multiple sensors. An on- board measurement system using Node MCU and sensors like accelerometer, GPS module to obtain vehicle data is made.
- Based on the data obtained we develop the vehicle driving cycle.
- Using machine learning algorithms analyze the data to recognize driving styleand patterns. we can find abnormaldriving behaviors And finding the driving styles which affects the fuel consumption.

6. CONCLUSION

Driver behavior characteristics are important in understanding and predicting driving behavior. There is a link between driving behavior, driving intention, and driver behavior characteristics, which are classified and identified through a process of establishing identification models. These characteristics have applications in intelligent driver advisory systems, driver safety warning systems, and vehicle dynamics control systems. The driver is a complex and uncertain individual, and online adaptation of driver behavior characteristics is a potential solution. Online adaptive models can be built to influence and reacclimate driver behavior characteristics, and there may be cross correlations among the classifications of driver behavior characteristics.

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