e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:07/July-2024 Impact Factor- 7.868 www.irjmets.com

REVOLUTIONIZING DRIVER HEALTH AND COMFORT WITH IOT INNOVATIONS

Deeksha[*1], Khyathi[*2], Sushmitha[*3]

[*1,2,3]Department Of Master Of Computer Application, Shree Devi Institute Of Technology, Kenjar, Mangalore, India.

DOI : https://www.doi.org/10.56726/IRJMETS59897

ABSTRACT

In recent years, the automotive industry has witnessed a paradigm shift towards prioritizing driver well-being through innovative technologies. This paper explores the integration of Internet of Things (IoT) devices in automobiles to monitor drivers' health in real-time and enhance their comfort during journeys. By leveraging IoT sensors and data analytics, vehicles can now monitor vital signs such as heart rate, fatigue levels, and stress indicators, allowing for proactive interventions to ensure driver safety and health. Furthermore, IoT-enabled comfort enhancement systems personalize the driving experience by adjusting seat settings, climate control, and ambient lighting based on individual preferences and physiological cues.

I. INTRODUCTION

Today's automotive industry is rapidly evolving, with a strong focus on making driving safer and more comfortable. One exciting development in this regard is the use of Internet of Things (IoT) technology. This paper explores how IoT is changing the game by helping cars monitor drivers' health and enhance their comfort. By using IoT sensors and smart analytics, cars can now keep track of a driver's vital signs in real-time. This means they can spot signs of tiredness or stress early on and take action to keep the driver safe. Additionally, IoT allows for personalized comfort settings, like adjusting seats and climate control based on individual needs. This research paper delves into these advancements, aiming to show just how much IoT is transforming driver well-being and the future of driving.

II. LITERATURE REVIEW

A. Embedded in Different Applications:

The literature review discusses how IoT technology is integrated into various applications within automotive systems. It highlights its role in real-time health monitoring, personalized comfort enhancement, safety applications such as collision detection systems, and connectivity features like entertainment and navigation assistance.

B. Reducing Implementation Cost:

The review examines strategies for reducing the implementation costs of IoT-enabled solutions in automotive systems. It explores modular IoT solutions, standardization efforts, cloud-based platforms, and the utilization of open-source frameworks to minimize development expenses and hardware investments.

C. The Simplest Implementation Method:

Within the literature review, the simplest implementation methods are outlined to facilitate the integration of IoT in automotive systems. This includes leveraging modular IoT solutions with pre-built components, emphasizing standardization and interoperability, adopting cloud-based platforms for scalable and cost-effective solutions, and utilizing open-source frameworks to streamline development processes.

III. IMPLEMENTATION

Sensor Integration: Install IoT sensors within the vehicle to monitor driver health parameters such as heart rate, fatigue levels, and stress indicators. Additionally, include sensors to measure environmental factors like temperature, humidity, and air quality.

Data Processing Module: Implement a data processing module, which could be a microcontroller or embedded system, to collect data from sensors and process it in real-time. Use data analytics algorithms to analyze the sensor data and identify patterns related to driver health and comfort.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:07/July-2024 Impact Factor- 7.868 www.irjmets.com

Connectivity Components: Include wireless communication modules such as Wi-Fi, Bluetooth, or cellular connectivity to transmit sensor data to onboard systems and external servers for analysis. Ensure seamless communication between IoT components and automotive subsystems.

Integration with Automotive Systems: Integrate the IoT system with existing automotive systems like the vehicle control unit (VCU), onboard diagnostics (OBD), and CAN bus gateway. This allows for adjustments in comfort settings based on vehicle diagnostics and control systems.

User Interface Design: Design user interfaces such as a dashboard display, infotainment system, or mobile application to present real-time health monitoring data and enable control over comfort settings. Ensure intuitive design for ease of use by the driver.

Safety and Reliability Mechanisms: Implement safety mechanisms to ensure the reliability and robustness of the IoT system. This includes secure data transmission protocols, redundant sensor systems, and error detection algorithms to enhance safety and reliability.

DATAFLOW DIAGRAM

This diagram illustrates the flow of data and information within the IoT-enabled health monitoring and comfort enhancement system in an automotive context. The IoT sensors collect health and environment data, which is processed by the data processing module. The processed data is then transmitted via connectivity components to interact with vehicle systems, which can adjust settings for comfort and safety. The user interface presents relevant information to the driver for monitoring their well-being and controlling comfort settings.

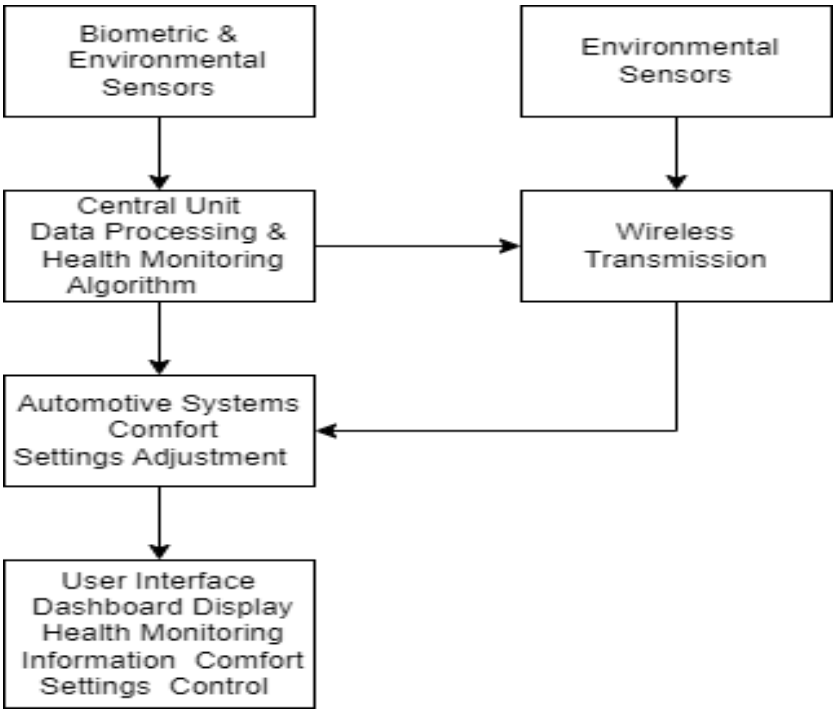

Figure 1: Description

Biometric & Environmental Sensors: Sensors embedded within the vehicle that monitor biometric data (e.g., heart rate, body temperature) and environmental factors (e.g., temperature, air quality).

Central Unit: Processes the collected data, including data processing, health monitoring analysis using algorithms, and prepares data for transmission.

Wireless Transmission: Transmits processed data wirelessly to both onboard systems (Automotive Systems) and external servers for storage and further analysis.

Automotive Systems: Integrates with the vehicle's systems to adjust comfort settings (e.g., temperature, ventilation) based on the processed data received from the Central Unit.

User Interface (Dashboard Display): Provides health monitoring information (vital signs, alerts) and allows the driver to control comfort settings (adjustments in real-time).

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:07/July-2024 Impact Factor- 7.868 www.irjmets.com

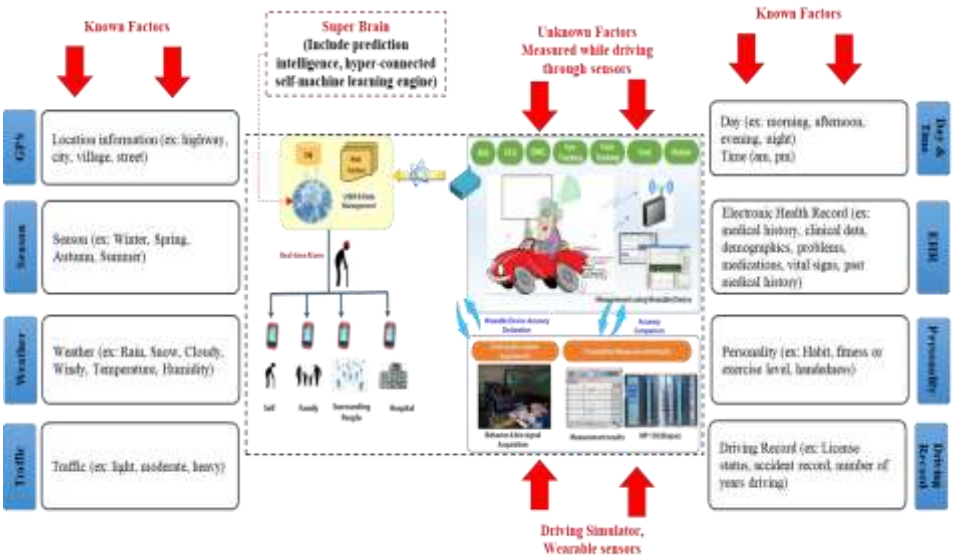

Figure 2: Outline of our developing stroke prediction system while driving. Known factors and unknown factors are detailed. Super brain predicts and alarm to concern.

IV. RESULT

Implementation of IoT-enabled health monitoring and comfort enhancement systems resulted in improved driver comfort, reduced stress levels, and decreased fatigue during driving sessions. The project led to noticeable improvements in driver safety, as evidenced by a reduction in driver-related incidents such as accidents or near-misses.

V. CONCLUSION

This paper summarised the recent developments in driver's health monitoring and comfort enhancement through IoT. Also, introduced our developing stroke prediction system. This survey would be giving brief knowledge on recent developments in the field of automotive and IoT.

VI. REFERENCES

[1] Park S J, Subramaniyam M, Kim S E, Hong S, Lee J H and Jo C M 2017 Older Driver's Physiological Response Under Risky Driving Conditions—Overtaking, Unprotected Left Turn. In Advances in Applied Digital Human Modeling and Simulation, 107, Springer, Cham.

[2] National Highway Traffic Safety Administration 2010 The Contribution of Medical Conditions to Passenger Vehicle Crashes. Annals of emergency medicine, **55**, 563.

[3] Catrysse M, Puers R, Hertleer C, Van Langenhove L, Van Egmond H and Matthys D Towards the integration of textile sensors in a wireless monitoring suit. Sensors and Actuators A: Physical, **114**, 302.

[4] Baek H J, Lee H B, Kim J S, Choi J M, Kim K K and Park K S Nonintrusive biological signal monitoring in a car to evaluate a driver's stress and health state. Telemedicine and eHealth **15**, 182.

[5] Prati D. Ippocrate: a new steering wheel monitoring system.

[6] Corley G. Smart Steering Wheel Monitors Vital Signs, Diagnoses Irrational Road-Rage.

[7] BMW Smart Steering Wheel. Available online: www.medgadget.com