International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

REAL TIME APPLICATION OF VEHICLE ANTI THEFT DETECTION AND PROTECTION WITH SHOCK USING FACIAL RECOGNITION

[1] Dr. Ramesh Babu Kellampalli ,[2] A. Sowmya,[3] B .Shravya ,[4] D. Apoorva

[1]Associate Professor, Department of ECE, Mallareddy Engineering College for Women, Hyderabad

[2,3,4,]Students, Department of ECE,Mallareddy Engineering College for Women, Hyderabad

ABSTRACT

The strengthening in vehicle technology system is obtaining increased research popularity and adding a vehicle theft security system in order to avoid vehicle theft in the parking and sometimes driving in unsecured places. In this developing world where technology is growing day by day and scientific researchers are presenting new era of discoveries, the need of security is also increasing in all areas. At now, the vehicle practice is basic fundamental for populace. Concurrently, preserving the vehicle against theft is also prime. When the vehicle is filched no more feedback or preference could be accessible to help the owner of vehicle to find it back. The main objective of this method is to find the vehicle from unauthorized access, using fast, easy-to-use, clear, reliable and inexpensive. The advanced system provide surveillance and better robbery control using profile recognition and giving shock treatment to unauthorized person trying to run the vehicle and will be notified to vehicle holder.

I.INTRODUCTION

Now a day's everywhere in the world jalopy robbery is increasing day by day. The jalopy builders are trying to improve the surveillance features of their products by introducing advanced technologies to avoid the thefts specially in the case of cars. Generally, biometric and non - biometric methods are used to give security. In non–biometric method, password and personal ID are used to recognize the authorized person, but still the possibility of robbery persists. But in biometric methods no such possibilities involve, because they employ

Techniques such as voice recognition, finger print recognition, signature recognition, eye retina recognition, iris recognition and face recognition. Among of these, face recognition and detection system is more

International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

sophisticated. In this project, we are dealing with design and development of a real time face recognition system using HAAR cascade algorithm. This surveillance system can admit the person who enters in the car and it will check whether he/she is authorized person or not. When an unauthorized person tries to run the car, the relay will provide trauma. The latest car anti theft system are Car alarm, flashing light manners which makes use of different kind of sensors which can be pressure, tilt and shock & door sensors, but the shortcomings are cost and it only averts the vehicles from theft but can't be used to trace the thief. Customary car security systems rely on many sensors. When firstly 'Car Alarm System' is initiated, this system consists of mostly electromechanical devices. As automation advanced they unfolding into fully integrated microprocessor positioned system using diversed electronics sensors. In , the hardware and software of the GPS and GSM grid were advanced.[1] In, a vehicle tracing system is an electronic device, installed in a vehicle to authorize the owner or a third party to track the vehicle's place. This advanced to Design a vehicle tracing system that works using GPS and GSM technology. This process is set up based on embedded system, used for tracking and positioning of any vehicle by using Global Positioning System (GPS) and Global system for mobile communication (GSM). This pattern will continuously watch a Motion Vehicle and rank the status of the Vehicle on request. Research groups around the world are developing algorithm and systems based on face, iris, fingerprint, palm print or voice… In our research laboratory, recognition with iris [1] and face, and their implementations on embedded platforms are studying. Face recognition algorithm is mainly based on Principal Component Analysis (PCA) [2]. PCA can be time consuming and this article will give quantitative data for choosing the best platform for implementing this algorithm.

II.METHODOLOGY

A) System Architecture

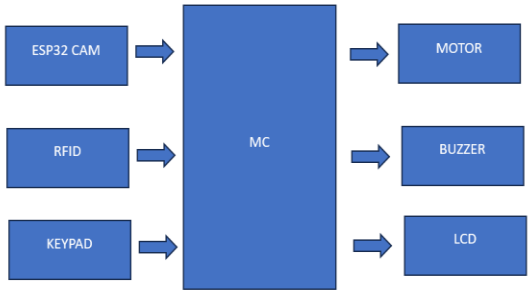

Fig1 .Block Diagram

The system architecture for a real-time vehicle anti-theft detection and protection system with shock detection using facial recognition consists of several key components designed to ensure the security of the vehicle. At the heart of the system is an embedded microcontroller or processor that coordinates the operations, integrating various sensors and modules. A facial recognition module, utilizing high-resolution cameras placed near the vehicle's entry points, captures the driver or authorized personnel's facial features. The facial recognition software processes the captured image in real time, comparing it with a pre-stored database to authenticate the individual. If the system identifies an unauthorized person attempting to access the vehicle, an alarm is triggered, notifying the owner through a mobile app or SMS. The system is also equipped with shock sensors installed in key parts of the vehicle to detect unauthorized tampering or movement, such as an attempted break-in or tow. These sensors communicate with the microcontroller, which processes the data and activates the alarm and GPS tracking system to locate the vehicle. Wireless communication, such as Wi-Fi or Bluetooth, ensures remote access and control of the system, enabling real-time updates and alerts. The entire system is powered by a battery or vehicle power supply, designed to function autonomously without draining the vehicle's main battery.

B) Proposed Raspberry pi

The Raspberry Pi Pico is an affordable microcontroller board created by the Raspberry Pi Foundation. Unlike full-fledged computers, microcontrollers are small and have limited storage and peripheral options, such as the absence of devices like monitors or keyboards. However, the Raspberry Pi Pico is equipped with General Purpose Input/Output (GPIO) pins, similar to the ones found on Raspberry Pi computers, allowing it to connect with and control a variety of electronic devices. Introduced in January 2021, the Raspberry Pi Pico is based on the RP2040 System on Chip (SoC), which is both cost-effective and highly efficient. The RP2040 SoC includes a dual-core ARM Cortex-M0+ processor that is well-known for its low power consumption. The Raspberry Pi Pico is compact, versatile, and performs efficiently, with the RP2040 chip as its core. It can be programmed using either Micro Python or C, providing a flexible platform for users of various experience levels. The board

contains several important components, including the RP2040 microcontroller, debugging pins, flash memory, a boot selection button, a programmable LED, a USB port, and a power pin. The RP2040 microcontroller, custom-built by the Raspberry Pi Foundation, is a powerful and affordable processor. It features a dual-core ARM Cortex-M0+ processor running at 133 MHz, 264 KB of internal RAM, and supports up to 16 MB of flash memory. The microcontroller provides a wide range of input/output options, such as I2C, SPI, and GPIO. The Raspberry Pi Pico has 40 pins, including ground (GND) and power (Vcc) pins. These pins are grouped into categories such as Power, Ground, UART, GPIO, PWM, ADC, SPI, I2C, System Control, and Debugging. Unlike the Raspberry Pi computers, the GPIO pins on the Pico can serve multiple functions. For instance, the GP4 and GP5 pins can be set up for digital input/output, or as I2C1 (SDA and SCK) or UART1 (Rx and Tx), though only one function can be used at a time.

C) Design Process

The design of embedded systems follows a methodical, data-driven process that requires precise planning and execution. One of the core elements of this approach is the clear separation between functionality and architecture, which is crucial for moving from the initial concept to the final implementation. In recent years, hardware-software (HW/SW) co-design has gained significant attention, becoming a prominent focus in both academia and industry. This methodology aims to align the development of software and hardware components, addressing the integration challenges that have historically affected the electronics field. For large-scale embedded systems, it is essential to account for concurrency at all levels of abstraction, impacting both hardware and software components. To facilitate this, formal models and transformations are employed throughout the design cycle, ensuring efficient verification and synthesis. Simulation tools are vital for exploring design alternatives and confirming the functional and timing behavior of the system. Hardware can be simulated at different stages, including the electrical circuit, logic gate, or RTL level, often using languages like VHDL. In certain setups, software development tools are integrated with hardware simulators, while in other cases, software runs on the simulated hardware. This method is generally more

International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

suited for smaller parts of an embedded system. A practical example of this methodology is the design process using Intel's 80C188EB chip. To reduce complexity and manage the design more effectively, the process is typically divided into four main phases: specification, system synthesis, implementation synthesis, and performance evaluation of the prototype.

APPLICATIONS

Embedded systems are being increasingly incorporated into a wide range of consumer products, such as robotic toys, electronic pets, smart vehicles, and connected home appliances. Leading toy manufacturers have introduced interactive toys designed to create lasting relationships with users, like "Furby" and "AIBO." Furbies mimic a human-like life cycle, starting as babies and growing into adults. "AIBO," which stands for Artificial Intelligence Robot, is an advanced robotic dog with a variety of sophisticated features. In the automotive sector, embedded systems, commonly referred to as telematics systems, are integrated into vehicles to offer services like navigation, security, communication, and entertainment, typically powered by GPS and satellite technology.

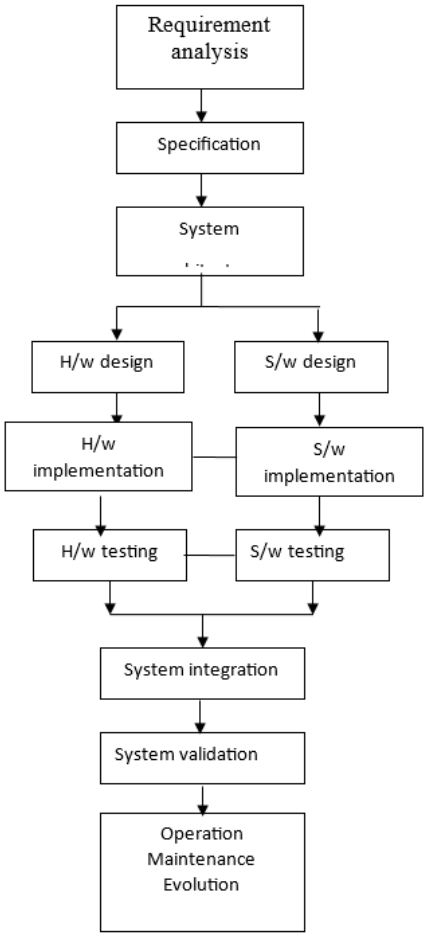

Fig 2. Embedded Development Life Cycle

The use of embedded systems is also expanding in home appliances. For example, LG's DIOS refrigerator allows users to browse the internet, check emails, make video calls, and watch TV. IBM is also developing an air conditioner that can be controlled remotely via the internet. Given the widespread adoption of embedded systems across various industries.

III.CONCLUSION

The advanced structure will be more well planned by executing the GSM of high baud rate and also together with GPS module for the arranges and it is evident that the decision of this face recognition system is worthy but there is range for forthcoming growth.. Because of time constraints we were not ready to execute a few objective that ought to have better the study work a charge. The principle change will seek after the exhibitions, perceives the ongoing face acknowledgment. I might want to enhance my code for face picture acknowledgment and also tidy up the code keeping in mind the end goal to enhance execution. Numerous challenges has been confronted when perceived face pictures from database, for example, lighting varieties, expression varieties, age varieties, and facial impediments. In future to enhance the posture remedy, quality based edge determination, maturing correction, and stamp based coordinating procedures can be joined to manufacture a unified framework for video based face acknowledgment.

IV.FUTURE SCOPE

The future scope of the vehicle anti-theft detection and protection system with facial recognition lies in further enhancing security and convenience. With the advancement of AI and machine learning, the system could become more accurate in identifying faces, even under challenging conditions like low light or partial visibility. Biometric authentication could also be integrated, allowing multiple modes of access (e.g., fingerprint or retina scans). The system could evolve to include vehicle-to-vehicle communication for detecting nearby stolen vehicles, improving GPS tracking capabilities for real-time location updates, and using cloud storage for secure data backup. Smartphone integration will allow users to remotely monitor and control the system. Additionally, battery-saving techniques and solar-powered options could make the system more energy-efficient, ensuring long-term operation without relying heavily on the vehicle's power. As vehicle technology advances, these systems could become an integral part of smart cars, offering enhanced safety and convenience.

V.REFERENCES

[1] Nicolas Morizet, Frédéric Amiel, InsafDris Hamed, ThomasEa, "A ComparativeImplementation of PCA Face

Recognition",InstitutSuperieur d' Electronique de paris (I.S.E.B),2013

[2] Bahurupi Saurabh p.,D.S Chaudhary "Principle Component Analysis for the face Recognition",International Journal of Engineering and Advanced Technology (IJEAT) ISSN:2249-8958.

[3] OnsenToygar and Adnan Acan "Face recognition using PCA, LDA and ICAapproaches on colored images",Journal of Electrical &Electronics Engineering ,Istanbul Uiversity,Volume 3,2003,p735-743.

[4] Ms.S.S.Pethakar, Prof. N. Srivastava, Ms.S.D.Suryawanshi ,"RFID, GPS and GSM Based Vehicle Tracing and Employee Security System '', International Journal of Advanced Research in Computer Science and Electronics Engineering, vol. 1, no. 10, Dec 2017.

[5] Hu-Jian-ming, Li Jie and Li Guang-Hui ,"Automobile Anti-theft SystemBased on GSM and GPS Module'', Fifth International Conference on Intelligent Networks and Intelligent Systems, 2017.

[6] M. A. Al Rashed, Ousmane Abdoulaye Oumar, Damanjit Singh, "A real time GSM/GPS based tracking system based on GSM mobile phone'', IEEE Journal on Signals and Telecommunication, vol. 3, no.1, March 2016, pp. 33-39.

[7] Shihab A. Hameed, Othman Khalifa, et,el, "Car Monitoring, Alerting and Tracking Model Enhancement with Mobility and Database Facilities," International Conference on Computer and Communication Engineering (ICCCE 2010), pp.1-5 , May.2018.

[8] Fleischer, P.B.; Nelson, Atso Yao; SowahRibertAdjectey, Bremang, Appah," Design and Development of GPS/GSM Based Vehicle Tracking and Alert System for Commercial Inter-City Buses'', Adaptive Science and Technology, IEEE 4th International Conference , Oct 2016.