

Facial and Voice Command Based Security System in Vehicles Using Arduino

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Abstract — In recent years, there is rapid increase in number of vehicles and so is the number of car theft attempts, locally and internationally. With the invention of strong stealing techniques, owners are in fear of having their vehicles being stolen from common parking lot or from outside their home. Thus, the protection of vehicles from theft becomes important due to insecure environment. Real time vehicle security system based on computer vision and Natural language processing provides a solution to this problem. The proposed vehicle security system performs image processing based real time user authentication using face detection and recognition techniques and as a Second verification Audio keyword from the user will be detected. If above both steps are verified car ignition will turn on. A dc motor and an Arduino is represented as a car ignition. A computer is used for face and audio keyword recognition and Arduino system is controlled based verification.

I.INTRODUCTION

Vehicle security has become an increasingly important concern in recent years due to the rise of automotive technology and the sophistication of security threats. The automotive industry has been working to develop effective security measures to prevent theft, unauthorized access, and other threats to vehicle safety. Advances in technology have enabled the development of innovative solutions, such as facial recognition, voice command based with physical key, Biometric authentication, and vehicle tracking using GPS.

The risks associated with vehicle security are varied and complex. These risks can include theft, carjacking, hacking of vehicle systems, and other malicious acts. As such, ensuring vehicle security has become a critical area of focus for the automotive industry and for consumers.

II. LITERATURE SURVEY

Since the invention of the automobile, they've been prized possessions and invaluable assets. As cars became more accessible and less of a luxury item, people began to leave them unoccupied and vulnerable to thieves. Thus, the need to keep them safe and theft-proof increased.

A removable steering wheel is cited as the first anti-theft technology in cars, developed by Leach Automobile in 1900. The idea was that the driver would remove the steering wheel after driving and carry it with them to deter thieves.

It seems like a no-brainer to secure cars using locks. However, most early cars didn't even have doors, which wouldn't be standard until the early 1920s. By then, companies started to add locks to their cars. However, early car locks were easy to pick and it wouldn't be until the 1970s when more sophisticated locks were introduced.

Power locks were first introduced in 1914 on luxury cars built by Scripps-Booth. However, it took a few decades for power locks to become popular, when Packard introduced them as an option in 1956.

Keyless entry was first introduced by Ford in 1980 on select models. To unlock the car, the driver would have to punch in a 5-digit code on a keypad located above the driver's side door. Nissan would introduce a similar system in 1984. The first remote entry using a handheld transmitter was developed by Renault in 1982 for the Renault Fuego.

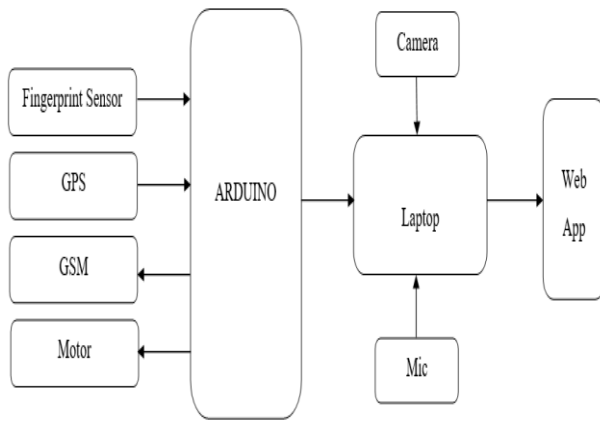
III. METHODOLOGY

This project proposes an advanced authentication system such as Face and voice recognition. A Real

time verification system is used for robust and efficient applications.

Face detection and recognition system use enhanced HARR CASCADE algorithm for authentication. The camera acquires the image of the person inside the car fixed in an appropriate position in front of the driver seat. Once the image of the person is acquired, the system now tries to detect the face.

IV. BLOCK DIAGRAM



V. RESULT

In the web application, there are two options for face recognition and voice command based on the user's preferences see Fig 1.

1.FACIAL RECOGNITION: In this face recognition, the person's face is captured and matched with the database. If it matches with the database, the ignition of the vehicle is turned on Fig 2. Otherwise, if it does not match, then it will alert the owner with a message via GSM Fig 7 and capture the person's image and send it to Gmail Fig 8.

2.VOICE COMMAND: When an input command is given to the microphone of the laptop then the laptop Performs the NLP (Natural Language Processing). If the command is matched with the input command (open) in the data base Fig 3. Then it will redirect to the next step verification (fingerprint Authentication) Fig 4. If the finger ridge match with the database then GSM will intimate the owner with message of authenticated then the ignition of the vehicle is turned on Fig 5.6. If it does not match, then it will alert the owner with a message unauthorized and sends the location via GSM and GPS Fig 8.

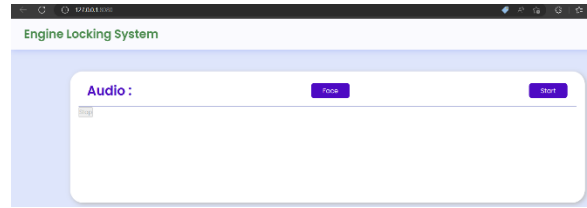


Fig 1: web application



Fig 2: Facial Recognition

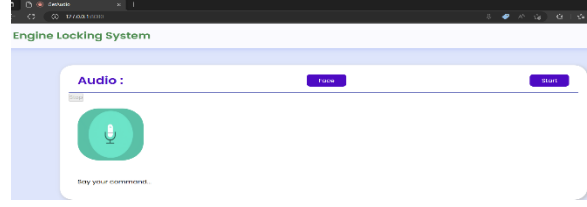


Fig 3: Voice command

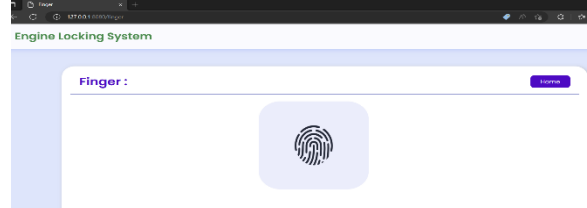


Fig 4: Fingerprint Authentication



Fig 5: Authenticated status

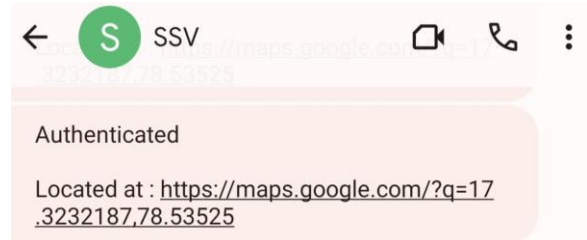


Fig 6: Authentication SMS with location

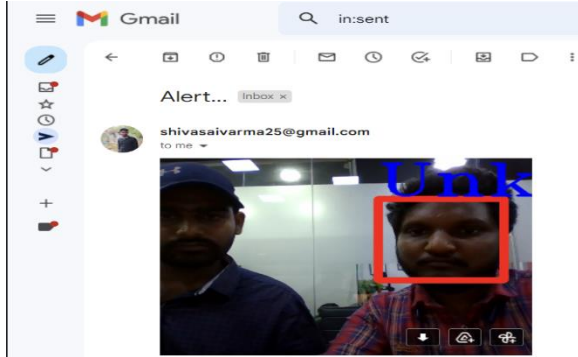


Fig 7: Captures the unauthorized person and sends mail to the owner.

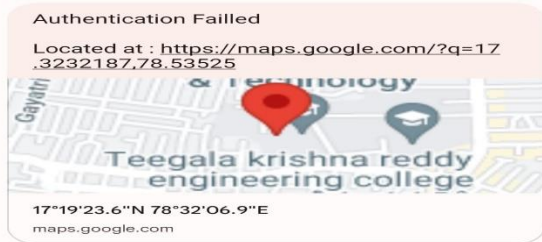


Fig 8: Authentication Failed SMS with location

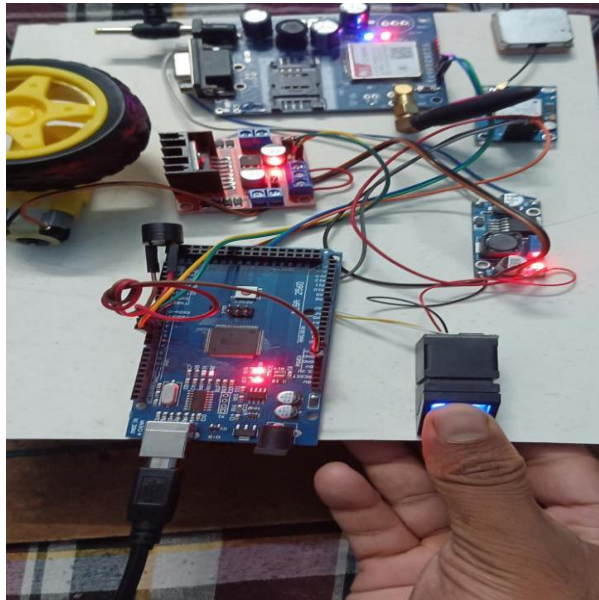


Fig 9: Result of the project

Advantages

1. Enhanced Security: Facial recognition technology can enhance the security of vehicles by ensuring that only authorized drivers have access to the vehicle. It can also be used to detect unauthorized passengers or prevent car theft.
2. Convenience: Facial recognition technology can make it easier and more convenient for authorized drivers to access their vehicles.

VI. CONCLUSION

This proposed system provides security and safety in automobiles for the user with the help of face recognition and Voice command. Facial recognition is a type of biometric technology that uses HAAR Cascade algorithms and machine learning to identify and verify individuals based on their facial features and Voice command system accepts voice as an input and determines authenticated user by machine learning techniques. Voice based system is secured with the additional face detection system. The action is carried out by taking input as control commands in spoken natural way. The method is proved for real-time operation. This system is useful for users with low costs and easy installation as compared to other system. It can be used in any type of automobiles. Thus, face recognition and voice command system allow specialized users to make use of the system

VII. FUTURE SCOPE

- **Road Safety:** Features of IGNS system such as automated number plate recognition system combined with face recognition and vehicle detection can be upgraded to new level of security for road safety management system for the government. The system can be used to understand and analyze daily traffic flow.
- **Vehicle Tracking:** Since the Proposed system uses number plate for recognition it is possible to track the vehicle anywhere with the same plate.
- **High Security:** The system can work efficiently in areas which restrict human interactions such as military base.
- **Monitor Activity:** The system can be used to monitor activity records of the driver and vehicle which would stand as a vital information for investigation authorities.
- **User Tracking:** The system enables face identification for security purpose. Hence can play a vital role in tracking a user.

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