**5th Boeing Engineering Student Competition**

**Project Proposal**

**Title : Intelligent autonomous hoover an IoT solution**

**Team Members:**

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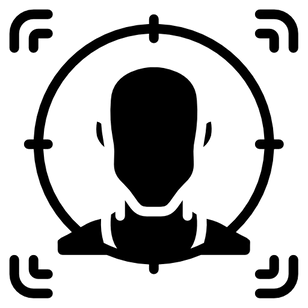
**Academic Advisor and Project Supervisor : Dr.Nidal Nasser**

**Purpose of the project:**

Robotic vacuum cleaners, or "hoover," are self-contained devices that are already widely utilized around the world, bringing in the "digital revolution" of home life. Our contemporary hoover model is accessed and controlled by the implementation of its own IDE, "iRobot education," which is written in Python. web online applications, allowing them to function independently based on the specified time, locations, and boundaries. This technology will help homeowners the most because it will reduce the amount of effort required. As a result, unlike traditional vacuums, the automated robotic hoover is efficient and simple to use.

Our project aims to implement android mobile application for the use of biometrical recognition features in the automated hoover, thereby simplifying its use. Our goal is to learn more about AI, machine learning, and IoT in order to improve domestic life, as well as to understand how to build and connect biometrical recognition features of the Android mobile application into the iRobot create 3 online application for robotic vacuuming. Raspberry Pi is a Robot Operating System; a middle-framework used to get any robotic application up and running. The management of connecting one's device to the Pi will be centralized so that it may be synced with other devices to allow control and monitoring with the installation of sensors.

**Design/Methodology/Approach:**



Admin logs in using facial recognition biometric then allowing inputting the locations to be cleaned around the campus. Checking the database provided around the campus.

Shape

Description automatically generated with low confidence

## The allowance of using voice recognition identified by the person giving the cleaning instructions.

Icon

Description automatically generated

The capability to add new biometric data features of the users in the system. Editing the biometric features details of any of the users and ensuring it would be accepted

**Limitations:**

1. The project may have limitations in terms of the type of biometric recognition feature that can be implemented. This is because not all biometric recognition technologies are equally reliable, and some may not work well in the context of a vacuum cleaner.

2. The project may have limitations in terms of the processing power of the Raspberry Pi, which is being used as a middle-framework. As the number of devices and sensors connected to the Raspberry Pi increases, the performance of the system may decrease, limiting the scalability of the project.

3. The project may have limitations in terms of the cost of implementation. As the project involves multiple devices and sensors, the cost of purchasing and integrating them all may be high, making the solution less accessible to some homeowners.

4. The project may have limitations in terms of the geographic area where it can be used, as the technology requirements may not be readily available or accessible in all regions.

**impact of the project:**

it has the potential to transform the way households clean their living spaces. By implementing biometric recognition features into an intelligent autonomous hoover, the project aims to simplify the use of the hoover, enhancing its efficiency and convenience. The project also presents an opportunity to learn more about AI, machine learning, and IoT systems. However, the project may face limitations in terms of the type of biometric method used, processing power limitations, the cost of materials and integration, and regional availability. It is important to consider the social implications of the project, including concerns about data privacy and protection, employment impacts, and accessibility to all socioeconomic groups, in order to ensure that the project has a positive impact on society. Overall, the impact of the project will depend on its successful implementation and adoption by homeowners.

**Social Implications** :

May include concerns about privacy and data protection. Biometric data, such as facial recognition or Voice recognition data, is highly sensitive and personal, and there may be fears about this data being misused or hacked. As such, it may be important for the project to have strong data protection measures in place, and to communicate clearly with users about how their data will be collected, stored, and used.

There may also be concerns about the impact of this project on employment, particularly in the cleaning and home services industries. If homeowners are able to automate their cleaning processes, this may lead to fewer jobs being available in these industries.

Additionally, the cost of implementing this technology may limit its accessibility to certain socioeconomic groups. This may further perpetuate existing inequities and social divisions. It will be important for the project to consider ways to mitigate these potential social and economic impacts.

**Originality and value:**

The project of implementing biometric recognition features into an intelligent autonomous hoover is innovative and valuable due to its potential to transform the way households clean their living spaces. The use of biometric recognition features would simplify the use of the hoover, enhancing its efficiency and convenience. Therefore, it also presents an opportunity for individuals to learn more about AI, machine learning, and IoT systems. However, the project may face limitations as a result of the type of biometric method used, processing power limitations, the cost of materials and integration, and regional availability. Furthermore, the social implications and concerns about data privacy and protection, employment impacts, and accessibility to all socioeconomic groups must be considered when developing such a project. Overall, it presents an innovative and valuable approach to simplifying household chores and improving domestic life.

**References:**

<https://www.researchgate.net/publication/260359318_Mobile_Biometrics_Combined_Face_and_Voice_Verification_for_a_Mobile_Platform>

<https://www.ojp.gov/ncjrs/virtual-library/abstracts/biometrics-look-facial-recognition>

<https://www.ijcaonline.org/volume14/number5/pxc3872493.pdf>