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Automation used for Household Application with Google Assistant

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Abstract - *The purpose of this project is to clean the floors in college, hospitals, auditoriums, malls and workshops with using automated cleaning machine with using voice command. The aim of this project work is to design and develop process for cleaning the floors with automated cleaning machine. In modern days we are very busy to give time for household work for sake of busy people this automated cleaning machine becoming an important in our life. Cleaning of floor is very important for our health and this floor cleaning machine reduces the effort required for cleaning. Hence this project is very useful in our day to day life. It is very simple in construction and easy to operate, anyone can operate this machine easily.The floor cleaning machine consist of Google Assistance, Raspberry Pi Board, moisture cotton mop, swiping brushes, wipers and vacuum cleaner for reducing the cleaning time. The overall cost of this machine is also cheap. This automated cleaning machine can be operated on voice command and it can do that work with itself by taking required decision. We can give command to this machine over phone so it is not necessary to stay close to the machine.*

***Key Words*: Google Assistant ,Raspberry Pi,Moisture cotton mop, Wipers, Vacuum cleaner.**

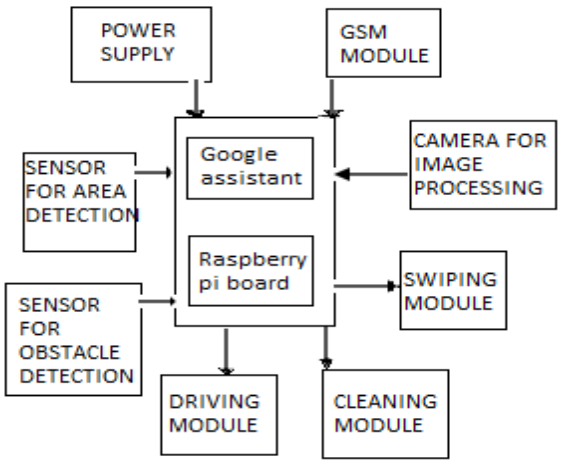
1.INTRODUCTION

The "Home Automation" concept has existed for many years. The terms "Smart Home", "Intelligent Home" followed and has been used to introduce the concept of networking appliances and devices in the house. Home automation Systems (HASs) represents a great research opportunity in creating new fields in engineering, and Computing. HASs includes centralized control of lighting, appliances, security locks of gates and doors and other systems, to provide improved comfort, energy efficiency and security system. HASs becoming popular nowadays and enter quickly in this emerging market. However, end users, especially the disabled and elderly due to their complexity and cost, do not always accept these systems.

Due to the advancement of wireless technology, there are several different of connections are introduced such as GSM, WIFI, and Bluetooth. Each of the connection has their own unique specifications and applications. Among the four popular wireless connections that often implemented in HAS project, WIFI is being chosen with its suitable capability. The capabilities of WIFI are more than enough to be implemented in the design. Also, most of the current laptop/notebook or Smart phone come with built-in WIFI adapter. It will indirectly reduce the cost of this system.

This project forwards the design of home automation using Raspberry pi, a credit sized computer. Raspberry pi provides the features of a mini computer, additional with its GPIO pins where other components and devices can be connected. GPIO registers of raspberry pi are used for the output purposes. We have design a power strip that can be easily connected to GPIO Pins of the Raspberry pi. The home appliances are connected to the input/output ports of Raspberry pi along with the power strip and their status is passed to the raspberry pi. The android running OS in any phone connected to a network can access the status of the home appliances via an application. It presents the design and implementation of automation system that can monitor and control home appliances via android phone or tablet.

2. SYSTEM BLOCK DIAGRAM



3. BLOCK DIAGRAM EXPLANATION

In our proposed work; Raspberry Pi is the core which accepts the instruction from google assistant through GSM module, sensors and camera. It gives the task to the various component on the device.
As a user; one of the basic advantage of our proposed system is that the device (robot) can be separated from far away locations. The android phone user sends the command to the robot; which is received by the GSM module on the robot.
After receiving the command; the raspberry pi module process and understand what the work is, then the work is allocated to particular module on machine.
While beginning the operation, the robot will first locate its own location and go to work location by locating various tags given to each room of the area. The tags of the room are pre-located in the memory. Thus it identifies though tags and go to that location where it is intended to go and do its assigned task.
While it moves; camera is mounted on the device which provide the image and tags to locate the various tags.
Connect to the device can also be used to view live operation of robot from any distance place through android phone.
After the completion is completed; it goes to its predefined location.

- **Driving module:** A differential wheeled robot is a mobile robot whose movement is based on two separately driven wheels placed on either side of the robot body. It can thus change its direction by varying the related rate of rotation of its wheel and hence does not require additional steering motion. To balance robot additional wheel or caster may be added.
- **Sensor module:** Sensors used in this project is for area detection and obstacle detection. Area detector sensor will sense the floor area where the open area is present and where the objects is present. Obstacle detection sensor will detect the object come in between the way of robot and tackle it and continue its work.

4. FLOWCHART

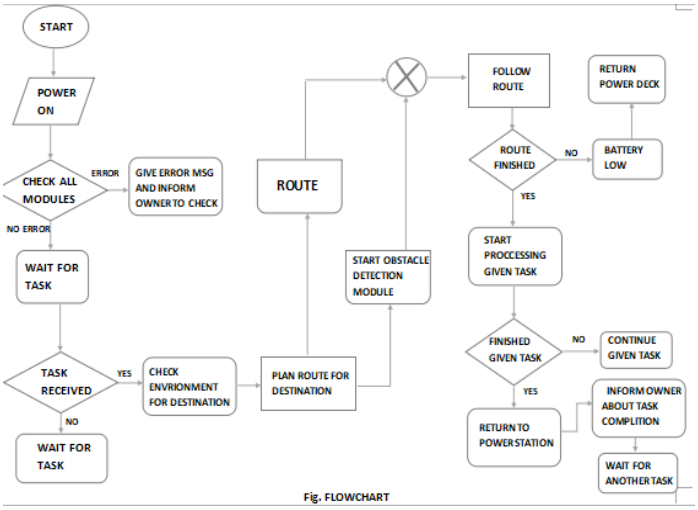


Fig. FLOWCHART

5.METHODOLOGY

When the robot start, it will check all the modules availability. If all the module are OK means there will be no error condition then it will wait for user to give specific command which is given by GSM module or voice module and if there will some error occur then the module inform user about the error.Once the error will resolve then module accept the specific command from user and start to check environment for obstacle and space by using camera and IR sensors. After the completion of checking environment then robot will plan for specific route for work. While working the obstacle detection module work simultaneously to check whether any obstacle is left in scanning and it will avoid that obstacle and continue its work. IR sensor is not able to scan all the obstacle in the way so a camera is used to capture image. After capturing the image ,image processing take place for obstacle avoidance. Once the route completed then robot will return back to charging unit.During performing task if the robot is on low battery then it will stop on the position and return back to charging unit once the battery is full then it will start again the task. When the robot will complete its given task then it will inform user that the work is done. And return to charging unit and wait for further instruction.

5. APPLICATIONS

1. The Home automation is one domain that has been target of all robotics companies, large and small. Soon a time could come when you clean your home using a robot just like the one we've given life here. These could make the tiresome task of cleaning all those rooms, into a few minutes' work. Cleaning your home would no longer be the same.
2. The robotic cleaner enhances the technology of cleaning and can be further used to integrate

features of fast and effective cleaner by different other methods. As we can observe that development of comfort systems has found a new market for themselves and if these systems can be remotely operated, i.e. in the click of just one single button we have an entire smart home for us.

3. Gadgets like these prove instrumental in designing homes having all the facilities, and with the inclusion of more and more features like that, a new sound picture of future begins to develop.
4. Nowadays as more households are having nuclear family, automated cleaning robots can be used for cleaning floor in house with only working couple and teens.
5. It is useful for elderly people leading retired life, as cleaning floors can take a toll on their health.
6. It can be used in offices; helping in keeping the offices tidy as well as in long run it helps to keep maintenance cost low.
7. It can be used in old age homes for cleaning floors as it is necessary to keep them clean.
8. It can be also used in hospitals to keep clean the floors where work is maximum and some hazardous elements are present.
9. Places like hospitals, restaurants and retirement homes can take the advantage of these devices where not much dirt is accumulated and can be cleaned easily with these devices.

6.CONCLUSION

While Studying various aspects of automated cleaning robot we came to know about many difficulties faced by people today in keeping their houses clean and how using robot can help them in tackling those problems. As we know that time is money, our proposed robot will help user to save precious time and use them for other important task. We came to know about many advantages of using automated cleaning robot and their application in different spheres of human work as mentioned above.

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