# DigiMop – A Home Automation Tool

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***Abstract*: The research aims to create a automated home cleaner thus helping people reduce their labour intense work such as sweeping and mopping floor The objective of this project is to design and implement a vacuum robot prototype by using Arduino , LDR sensor, motor shield L293D, infrared sensor and create a user friendly home cleaning device.**

***Keywords:* Arduino; IOT; home automation; sensor; cleaner**

## I. INTRODUCTION

Even though there is considerable work done in this application of robotics, none of it concerns with the cleaning of both dry and wet floors by respective detection. The conventional vacuum cleaner consists of large mechanical and electrical parts which are more costly and consume more power whereas the autonomous cleaner robots consists of low power consumer electronics and mechanical parts and it can operate during power outage period and does not need any human guidance.

Robotic cleaners are basically distinguished on their cleaning expertise like floor mapping, dry vacuum cleaning etc. The motto of this project is to evaluate cost efficient, light weight, less noisy and low maintenance robotic system.

Simultaneously having the facility of automatic avoidance of any obstacles and capable of finding its way around. way. Robot can clean along edges and into other hard-to-reach places. They are guided by certain algorithms for path planning and navigation, accordingly robot cleans the surface. Sensors present in it are used for obstacle detection. The robot's bumper prevents it from bumping into walls and furniture by reversing or changing path accordingly.

## II. RELATED WORK

Bluetooth Based Automated Floor Cleaner by C R Balamurugan,P.Kerubha, S.Arunkhanna with disadvantages Scrubber design is inefficient, development can be made in field of sensors.

Auto Floor mopping and Cleaning BOT by Priya Shetty, Ranjitha M, Pratik Naik with the disadvantage Wet floor cleaner can be implemented with advancement as for now footprints are visible after cleaning.

Design and Implementation of Smart Floor Cleaning Robot using Android App by S Monika, K Aruna Manjusha, S V S Prasad, B.Naresh with disadvantage robot had some drawbacks like colliding with objects in front of it and this vacuum cleaner couldn't reach to small areas and left those areas unclean and the automatic floor cleaner robot collects the dust but the drawback over here is that it does not clean the wet floor.

Design and Implementation of Smart Floor Cleaning Robot using Android App by S Monika, K Aruna Manjusha, S V S Prasad, B.Naresh with disadvantages robot had some drawbacks like colliding with objects in front of it and this vaccum cleaner couldn't reach to small areas and left those areas unclean and the automatic floor cleaner robot collects the dust but the drawback over here is that it does not clean the wet floor.

## III. SCOPE

Controlling provides various advantages over human powered work. Following are some of them: -

1. It gives accurate results and eliminates possibility of manual error.
2. It is very first and efficient and the control system used in industries are 100 timesefficient than human work.
3. In some part of the work areas it lessens the human efforts. Washing machine comesunder this category.
4. It also plays the great role in bringing entertainment in human life in different work.
5. Television is the live example of these types of robots.

## IV. REQUIREMENTS

The system uses a physical factor to gauge if the driver is drowsy.

*A. Feasibility study*

1. Hardware requirements:
2. System Specification: -
3. 2 GB RAM and internal memory of 250GB
4. Windows 7,8.1,10

*B. Various robotics parts are: -*

1. Actuators
2. Sensors
3. Mechanical control devices like valve
4. Microcontroller – Controlling unit

*C. Software requirements:*

1. Arduino ide
2. Embedded C
3. Arduino Code

## V. PROJECT DESIGN

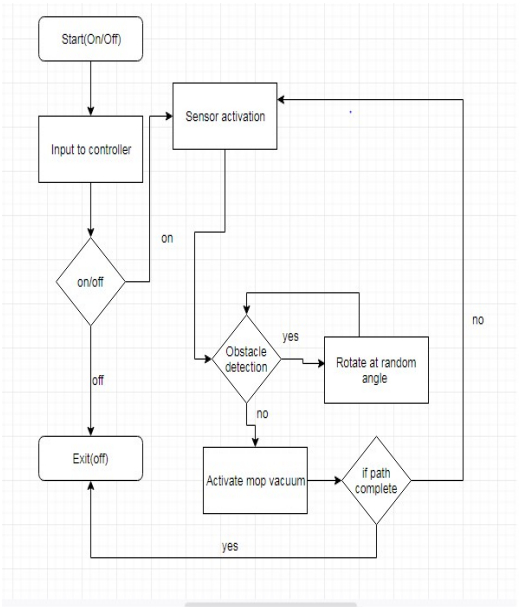


Figure 1. Design Flow

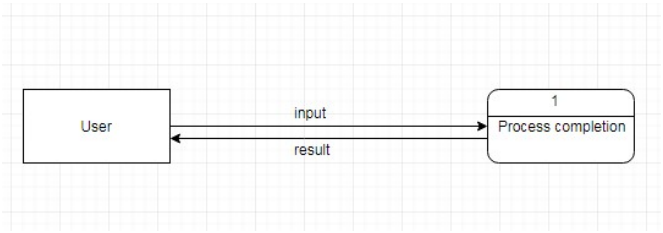


Figure 2. DFD Level 0

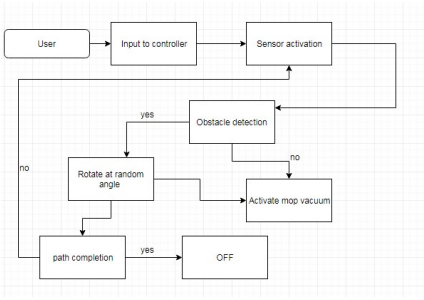


Figure 3.DFD Level 1

## VI. METHODOLOGY

### A. *Spiral motion algorithm*

Step 1: The common observation is that the square thus formed will be of size (2*N-1) *(2*N-1).

Step 2: Fill the first row and column, last row and column with N, and then gradually decrease N and fill the remaining rows and columns similarly.

Step 3: Decrease N every time after filling 2 rows and 2 columns.

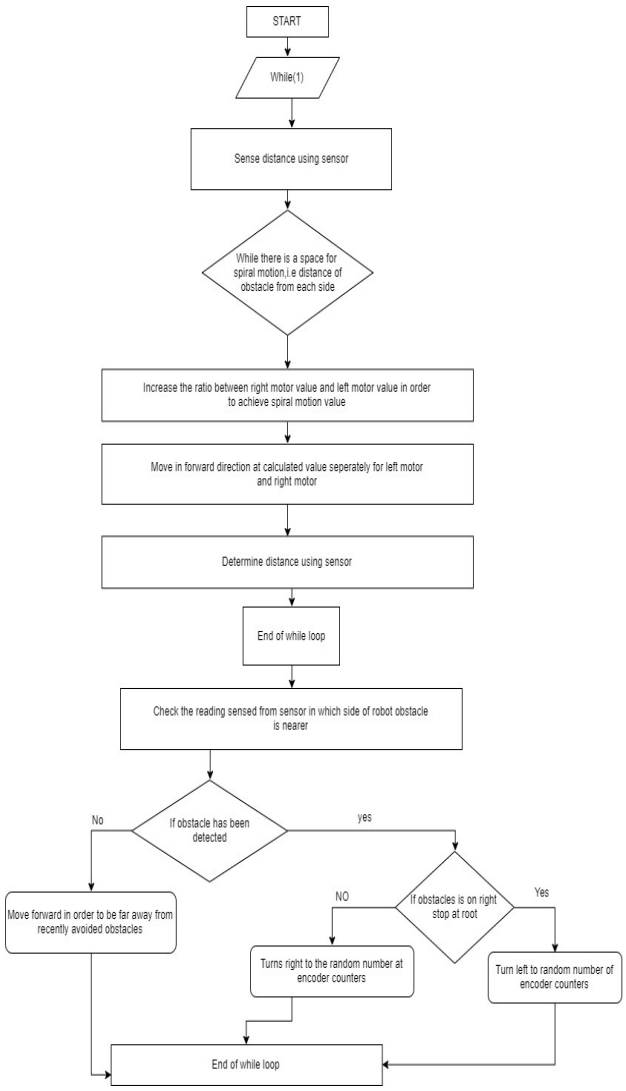


Figure 4. Spiral motion flowchart.

### B. *Random path algorithm*

Step 1: Inputnumber of Max_tries, Max_flips probability
Step 2: for i=1 to Max_tries do
Step3: Start with random initial assignment a
Step 4: compare best assignment with a and retain the best
Step 5: for j=1 to Max_flips
Step 6: if a is the solution return a and "True"
Step 7: else, pick a violated constraint C, and calculate the probability p
Step 8: change x's value to a's and return "False" and the best current assignment


Figure 5. Random path flowchart.

## VII.CONCLUSION

With the help of various methodology implemented the prototype is able to clean successfully with the help of collision detection algorithm and the available hardware such as the Infrared sensor in combination with the servo motor has the ability to have a view of 180° while the relay and pump in combination help to deploy the mop system whenever the vacuum of the given place is done. The vacuum system and the mop system works together simultaneously thus reducing the time required for cleaning and thus improving the efficiency of the overall system and also reduces the energy consumption which would have been required if the vacuum and mop system had worked independently.

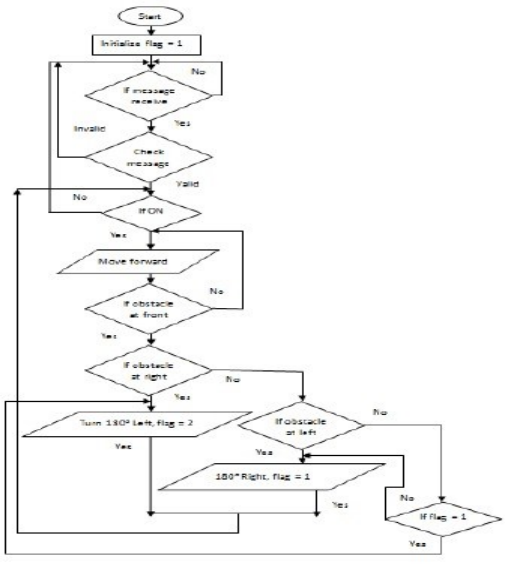


Figure 6. Design Flow.

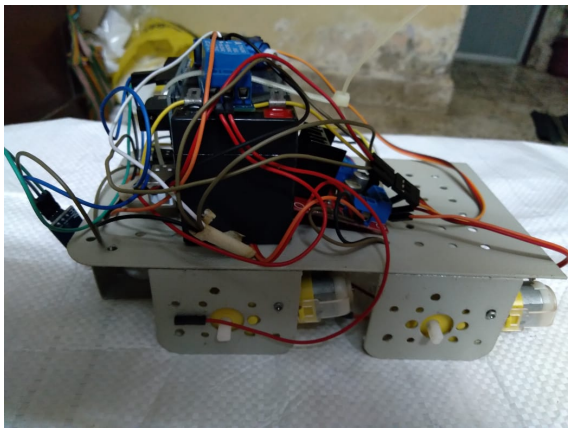

Figure 7. Connected circuit

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