

INTELLIGENT ROOM CLEANER

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ABSTRACT

The main objective of this project is to develop a robot which can clean an area (of size at least 5m x 5m). Besides, the robot should traverse the path only once. By doing so, it can lead to clean environment thus saving time and energy.

Basically, robot can move in two different types of path pattern as shown in Figure 1-1 whereby the robot just traverses the path only once without repeating the area it traverses before. There are four tic-tac switches in the surface of the robot for user to choose. First switch is a reset button whereby users wish to stop the robot operation. Once the user press second switch, the robot will clean the area in a way as shown in Figure 3-5 while user choose third switch, the robot will traverse and clean the area as shown in Figure 3-6. Forth option is that the robot movement is not limited. It can traverse in anywhere and clean the area but there is another function whereby the robot could detect object and avoid hit on particular object.

MicroBasic II Microcontroller (PIC 16C57C) is selected as a device to control the moving mechanism of the robot. Programming code for controlling the motor is written in Parallax Basic Language (PBasic). Two continuous servo motor are directly connected to the I/O pins (P0 and P1) of MicroBasic II Microcontroller to move the robot by driving the wheels. A spinning brush is constructed in order to clean the floor. To do so, a DC motor is connected through gear to spin the brush. However, the DC motor requires more current than the power supply on the Microcontroller can provide. Hence, cathode driver (ULN 2803) is used to provide external supply to the DC motor resulting it able to spin the brush but yet the brush for this project failed to clean the floor because of its position. In additional, PNP IR module VER 3.2 is purchased for object detection. Two IR sensors is put on the right and left side of the robot so that the robot can avoid obstacles. The maximum range of detection of PNP IR module VER 3.2 is approximately 2m depend on how much the rotation of the Variable Resistor to increase its sensitivity.

Intelligent Room Cleaner is powered by two cheapest carbon zinc 9V batteries. Without battery, robot could not function. One 9V battery is connected to 5V voltage regulator to supply to two servos and another 9V battery is connected to 5V voltage regulator and supply to the MicroBasic II Microcontroller. As a suggestion, rechargeable battery can be chose for robot because it has lower internal resistance compare with the cheaper battery.

For further enhancement, it is proposed to add extra features such as replace brush with vacuum cleaner in order to create a clean environment. Status of the robot can display in LCD. (Notify the user the process of cleaning is done).

Overall, this project outcome has successfully meets the aims and objectives.