Nav Ujjwal E-Innovation Hackathon

TEAM OMEGA

Topic: Chemical Free Non-Toxic Sanitization Solution

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ABSTRACT

This project focusses on the development of an Ultraviolet Disinfection Robot which is an autonomous robot. The robot uses Ultraviolet Germicidal Irradiation (UVGI) method which is a non-toxic disinfecting solution and is also effective in damaging the DNA of harmful bacteria thus preventing its replica. The UVGI system emits an ultraviolent UVC light of which is capable of eliminating 99.99% of all viruses and bacteria in a few minutes. The main objective of the project is to predict the dynamic behaviour of the robot with respect to the changes in the environment as precisely as possible. Generally, an autonomous robot requires specific approach for path planning and localization.

- This robot is highly proficient in understanding its environment and mapping the surroundings using its path planning algorithm.
- The robot is built smart to avoid any hindrances caused by the surrounding objects by updating its trajectory path on its own.
- In order to increase the effective use of the robot the irradiance field is calculated at a particular orientation of the robot. Then the environment around the robot is divided based on the irradiance field eventually covering the complete field area in a productive manner.
- The robot is also equipped with a passive infrared sensor and a camera which detects general movement around the robot and identify the presence of a human around the robot at any particular time which turns off the robots UV light emission.
- The structural design of the robot will be done using Solid-works CAD software.
- Simulation of the robot helps us in calculation of the behaviour of the robot with respect to the time and state of the system. The Kinematic and Dynamic simulation of the robot will be done using MATLAB software.
- Study on mapping of the environment and recognition of objects will be carried out using Robot Operating System Software.