

Y.M.I.C (You Mess, It Cleans)

Blitzkrieg

Team Details

Name	Roll number	Contact No.	Email ID
Ashwin Ramachandran	200050016	9790430198	ashwinramachandran@gmail.com
Omkar Devgonda Patil	200100111	9763860735	omkardpatil23@gmail.com
Sourabh Hanje	20D110028	9359688979	sourabhhanje389@gmail.com
P Balasubramanian	200050103	8939623615	zestyoreo9@gmail.com

Description

- We plan on designing a duo of robotic arms which with the assistance of a camera and openCV will identify the utensil that needs to be cleaned and then wash it.
- Upon recognizing the utensil (bowl/plate/glass/mug) placed at a designated position, the secondary or the gripper arm picks up the object accordingly and rises it to a certain height.
- Then, the primary or the washer arm consisting of a brush, along with two tubes that discharges the dishwashing fluid and water onto the vessel, scrubs it and cleans it for a stipulated time. The secondary arm rotates the dish to appropriate positions so that thorough washing takes place.
- The discharge of dishwashing fluid is controlled by a pump and a solenoid switch for dishwashing liquid and water respectively.
- After cleaning, the secondary arm lowers it and moves onto the next object.
- Note: The arms and OpenCV do not work together (no computer vision aided navigation) in real-time, and OpenCV just helps in identifying the object.

Motivation

Women from middle-class families work relentlessly, every day, performing similar activities on daily basis. So, we thought if we can make an autonomous bot that performs one of such tasks, would be great. So, after some research, we decided to make a utensil/dishwasher.

In the usual dishwasher only a water sprinkler performs cleaning, it generates a moist environment which is suitable for the growth of bacteria and fungi and not to mention hand washing by scrubbing it would give way better results than it. While, our dishwasher will perform cleaning by a robotic arm, making it very similar to the actual cleaning. It will clean them individually creating a quality result.

And in the future, we can also make it fully autonomous, and adding different tasks, will make a fabulous product for household use and the hotel industry as well. Learning Solidworks, ROS, Gazebo software and using them for making a project is also our motive.

Flow Sheet of Idea

Please see the Link for approximate timeline

https://drive.google.com/file/d/16wf7R5a7A3DsaoBoVXERLcamxx9_I6jo/view?usp=sharing

Current Solutions / Market Demand (Optional)

Similar Products in the Market

The products that are currently in the market-

- DishCraft robot (<https://dishcraft.com>)- a robot that takes in particular dishes and cleans them with water and soap
- KarRobot Arm, Samsung's Bot Handy robot, Panasonic IRT dishwasher (<https://futurism.com/the-byte/samsung-bot-handy-dishwasher>)- a arm that detects the kind of utensils and sorts them and places them in a dishwasher. (<https://hometone.com/panasonic-kar-robot-arm-washes-your-dirty-dishes.html>)

What we aim to do is take the core elements of both these tasks, i.e. detection of the utensil and performing the cleanup task using a robotic arm.

- A bot close to our objectives but doesn't use CV
<https://www.thekitchn.com/electric-dishwashing-robot-arm-video-261438>

Market Demand

A lot of restaurants and homes today face the difficulty of doing the dishes especially when they are in large numbers. What we aim to do is to automate the task to a certain level which would make the task a lot simpler. We expect our product to simplify the major task that most households face- dishwashing. Dishwashers available in the market do not clean the dishes as thoroughly as our bot does and the dishes need to be pre-cleaned before placing it in unlike our robot which can wash these dishes straight out of the hands on a consumer.

Aim for In-Sem Phase (May 2021)

- Learn The Basics of ROS, Gazebo, Git, CoppeliaSim and OpenCV (using Python). Simultaneously research on similar utensil ID projects.
- Refine choices and methods of implementation with mentors and assign work amongst the team. Work will be started on the main project.
- Project building and collaborating time. (Most hectic) Regular reviews with mentor to update on process and improve necessary parts.
- Aim/Goal: Complete the CV/ ML part by this stage and be at least start on the simulation or making robot arm (decision still to be taken)

Personal Learning

- We shall learn many software through this project and many robot-related technologies.
- We shall learn to make a robot arm and gripper, and control it. We shall also learn Computer Vision and its integration with robotic arm control.
- We shall also be using many development tools like ROS, Gazebo (For simulation), OpenCV (for computer vision), Python (For coding the bot), Git (For simultaneous coding), Solidworks (For design and building of mechanical arm), ANSYS (For checking static stability).
- For control of the arm, we shall learn and use Arduino with servo shields etc;

YOUR DISHES DON'T DO THEMSELVES,
OUR BOT DOES