AMRITA
VISHWA VIDYAPEETHAM

AUTONOMOUS NAVIGATION ROBOT WITH OBJECT AVOIDANCE

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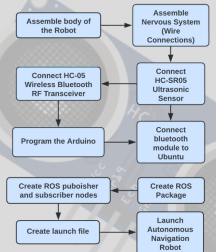FACULTY: DIVYA UDAYAN J

Introduction

- **The term "obstacle avoidance" is now used in modern robotics to denote the capability of robot to navigate over an unknown environment without having any collision with surrounding objects.**

- **Obstacle Avoiding Robot is an intelligent device which can automatically sense the obstacle in front of it and avoid them by turning itself in another direction.**

- **This design allows the robot to navigate in unknown environment by avoiding collisions, which is a primary requirement for any autonomous mobile robot.**

URDF

We are avoiding objects using URDF with the help of laser light. we take input and identify whether the obstacle is in left or right of the robot and move the robot in opposite to that direction.
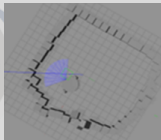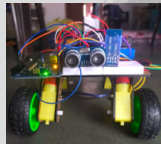
Workflow

```
Assemble body of  →  Assemble
the Robot            Nervous System
                     (Wire
                     Connections)

Connect HC-05    →   Connect
Wireless Bluetooth   HC-SR05
RF Transceiver       Ultrasonic
                     Sensor

Program the Arduino → Connect
                      bluetooth
                      module to
                      Ubuntu

Create ROS puboisher → Create ROS
and subscriber nodes   Package

Create launch file   → Launch
                        Autonomous
                        Navigation
                        Robot
```

Distance Calculation

```
Send Waves        →  Receive Reflected
                     Waves

if (dist<19)     ←   Calculate the distance
move forward else    (dist = duration/58.2)
move back or left or right
```

Output

References

https://www.ijert.org/obstacle-avoidance-robot-using-arduino
https://www.sciencedirect.com/topics/engineering/obstacle-avoidance