

## TASK3.2- Cookiebot

### What Is SLAM (Simultaneous Localization and Mapping)?

-It is a technique used in robotics and computer vision to solve the problem of a robot or an autonomous agent simultaneously creating a map of an unknown environment while determining its own position within that environment.

-The primary goal of SLAM is to enable a robot to navigate and operate in an unknown environment without any prior knowledge of the surroundings. SLAM algorithms use sensor data, such as range measurements from laser scanners (LiDAR), visual data from cameras, or other types of sensors, to build a map of the environment and estimate the robot's pose or position within that map.

### There are different SLAM algorithms, but they can be classified into two groups:

#### 1-Filtering:

- Extended Kalman filter
- Particle filter

#### 2-Smoothing:

- pose graph optimization

-These are just a few examples of SLAM algorithms, and there are many other variations and improvements available in the field. Each algorithm has its strengths and weaknesses, and the choice of algorithm depends on the specific requirements of the SLAM application, the available sensor data, computational resources, and environmental constraints.

## There are different sensors could be used for SLAM:

- Lidar (Light Detection and Ranging)
- Cameras
- IMU (Inertial Measurement Unit)
- Ultrasonic and Infrared Sensors
- RADAR (Radio Detection and Ranging)
- RGB-D (Red Green Blue – Depth)

## Applications:

- Cleaning Robots
- Self-Driving Cars
- Augmented Reality
- Archaeology and Exploration
- Industrial Automation