

SLAM Localization Technique

SLAM:

Simultaneous Localization and Mapping is a technique that allows the robot to build a map of the surrounding environments. Through processing sensors' data, the robot can identify its position through this map he identified of the environment.

Sensors Required:

GPS:

It is one of the good sensors for the robot to identify its global location, though it might be ineffective open doors.

Cameras:

They capture visual data that can be used for **Extraction and Recognition**, where the robot can identify landmarks such as doors, corners, or even places if outdoors.

Lidars:

It projects a 3D view of the environment, through emitting laser beams and calculate its reflection and rebound time, to get a spatial perspective.

IMUs:

They are used to calculate the robot's acceleration and velocity; thus, he can get a hint about his location in the self-identified map.

Workflow:

First, the robot uses the sensors to collect data about the environment and its position relative to the surrounding objects. Then it extracts and identifies landmarks as stated above.

Moreover, the robot associates the current sensors' data with previous ones, in order to determine its position among the map it is projecting.

Last, it associates all the sensors' data in addition to its exploration and it reaching dead-ends or previously visited places, it now can project a map of the environment and localize itself among this map.