

REPORT:

The simultaneous localization and mapping (SLAM) problem asks if it is possible for a mobile robot to be placed at an unknown location in an unknown environment and for the robot to incrementally build a consistent map of this environment while simultaneously determining its location within this map. This problem has been solved in a theoretical and controlled environment but still has some issue plaguing it that prevent real life use. It has proven to work in an airborne and subsea systems.

->Structure:

SLAM is a recursive probabilistic function where the state and orientation of the robot at time instant k affects the robot at $k+1$. It uses observations and correlation between certain reference points to further make more accurate predictions. The key insight is the fact that the relative position between two landmarks is relatively constant. Hence when the location of the bot is changed, the location of the second landmark is also instantly updated. Once the other landmark's position is updated and fixed through multiple updates, that landmark is used as the basis for other landmark and its position is updated with respect to the fixed landmarks. Graph SLAM is the de facto way to implement a SLAM algorithm.

CREDITS:

https://ieeexplore.ieee.org/abstract/document/1638022?casa_token=oMLiCH8d2fEAAAAA:4t0hct749q9cKKBRSWwO1AzsOwvgCpzu1rlpSmYkVRd9ocFdUHneECSQ_K0-Uv4OnSZLROrNQ

<https://ieeexplore.ieee.org/abstract/document/1678144>

https://en.wikipedia.org/wiki/Simultaneous_localization_and_mapping