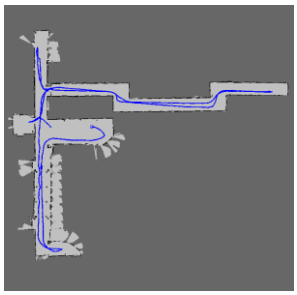
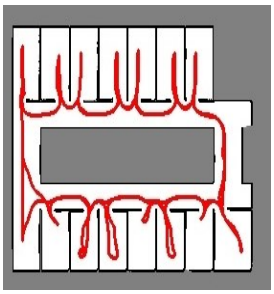
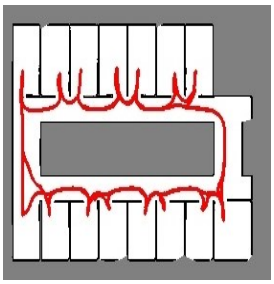
Autonomous Robot Navigation

This project carries out research activities on autonomous robot navigation in challenging environments.

Exploring an unknown environment to generate a map is a fundamental requirement of autonomy for robots. We have developed an incremental algorithm (SRFD) that efficiently manages the underlying data structures used by robots for exploration. The SRFD method improves the efficiency of autonomous exploration missions by allowing faster decision frequencies for robots, especially for those with limited computing capabilities.







Goal oriented navigation in unknown environments must be able to adjust its existing plans based on the newly acquired environment data such as new obstacles and dead-ends. We have developed a new goal oriented navigation algorithm that is based on directing a robot's exploration towards the goal. It utilizes the SRFD approach's fast exploration data update rates to quickly detect and recover from dead-end situations and to send the robot in the correct direction towards the goal.