Multi Robot Graph Exploration, declaration of complete exploration, obstacle avoidance

Salient features:

* Each robot takes independent decisions for exploration + obstacle avoidance (without direct communication)
* This decentralized technique guarantees completion of exploration of an unknown env in finite edge traversals(where graph structure is incrementally constructed)
* Information exchange bw roots is through beacons available at visited place.
* New condition for decalring completion is obtained.
* Incidence matrix modified to use it as a data structure for info exchange.The modified Incidnce marix after completion represents map of env.
* Lesser or equal number of edge traversals reqd. compared to present tree explorarion stratergies.
* Constant speed change approach is proposed to address the collision avoidance using a local sensor on each robot.

Problem Statement:

Surveillance, search, rescue any task requires to explore the entire environment. A representation of env needs to be built incrementally and then be used while exploring.

What do we mean by Completion?

When no unexplored part of the env. A major challenge in autonomous exploration task when decentralized methods used.

Other challenges that are resolved by our technique:

Redundant exploration, collision avoidance, cordinattion and info exchange bw rbots.

How do multiple robots communicate in a decentralized manner?

By broadcasting in limted range or placing beacons at important locations.