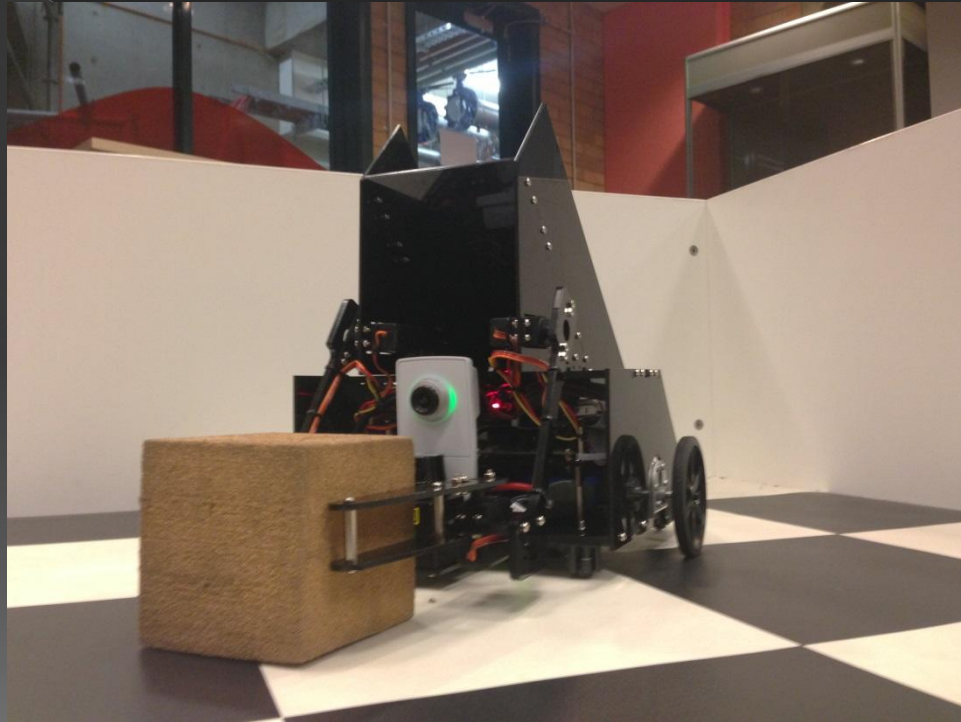


2013 NI ARC

Team UTS Robotics Society



A Challenger Appears



Approach... Initially

- ① Sense
 - > Hokuyo LIDAR for navigation and obstacle avoidance
 - > Wheel encoder feedback
 - > Axis M1013 IP Camera for gold cube detection
- ② Think
 - > National Instruments sbRIO 9636
 - > A* path planning with occupancy grid for navigation to and from mining zone
 - > Obstacle avoidance using the advanced vector field histogram
 - > Line segmenting algorithm to find cubes and correlating with image data to determine whether a cube is gold or rubble
 - > Localization utilising ICP scan matching/particle filter/hough scan matching
- ③ Act
 - > Differential steering
 - > Dual arm design for picking up cubes and storing via storage ramp

What Happened...

● A Wheely Bad Time

- › Wheel encoders performed increasingly worse over time
- › Robot posture could no longer be trusted even for short distances
- › No time left before competition to order and replace motors

● Heuristic Based Approach

- › Line segmenting algorithm used to detect mining zone entry
- › LIDAR based navigation
- › Heuristic approach, position of robot is unknown. Navigation is accomplished by tracking known map features: corners, walls, cubes and gaps

Fight... Begin!



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