Progress Report – CSC 714

NXT Autonomous Retriever

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Tasks Completed –

Configure Bluetooth connection between the NXT's

Transfer data using a test program

Implement event based motor control and understand it's working

Come up with multiple track and bot designs.

Tasks In Progress –

Select a bot design for navigating the track based on sensor capabilities – 4/3

Implement the application code. – 4/10

Implement a track based on bot capabilities and Bluetooth limitations on the NXT. – 4/15

Testing of the system as per project scope. – 4/20

Finalize Track and Bot for final demo. – 4/25

Report and Presentation work. – 4/27

Problems faced

Bluetooth Connectivity

During initial testing in pairing the two NXT's the slave address was not being displayed by the program. Since the master needs a unique address to start communication Bluetooth from a smartphone was used to figure out the physical address of the slave NXT. Once declared in the master both NXT paired automatically and data was being transferred.

SOLVED

Track Designs –

Since this project simulates retrieval of items track design is very important. It determines program logic and bot design. Various track designs were looked into which can be used in a warehouse/assembly line. Grid, Branch and Conveyer line are the most preferred options. The final design will implement one or a combination of the above mentioned options.
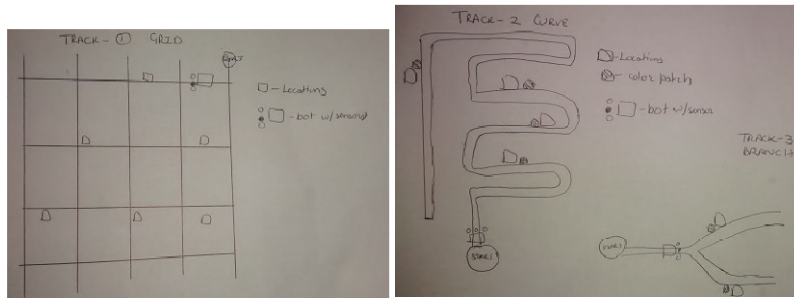
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Open Problems

Track Selection and implementation -

Finalizing a track is still pending as testing needs to done via bot runs. As processing is done on board there are limitations to the logic for track maneuvering. Complex tracks like grids pose a problem as they might need image processing capabilities.

Steps

Proper logic for maneuvering the track based on the bot sensing capabilities.

Bluetooth Input Location

Currently the touch sensor is used to provide input. A proper input method has to be implemented for the master to inform the bot about the item location.

Steps

The touch sensor can be programmed so as to take x number of clicks and transmit to the slave device.

Detect Location

The bot needs to detect the location from the input received. Once detected it has to wait for some time on the desired spot.

Steps

This can be done by placing colored tiles beside the track which can act as current locations.

The bot is given an input from the master i.e a counter as to the number of tiles from the start point. It can then follow the path and stop at the given location for certain amount of time.

Other Constraints

Bluetooth limitations and bot designs also need to be considered. When implementing a hybrid track with branches, input needs to be received and understood before passing the actual location. Hence event synchronization is critical so that the correct information is transmitted from the master NXT to the bot's NXT.