

Robot Presentation

3958 Green Mountain Gears

My robot's name is MIA, which stands for Mission Impossible Automaton. The current version of the robot scores by fitting inside the small space, the innovation project, the bench, the stepper, the pass through under the bridge, and the pull-up bar. These missions were selected because they were close to base, they were relatively simple, they had a high chance of scoring and a low chance for penalties.



The innovation project and bench share a single removable attachment that is used to push over the bench and release the innovation project. The stepper uses sliding L beam and a push point to push the stepper from the line. MIA lifts herself for the pull up using a winch, which is connected to a hook. The hook is placed with a spatula arm, that rotates the hook into position.

The robot uses (4) large motors, (2) color sensors and an ultrasonic sensor for autonomous navigation. The robot uses a PID algorithm for line following. The robot also uses a different PID algorithm with the stepper, to keep robot straight. The robot tended to drift slightly while pushing stepper, which caused it to jam. The robot uses a third different PID when going backwards after the pass-through because the robot tended to drift into the bridge. The robot uses an ultrasonic sensor when passing back under the bridge to make sure it stops at the correct position to place the hook.

MIA was programmed in Mindstorms. Each of the individual missions was saved as a My Block, which was placed inside a loop. The individual programs are run when a specific button is pressed on the robot. The top button runs the innovation/bench. The right button runs the stepper/bridge. The bottom button runs just the bridge. This control program allows a single program to control the other programs used for the missions so there is less search for programs on the robot.

The main decision when designing the robot was whether to fix a problem using programming or by building something different or if a human was making a mistake. The stepper was the most frustrating part of the game because it kept getting stuck. The solution to the stepper was a programming because the robot needed to drive straight and make small moves forward and then backward. The innovation/bench/back rest was frustrating because MIA would score all three some of the time. This was mostly a human error with small differences in the starting position. The hook and winch were an example of making different robot designs. I started with a scissor's linkage, but it could not hold the weight of the robot under testing conditions.

I used audio cues on each mission to let me know MIA had completed a mission or that it was stuck. This was helpful when making decisions about whether or not to re-launch a mission or wait for the mission to be completed.

I worked alone this year because of COVID. I am hoping to get more team members for next year. Team-mates are helpful doing check-lists before launching the robot and to help make decisions about whether or not to run the robot again or stop.