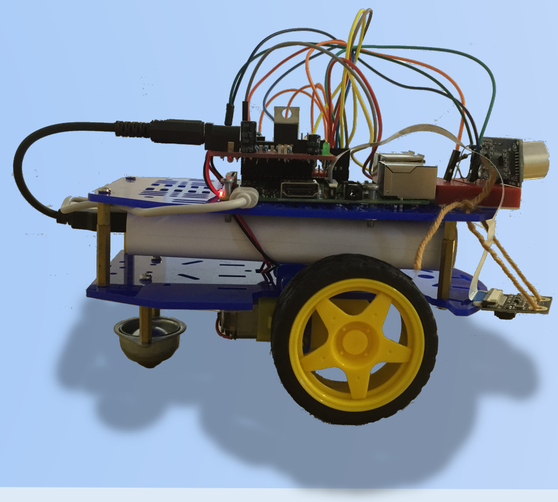
RASPIED

An Educational Robot Platform



Description

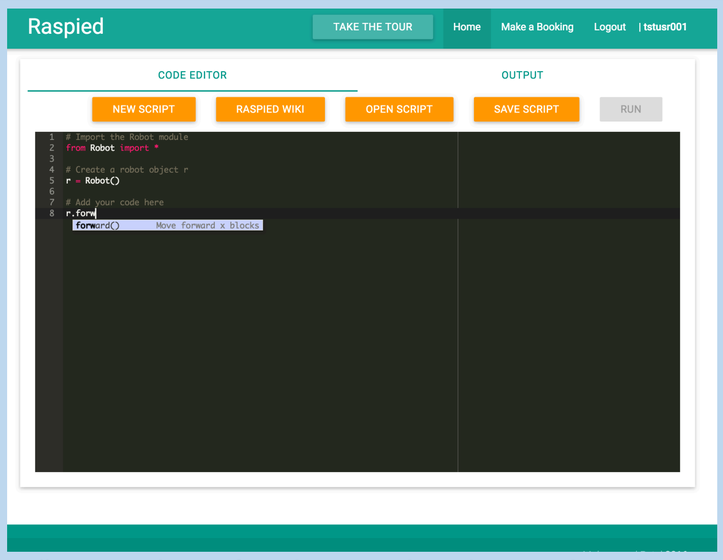
Design and implement an educational robot platform consisting of a robot and a web-app, to be used to teach introductory Computer Science concepts.

Objectives

Build a web-app to enable remote shared access to the robot. Build a robot equipped with a set of features which can be programmed via a high-level API. Use robot platform to increase the motivation of students and identify which features best demonstrate various concepts.

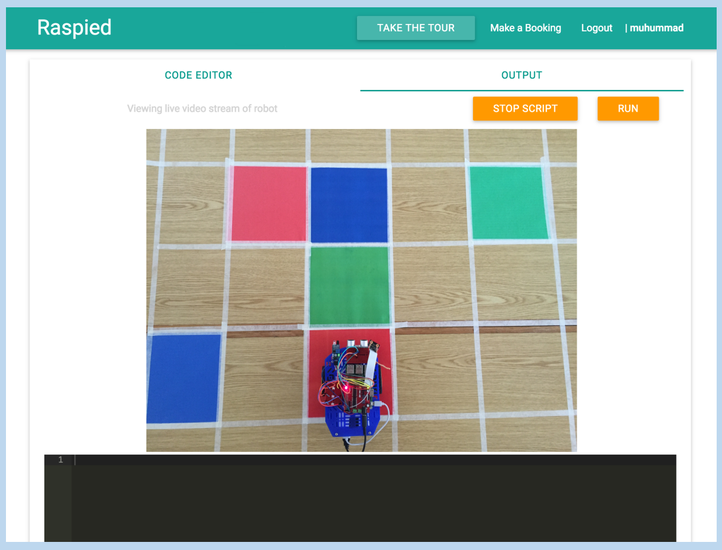
Uses

Web-Application



Screenshot of web-app showing code editor

- ❑ Booking system to manage shared access
- ❑ Robot access control
- ❑ Write code for the robot
- ❑ Upload code to the robot and run it remotely
- ❑ Live video stream of robot



Screenshot of web-app showing live video stream of robot

Robot, Movement and Control

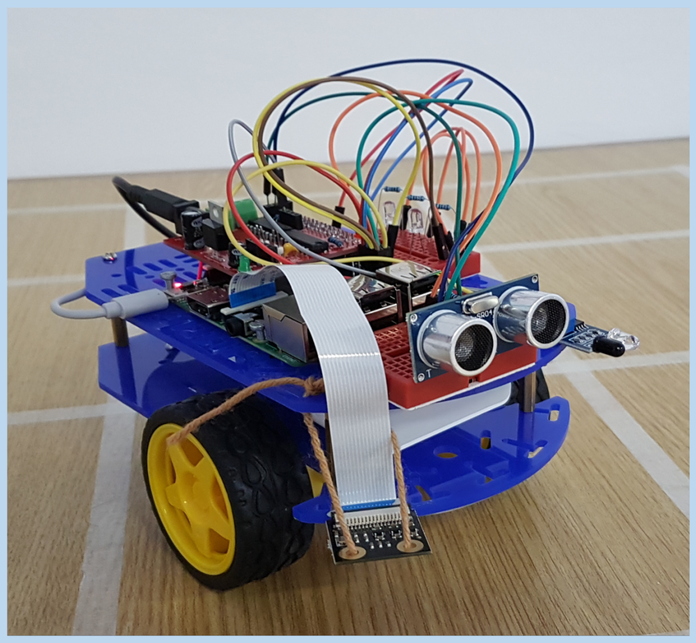
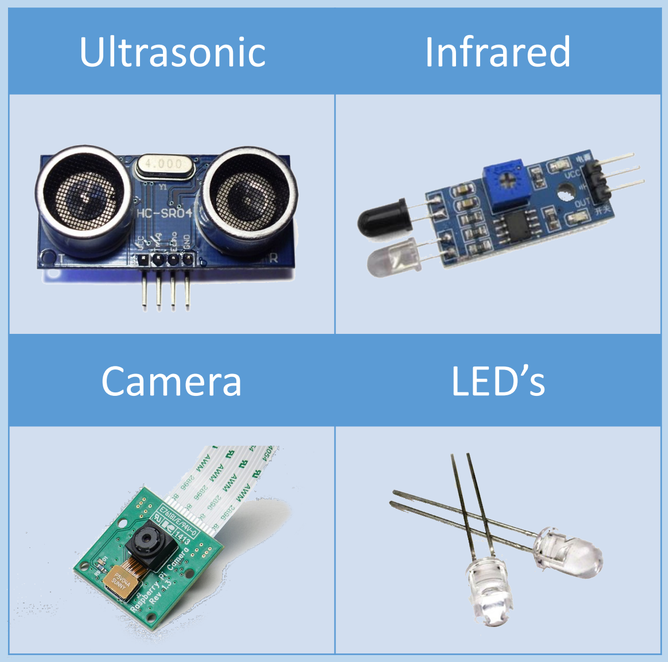


Image of the Raspied Robot

- ❑ Robot and its motors controlled by Raspberry Pi.
- ❑ Movement API:
- ❑ Restricts movement to grid blocks
- ❑ Movement in 8 directions
- ❑ Forward, reverse, and rotation function
- ❑ Return-to-start function
- ❑ Pathfinding with obstacle avoidance

Features



Features used on robot

- ❑ Features API:
- ❑ Infrared Sensor: Check if obstacle in front of robot
- ❑ Ultrasonic Sensor: Get distance in cm to nearest object
- ❑ Camera: Detect colour of grid block
- ❑ LEDs: Switch LEDs on and off

Uses

Conclusion

The web app and overall platform was well received by users. The results of the testing showed a significant increase in the motivation of users, especially in Attention and Satisfaction. The infrared sensor proved to be the most versatile and cost effective feature of the robot.

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