Live Robot Sensor View

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Abstract

The Valparaiso University Robots Team's Robotic Football group has requested an application to process and display real-time sensor data during gameplay. Data of interest to both the build and drive teams includes the robot's uptime, current speed, motor power, control stick orientation, and battery life. This information will be sent to a Raspberry Pi single-board system by Arduino chips on each robot via MQTT and processed and presented by the application being built. To achieve this, the tool will be built on the Django web server framework, using Python. Challenges involve working with multiple stakeholders, multiple networked objects sending data simultaneously, and rapidly-evolving technical considerations.

Challenges

While working on the project, difficulties included:
- It took time for us to access to necessary tools such as the Raspberry Pi.
- We had little to no experience with Django.
- Due to the COVID-19 pandemic, we had to complete most of the project remotely. This resulted in:
    - A feature being cut, since it couldn't be tested remotely.
    - Working schedules changing dramatically.
   - Technical problems becoming magnified since hardware access was no longer possible.

Mozilla Firefox@tweed

192.168.1.250:8000/?page_y=0

Home | About

Sensor View

Robot Name	Time(sec)	Speed	Power	L-Stick	R-Stick	Battery
Test Bot 1	April 18, 2020, 2:43 a.m.	MS 3	MP 7	LS-(2,4)	RS-(6,8)	56%
Test Bot 2	April 18, 2020, 2:44 a.m.	MS 1	MP 2	LS-(7,7)	RS-(5,4)	61%
Test Bot 0	April 18, 2020, 3 a.m.	MS 50	MP 100	LS-(9,1)	RS-(0,6)	25%

The Robotics Team requested the ability to view the robot's identifier, its uptime, motor power level, its current speed, joystick controls, and remaining battery life.
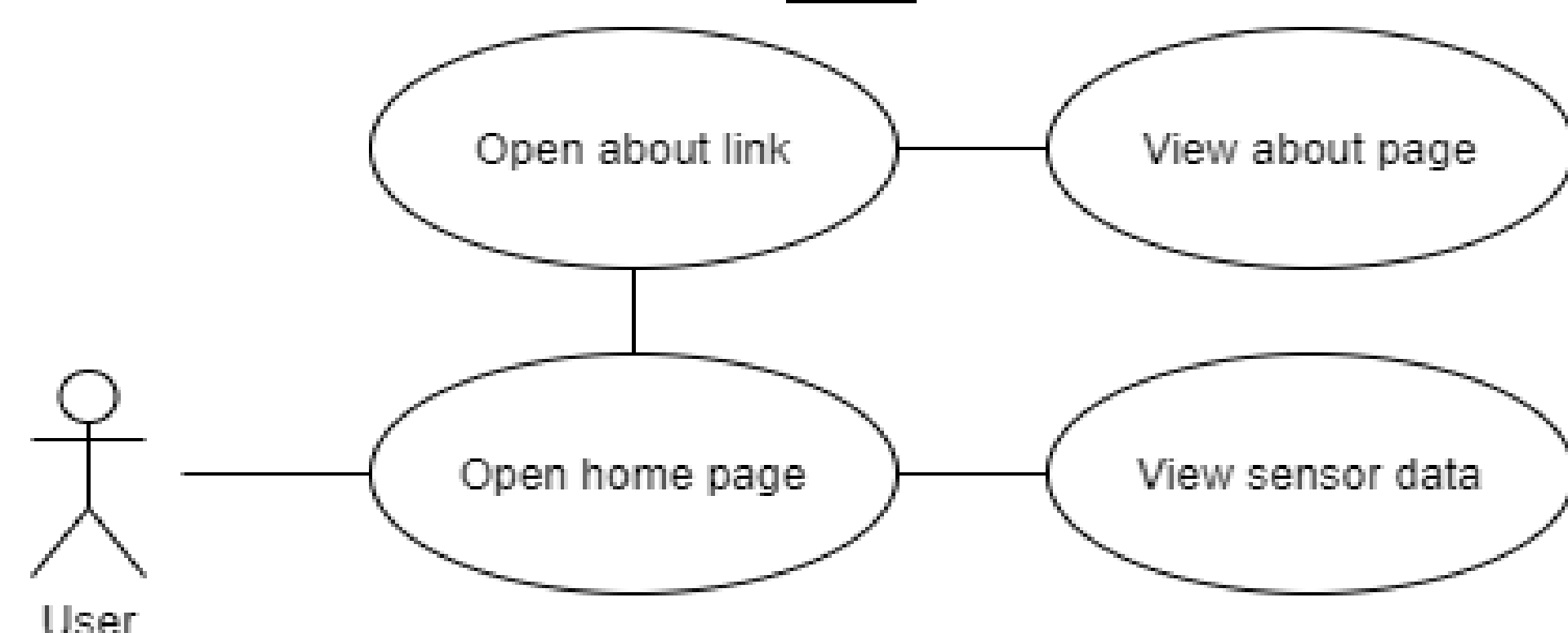
The table displays incoming sensor data from up to 64 unique robots. The list will automatically populate with new data sent to the database by refreshing every few seconds with new data. It will display the 64 most recent unique entries.

Acknowledgemets

UML

User — Open home page — View sensor data — Open about link — View about page
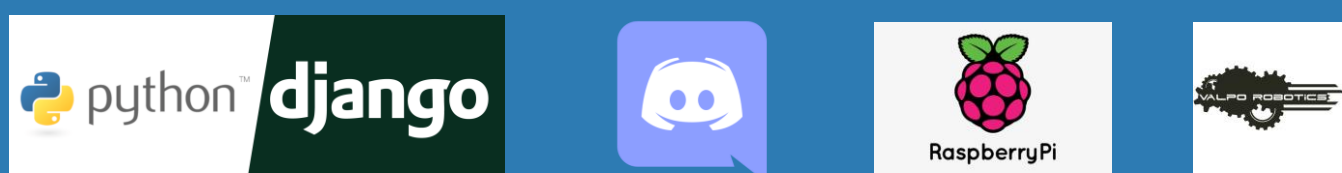
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