Parker Hague

CS 4273

Assignment 4

**Functional Requirements:**

1. The robot needs to work with a mobile phone
2. The robot needs to have basic motor functions such as moving forward, backward, left, and right
3. The robot needs to have internet capability
4. Robot needs to be able to process voices to learn words and moves for every user
5. The voices need to be processed in a backend system

**Nonfunctional Requirements:**

1. When using the robot, the user will need to access to a stable internet connection
2. The system will need to be limited to a language as it’s not feasible to account for every spoken language in the world
3. The robot needs to be appropriately sized so that it’s portable while still being big enough to incorporate wheels and listen for voices
4. The user’s mobile device will have to be running an OS with a minimum version that is greater than or equal to one specified by the developers
5. When operating the robot, it will be necessary to have it in an area with sufficient space to move around

**Scenario:**

**Initial Assumption:**

The user has an iPhone and wants to use the voice recognition robot. The user has enough space in the room to operate the robot and also a stable internet connection.

**Normal:**

The user chooses to use the robot. The user places their mobile device on the docking station on the robot. At this point, the user is now able to control the robot’s movement (through a means not specified in the assignment). The user then plays with the robot by pronouncing several words in English. The user says the word “sunshine” and the robot begins to smile. The user says the word “funeral” and the robot begins to frown. The user says the word “kill” and the robot begins to look angry. The user continues to say specific words and watches as the robot’s facial expressions change. The user removes their phone when their done interacting with the robot and puts the robot away.

**What Can Go Wrong:**

* Losing internet connection would cause the robot to quit processing speech and therefore quit functioning correctly
* The user speaks in a language unrecognized by the backend that processes the speech
* An object is in the way of the robot and it’s not able to move about freely
* Normal hardware malfunctions could cause various components to quit working such as loss of motor function or loss of ability to hear the user’s words
* The mobile device or the device’s OS may not be supported by the robot

**Other Activities:**

The robotic system admin may be able to access a special UI to make configuration changes to the robot that users aren’t able to access.

**System state on completion:**

The user removes their mobile phone and then the robot powers down. Now the robot is motionless, and all the lights have faded on the robot.

**Requirement Specification:**

**Natural Language:**

1. The system needs to be able to move forward, backward, left, and right.
2. The system needs to show emotions to specific words.
3. The system needs to work with a mobile phone that is put on it.
4. The system should be able to connect to the internet.
5. The system should process the voices on a server (backend system).
6. The system needs to learn words and moves for every user.

**Structured:**

**Function**:

Move around and display emotions based on recognized verbal words.

**Description**:

A motorized robot that can move around and display different facial expressions based on the words spoken to it. The words are learned from one to many users and the voices are processed on a backend system.

**Inputs**:

Movement commands and spoken words over an internet connection.

**Source**:

The language is processed by a neural network on a server.

**Outputs**:

The facial expression that corresponds to the word that was spoken.

**Destination**:

After processing the voices, the results are sent back to the robot to display the correct emotion.

**Action:**

The only actions needed by the user are to put the mobile phone on the robot, control its movement, and to speak words to the robot. The rest of the processing is done in a backend system away from the user.

**Requirements:**

The user needs a mobile device, stable internet connection, and the ability to speak.

**Precondition:**

The robot needs to not have any physical signs of damage on the motorized parts and especially no damage on or near the circuit board.

**Postcondition:**

When powered off, the robot returns to its original state.

**Side Effects:**

None.