EyesBot Robot Javascript Reference

Version 01
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Revision History

Date	Version	Description	Author
16 July 2015	01	New document	John Keogh

Overview

This document provides a reference and overview for using the Javascript functions that are accessible from the web interface of EyesBot Driver. Using these functions, you can create programs that permit you to interact with hardware by connecting the hardware to the pins on the EyesBot Driver Robot.

WARNING

Working with electronics and robots is inherently risky. You can damage the robot, your iOS device, yourself, you can start fires, injure people including your self and cause property damage, injury, or death. You use this document and any associated hardware at your own risk. Please be careful and, if you are young, only use with adult supervision.

CAUTION

The pins can only source or sink 40 milliamps, so use a transistor if you will source or sink more than that. The exception is D5, which comes with a transistor already on the board and can be used to sink up to 500 milliamps.

If you destroy your Blend Micro, you can buy a new one and load the Arduino sketch (program) onto it. The sketch is available on the EyesBot website.

Reference

Command	Description	Version
`function initializeRobot (hardware, setupFunction, loopFunction, shutdownFunction, loopTime)`	This is the first command that your script should run **Arguments** hardware: This should be "" setupFunction: A function you supply that should taken no arguments. This method is called a single time to setup your program. loopFunction: This is the main loop of your program. It should take no arguments. shutdownFunction: This function you supply will be called a single time at the termination of your program. loopTime: How frequently you want the loopFunction you supplied to be called. The time is in milliseconds. Valid values are 1 to 86400000 (from 1 millisecond to 1 day). The actual time it takes your loop function to be called depends on how much processing time your loop function takes and how powerful the system the program is running on is.	1
`function stopRobotScript()`	You create this callback function and pass it to the initializeRobot function. It will be called when the program terminates.	1
`function setRobotLoopTime (loopTime)`	**Arguments** loopTime: Lets you adjust how frequently your loopFunction should be called, in milliseconds. Note that this value is also passed into the initialRobotFunction, this function lets you reset it during runtime, if necessary. **Return value** This function returns the previous loopTime in milliseconds	1
`function setPinMode (pin, mode)`	This function sets a pin into either input our output mode. Use input mode if you are reading the pin, use output mode if you are setting the pins value. **Arguments** pin: A string containing the identifier of a pin on the robots board, valid pins for this version are "A0", "A1", "A2", "A3", "A4", "D5", "D12", and "D13"	1

	mode- Either "INPUT" or	
`function digitalWrite(pin, value)`	Turn a pin on the board high. This function validates the pins prior to turning them on. **Arguments** pin: A string containing the identifier of a pin on the robots board, valid pins for this version are "A0", "A1", "A2", "A3", "A4", "D5", "D12", and "D13" initialRobotFunction, this	1
`function analogWrite(pin, value)`	Sets the PWM output of PWM pins **Arguments** pin: A string containing the identifier of a PWM pin on the robots board. The valid PWM pins for this version are "D5" and "D13" value: An integer from 0-255 which sets the PWM duty cycle. Higher numbers provide more "power".	1
`function pwmWrite(pin, value)`	This calls analogWrite.	1
`function digitalRead(pin, callback)`	Read the digital value of one of the robot pins **Arguments** pin: A string containing the identifier of a pin on the robots board, valid pins for this version are "A0", "A1", "A2", "A3", "A4", "D5", "D12", and "D13" callback: A function you provide that receives a single string argument containing either the text "HIGH" or "LOW"	1
`function analogRead (pin, callback)`	Read the analog value of one of the robots analog pins **Arguments** pin: A string containing the identifier of an analog pin on the robots board, valid pins for this version are "A0", "A1", "A2", "A3", "A4" callback: A function you provide that receives an int argument containing a value from 0 to 1023	1
`function setSpeed(leftSpeed, rightSpeed)`	Control the speed of both motors. The EyesBot Robot is differential drive, so this is used for turning as well as moving.	1

	Arguments leftSpeed: A float between -1.0 and 1.0 indicating the speed of the left motor rightSpeed: A float between -1.0 and 1.0 indicating the speed of the right motor	
`function setLeftSpeed(speed)`	Modify just the speed of the left motor **Arguments** leftSpeed: A float between -1.0 and 1.0 indicating the speed of the left motor	1
`function setRightSpeed(speed)`	Modify just the speed of the right motor **Arguments** rightSpeed: A float between -1.0 and 1.0 indicating the speed of the right motor	1
`function setLightPower(lightPower)`	Lets you set the intensity of the headlights. Use a value from 0 to 1.0 **Arguments** lightPower: A float from 0 to 1.0	1
`function getCurrentImagePixels()`	Use this to get a matrix of RGB pixels for the images that the iOS device camera is providing to the web UI. Use this matrix for computer vision tasks. **Returns** A matrix of RGB values for the pixels of the image that the iOS device on which EyesBot Driver is running most recently returned.	1
`function isRobotConnected()`	Use this to determine whether the robot is connected to the iOS device. This will be called during setup and you will get a warning that the robot is not connected, but the program you provide will be run anyway. **Returns** A Boolean indicating whether the iOS device running the EyesBot Driver app is connected to a robot	1
`function getDisplaySpan()`	This returns a span into which you can set your own innerHTML to use for displaying values from your program. **Returns** A span object	1

Example Programs

Hello World Dance

This program makes the robot turn left and right alternately:

```
var turningRight = false;

initializeRobot("EyesBot v1.0", setup, loop, shutdown, 2000);

function setup(){

}


function loop(){
  turningRight=!turningRight;
  if(turningRight){
    setSpeed(-0.7, 0.7);
  }
  else{
    setSpeed(0.7, -0.7);
  }
}

function shutdown(){
   setSpeed(0.0, 0.0);
}
```

Computer Vision

This program lets you experiment with computer vision:

```
initializeRobot("EyesBot v1.0", setup, loop, shutdown, 200);

function setup(){
}


function loop(){
 var imgData = getCurrentImagePixels();

 var redPixels = 0;
 var yellowPixels = 0;
 var totalPixels = 0;
```

```
for (var i=0;i<imgData.data.length;i+=4){
  var red = imgData.data[i];
  var green = imgData.data[i+1];
  var blue = imgData.data[i+2]
  if((red>green*2)&&(red>blue*2)&&(red>100)){
    redPixels++;
  }
  if((red>blue*2)&&(green>blue*2)&&(red>100)){
    yellowPixels++;
  }
  totalPixels++;
}

if(redPixels/totalPixels>0.3){
  setSpeed(0.5, 0.5);
}
else if(yellowPixels/totalPixels>0.3){
  setSpeed(-0.5, -0.5);
}
else{
  setSpeed(0.0, 0.0);
}

}

function shutdown(){
}
```