Duayenler Ltd. Şti.

Members :

Enes Taştan, 2068989, 0543 683 4336

Halil Temurtaş, 2094522, 0531 632 2194

October 29, 2018

Sarper Sertel, 2094449, 0542 515 6039

Erdem Tuna, 2167419, 0535 256 3320

İlker Sağlık, 2094423, 0541 722 9573

October, 21-29 Weekly Report

1 Progress

- [Erdem] Generally, DC motors types (for general robotics applications) are divided into 2, as listed below. Motors such as stepper and servo are omitted, since they are (possibly) not related with driving a vehicle.

  - Brushless DC Motors: Brushless DC motors do not use brushes. The rotor is a permanent magnet and the coils do not rotate, but are instead fixed in place on the stator. One advantage is energy efficient since there are no brushes to cause additional friction in the motor. Another advantage is durability, nothing to be broken inside. Moreover, the noise inside is lowered considerably which results in high torque and precision in controlling. These motors are mostly used in CD drivers and drones.

  - Brushed DC Motors: Brushed DC motors use the brushes to conduct current between the source and the armature. A variation of such motors is geared DC motors. They have a gear assembly attached to the motor. The speed of the motor is reduced with an increase in torque with the help of gear assembly. By usage of the gears, the speed of the DC motor can be reduced with an increase in torque. For controlling geared DC motors, L293D motor driver is normally used in hobby robots.

- [Erdem] Some important points on selecting the right motor are:

  - Electrical Characteristics: Op. voltage, max. current
  - Mechanical Characteristics: Motor type, torque (load, no-load), rpm
  - Battery: Battery should be capable of supplying required current

- [Halil] Image/Video processing can be done using OpenCV, Open Source Computer Vision Library. Written in optimized C/C++, the library can take advantage of multi-core processing. Enabled with OpenCL, it can take advantage of the hardware acceleration of the underlying heterogeneous compute platform.

  - for more info https://github.com/opencv/opencv

- − can be done using Python on Raspberry Pi directly
  - * can be slow in high resolutions due to processing power of raspberry.
  - * one simple example using Haars Cascade added to repository
- − can be done using Matlab on computer
  - * uses C++, native language support.
  - * can be slow due to video transmission between robot and device
  - * visionSupportPackages should be added to Matlab, there are examples for learning the basics
  - * https://www.mathworks.com/help/vision/ug/opencv-interface.html
  - * https://www.mathworks.com/discovery/matlab-opencv.html

- [İlker] In the racing project, TCS230 color sensor can be utilized as an alternative for image processing. The TCS230 basically senses the color with the help of 8x8 array of photodiodes and generates a PWM signal whose frequency is proportional to the light intensity. For example, if the elliptic path is red, we can give the s2 and s3 pins of the sensor low voltage, we activate the red photodiodes and we can use the pulseIn command of Arduino to measure the frequency of the generated PWM signal. When the robots are out of the path, the output frequency of the sensor will significantly decrease, so this information can be used to keep the robots in the path.

2 Plans

- [Halil] More research on OpenCV

- [Halil] Motor derive and basic sensor usage

-

3 Problems

- [Halil]