MIDDLE EAST TECHNICAL UNIVERSITY

ELECTRICAL & ELECTRONICS ENGINEERING

Weekly Report 5

EE 493

Cat Feeding Project

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Contents

1 Works Done

1.0.1 Mechanic Part

This week the door is tested by using cutting cardboard. As mentioned in the previous reports, we have make a door using the idea of salts. This can be seen on Fig 1.

(a) Bottom View

(b) Top View

In order to rotate the lower cardboard one has to use a strong servo motor. Therefore some of the servo motors are examined like:

- TowerPro MG995R

  Torque: 9.4kg-cm

  Speed: 0.20sec/60degree

  Size: 40.7×19.7×42.9mm

  Cost: 35TL

- TowerPro Mg996R

  Torque: 9.4kg-cm(4.8v)-11kg-cm(6.0v)

  Speed: 0.19sec/60 degree(4.8v)-0.15sec/60 degree(6.0v)

  Size: 40.9×20×42.7mm

  Cost: 36TL

- Futaba S3003

  Torque : 4.1kg.cm

  Speed : 0.23sec/60 degrees

  Size : 41 x 20 x 36mm

  Cost : 42 TL

These are called as high torque servos. First two servos look like as if they can rotate our cardboard. It looks like the lower cardboard will carry at most 600gr, while it's radius is 8cm. 9.4/16 = 0.58kg which is close to 600gr. In addition to that one can also use gearbox to improve the torque but it is not desirable since it can create speed and design problems.

A meeting is conducted with the furnishes for the outer design and as soon as inner design is finished the exterior design will be ordered.

1.1 Software Framework and Computer Vision

Works done in detail are given in detail below as items. In a general view, a working system is constructed and tested. The first time hardware - software - computer vision parts are interated together and tested.

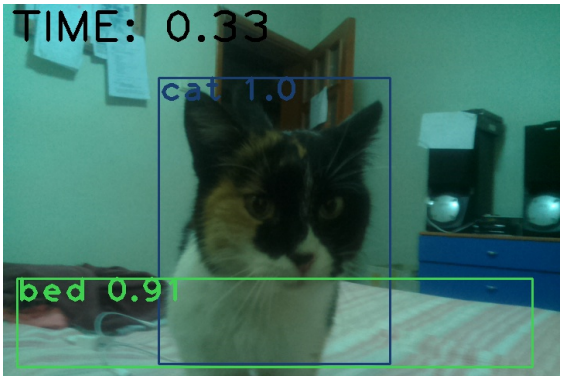
- Server client communication software is finished and integrated with the computer vision part with currently available features.
- Test of the parts individually are done and some optimization - corrections are made
- Real time performance is tested, results is given in the 1.2 section for both present the current work done and create a reference
- Data-sets created from real time camera images and video capture
- YOLO integrated to the OpenCV is used

1.2 Real Time Results

In this section different kinds of results are given. Accuracy, TODO - tesleri yazmadim ekleyelim ama - accuracy eklemeli

1.2.1 Classification Results

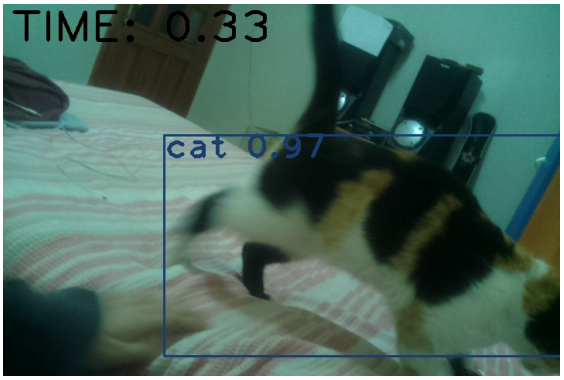
Classification results are given in figure 2.



(a) Sample Classification 1

(b) Sample Classification 2

(c) Sample Classification 3



(d) Sample Classification 4

Figure 2: Some Classification Results

1.2.2 Response Time Results

1.2.3 CPU - Memory Usage

Client Hardware Statistics

Server Hardware Statistics

1.3 Discussion

It is clear the system should be improved further by adding other parameters and techniques to eliminate wrong results, especially false positives!. Some of the methods we propose are given as follows:

- Taking the most repeated result for the last 5 time frames
- Averaging the accuracy values given by OpenCV
- Building confidence intervals
- Mixture - Building confidence intervals dynamically depending on the first two techniques

2 Work Distribution

Previous week we planned the works to do this week as follow :

- Utku
  - Overall circuit design and implementation
- Eser
  - Classification of cats, library search, implementation as well as integration to software framework
  - Software framework design and implementation, including integration to the hardware
- Asude
  - Literature search on classification problem, practice on similar codes
  - Implement basic classification code on Jupyter Notebook using python-tensorflow
- Aldemir
  - Mechanical design and implementation of the gate
  - Mechanical design and implementation of the body
- Doga
  - Mechanical design and implementation of the gate
  - Mechanical design and implementation of the body

3 Next Week Tasks

References