



Department of Computer Science, Namal Institute Mianwali

FYP Proposal

Autonomous Checkout System

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1 What ?

The objective of this project is to provide retailers with a computer-vision based system that Keeps track of buyers and items they pick up in order that the costumes may be charged without problems and save you shoplifting. The system will detect and classify one-of-a-kind products costumer picked and keep track of the customers and inside the final step generate a bill for each customer once they reach checkout point.

2 Why ?

Everyone knows the queue system in Pakistan on every store, in my opinion, it was possible to walk in, grab whatever you like and leave with a self-checkout system. Especially we've seen that in many shops and bakeries there are a few products like Lays chipa racks and glass-cased cold drink freezers are located outside the shops and given Pakistani society's ethical standing and economic situation of a common shopkeeper, shoplifting is a legitimate and serious issue. Some retailers installed cameras to hold a check on their products however that's not enough because there needs to be someone who's looking at the display screen all the time. Keeping in view these serious issues there is a need to develop an intelligent camera-based system that keeps track of customers and the items they picked out of racks, to help both the retailers as well as shoppers.

3 How ?

Our application will be the real-time and dynamic application and system will receive images from the CCTV (Closed-Circuit Television) cameras and then our application will process on that set of frames or images. Because it is the real-time application so time is a very important aspect of our application. There is a lot of Deep Learning algorithms that help us to process CCTV cameras images and frames. Thus, we may use RNN (Recurrent Neural Networks) with the LSTM (long short-term memory) architecture used in the field of deep learning and these typical architectures are feasible for processing and classifying the continues data coming from CCTV cameras. RNN architecture will helpful for our needs because it accepts images a sequence and the output also in sequence in text form.

Also, we will use the LSTM architecture involves using Convolutional Neural Network (CNN) layers for feature extraction on input data combined with LSTMs to support sequence prediction. CNN LSTMs were developed for visual time series prediction problems and the application of generating textual descriptions from sequences of images (e.g. videos). Specifically, the problems of :

3.1 Activity Recognition

Generating a textual description of an activity demonstrated in a sequence of images.

3.2 Image Description

Generating a textual description of a single image.

3.3 Video Description

Generating a textual description of a sequence of images.

4 Data Preparation

Dataset gathering parts :

4.1 Obtaining the Dataset

We will capture videos from CCTV cameras from the real environment with real customer and products from Namal Canteen. Convert these videos into different action and activities frames or images.

4.2 Dataset Annotation

Because these videos will be unlabeled, then annotate these frames or images according to real scenarios and human activities.

We will separate datasets for Training and testing.

5 Desktop Application

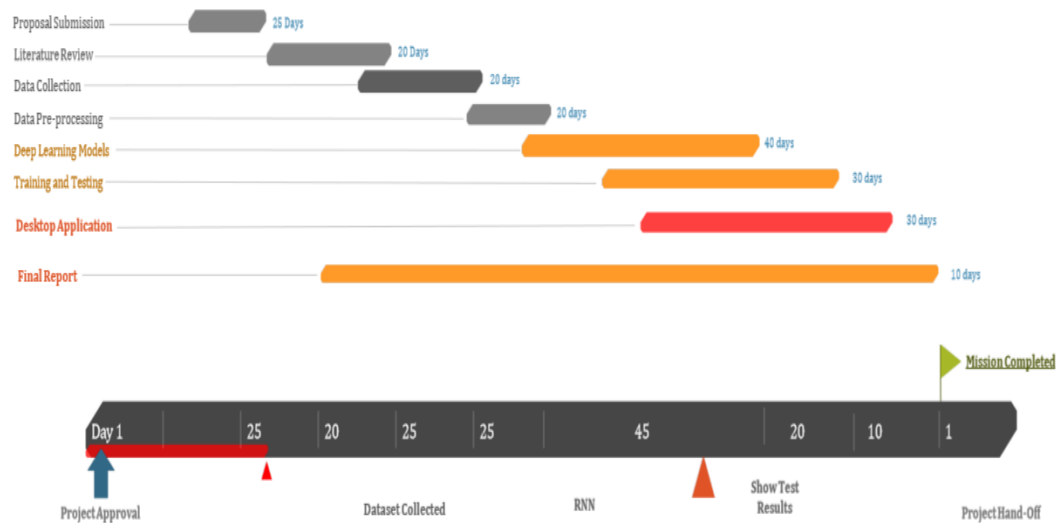
Because it will be the Autonomous Checkout System, we will design an animated type of desktop application for showing products details and product payments.

5.1 *Technology / Tools*

- Database (MySQL, SQLite etc.)
- React JS (For frontend)
- Python or Java (For Backend)

6 When ?

Autonomous Checkout



7 References

[1] Human activity recognition with smartphone sensors using deep learning neural networks. Charissa Ann Ronao, Sung-Bae Cho.

[2] Human Activity Recognition using Wearable Sensors by Deep Convolutional Neural Networks, Wenchao Jiang and Zhaozheng Yin.