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Contents

1. Introduction

As the number of software engineer continuously increase ,the transition from scholar to tech career is compulsory require an placement experience to adapt the working environment in the “real industrial ”. This report describes the activities carried out during the last 6 weeks full-time work placement at the Athlone Institute of Technology software research Group. The placement are undertaken remotely commencing from Monday 14th of June with assigned project supervisor “David Scott”.

2. Responsibility and duties

As an intern researcher my responsibility is to

- Conduct a research on the topic of machine learning with a project to learn deep learning algorithm.
- Build plan for agile software development and write user stories for the project.
- Learning new deep learning technique to deal with image processing problem.
- Develop user healthy dietary track system on Web that use the Machine learning technique.

To develop the project user healthy dietary track system I need to

- Create a web base system for user to record daily intake nutrition by scanning the meal image and recognized through neural network model.
- Visualise a weekly report based on user intake dietary to suggest healthy dinning plan
- Build a system to recommend the meal for user base on the what ingredient user had.

3. Technical Achievement

- *Set up the Environment*

On the Fourth weeks I had choose to build up image recognize model by CNN algorithm using TensorFlow 2 Framework, which are installed as GPU 2.5 version. For the web frontend I am using the Flask sever in PyCharm IDE.

- *Image collection and processing*

I had download the 101 categories of food images from Kaggle [1], and clean the image noise by using the polygon annotation through MakeSense AI [2].

- Learning TensorFlow framework

The Major study for me in this project is learn TensorFlow 2 from beginner to Advance. Although I am the knowledge of Machin learning but Tensorflow are completely new to me , so I am learning from the tutorial video on Youtube. [3]

- *CNN model building and training*

Build the CNN model by Keras with 3*3 Convolution kernel and trained with 4321 image of 131 categories fruit. After 10 times of trained the validation rate had reached 97%.

- *User Image upload and recognition*

I create a simple web page on Flask server that allow user to upload image of fruit and call the CNN model to return the predict name to user.

4. Challenges

- As mentioned previously I am beginner of TensorFlow framework so I had look over the demo code from GitHub and try to learn it. But some of the code are written in TensorFlow 1 which are uncompilable to run in my Environment. Thus I had to find the replaced function in TensorFlow 2 on code Document [4]
- The image with noise background cause the mistake inference with current model , this could cause by the similarity of train sample image. Thus I am working on using Polygon annotate the different look like of food images and train the image with new dataset.
- Because the aim of this project is to provide a healthy dietary plan for user so I would need to increase the Accuracy of model by train with massive images of healthy foods which The Kaggle 101 dataset don't have. To solve what problem I wrote a python Crawler Function to Download the images of healthy meal from Google Image to Individual folders.

References

[1] K. S. Mader. [Online]. Available: https://www.kaggle.com/kmader/food41.

[2] "MakeSense Ai," [Online]. Available: https://www.makesense.ai/.

[3] A. Persson, "Youtube," [Online]. Available: https://www.youtube.com/watch?v=pAhPiF3yiXI.

[4] "TensorFlow," [Online]. Available: https://www.tensorflow.org/api_docs/python/tf.