Zayyan Hassan

33497868

What are you planning on making?

My plan is about to do project in medical imaging by using latest deep learning technique. In medical side I am targeting Lung cancer nodules and in deep learning I am targeting Faster R-CNN algorithm. So, the title of the project on which I will work is "Lung Cancer Nodules detection by deep learning".

What are you hoping to achieve for your users/audience?

After completing my project my main purpose is to provide my audience efficient method of detection the lung cancer nodules of high accuracy and to save the life of lung cancer patients by detection the cancer nodules in early stages.

What technology will it use (briefly)?

I am going to you 16 GB ram and 2 GB graphics card in this project along with this python IDE for programing and Laptop**.**

What platforms/languages will you build it with?

I am going to use python language and the environment will be anaconda.

What libraries do you envisage using?

Mainly these libraries which I am going to use in this project are

1) Keras
2) Tensorflow
3) Matplotlib
4) Numpy
5) Panda
6) Opencv
7) Pillow
8) Lxml
9) Cython
10) Cntextlib2

The main important thing that needs to be noted down here is version of each library.

What equipment will you need? How will you source it?

For this project I will need GPU, RAM and laptop, which I will buy by myself.

What physical materials, if any, will be involved?

Physical materials that I will need for this project are Dataset, Laptop, Ram, and GPU.

What techniques will you use? (eg. Machine Learning, Data Mining)

I am going to use latest field which is deep learning for detection of cancer and the method will be Faster R-CNN.

Include links to libraries/frameworks

Links of some of libraries are

1) Tensorflow (https://www.tensorflow.org)
2) Keras (https://keras.io)
3) Opencv(https://opencv.org)

Demonstrate what is inspiring your work?

Among all types of cancers, lung cancer has been the highest number of mortalities. When the patient of lung cancer has not been diagnosed early then the chance of survival rate is left only 16%. If they are detected at the earliest stage so the rate of survival would be increased up to 52%. Now-a-days lung cancer detection is the milestone to minimize the rate of mortality and morbidity. Chest CT images the most commonly screening tool for examination lesions.In medical imaging modality the x-rays images are the modern technique used for diagnosing.

In the last century Computer Aided Diagnosis (CADx) frameworks was used to aid the radiologist for better interpretation of lesions in the medical images. Innovation in CAD technique for the medical images evaluation it would increase the chances of survival rate and better health services in distant areas. In recent era deep learning has achieved much popularity and Excellency in various aspects of challenges such as image recognition, classification and segmentation. Deep learning would also be applied in a lot of medical imaging tasks. In this project i will employ deep learning-based approach for lung nodule detection in X-rays images on the available datasets. In today's era many patient died because of lung cancer and this is all because they know about the cancer lately. So this method will detect the lung nodules in early stages and by doing this many patient will get recovered without going through difficult situation.

Literature

Lung cancer is one of the most common outspreading diseases and the main reason of death due to cancer worldwide. According to a global cancer statistical report in 2012, About 1.83 million new cases of lung cancer occurred, and the approximated deaths are more than 1.5 million. Detection of nodules in early-stage is necessary for the treatment of lung cancer. Lung cancer is difficult to be cured as early treatment is essential to save the patient. Detection of lung cancer in early phases can increase the chances of cure. Mostly lung cancer in a patient is diagnosed at the

advanced stage. The discovery of nodules is the first phase towards the treatment of lung cancer. Detection of lung cancer in initial phases is difficult because the nodule is of tiny size and cannot easily be detected. Often nodules are found accidentally. After the detection of a nodule, there is still a challenging task of finding the type of nodule that whether the nodule is benign or malignant (Masood et al., 2018;).

A lung nodule is an expansion of abnormal tissue on the lung leading to lung cancer. It is usually present at the lung as a white spot that cannot be easily detected with simple x- rays. A lung can have a single nodule or have multiple nodules. There are several reasons for the nodule formation in the lungs, such as infections and so on. There are mainly two types of nodules. The nodule can be (benign) noncancerous or (malignant) cancerous. Benign nodules are noncancerous. They usually don't grow and spread to other body parts. The size of lung nodules typically ranges from 5mm to 30mm. The nodules greater than 30 millimeters have a high possibility of being cancerous rather than a smaller one. Malignant nodules are usually cancerous. They can overgrow and increase to other nearby tissues and remote organs (Erasmus et al., 2000;).

How are you drawing on knowledge from current and past modules?

I am currently familiar with python and some of the libraries and can implement all these libraries and the rest I will learn with time to time in a project.

What new skills do you need to acquire?

Apart from the python which is required for this project is deep learning and I will learn that step by step with and will further dig more into it to be able to do my work with Faster R-CNN.

What new skills do you need to acquire?

I will follow Andrew which is specialist of deep learning on Coursera. I already started his courses and all of his courses are available on Coursera website.

Be specific about what you will research when and what parts of your code and piece you will build when?

My main research is to detect the lung nodules cancer spot in chest x-rays. My contribution will be in my code and that is to write code that automatically detects the affected place in lung x-rays. The whole story of what I will do when I will do is shown in the following table.

Dates	Activities	Assignment Title
28/9/20 to 6/11/2021	Planning and detailed research	Project Specification
9/11/20 to 11/1/2021	Prototyping(collecting of dataset and perform initial coding plus report)	Interim project report
11/1/21 to 26/3/21	Development , testing & draft write up(writing up the whole code for final detection of cancer with report)	Submit draft report
26/3/21 to 14/5/21	Final implementation , write up & evaluation (Final thesis writing up)	Submit final report
17/5/21 to 4/6/21	Showcases & Vivas	Project showcases

My github link is given below, which I will use in my projects and will update time to time.

https://gitlab.doc.gold.ac.uk/zhass039/finalyearproject