National College of Ireland

Configuration Manual

MSc Research Project
Cloud Computing

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National College of Ireland
Project Submission Sheet
School of Computing

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Configuration Manual

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1 Downloading and Installing Softwares

1.1 Downloading and Installing Android Studio

The android application used in this research work is developed using the Android Studio tool. Research works such as (Zhou et al.; 2015; Saha et al.; 2019) demonstrate their experiment using an android application built using Android Studio. This section involves downloading, configuring, and installing the android studio tool.

1.1.1 Downloading the Android Studio tool

This[1] link can be used to download the exe file for Android studio.

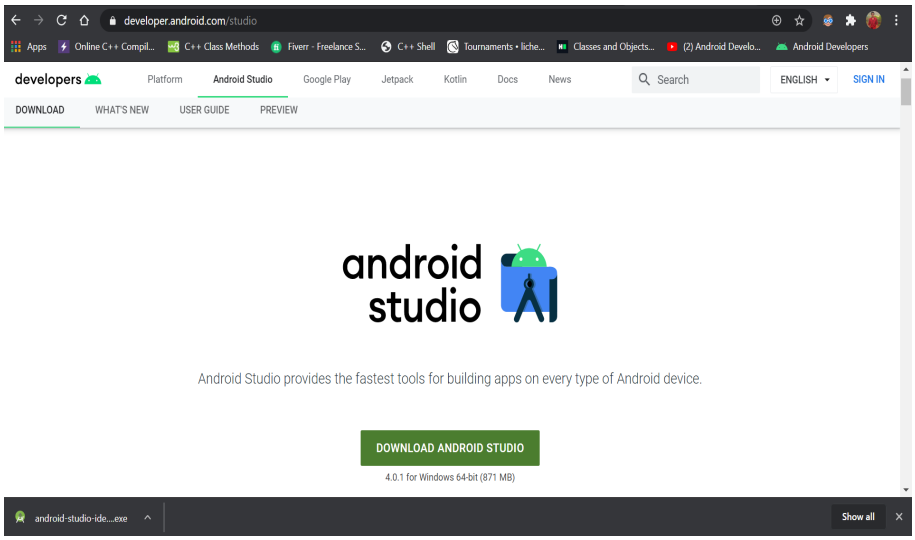

Figure 1: Download link for Android Studio

1.1.2 Terms and Conditions

Tick the terms and conditions box to proceed with the download.

1.1.3 Setup Page

After the exe file downloads, open the exe file and when the popup window asking for the permissions to make changes opens, click yes to proceed with the installation.

[1] https://developer.android.com/studio

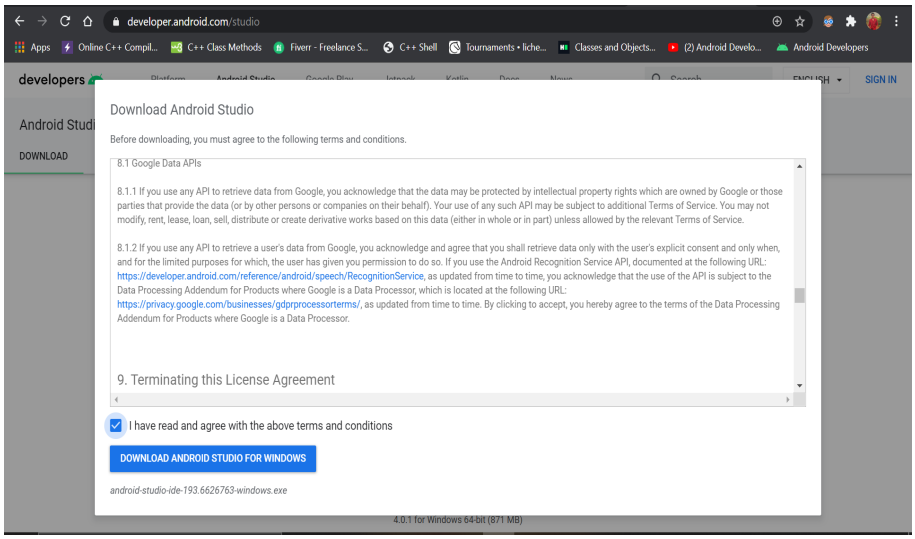

Figure 2: Terms and Conditions

Figure 3: Setup Page of Android Studio

1.1.4 Components Page

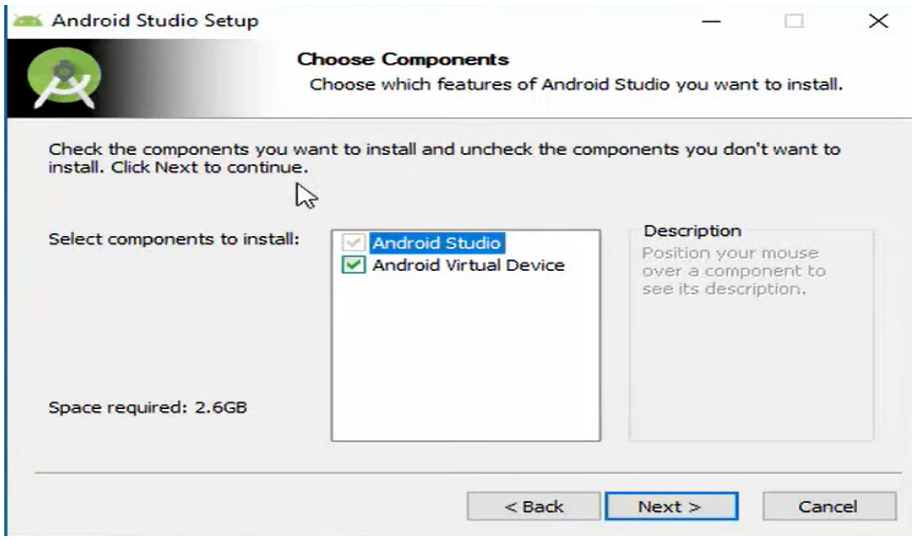

Figure 4: Components to install

The components page displays the components to be installed. Check the tick box and install both android studio and android virtual device. Android virtual device is responsible for testing the application using an emulator.

1.1.5 Installation Location

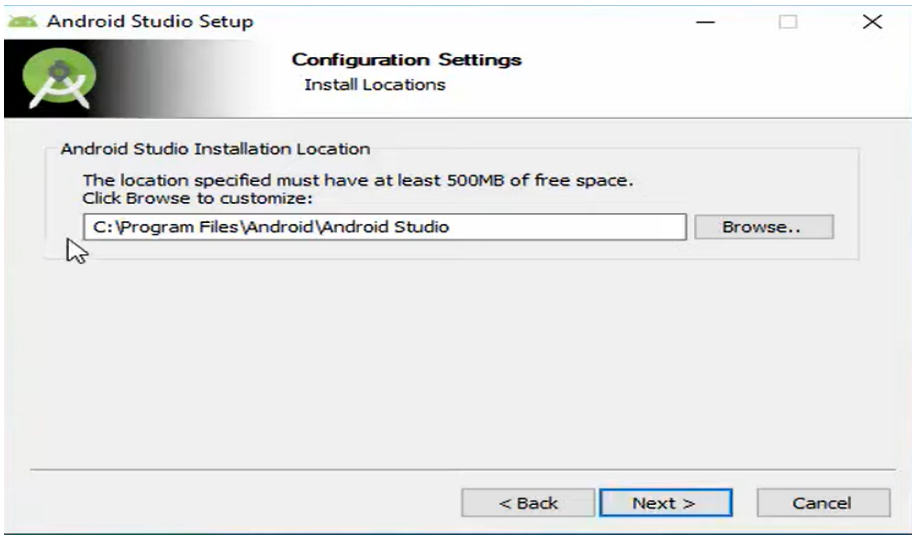

Figure 5: File location to install Android Studio

The installation location specifies the file location for the software to be installed. Proceed with the predefined file location on the popup screen of the software.

1.1.6 Start Menu

The start menu folder provides an ease of use in accessing the software from the desktop window of the laptop. Once the install button is clicked, the installation of the software

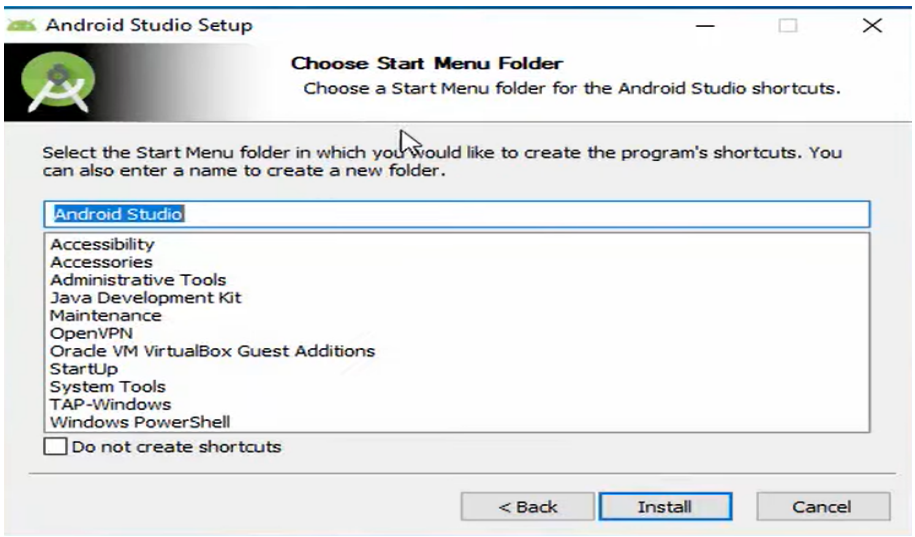

Figure 6: Permission to place Android Studio on the start menu

will take place.

1.1.7 Installation

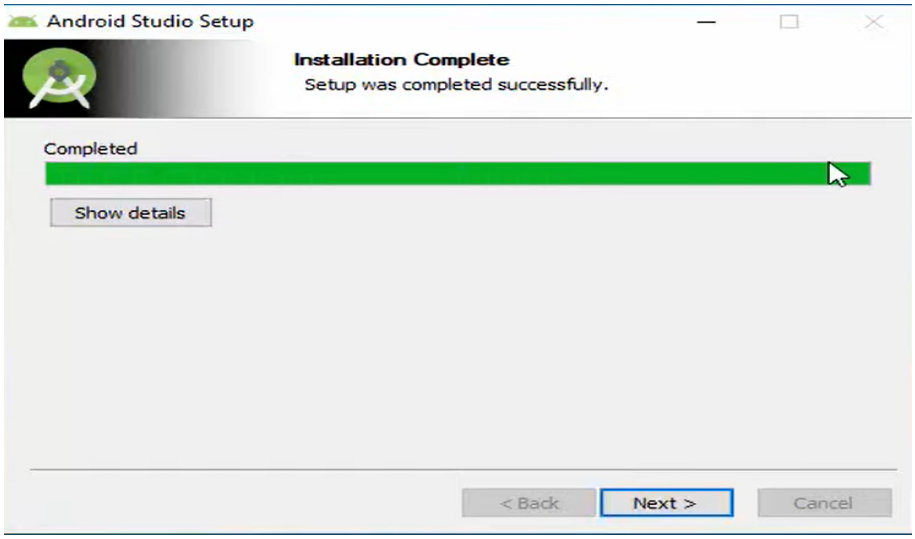

Figure 7: Android Studio Installation

1.1.8 Installation Complete

The installation has completed. With the start android studio check box ticked, the android studio will open once the finish button is clicked.

1.1.9 Setup Wizard

The wizard setup page helps setting up the android studio.

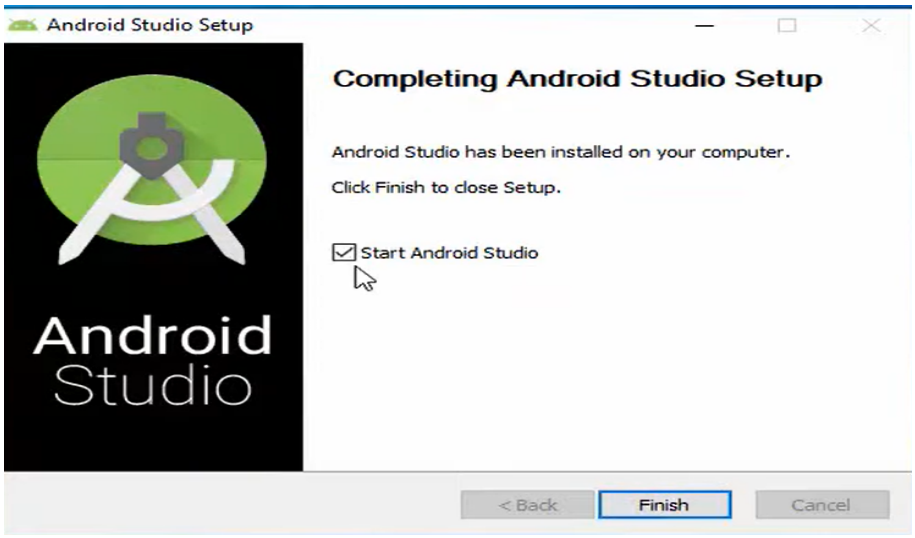

Figure 8: Installation Completion

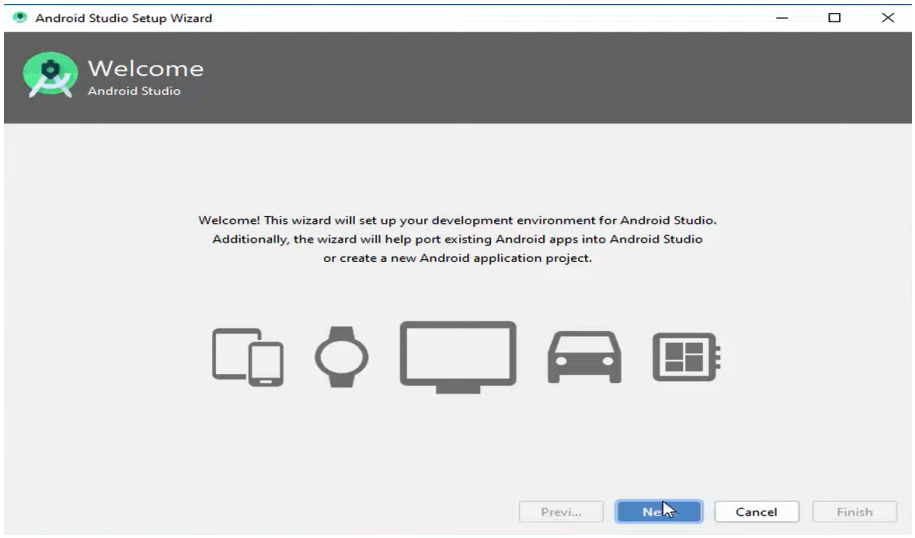

Figure 9: Setup Wizard

1.1.10 Installation Type

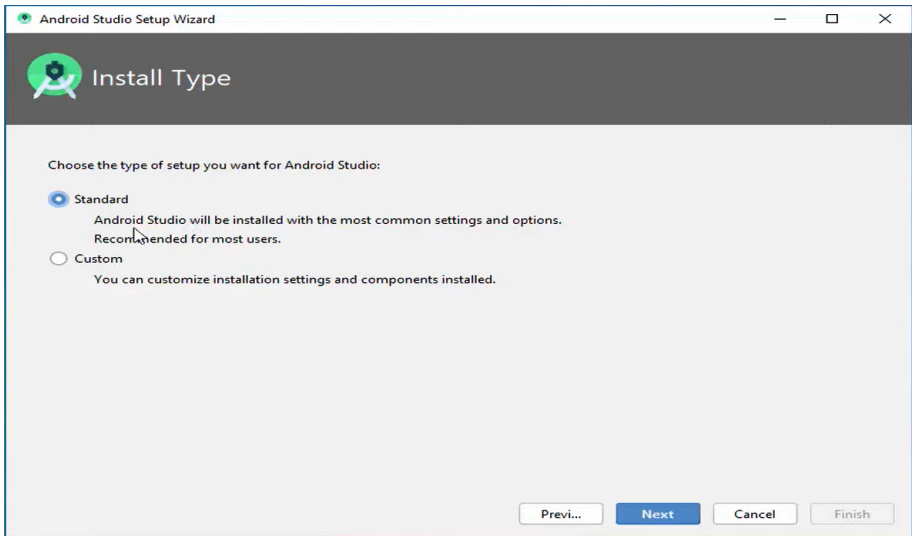

Figure 10: Installation Type

The installation type provides with two types of installation. Proceed with the standard type which is recommended.

1.1.11 Settings Verification

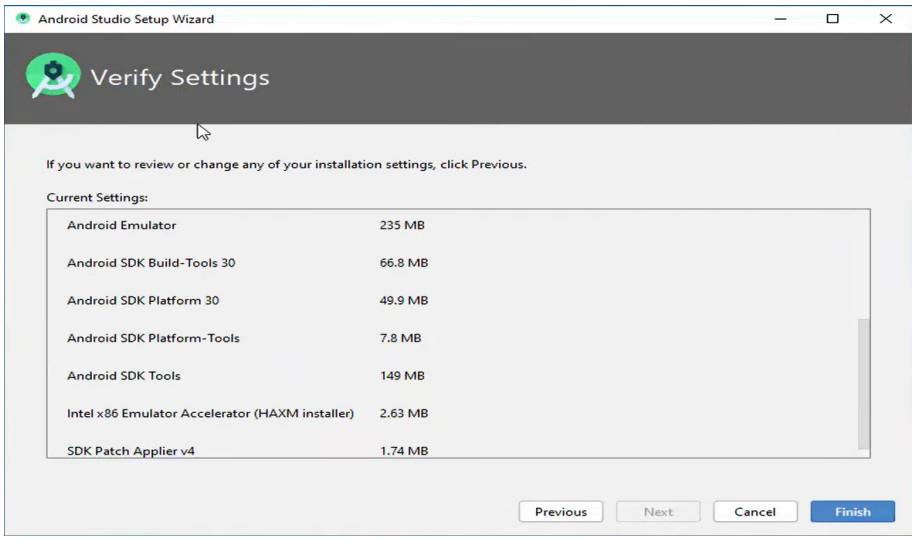

Figure 11: Settings verification

The settings verification provides an overview of the settings to be installed with the installation of android studio. Proceed with the predefined settings.

1.1.12 Downloading the Components

The downloading components downloads the necessary components for using android studio. These components include emulator files, SDK kit for android OS and so on.

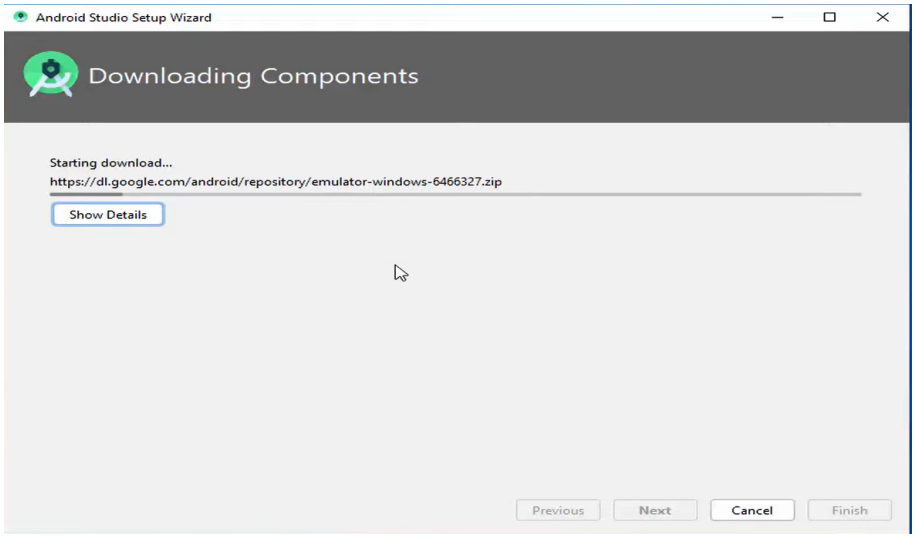

Figure 12: Downloading the components

1.1.13 Download Complete

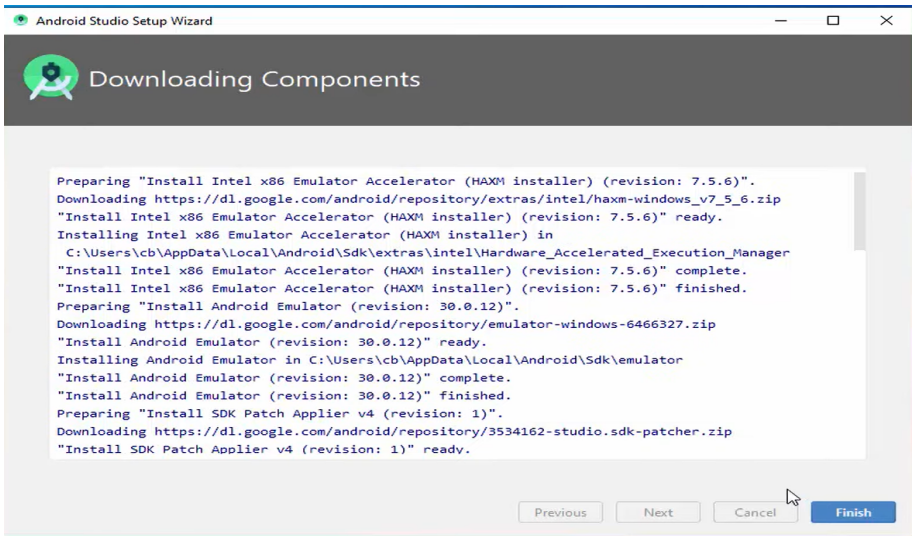

Figure 13: Download Completion

Once the download has been complete, please click the finish button.

1.1.14 Android Studio HomePage

Once the android studio has been successfully installed, Android studio home page pops up. Click the start a new android studio project option and proceed with the empty application template with the name of the project as Offloading Experiment.

1.2 Downloading and Installing Anaconda Navigator

Research works(Nguyen and Dressler; 2020; Goudarzi et al.; 2017) has also focused on usage of edge devices to perform offloading. The python scripts for processing the Fibon-

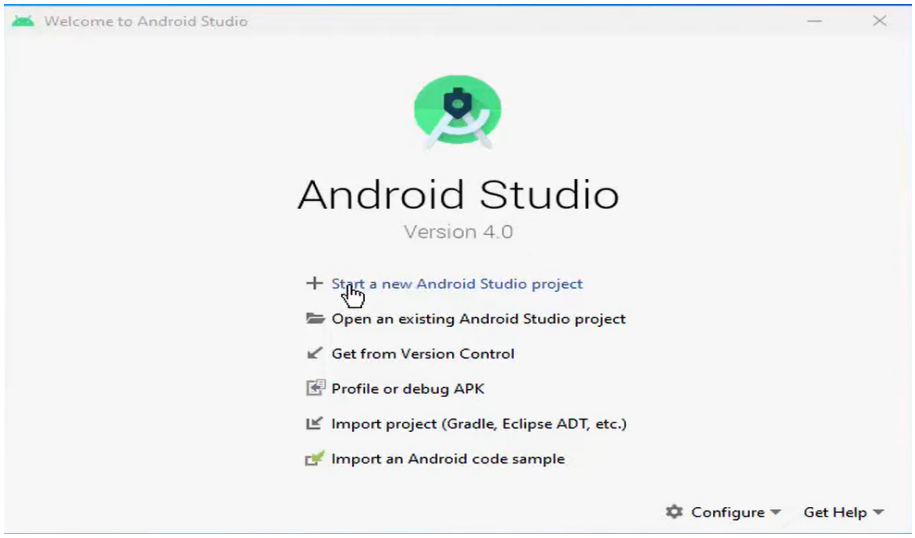

Figure 14: Homepage of Android Studio

acci series and Image processing compile the data offloaded to the edge device and the results are sent to the edge device using the localhost connection.

1.2.1 Downloading the Anaconda Navigator Tool

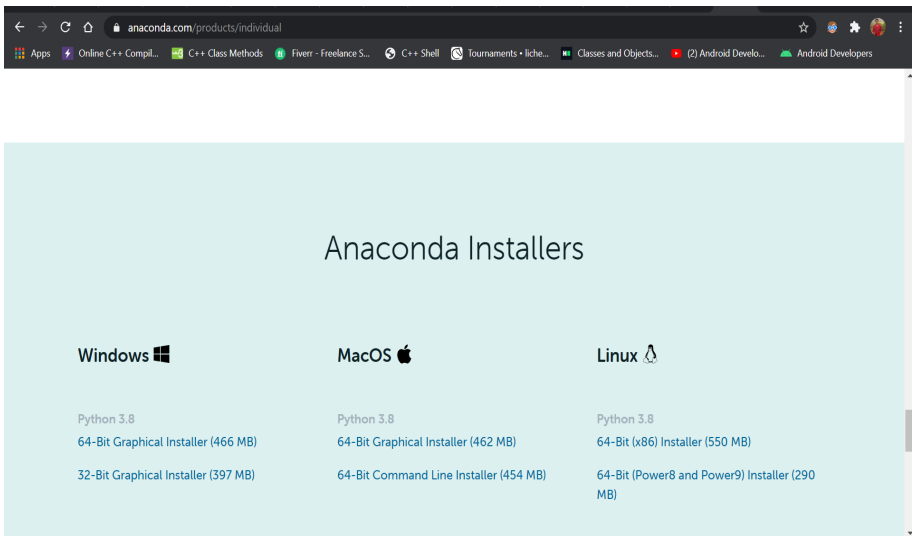

Figure 15: Downloading the Anaconda Navigator tool

This[2] is the download link for downloading the Anaconda tool. Download the anaconda exe file based on the Operating system of the laptop.

1.2.2 Installation Agreement

Once downloaded, open the exe file, and click on the I agree button of the exe file to proceed with the installation.

[2]https://www.anaconda.com/products/individual

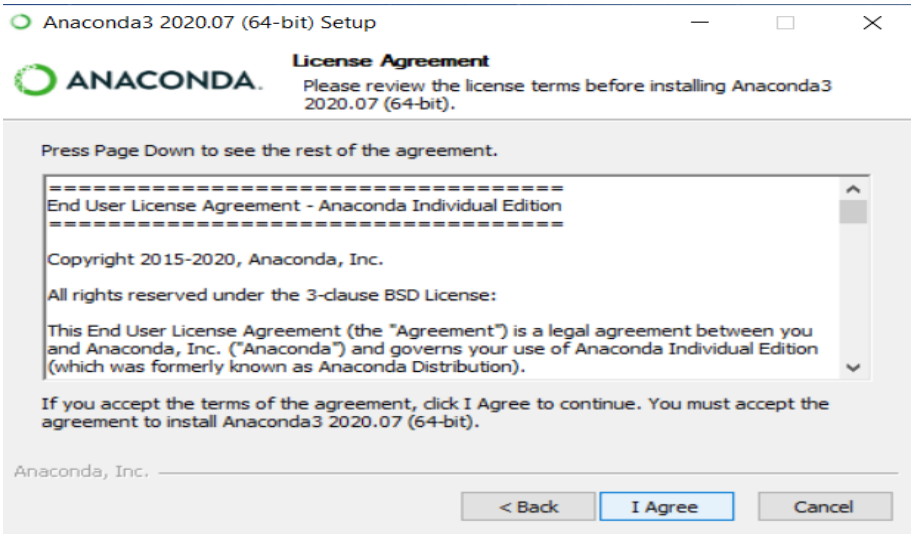

Figure 16: Installation Agreement

1.2.3 Installing the tool

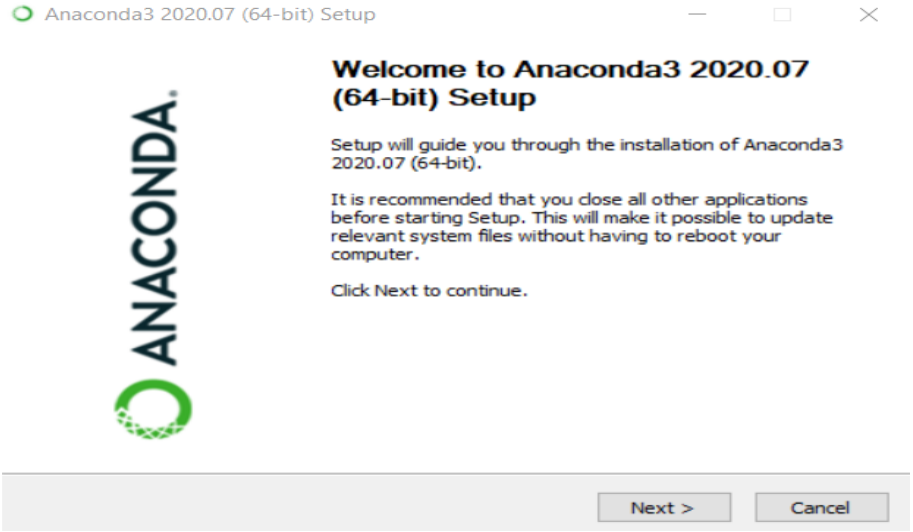

Figure 17: Installing the tool

Click on the next button to proceed with the installation of the tool.

1.2.4 Choosing the Installation Type

The installation type provides us with the type of installation. Since single user will be using this, proceed with the just me option.

1.2.5 Choosing the Installation Location

The installation location the file location for the software to be installed. Proceed with the predefined file location displayed in the popup box.

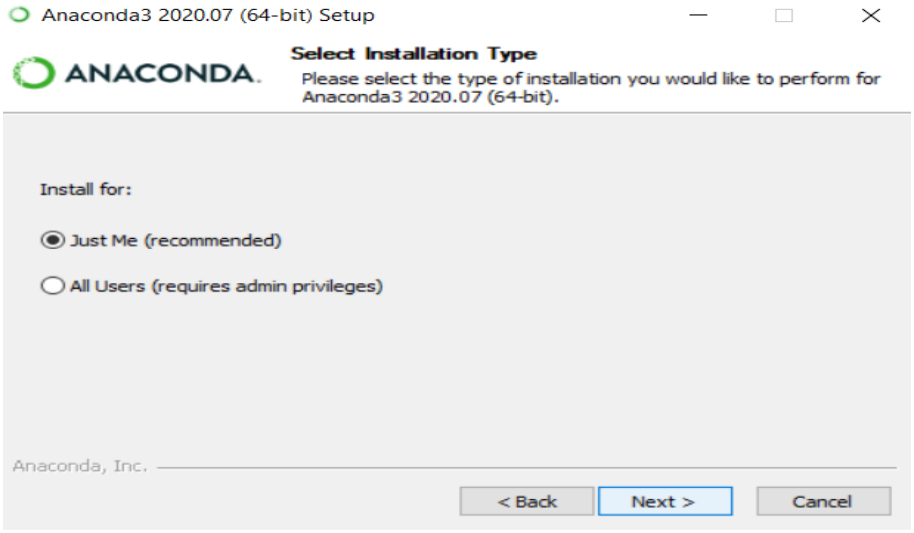

Figure 18: Choosing the installation type

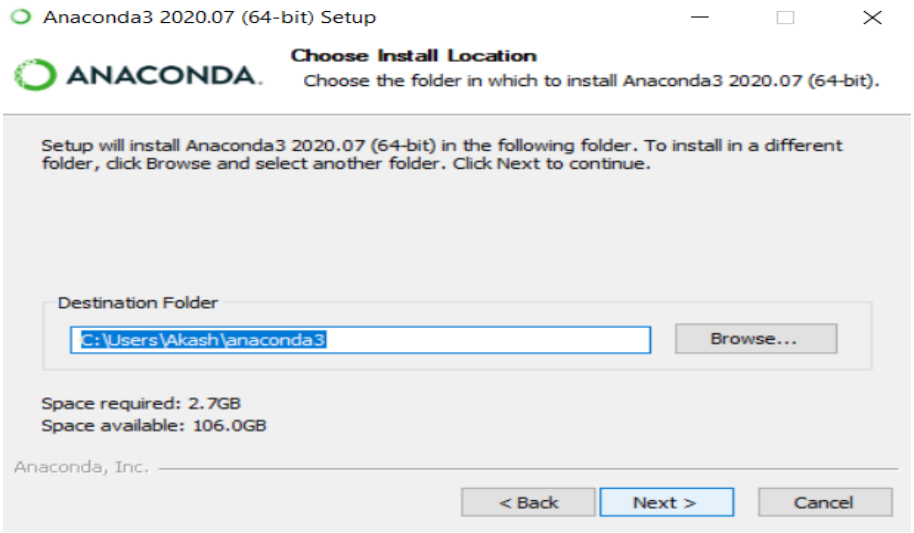

Figure 19: Installation Location

1.2.6 Anaconda Python

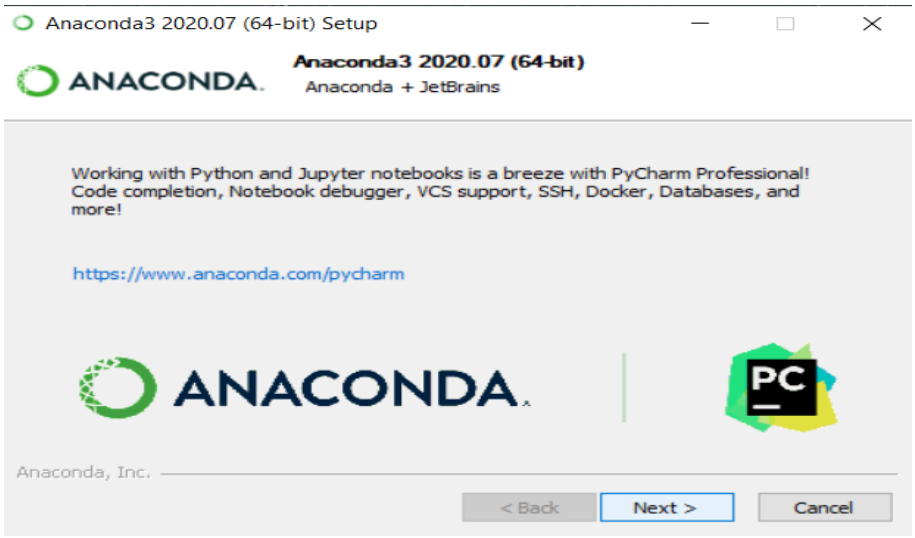

Figure 20: Anaconda python installation

Click on the next option.

1.2.7 Advanced Option

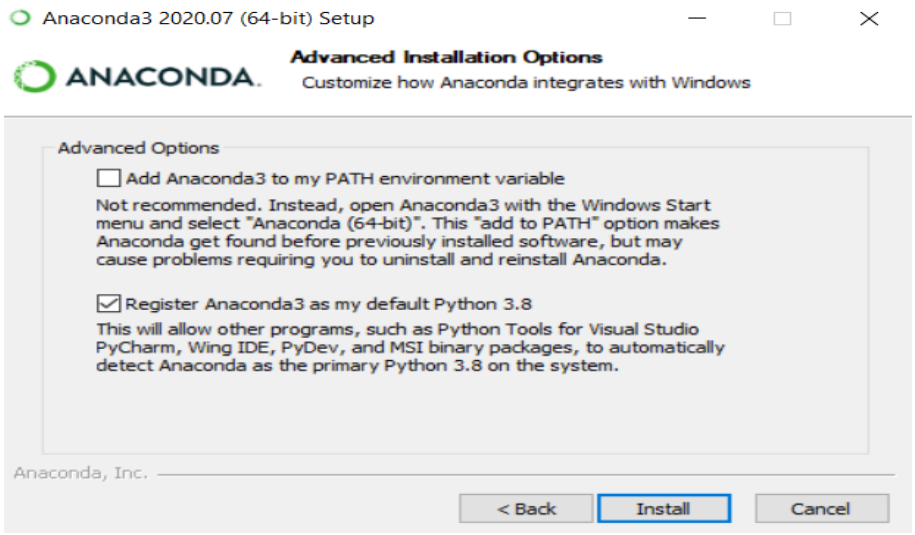

Figure 21: Choosing advanced option

In the advanced options box, tick on the register anaconda as my default python option and proceed with the install option.

1.2.8 Installing

Once the install option is clicked, the installation of the anaconda tool will take place. This tool will now be installed in the file location specified in the location of installation. Further to installation, environment for edge will be created.

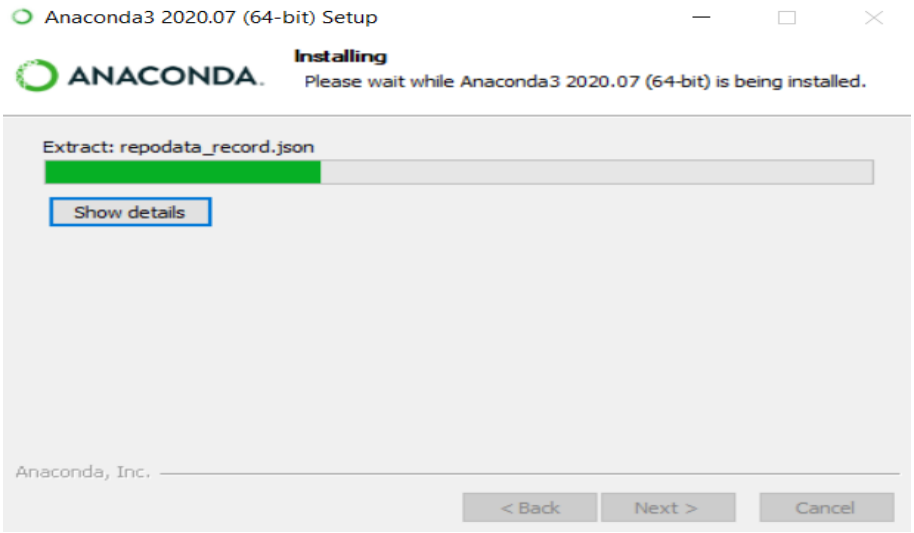

Figure 22: Installation of the tool

1.2.9 Installation Completed

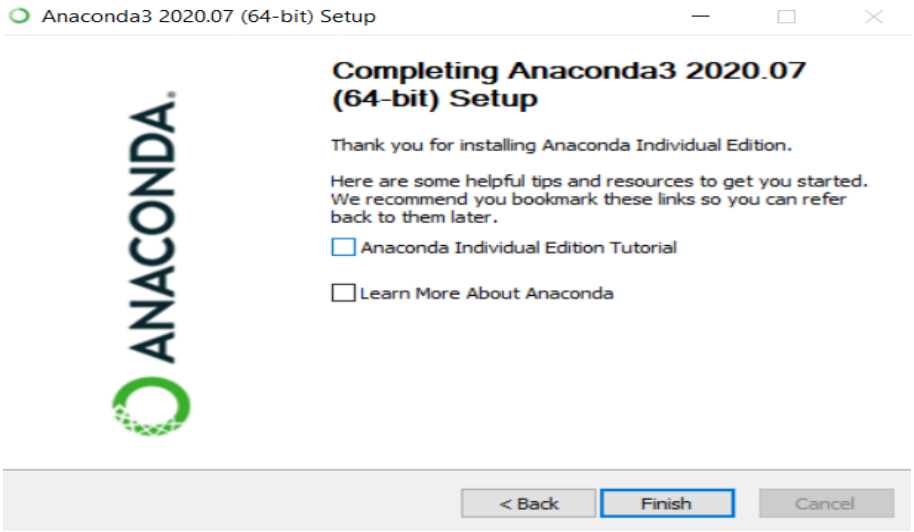

Figure 23: Installation completed

Click the finish option to start the anaconda tool.

1.2.10 Anaconda Home Page

The anaconda home page displays various environments for programming. In this experiment, we need to create a separate channel for edge and create an environment in jupyter labs notebook.

1.2.11 Creating the edge environment

Navigate to the environments channel on the left side of the anaconda tool.

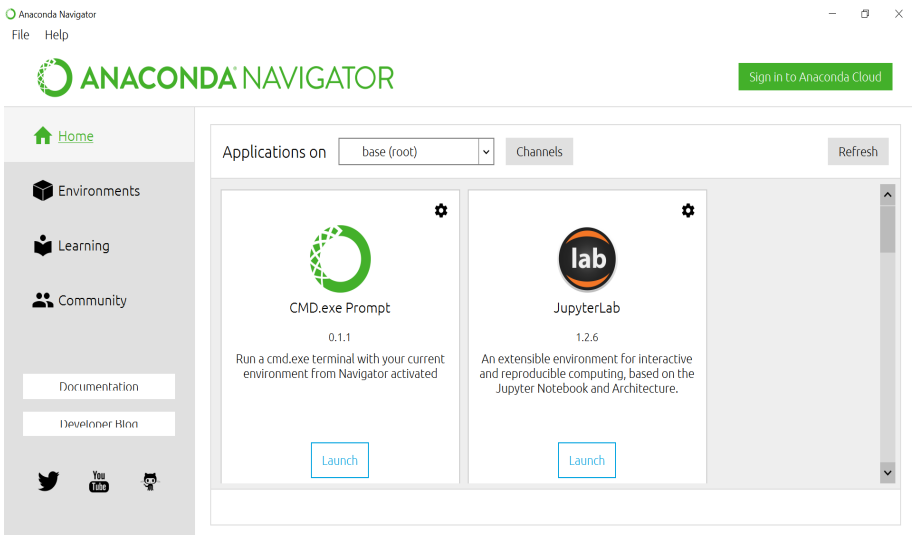

Figure 24: Homepage of Anaconda Navigator Tool

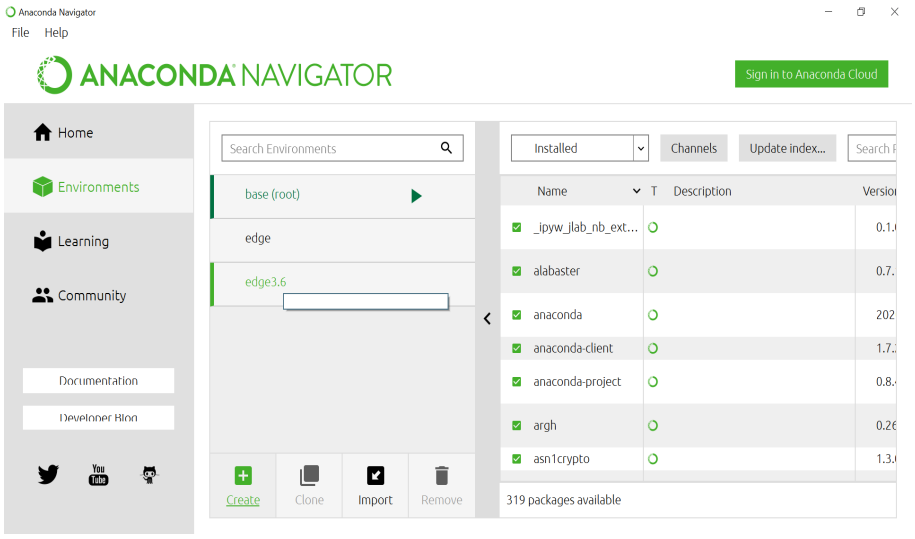

Figure 25: Creating the edge environment

1.2.12 Adding the edge name

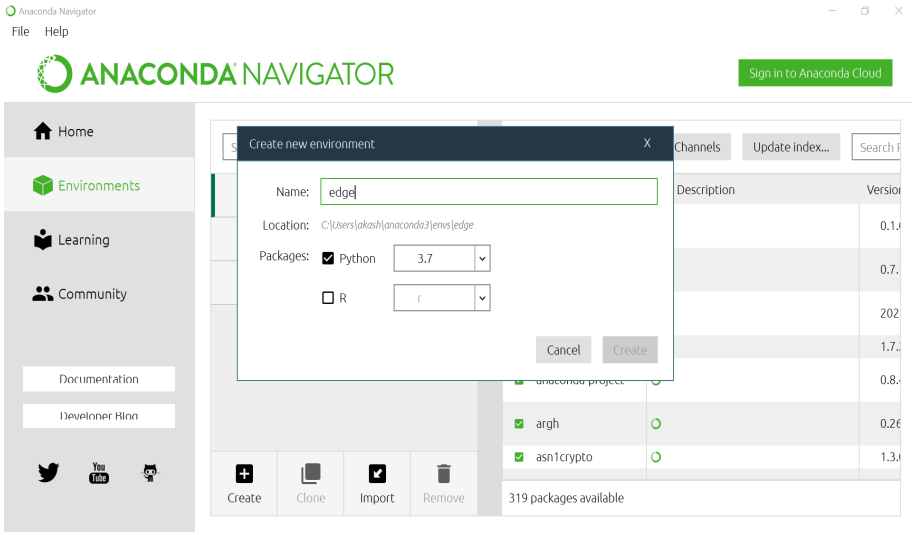

Figure 26: Adding the edge name

Click on the update channel and add edge name.

1.2.13 Edge Home Page and Launching of Jupyter Labs Notebook

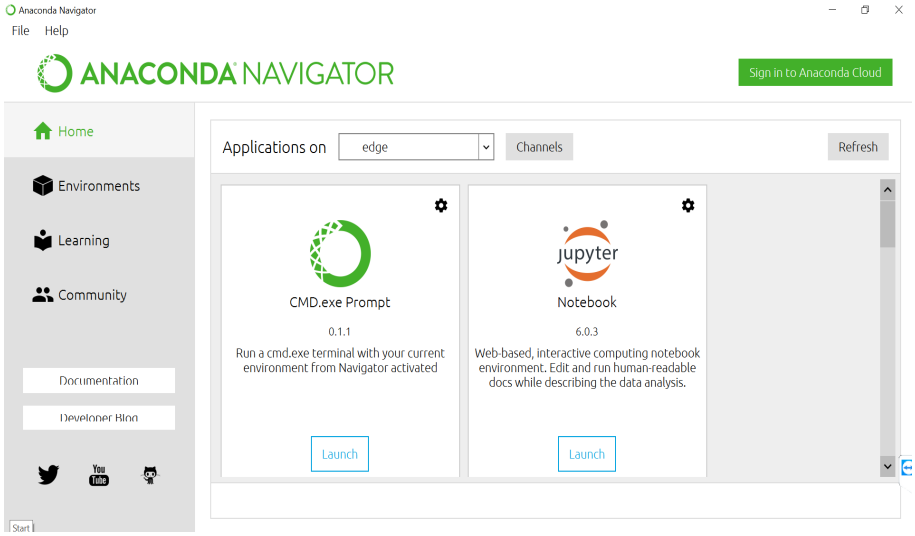

Figure 27: Homepage of Edge environment with Jupyter labs notebook

Once a separate channel for edge is created, open the jupyter labs notebook for writing the python scripts.

1.2.14 Python Script for Image Processsing

This is the python script for performing image processing.

1.2.15 Python Script for Fibonacci Series and Image Processsing

This is the python script for Fibonacci series and Image processing.

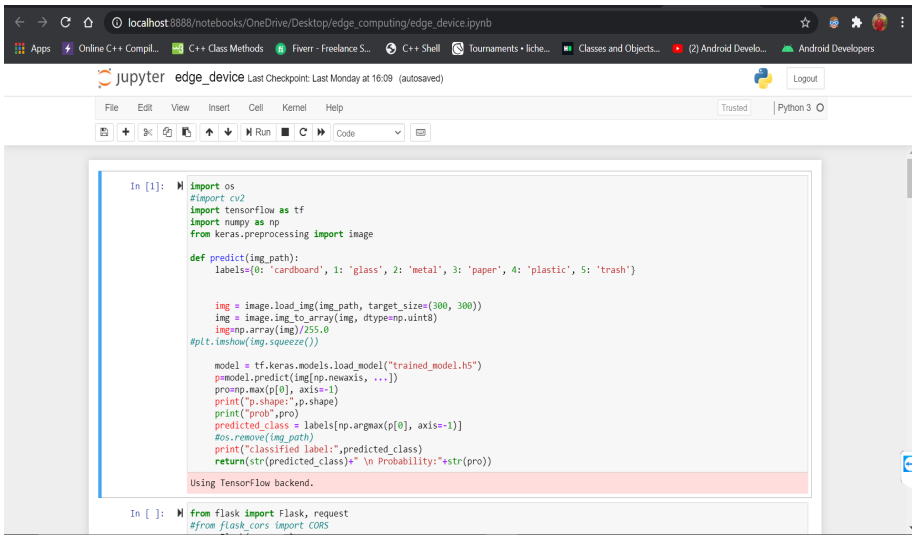

Figure 28: Python script for image processing

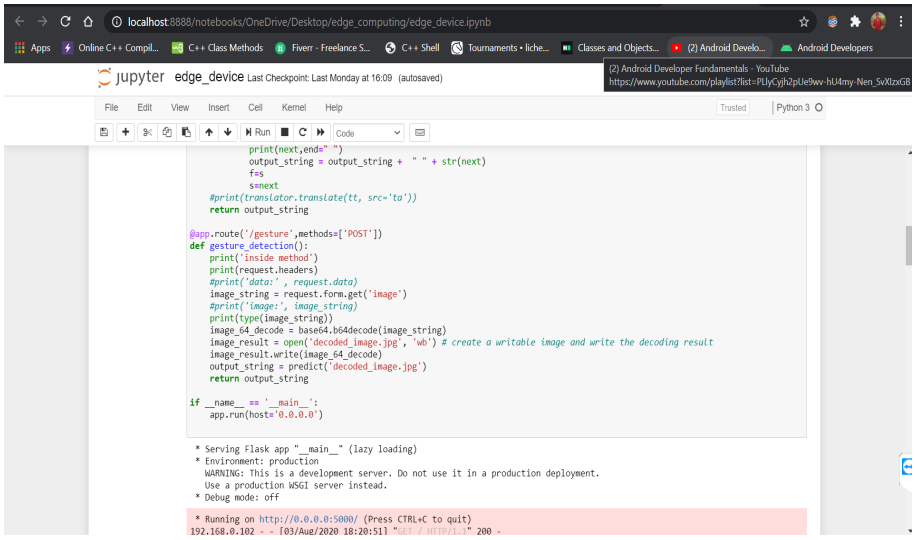

Figure 29: Python script for fibonacci series and image processing

2 Setting up the cloud server

Research works(Nguyen and Dressler; 2020; Flores et al.; 2014) have focussed on using cloud servers to offload the computing intensive tasks. This sections provides a detailed configuration on setting up the cloud server for offloading.

2.1 AWS Home Page

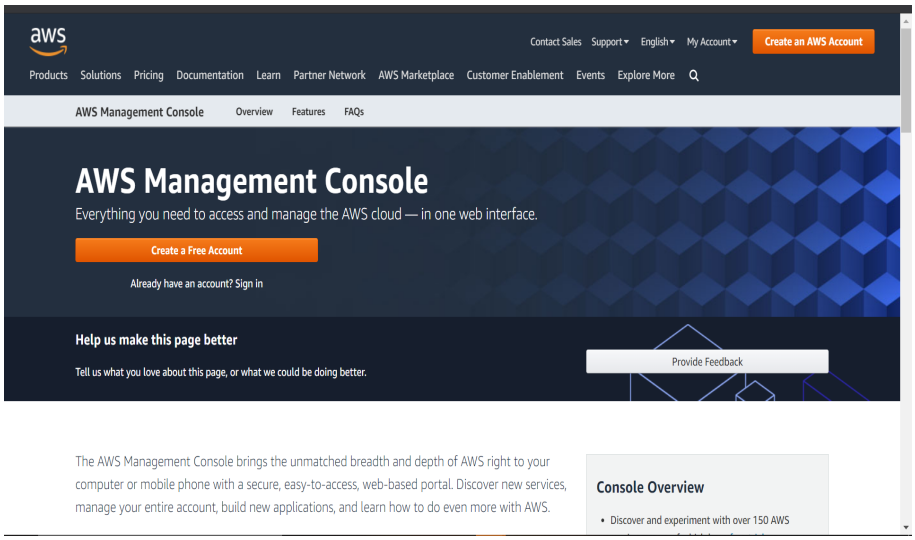

Figure 30: Homepage of AWS

This[3] is the AWS home page link. Click on the create account option to create an account with AWS and proceed with the cloud server.

2.2 AWS Account Creation

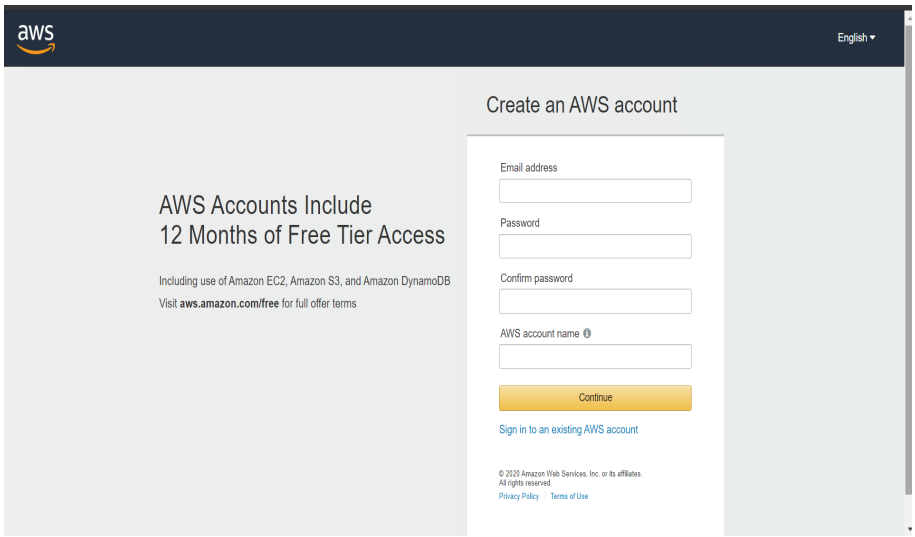

Figure 31: Creating an account in AWS

[3]https://aws.amazon.com/

Provide the necessary details and click the continue option.

2.3 Management Console

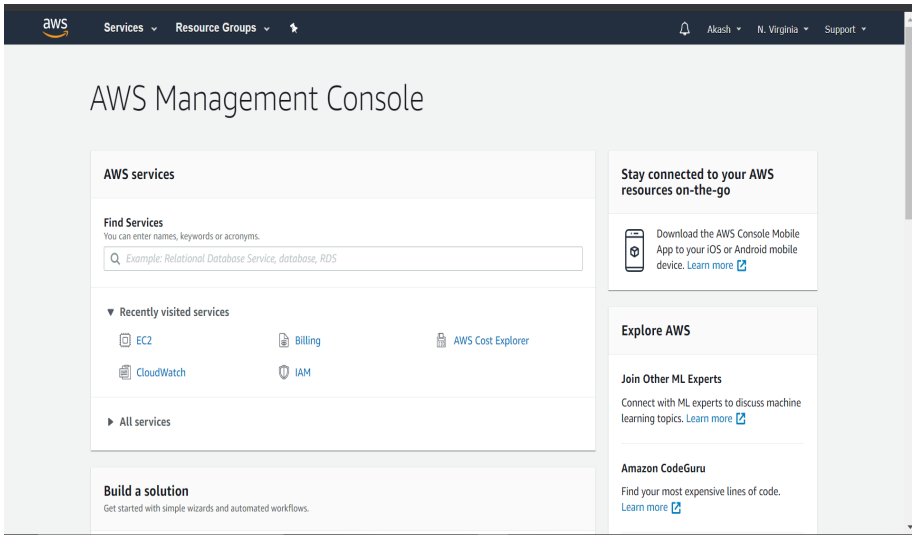

Figure 32: Management console for the AWS account

The management console provides us with the all the services available and various other options. Change the option for the region to north virginia. It can be changes on the right-side top corner of the home page. Once the region has been changed, click on the EC2 instance page.

2.4 Launch Instance Page

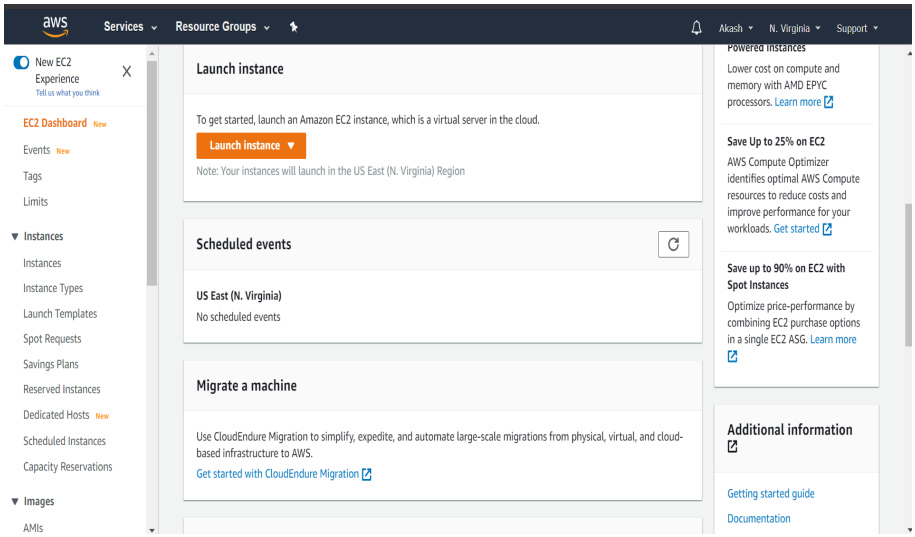

Figure 33: Launching a new instance

Click on the launch instance option to proceed with the launching and configuration of the EC2 instance.

2.5 Amazon Machine Image

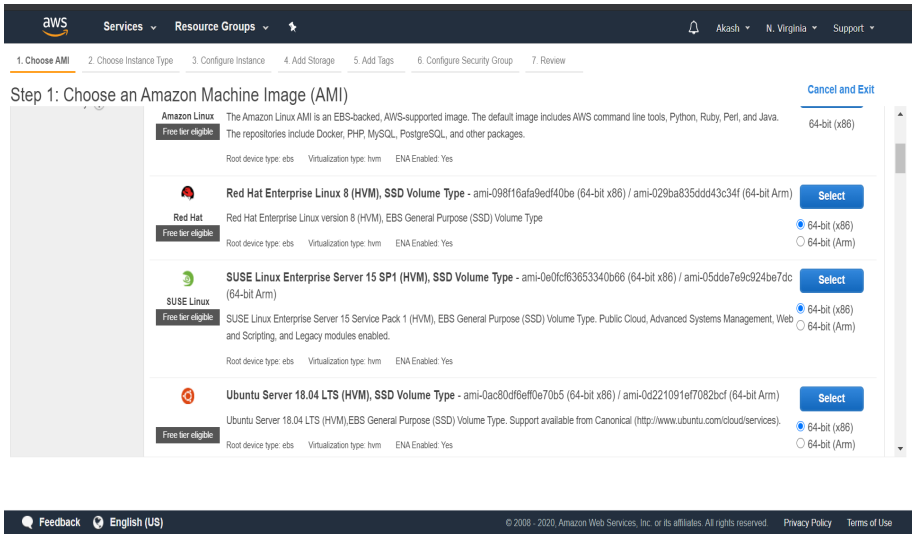

Figure 34: Choosing the machine image for the EC2 instance

The amazon machine image is the type of OS to be installed in the EC2 instance. Choose Ubuntu Amazon machine image and click next.

2.6 Instance Type

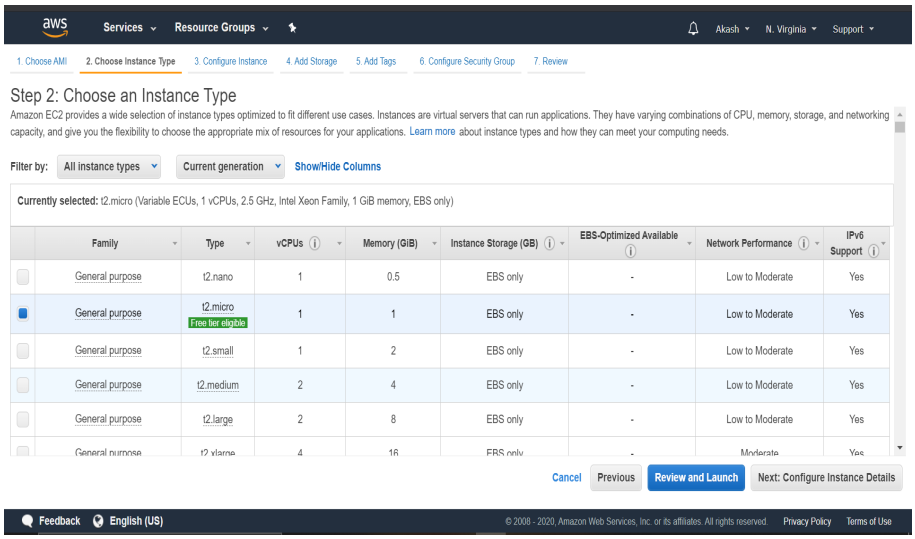

Figure 35: Choosing the instance type

The instance type provides with various options for the instance. The free tier eligible instance is the t2.micro instance. This instance type provides with the basic hardware specification.

2.7 Instance Configuration

Proceed with the default configuration for the instance.

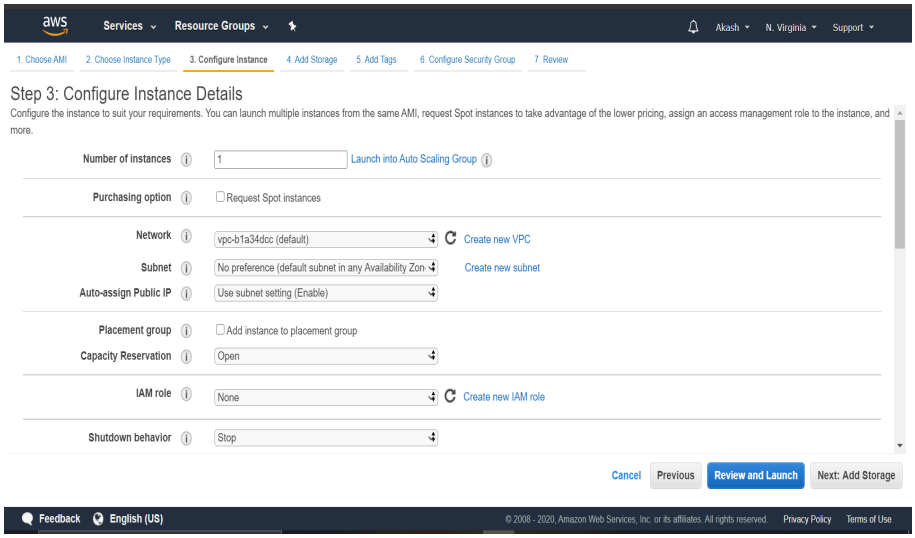

Figure 36: Configuring the instance

2.8 Adding Storage

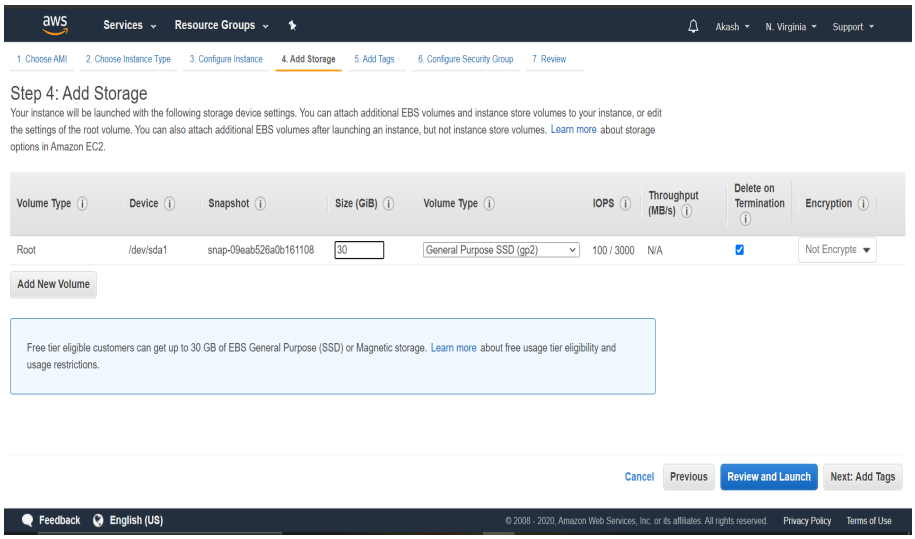

Figure 37: Adding storage to the instance

The predefined storage provided is 8GB in the elastic block storage for the EC2 instance. Change the storage from 8GB to 30GB.

2.9 Adding Tags

Tags are necessary to identify particular AWS resources. Each tag should have an associated value. Here, provide Name as the value for key and provide Flask Application as the value for the application.

2.10 Configuring Security Group

Proceed with the predefined security group provided by AWS for the EC2

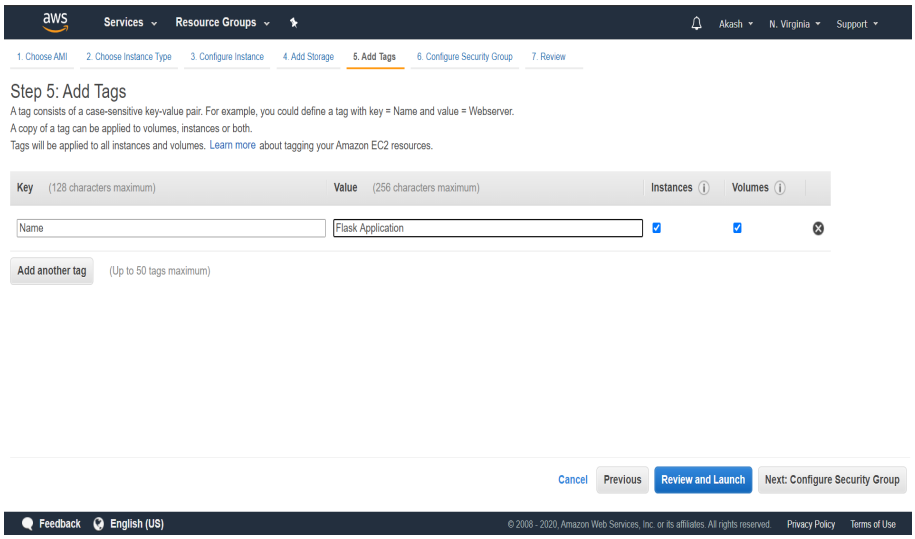

Figure 38: Adding tag to the EC2 instance

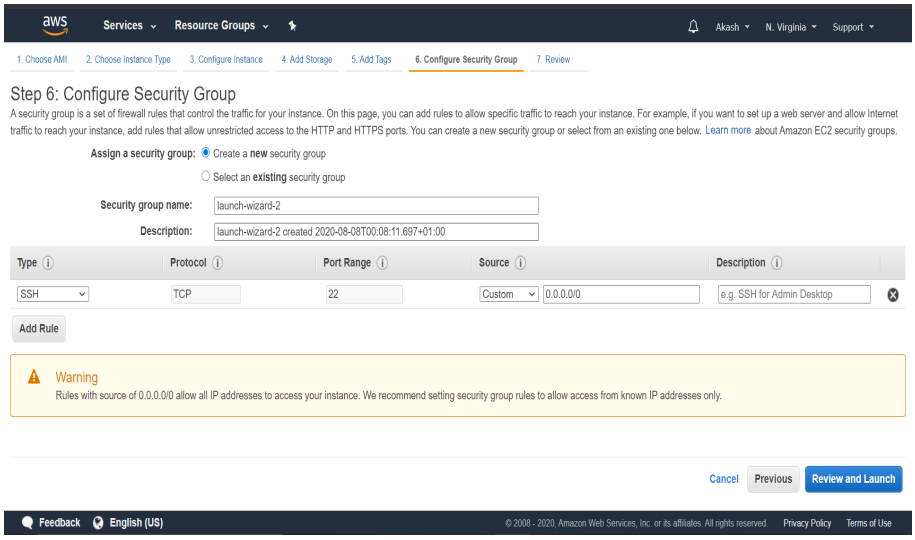

Figure 39: Configuring the security group

2.11 Review and Launch

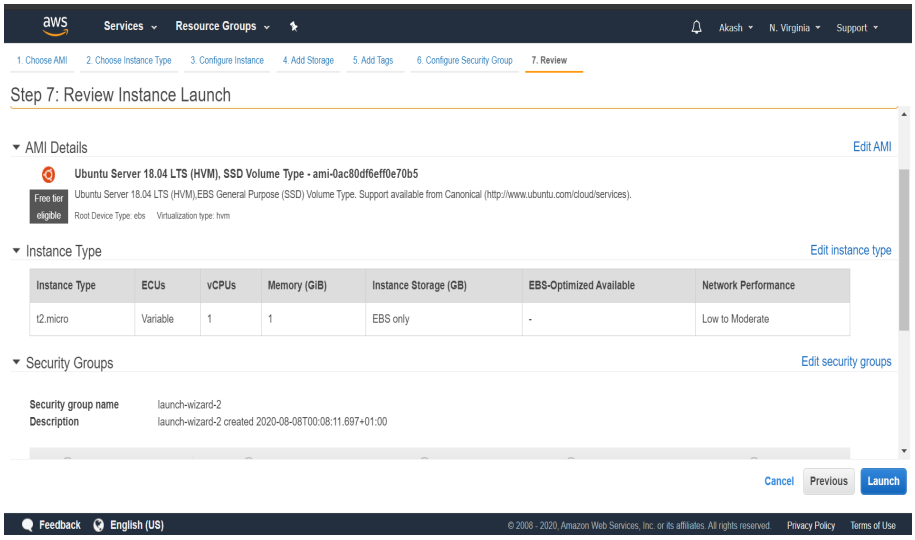

Figure 40: Reviewing and Launching the created EC2 instance

The review tab provides with the options chosen for the EC2 instance. Once reviewed, click launch and proceed with the starting of the instance.

2.12 Running Instance

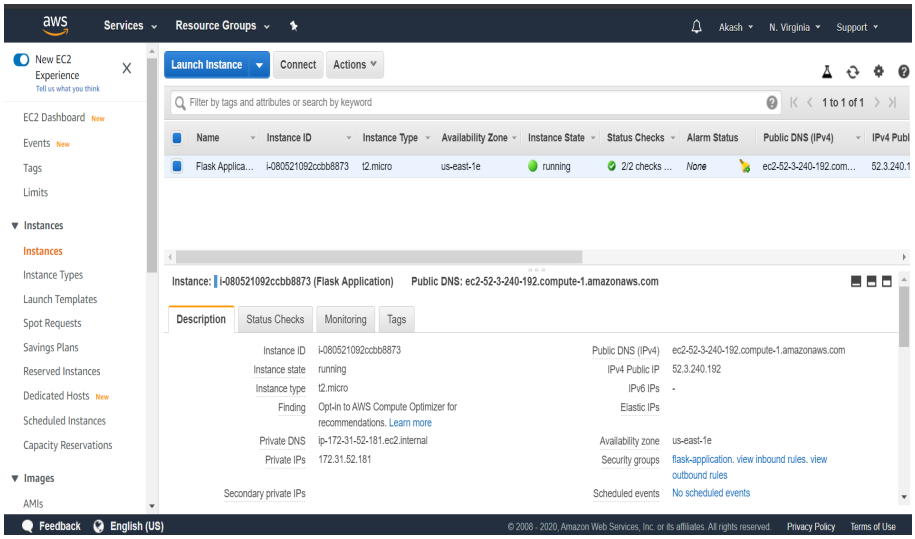

Figure 41: Running instance

The running instance tab shows the running instances created with the detailed options of the instance. The status of the instance and monitoring the instance such as the CPU and the network utilization of the instance can also be viewed.

2.13 Uploading files to the cloud server

The necessary files needs to be uploaded to the cloud server such as the images for performing image processing, python scripts for Fibonacci series and image processing.

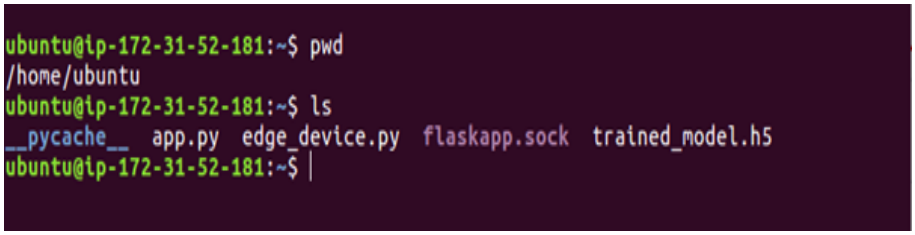

Figure 42: Uploading the necessary files to the cloud server

2.14 Create Gunicorn service

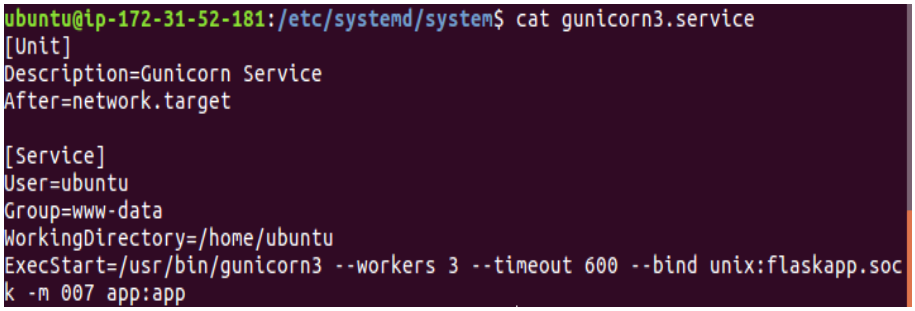

Figure 43: Creating a gunicorn service

Gunicorn service is created. This is necessary to transform the requests from the NginX server to the Flask application that the service can perform.

2.15 Modify the NginX proxy parameters for timeout

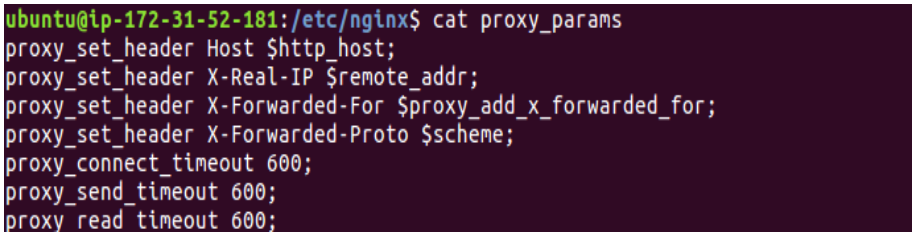

Figure 44: Modifying the timeout parameters for connection

Modifying the proxy params to set the timeout for the requests.

2.16 Modify Flask application

Configuring the Flask application. The application is configured to run the python scripts for the Fibonacci series and the Image processing. Further to executing, the requests must be redirected to the Gunicorn service.

2.17 Edit the Flask application to redirect to the Gunicorn Service

This is the modification in the flask application.

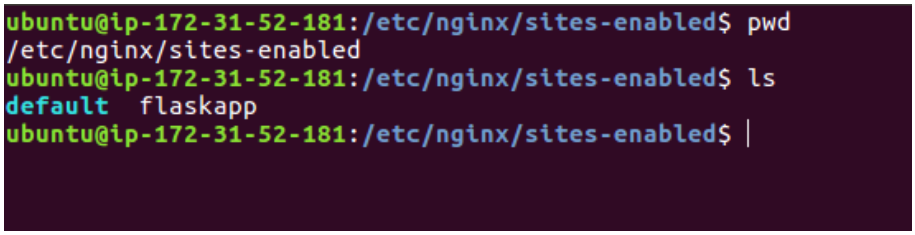

Figure 45: Modifying the flask application

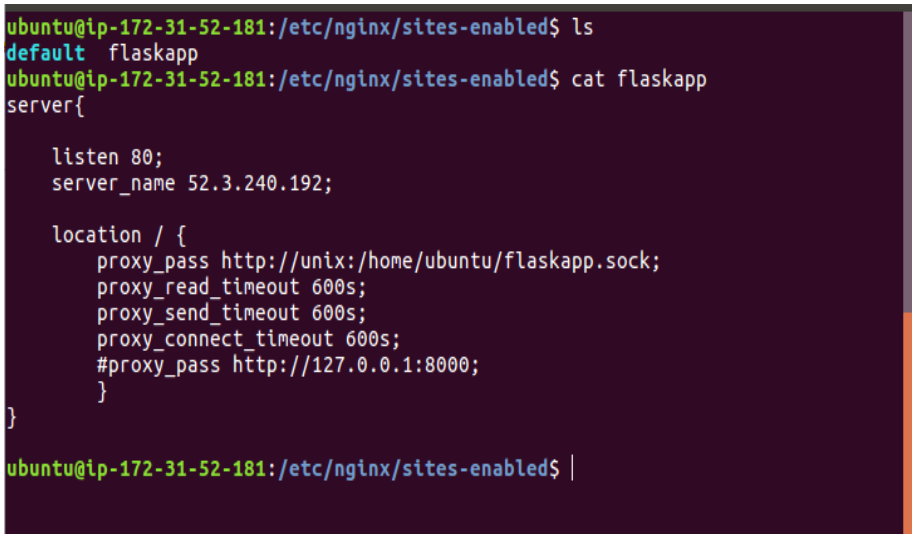

Figure 46: Modifying the flask application

2.18 Start NginX

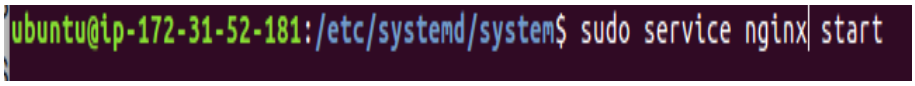

Figure 47: Starting the NginX server

This is to start the NginX server in the EC2 instance.

2.19 Start Gunicorn

This is to start the gunicorn service in the EC2 instance.

3 Implementation

The screenshots of the Fibonacci and the Image processing part of the android application are shown here. Also, the screenshots of the output derived on the edge device and the screenshots of the output obtained from the cloud server is shown here.

3.1 Fibonacci series part of the application in the mobile device

This is the Fibonacci series screen in the application.

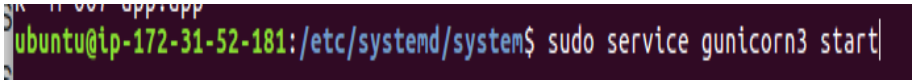

Figure 48: Starting the gunicorn servi

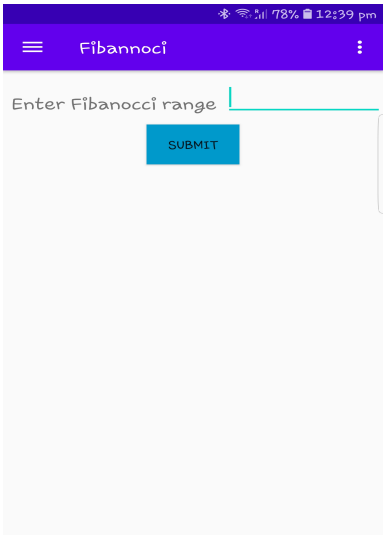

Figure 49: Fibonacci screen in the application

3.2 Image processing part of the application in the mobile device

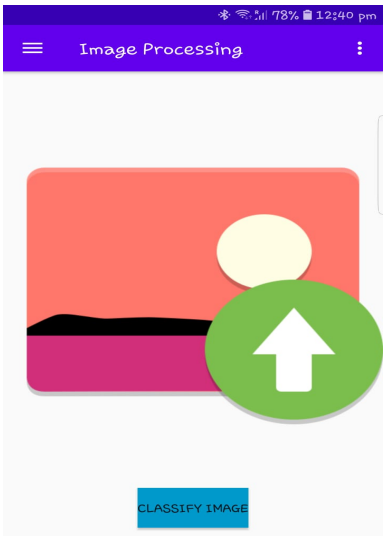

Figure 50: Image processing screen in the application

This is the Image processing screen inside the application.

3.3 Fibonacci series output in the edge device

This is the Fibonacci series output in the edge device.

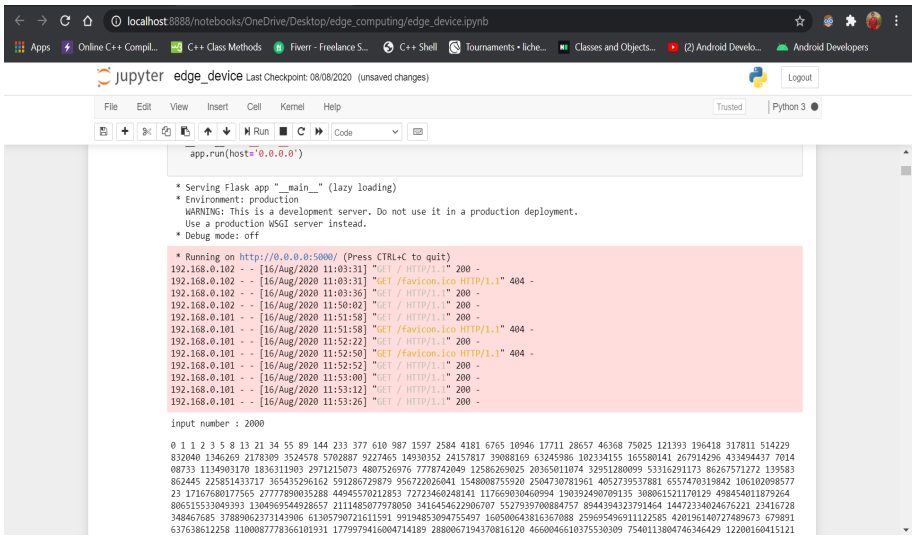

Figure 51: Fibonacci series output in the Edge device for 2000 iterations

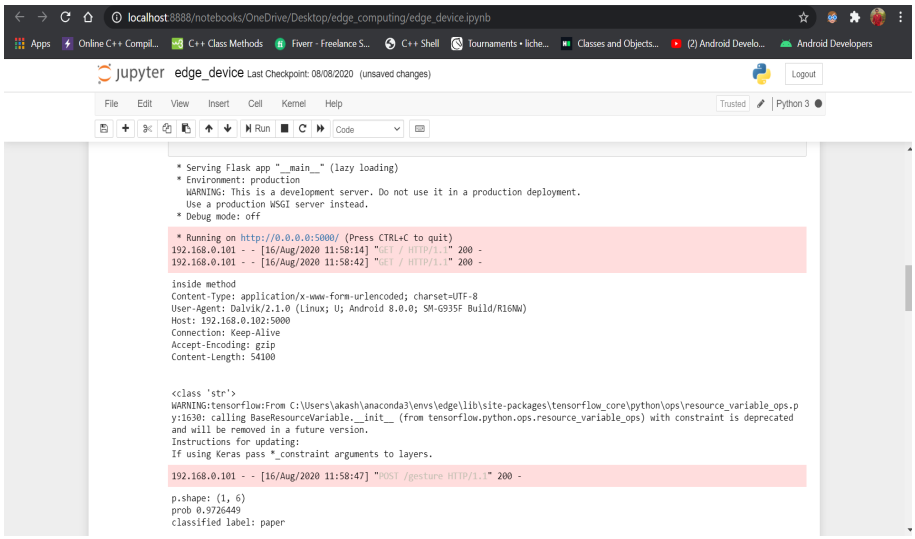

Figure 52: Image processing output in the Edge device

3.4 Image processing output in the edge device

This is the Image processing output in the edge device.

3.5 Fibonacci series output from the cloud in the mobile device

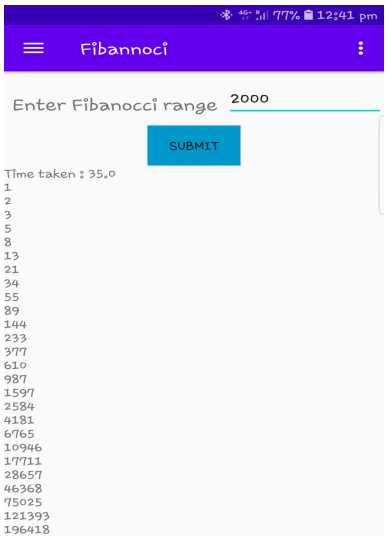

Figure 53: Fibonacci series output obtained from the cloud server

The output displayed on the screen is the result of the task offloaded to the cloud server.

3.6 Image processing output from the cloud in the mobile device

The output is a toast message displaying the result of the image processing. This result is obtained by offloading to the cloud server.

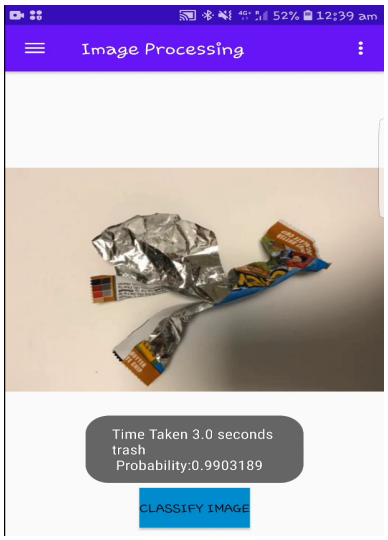

Figure 54: Image processing output obtained from the cloud server

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