SMAI Assignment-3

Prof. Vineet Gandhi (Section-A)

Deadline: 28th March, 2025

1 General Instructions

- Your assignment must be implemented in Python.
- The first part of the assignment should be implemented in a Jupyter notebook. Submit it on moodle.
- We have created a Github classroom for project phase-1 (Link to Join). Upload the images folder and the annotation csv file **in your repository**.
- You can use Pytorch for the first part of the assignment.
- Late days can only be taken for part 1 not for part 2 of the assignment.
- The grading for the second part will be binary. Full marks will be awarded only if all 55 images are taken, otherwise a zero will be given. The submission format, for the csv and the images(resolution, aspect ratio etc) is strict. Any violation of that will lead to a straight zero in the second part.
- Do not share the same images as other people, we will be checking for that. If found that multiple people are reporting the same images, they will be awarded a zero for the entire assignment. Make sure the annotations are right. This dataset will be used for your final mini-project so any discrepancies will directly effect the final mini project.
- The deadline is strict and will not be extended in any circumstances.

2 Age Prediction (20 Marks)

Download dataset from here. Use images from the path dataset/utkface_aligned_cropped/UTKFace.
The age is encoded in the name of image - [age]_[gender]_[race]_[datetime].jpg.
Split the dataset into 80 percent train and 20 percent test.

- Train a CNN from scratch to predict the age of people. Report the mse Loss
- Take a pretrained resnet 18 model. Change its last fc layer to accommodate for predicting age and train a model. Report the mse loss.

Which model performs better and why?

3 Mini Project: Phase-1 (Data Collection and Annotation) (80 Marks)

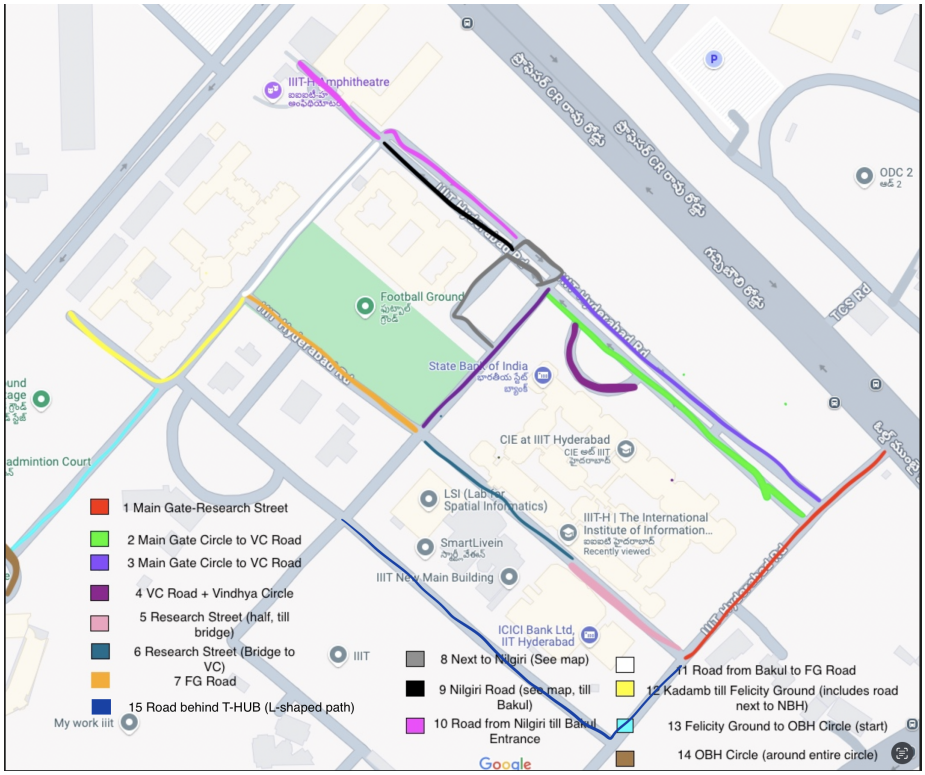

Figure 1: IIIT-H campus map with color coded regions

3.1 Introduction

The first phase of the project involves collection and annotation of a dataset consisting of images captured in a designated region within the IIIT Hyderabad campus. Each dataset sample will contain an image along with essential meta-data, including geographic coordinates (latitude and longitude), timestamp of capture, and orientation details. The second (and final) phase of the project deals with location prediction on the campus from a given image. To ensure diverse and evenly distributed data collection, the campus has been divided into 15 regions, each marked with a different color and a region ID (1-15) on the above map. Please refer to Link to know the region ID assigned to you and refer to the map to find the exact region within which you will be clicking pictures.

3.2 Guidelines

- Each student has to collect a total **55 images**, only from their **allotted region on campus**.
- The pictures should prominently feature various aspects of the campus, such as buildings, pathways, open spaces, and other notable landmarks. Taking images in a designated region means that you have to take photos while being within that region, and not that the images should be of that region.
- Each photo should be taken on your phone using **1:1 (square) aspect ratio**. Modify settings in your camera app to make sure that the photos you take are square.
- The regions have slight overlaps at their end points. Do not worry about being perfectly within your region, its fine if there are similar images coming from different regions because of slight overlaps
- After clicking a picture, open the google maps app, zoom in on the IIIT-H area and drop a pin at the location you think you are standing. You will find the Lat/Long (unique co-ordinates) for the red pin at the bottom of your screen. Save the co-ordinates for submitting with the image you clicked there. **Note:** The live location shown on the map may not be very accurate so do not rely solely on current location (blue marker) to get the co-ordinates. Also, do not worry about being very accurate while dropping the pin. It's ok to be off by a few meters but do as best as you can to pin point. Using satellite view might make this process easier. Android users can use long press on the map if a single tap does not drop the pin.
- Along with the co-ordinates, we also want you to give the angle (from North i.e. 0 degrees) at which the photo was clicked (which depends on the direction your phone is facing while clicking the picture). Use compass app on your phone (or download if not pre-installed) to find these angles. Also, submit the timestamp (24 hr format, hours and minutes)for the image (check image details in photos app).
- Capture images at different times throughout the day, from 6 AM to 6 PM, to account for variations in lighting and environmental conditions. Do not submit photos clicked at a unique (spot, angle) multiple times. Try to click 2-3 photos standing at (or near) the same spot but at different angles.
- Be careful while organizing your data collection. Make sure that the data that has to accompany each picture is not mixed up with others. You can carry along a notepad/sheet of paper or use an excel sheet on phone to write down the details.

- The images can be in jpeg/jpg/png file format. The images can be captured in any resolution (HD, 4K, etc.).
- Naming convention for each image: **YourRollNo_ImageNo.png** (image no. will be from 1-55). Example: **2022101001_17.png**
- You are given a python script (Link) which will make all the photos in your folder (name the folder SMAI_Images) of size 256x256. Upload all your images **only after running this script**.
- You are given sufficient time so please do not be in a hurry to collect the images.

3.3 Submission Format

- You will be sumitting a folder containing all the 55 images that you have taken. Each image will be 256x256 (after running the script). The folder should be named **RollNo_IMAGES**.
- The details to accompany each image will be sumitted in a CSV file. The format is shown below. There should be total 55 lines in the CSV file. The order of columns in a row: Time (24hr, ex- 22:10), Latitude (ex- 17.4463935), Longitude (ex- 78.3502121), Angle (0-360 where perfect north is 0, without decimal, ex- 282). First row should be for image named RollNo_1.jpeg, and so on. This file should be named:
  RollNo_ImageDetails.csv
  example: 2022101001_ImageDetails.csv

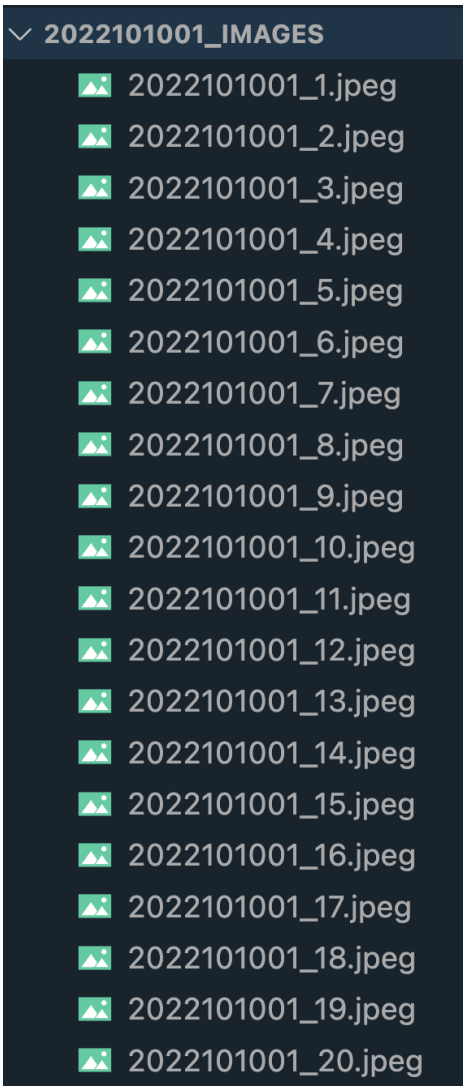

Figure 2: Sample Images Directory

Figure 3: Sample CSV file