

PROJECT REPORT

BITS Pilani K. K. Birla Goa Campus



ML – Sensistan (Android Application)

In partial fulfilment of the course

HSS F266 – STUDY PROJECT

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ACKNOWLEDGEMENT

I would like to thank Dr. Reena Cheruvalath and Mr. Shammi Raj Balla for their patience and guidance as well as the encouragement throughout the course of this project. The exposure provided to us for the project regarding Tech-Art Space was a fresh concept and we were given flexibility in ideation and actualisation of the project, which gave us a great opportunity to work in a new field. I would also like to thank my colleague Archit Jain, for supporting me in completing the project collectively.

ABSTRACT

The objective of this project is to design a Mobile application to automate tour guide experience and make it user-friendly. It also focuses on being programmer-friendly so that any updates done in future versions of the app can be made easily. The application will be connected with AI-powered Image recognition to address needs of a tour guide. It will also consist of a Story Mode, which will be an interactive way to move around the Museum and make the experience a bit more adventurous. The story mode will be under development and will be for the Museum's employees to update upon.

About the Tech

Android Studio - The mobile application developed for Android phones is developed on Android Studio with Java as its base programming language.

Image Recognition - Programmed in Python, this will be used to classify the images into their respective category classes using a Confidence Level, which would involve:

- Training a small network from scratch
- Fine tuning the top layers of the model using pre-trained model

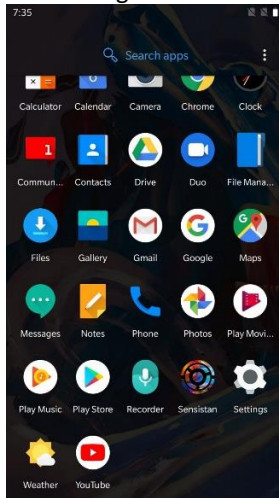
This compares the previously trained models with a new image and categorises it as a particular object.

For this project we used IBM's Watson Services for Image Classification. It has API's available which allow us to directly connect the service to the application.

The whole technological development is done on software and requires no additional hardware expenditures. Since, we are using the Lite Plan by IBM Watson for Image Classification, it is free for 1000 tries a month. For further pricing information, see references below.

Snapshots of the APP

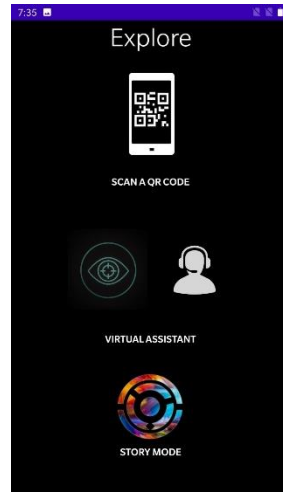
Logo



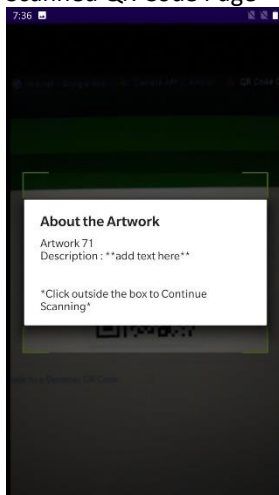
Launch Screen Splash, 1.5 Seconds



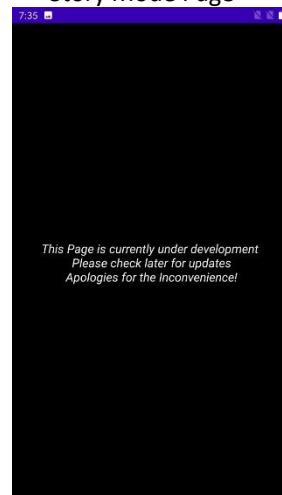
Home Screen



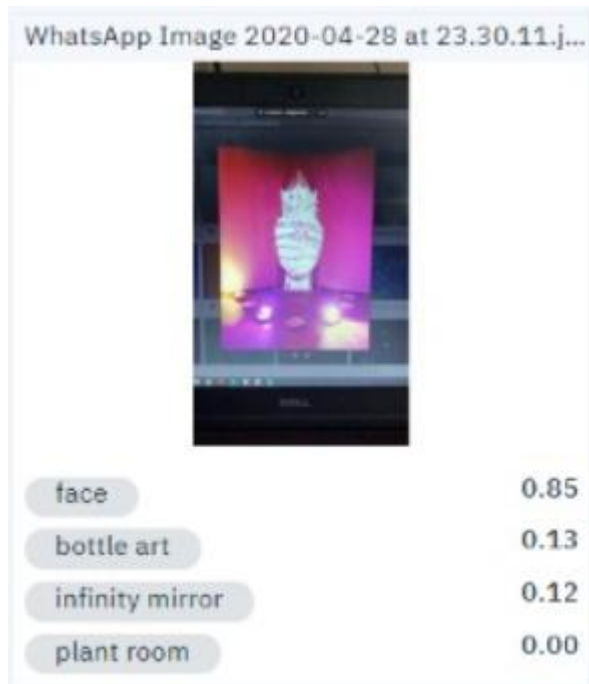
Scanned QR Code Page



Story Mode Page



IBM Watson Training Images – Test Pics



Detection of a new image (which we didn't use for training), with an accuracy of 85%.

The accuracy improves with more test cases that are added on the training module.

How to train your IBM Watson Module

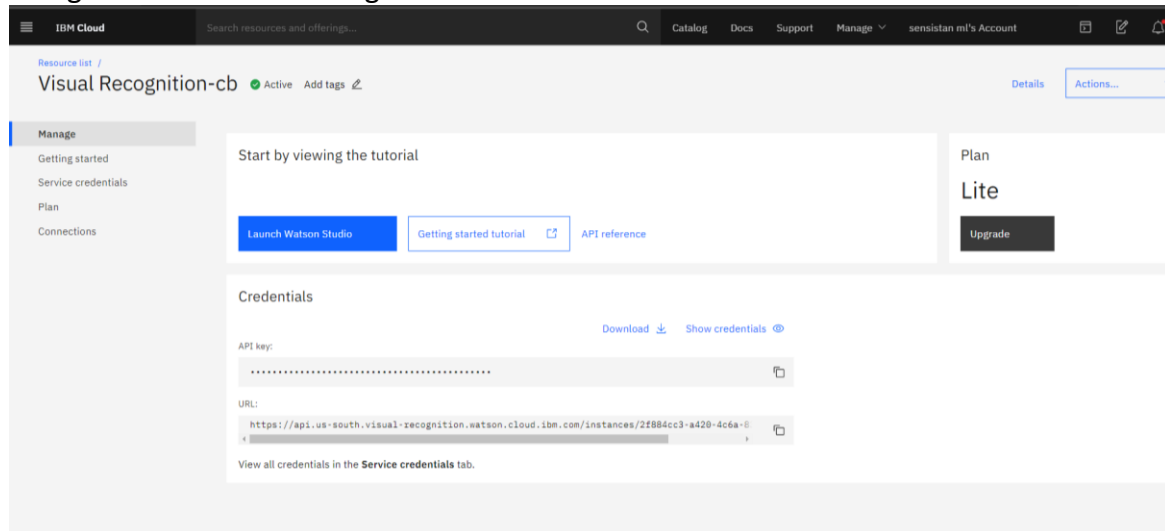
Log into : <https://cloud.ibm.com/login>

Login Credentials – sensistan.ml@gmail.com

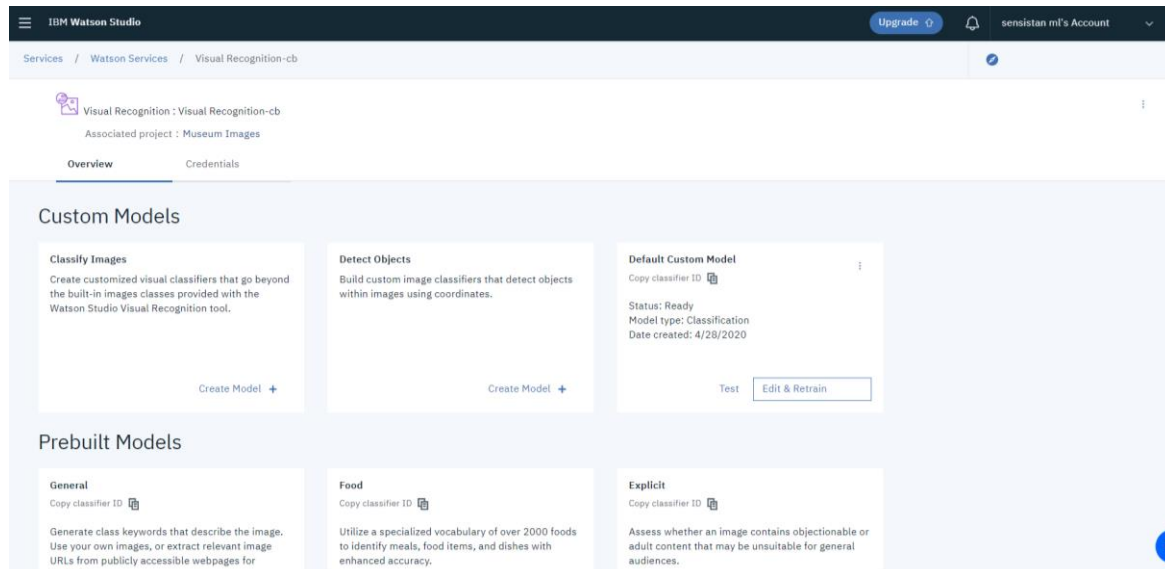
Password – Technology2020

{we used the same password to log into the Gmail Account as well}

Navigate to the Visual Recognition Window and Launch Watson Studio



Click on Edit and Retrain under Default Custom Model



For Deployment to other applets, click on credentials and follow the tutorial, which will have the API key for the services

Add required Images in the particular Class pertaining to the artwork and click train

IBM Watson Studio

Upgrade

sensistan ml's Account

Projects / Museum Images / Default Custom Model / Edit and retrain

Default Custom Model
Associated Service : Visual Recognition-cb

Train Model

My classes (5) All images (123)

Drag and drop files from your project.

5 classes | 0 incomplete classes | 0 unclassified images

New training data size: 0.0/250 MB

Create a class

bottle art (16)

face (17)

infinity mirror (10)

Upload directly

To add files to your project and model, drop .jpeg, .png, or .zip files here or

Browse

Add from existing project files

Drag .jpeg, .png, or .zip files from your project to the training area to add them to your model.

0 selected

- ☐ plant room.zip
28 Apr 2020, 11:48:59 pm
908.11 KB
- ☐ infi mirror.zip
28 Apr 2020, 11:34:14 pm
33.21 MB
- ☐ more face imgs.zip
28 Apr 2020, 11:33:08 pm
353.43 KB
- ☐ face.zip.zip
28 Apr 2020, 9:01:05 pm

New classes can be created for newer artworks that are not mentioned in the model.

Objectives

Completed

1. Setup Standard Mobile Application with a functional design, ready to be linked.
2. Gathering Basic Training Images
3. Training of AI Recognition Models
4. Setup Networking between Mobile Application and the Machine Learning model using IBM Watson.

Yet to be Completed

1. Gathering more Training Images for Complex artworks (those which look very similar/can shapeshift or change colours),

It has to be updated every time more tech-art is installed in the museum, as well as those which have less amounts of images present in the training module.

References

1. All Android Studio Programming done from - <https://developer.android.com/studio/intro>
2. Training Images - https://drive.google.com/folderview?id=1ofRXYn-sCYavTb_EVIZleYddN2EiO0c
3. <https://cloud.ibm.com/apidocs/visual-recognition/visual-recognition-v3?code=java>
4. <https://github.com/sudoalgorithm/Developing-A-Image-Classifer-Using-Watson-Visual-Recognition-On-Watson-Studio>
5. Bug Fixes and Testing – <https://stackoverflow.com>
6. Pricing Information – Watson Services: <https://www.ibm.com/in-en/cloud/watson-visual-recognition/pricing>