AIML | MODULE PROJECT

5 Takeaways

1 AIML module projects are designed to have a detailed hands on to integrate theoretical knowledge with actual practical implementations.

2 AIML module projects are designed to enable you as a learner to work on realtime industry scenarios, problems and datasets.

3 AIML module projects are designed to enable you simulating the designed solution using AIML techniques onto python technology platform.

4 AIML module projects are designed to be scored using a predefined rubric based system.

5 AIML module projects are designed to enhance your learning above and beyond. Hence, it might require you to experiment, research, self learn and implement.

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COMPUTER
VISION

PART I

AIML module project part I consists of task to train and compare image classifier models using supervised learning classifier, neural network classifier and a CNN classifier.

PART II

AIML module project part II consists of designing an object detection automation by imputing bounding boxes over a video as an input.
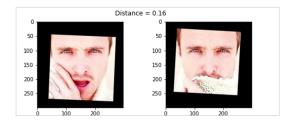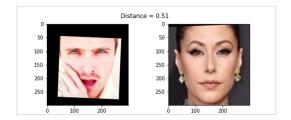
TOTAL SCORE | 30

| PART **ONE** | PROJECT **BASED** | TOTAL **SCORE** | **25** |

- **DOMAIN:** Face recognition
- **CONTEXT:** Company X intends to build a face identification model to recognise human faces.
- **DATA DESCRIPTION:** The dataset comprises of images and its mask where there is a human face.
- **PROJECT OBJECTIVE:** Face Aligned Face Dataset from Pinterest. This dataset contains 10,770 images for 100 people. All images are taken from 'Pinterest' and aligned using dlib library. Some data samples:

- **TASK:** In this problem, we use a pre-trained model trained on Face recognition to recognise similar faces. Here, we are particularly interested in recognising whether two given faces are of the same person or not. Below are the steps involved in the project.
    - Load the dataset and create the metadata.
    - Check some samples of metadata.
    - Load the pre-trained model and weights.
    - Generate Embedding vectors for each face in the dataset.
    - Build distance metrics for identifying the distance between two given images.
    - Use PCA for dimensionality reduction.
    - Build an SVM classifier to map each image to its right person.
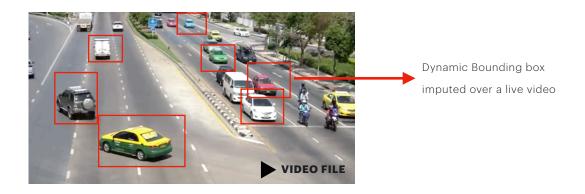   - Predict using the SVM model.

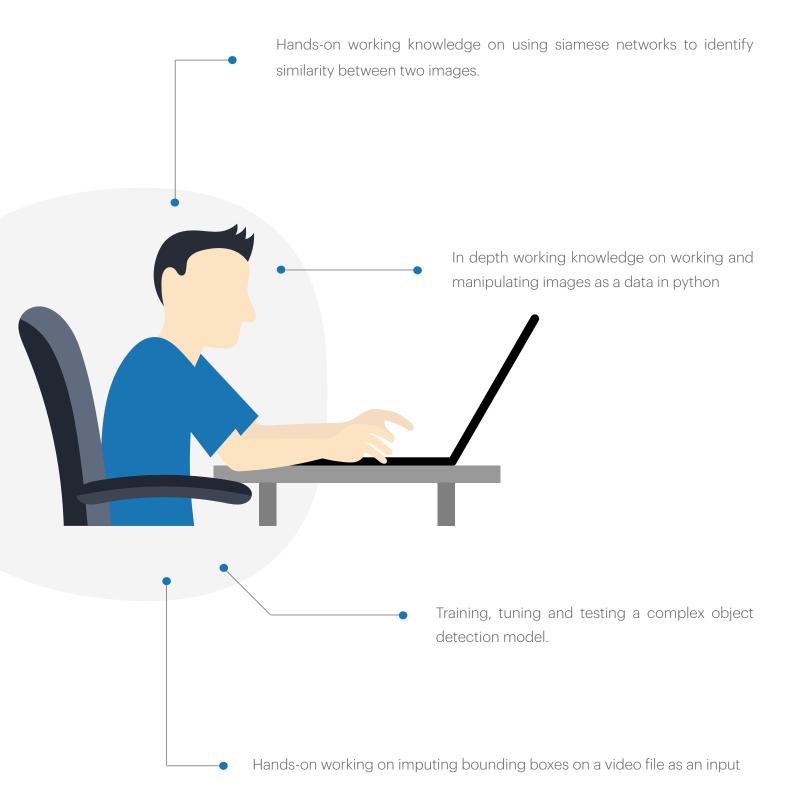| PART **TWO** | TASK **BASED** | TOTAL **SCORE** | **5** |

- **DOMAIN:** State traffic department
- **CONTEXT:** City X's traffic department wants to understand the traffic density on road during busy hours in order to efficiently program their traffic lights.
- **TASK:** Create an automation using computer vision to impute dynamic bounding boxes to locate cars or vehicles on the road. It would require for you to do some research on how to impute bounding boxes on video file. You can use video provided with this assignment or any video of your choice which has moving cars to impute bounding boxes.
    Refer to the screenshot from sample video below:

Dynamic Bounding box imputed over a live video

LEARNING
OUTCOME

Hands-on working knowledge on using siamese networks to identify similarity between two images.

In depth working knowledge on working and manipulating images as a data in python

Training, tuning and testing a complex object detection model.

Hands-on working on imputing bounding boxes on a video file as an input

" *Put yourself in the shoes of an actual* "

DATA SCIENTIST

THAT's **YOU**

Assume that you are working at the company which has received the above problem statement from internal/external client. Finding the best solution for the problem statement will enhance the business/ operations for your organisation/project. You are responsible for the complete delivery. Put your best analytical thinking hat to squeeze the raw data into relevant insights and later into an AIML working model.

PLEASE **NOTE**

Designing a data driven decision product typically traces the following process:

1. Data and insights:
    Warehouse the relevant data. Clean and validate the data as per the the functional requirements of the problem statement. Capture and validate all possible insights from the data as per the the functional requirements of the problem statement. Please remember there will be numerous ways to achieve this. Sticking to relevance is of utmost importance. Pre-process the data which can be used for relevant AIML model.

2. AIML training:
    Use the data to train and test a relevant AIML model. Tune the model to achieve the best possible learnings out of the data. This is an iterative process where your knowledge on the above data can help to debug and improvise. Different AIML models react differently and perform depending on quality of the data. Baseline your best performing model and store the learnings for future usage.
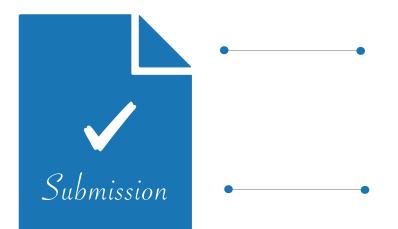
3. AIML end product:
    Design a trigger or user interface for the business to use the designed AIML model for future usage. Maintain, support and keep the model/ product updated by continuous improvement/training. These are generally triggered by time, business or change in data.

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IMPORTANT
POINTERS

Project should be submitted as a single ".html" and ".ipynb" file. Follow the below best practices where your submission should be:

- ".html" and ".ipynb" files should be an exact match.
- Pre-run codes with all outputs intact.
- Error free & machine independent i.e. run on any machine without adding any extra code.
- Well commented for clarity on code designed, assumptions made, approach taken, insights found and results obtained.

Submission

Project should be submitted on or before the deadline given by the program office.

Project submission should be an original work from you as a learner. If any percentage of plagiarism found in the submission, the project will not be evaluated and no score will be given.

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