



IITD

DEEP LEARNING FOR AI
PROJECT



5

Takeaways

1

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

2

DL module projects are designed to enable you as a learner to work on real time industry scenarios, problems and data sets.

3

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

4

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

5

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

IIITD

DEEP LEARNING FOR AI PROJECT

CONVOLUTIONAL NEURAL NETWORKS

This project consists of industry based dataset and problem statement which can be solved using Deep learning techniques.



PART I
TOTAL SCORE

10

PART I:PROJECT BASED

TOTAL
SCORE

10

- **DOMAIN:** Botanical research

- **CONTEXT:** University X is currently undergoing some research involving understanding the characteristics of flowers. They already have invested on curating sample images. They require an automation which can create a classifier capable of determining a flower's species from a photo.

- **DATASET DESCRIPTION:**

The data set comprises of images from 5 species of flowers daisy, tulip, rose, sunflower, and dandelion. Dataset can be downloaded from here <https://www.kaggle.com/datasets/alxmamaev/flowers-recognition>

- **PROJECT OBJECTIVE:** Company's management requires an automation which can create a classifier capable of determining a flower's species from a photo.

- **STEPS AND TASKS: [Total score: 10 points]**

1. Loading and Understanding the data [2 points]

- Import the data.
- Analyze the dimensions of the data.
- Visualize the data.

2. Data Preparation [2 points]

- Split the dataset into train and validation. (suggestion: keep the test folder for final validation)
- One hot encode the target variable.
- Normalize the data.

3. Train, tune, test, and Compare Deep Learning image classifier model using: [6 points]

- Use CNN for Training.
- Use various CNN with transferred learning models for training.
- Save the best model.
- Compare the results from the above steps and write your detailed observations.
- Load the best fitted model and make the predictions on a test image.

PART : II

NATURAL LANGUAGE PROCESSING

This project consists of industry based dataset and problem statement which can be solved using Deep learning.



PART II
TOTAL SCORE

10

PART II:PROJECT BASED

TOTAL
SCORE

10

- **DOMAIN:** Social Media Analytics
- **CONTEXT:** Past studies in Sarcasm Detection mostly make use of Twitter datasets collected using hashtag based supervision but such datasets are noisy in terms of labels and language. Furthermore, many tweets are replies to other tweets and detecting sarcasm in these require the availability of contextual tweets. In this hands-on project, the goal is to build a model to detect whether a sentence is sarcastic or not, using Bidirectional LSTMs.

- **DATASET DESCRIPTION:**

The dataset is collected from two news websites, theonion.com and huffingtonpost.com. This new dataset has the following advantages over the existing Twitter datasets:

Since news headlines are written by professionals in a formal manner, there are no spelling mistakes and informal usage. This reduces the sparsity and increases the chance of finding pre-trained embeddings. Furthermore, since the sole purpose of TheOnion is to publish sarcastic news, we get high-quality labels with much less noise as compared to Twitter datasets.

Unlike tweets that reply to other tweets, the news headlines obtained are self-contained. This would help us in teasing apart the real sarcastic elements,

Content: Each record consists of three attributes:

is_sarcastic: 1 if the record is sarcastic otherwise 0

headline: the headline of the news article

article_link: link to the original news article. Useful in collecting supplementary data

Reference: <https://github.com/rishabhmisra/News-Headlines-Dataset-For-Sarcasm-Detection>

- **PROJECT OBJECTIVE:** Build a sequential NLP classifier which can use input text parameters to determine the customer sentiments.
- **STEPS AND TASKS: [Total Score: 10 Marks]**
 1. Read and explore the data [1 Marks]
 2. Retain relevant columns [1 Marks]
 3. Get length for each sentence [1 Marks]
 4. Define parameters [1 Marks]
 5. Get indices for words [1 Marks]
 6. Create features and labels [1 Marks]
 7. Get vocabulary size [1 Marks]
 8. Create a weight matrix using GloVe embeddings [1 Marks]
 9. Define and compile a Bidirectional LSTM model. [1 Marks]
 - Hint:** Be analytical and experimental here in trying new approaches to design the best model.
 10. Fit the model and check the validation accuracy [1 Marks]

Please Note:

Intentionally limited questions/instructions are provided so that learners can explore more and perform more research since learners are comfortable with all the concepts and implementation.

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 organization/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 functional requirements of the problem statement.

Capture and validate all possible insights from the data as per 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 Deep learning model.

2. DL training:

Use the data to train and test a relevant DL model. Different DL models react differently and perform depending on quality of the data. Baseline your best performing model and store the learning's for future usage.

LEARNING OUTCOME

Hands on experience on using Convolution neural networks and transfer learning for building an image classifier.

Hands on experience on importing, pre-processing and computing a text dataset using python.

In depth working knowledge on working and manipulating images as a data in python. Using your learnings on text embeddings.

Training, tuning, testing, and comparing an image classifier..

Realtime experience working on designing, training, tuning and testing sequential NLP classifiers.

Hands-on experience on designing a CNN image classifier and using Pretrained models for performing a similar task, testing and evaluating the models based on the appropriate performance metrics and tuning the model for improving the performance of the model.

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.



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.



HAPPY LEARNING