IIITD

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 workon 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.

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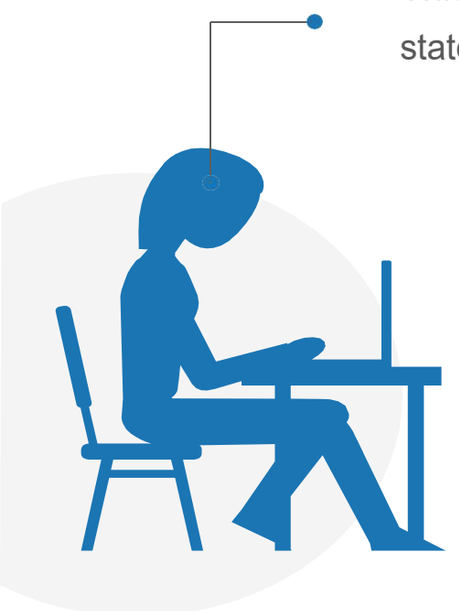
NEURAL NETWORKS



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

TOTAL SCORE 20

PROJECT BASED

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DOMIAN: Electronics and Telecommunication

CONTEXT: A communications equipment manufacturing company has a product which is responsible for emitting informative signals.Company wants to build a deep learning model which can help the company to predict the equipment's signal quality using various parameters.

DATASET DESCRIPTION: The data set contains information on various signal tests performed:

1. Parameters: Various measurable signal parameters.
2. Signal_Quality: Final signal strength or quality.

PROJECT OBJECTIVE: To build a classifier which can use the given parameters to determine the signal strength or quality.

Steps to the project: [Total score: 20 points]

1. Data import and Understanding [6 points]
   - Read the 'Signals.csv' as DataFrame and import required libraries.
   - Check for missing values and print percentage for each attribute.
   - Check for presence of duplicate records in the dataset and impute with appropriate method.
   - Visualize distribution of the target variable.
   - Share insights from the initial data analysis (at least 2).

2. Data preprocessing [6 points]
   - Split the data into X & Y.
   - Split the data into train & test with 70:30 proportion.
   - Print shape of all the 4 variables and verify if train and test data is in sync.
   - Normalize the train and test data with appropriate method.
   - Transform Labels into format acceptable by Neural Network.

3. Model Training & Evaluation using Neural Network [8 points]
   - Design a Neural Network to train a classifier.
   - Train the classifier using previously designed Architecture.
   - Plot 2 separate visuals.
     i. Training Loss and Validation Loss
     ii. Training Accuracy and Validation Accuracy
   - Design new architecture/update existing architecture in attempt to improve the performance of the model.
   - Plot visuals as in Q3.C and share insights about difference observed in both the models.

" Put yourself in the shoes of an actual "

DATA SCIENTIST

THAT's YOU

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

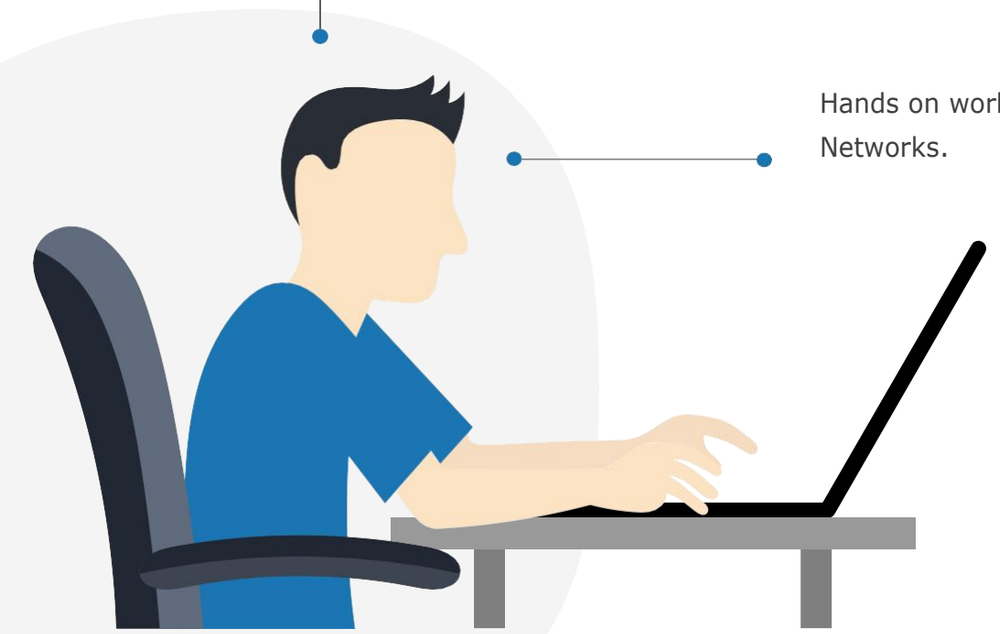
PLEASE NOTE

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 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 learnings for future usage.

LEARNING OUTCOME

Hands on experience on data design, data cleansing, data warehousing and data manipulation required to drive an DL model.



Hands on working knowledge on Neural Networks.

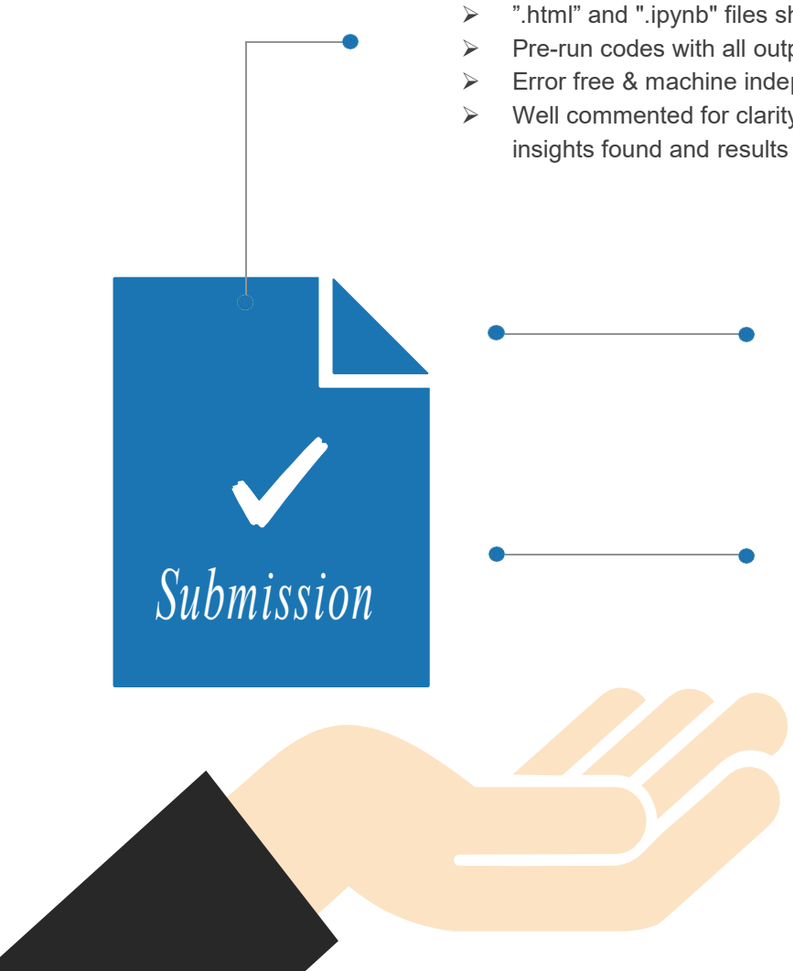
Deep dive onto designing, and training a Neural network model, and tuning the neural network model..

Hands-on experience on designing a deep learning model, traning 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