TSHPROI

School of Creative
& Technical Studies

ONLINE & OFF LINE

ADMISSIONS OPEN

PROSPECTUS

AI & DATA SCIENCE

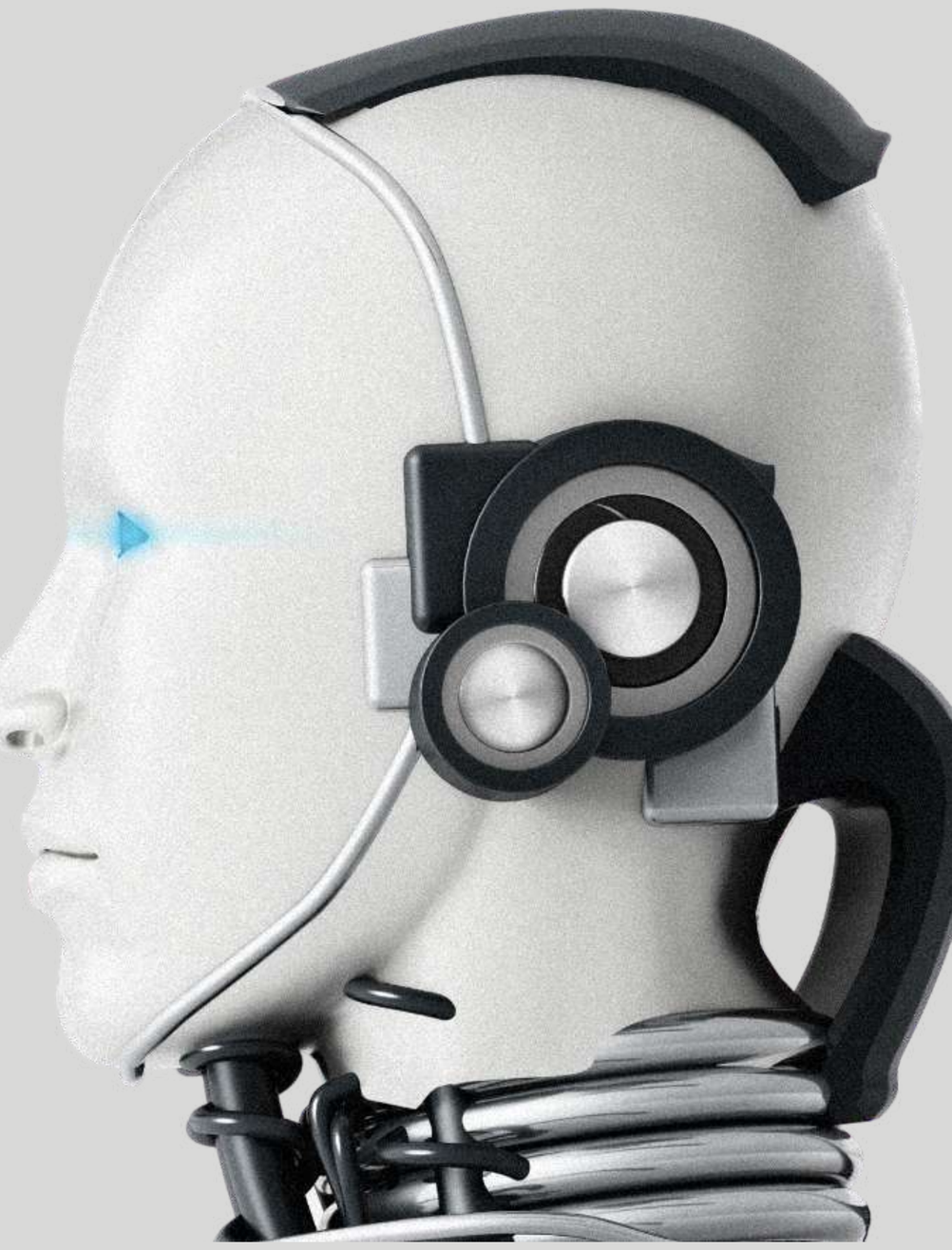
Live the future now

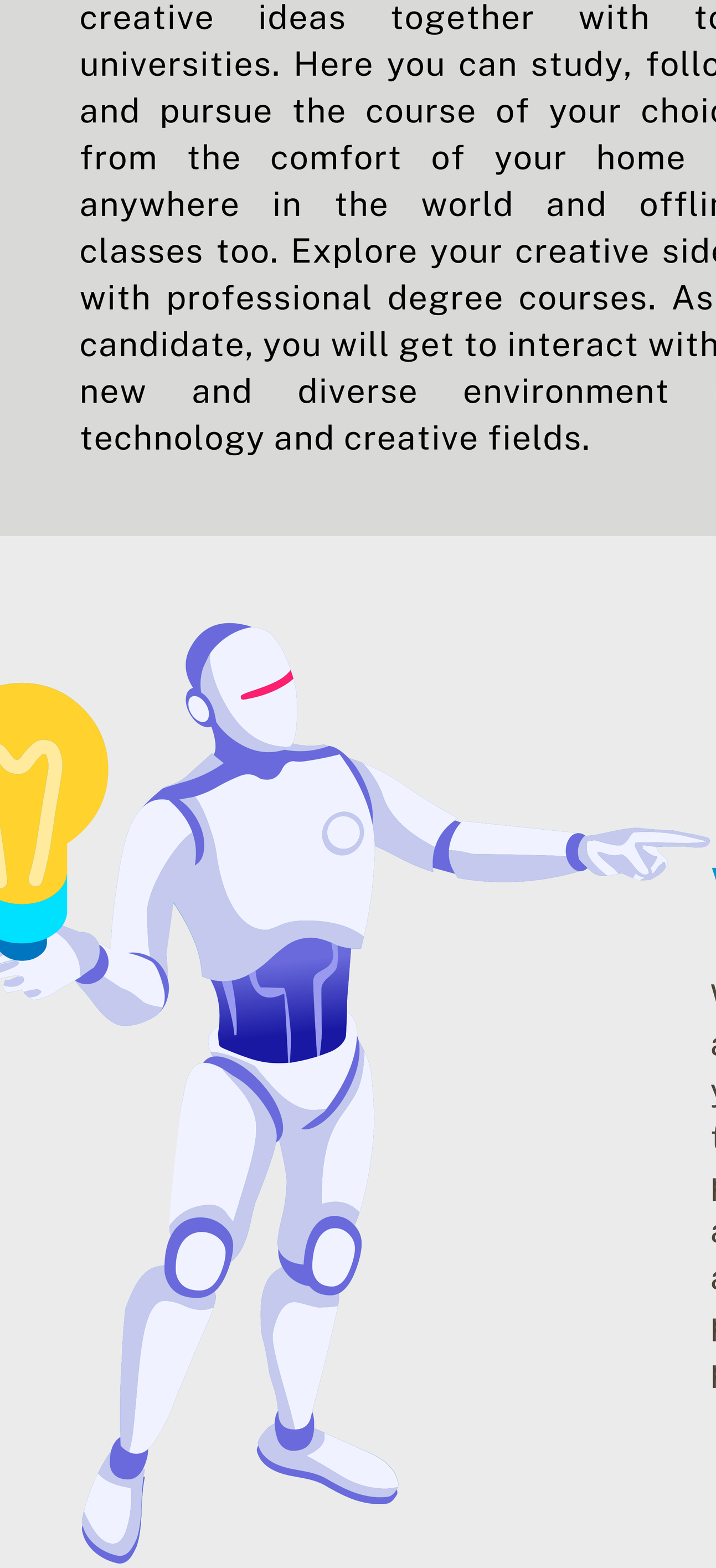
www.tshproi.com

GET TO KNOW ABOUT TSHPROI

WHY TSHPROI?

A fine clubbing of technology and creative ideas together with top universities. Here you can study, follow and pursue the course of your choice from the comfort of your home or anywhere in the world and offline classes too. Explore your creative sides with professional degree courses. As a candidate, you will get to interact with a new and diverse environment of technology and creative fields.





EVERYTHING IS TSHPROI

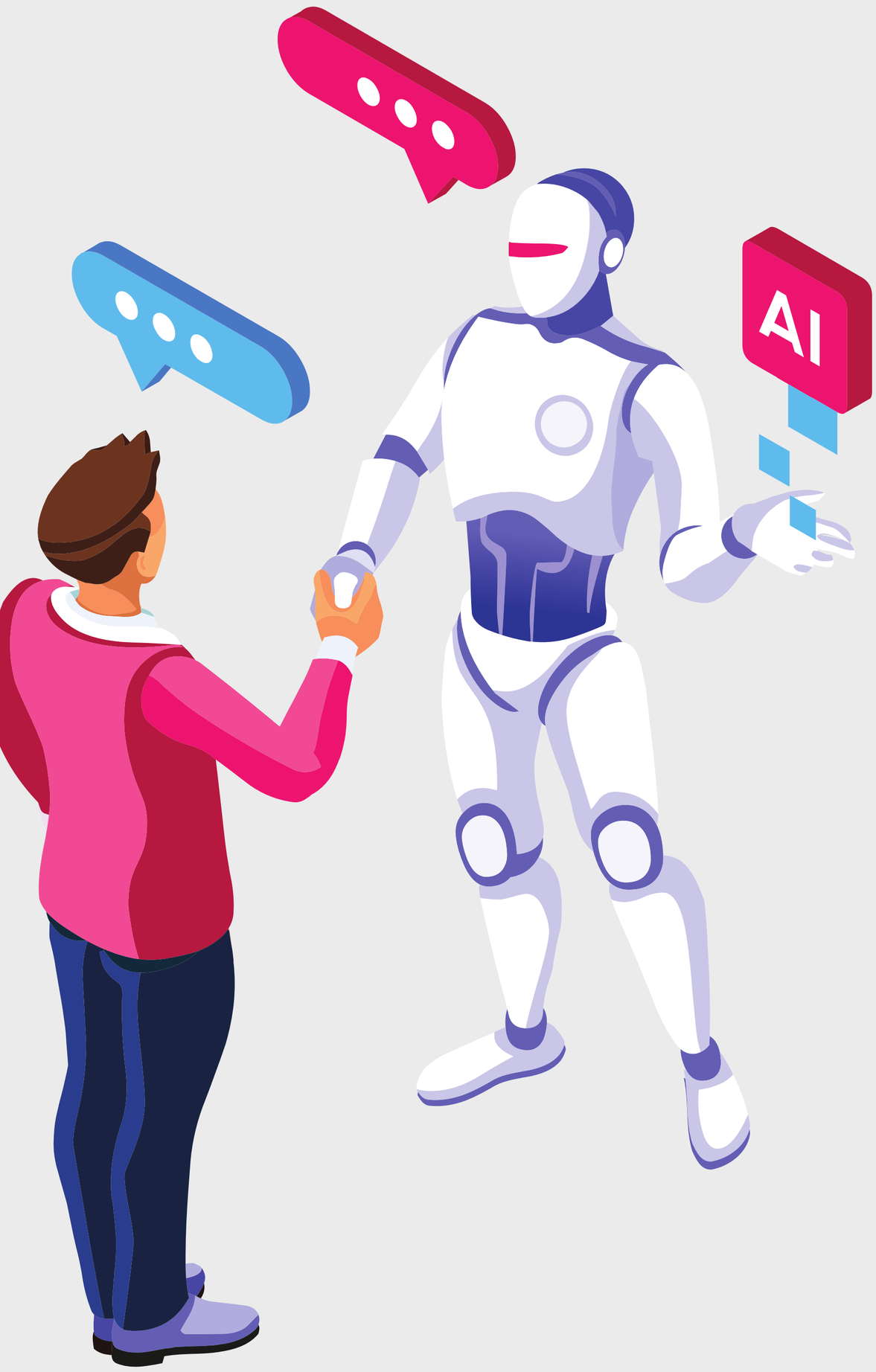
WHAT DO WE DO?

We have well-experienced faculty and an excellent course curriculum to help you learn the skills. Feel free to get in touch with us if you are looking to pursue a career in technology, design, and management. And we are here to address you with the best learning package at a reasonable fee range for a progressive future.

WHAT WE DO

Construct A Stunning Career Perspective

TSHPROI is a creative, Technical & Management educational platform. Here, we are introducing a new culture of creative education that is completely professional.



REDISCOVER YOUR CREATIVE SELF AND MAKE A CAREER OUT OF IT

The well-designed courses provide the aspirants with a realm of opportunities to conquer the creative world.

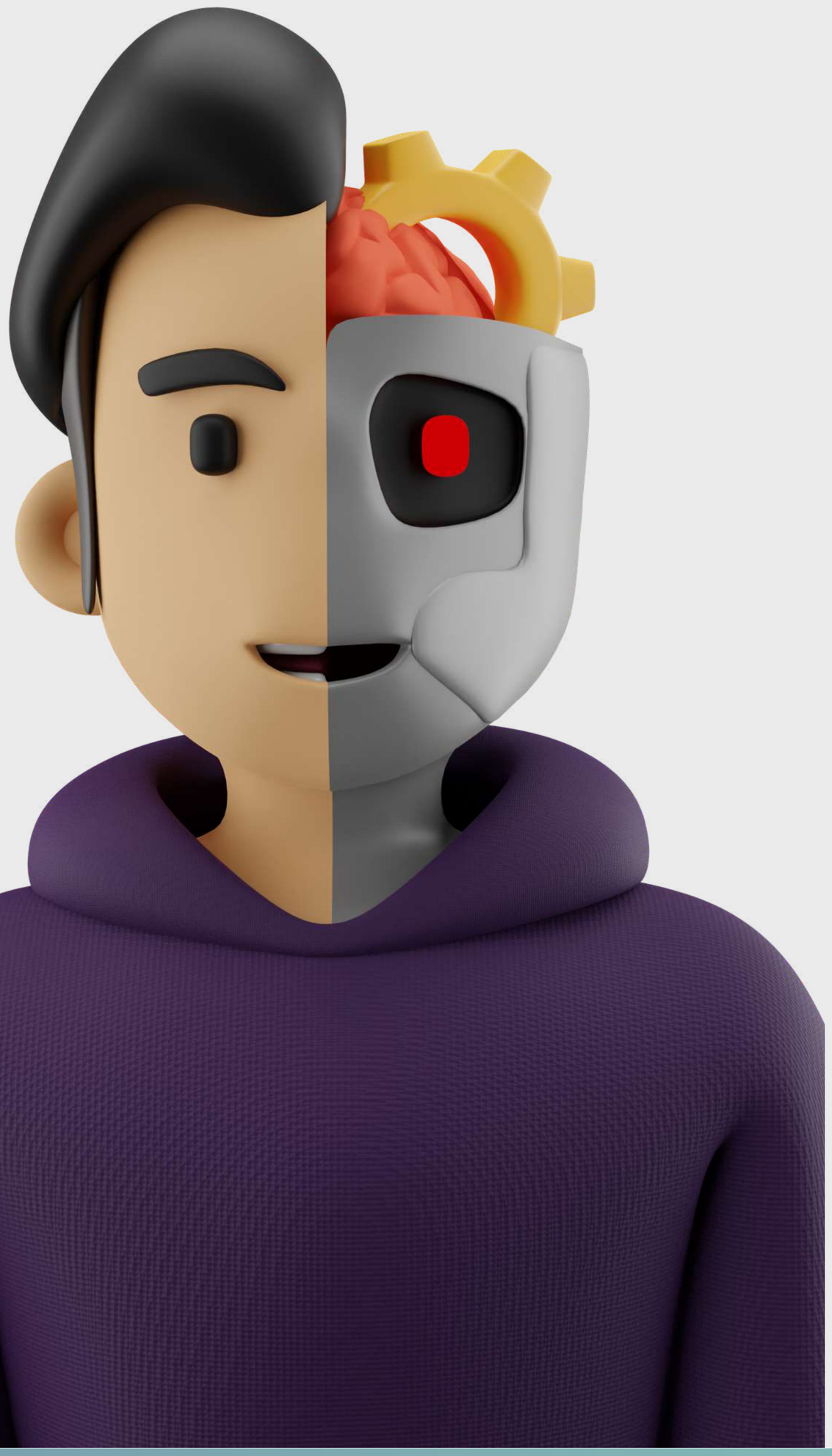
The academic program breaks the conventional educational system by providing the students with customized virtual and offline class facilities in the field of designing and management studies.

TSHPROI provides an entire professional system by ensuring the candidates with a well-organized practicing area to nurture their creativity with renowned industry experts and highly qualified professionals.

TSHPROI offers professional education in the field of Design, Technology & Management of Fashion, Product Design, Interior, Graphics, Management Ai & Data Science etc ....

OUR VISION

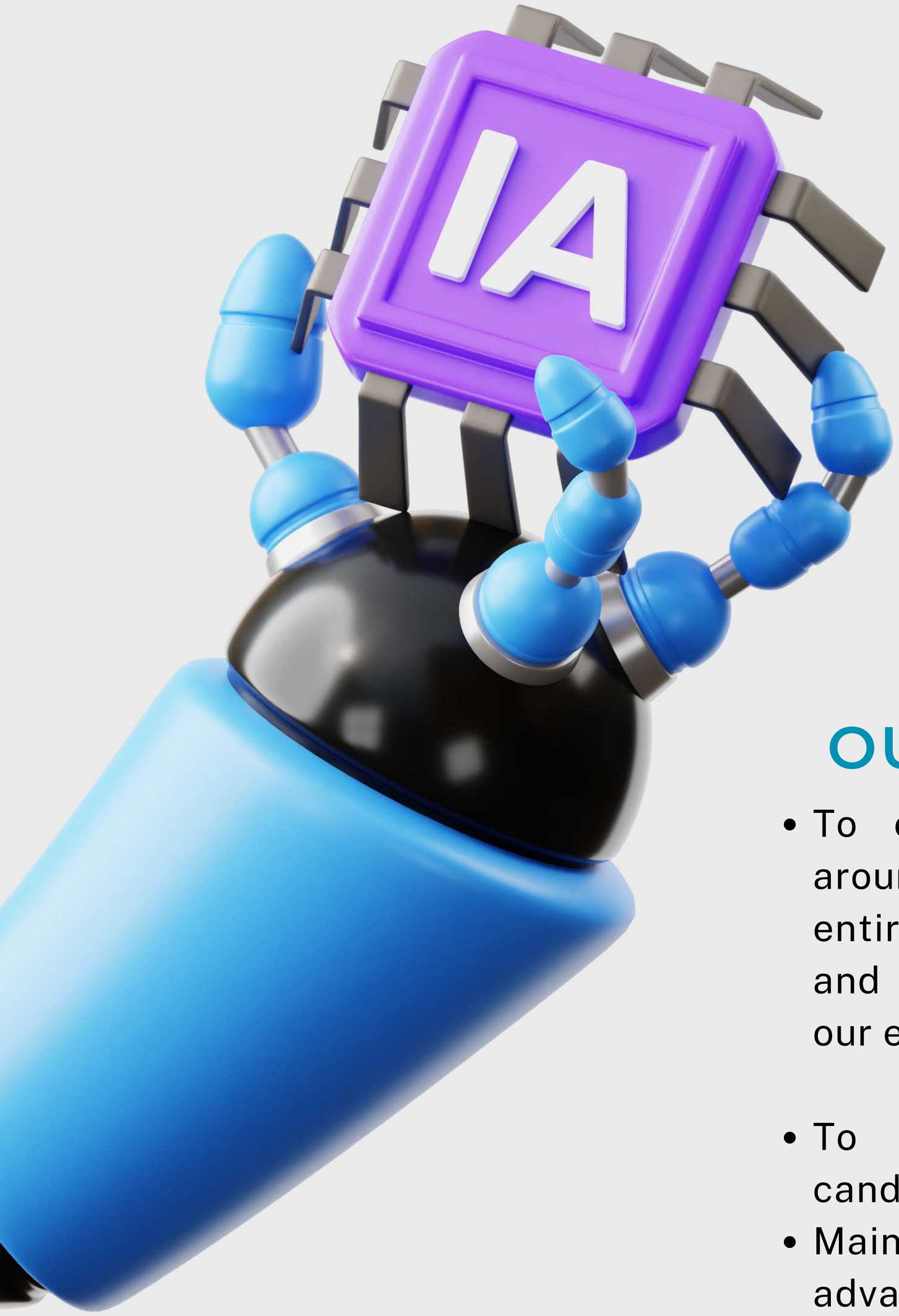
TSHPROI aims to flourish its diverse creative wings in the field of Art, Design, Technology, and Management across boundaries, axiomatically emerging as a transcendent institute of academic excellence around the Globe.



OUR MISSION

TSHPROI is more advanced as it provides innovative teaching techniques that ensure the candidates with efficiency and consistency via our teaching program.

TSHPROI's Holistic approach develops an optimistic attitude in candidates to overcome the challenges in this competitive world.
TSHPROI's Mission is to fabricate a new daring generation with the spirit of dignity.



OUR OBJECTIVES

- To establish professional education around the boundaries by covering the entire spectrum of technology, design, and Management with respecting all our ethical commitments.

- To promote the aspirations of candidates by personal grooming.
- Maintain innovative high-level advanced teaching methodologies that mirror the sense of confidence and creative aspects in candidates.

- To lead and enhance the development in the field of technology, design, and management.

- To provide limitless opportunities for aspirants in the field of technology, design, and management.

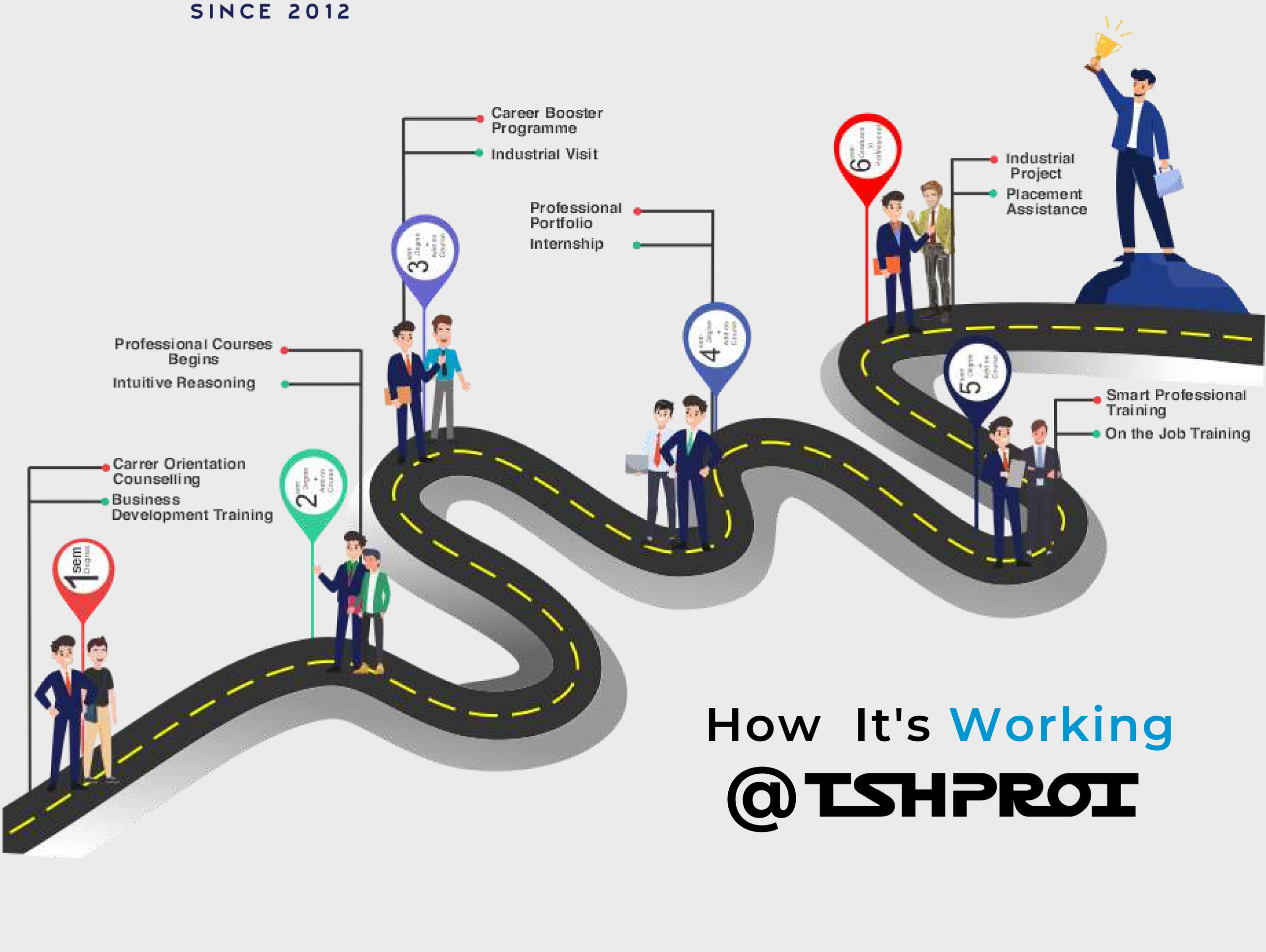
- To conduct research and disseminate knowledge to all spheres of academic, commerce, industry, community, society, and the world at large.

TSHPROI™
School of Creative & Technical Studies
SINCE 2012

TSHPROI™

School of Creative
& Technical Studies

SINCE 2012



How It's Working @TSHPROI

Fine Clubbing of Professional courses along with UG & PG from top Universities

TECHNICAL COURSES

@ TSHPROI™

ARTIFICIAL INTELLIGENCE

Artificial intelligence is a field of science concerned with building computers and machines that can reason, learn, and act in a way that would normally require human intelligence or involve data whose scale exceeds what humans can analyze.

DATA SCIENCE & MACHINE LEARNING

The primary objective of data science is to identify patterns in data. It analyses the data and derives insights using a variety of statistical techniques. A data scientist must carefully examine the data after data extraction, wrangling, and pre-processing.

CYBER SECURITY & CYBER FORENSICS

Cyber forensics is the discipline of studying digital sources to find reliable evidence of serious data security incidents. A cyber forensics investigation involves looking for clues from sources such as physical devices, network logs, databases, and cloud services.

FOOD PROCESSING TECHNICIAN

Food Processing and Technology includes a set of physical, chemical or microbiological methods and techniques used to transmute raw ingredients into food and its transformation into other forms in the food processing industry.

MORE TECH

ARTIFICIAL INTELLIGENCE

MASTER'S DIPLOMA IN AI & DATA SCIENCE

Our data science and AI master's program is designed for working professionals seeking career growth in this dynamic field. We prioritise practical learning, industry insights, and real-world case studies,
covering topics like statistics, data mining, and programming languages. Ethical considerations are integrated, giving professionals a competitive edge in the job market. Our goal is to offer affordable, industry-relevant education, empowering India's workforce to succeed.

Duration:- 18 months

Course Mode:-

ONLINE & OFFLINE

Criteria:- +2 above

CURRICULUM

1. PREPARATORY SESSION
2. PYTHON PROGRAMMING
3. STATISTICS
4. MACHINE LEARNING
5. SQL
6. MONGODB
7. TABLEAU
8. POWERBI
9. BIG DATA & SPARKS ANALYTICS
10. TIMDEEP LEARNING USING
11. TENSORFLOW
12. E-SERIES
13. NATURAL LANGUAGE PROCESSING
14. NATURAL LANGUAGE PROCESSING
15. COMPUTER VISION
16. REINFORCEMENT LEARNING
17. DEPLOYMENT AWS+AZURE
18. AI GENERATIVE TOOLS AND FUTURE TRENDS
19. DATA STRUCTURES & ALGORITHMS
20. DATA STRUCTURES & ALGORITHMS
21. PROJECT MANAGEMENT
22. EXCEL
23. BUSINESS ANALYTICS

LEARNING PATH

07

Essentials

Data Structures Algorithms, Business Analytics, Project Management, Excel

BONUS MODULE

AI Generative Tools and Future Trends

06

ChatGPT, Midjourney, DALL·E

AI Tools

05

Deep Learning, NLP, Deployment (AWS+Azure), CV, RL

Data Science Tools

04

Matplotlib, SQL, MongoDB, Tableau, PowerBI, Big Data & Spark Analytics, Time Series

Statistics and Machine Learning

03

Matplotlib, Scikit-Learn, Seaborn

Python Programming (Basic + Advance)

02

Python, Anaconda, Github, Pandas

Cohort Orientation + Special Programming Classes

01

PREPARATORY SESSION

Preparatory Session

- A brief introduction to tools related to data Learn about particular real-time projects & Capstone projects
- Data and its impact on career opportunities
- Fundamental relevance of projects using data
- Role of data in businesses
- Significance of data in decision-making
- Scope of data in research and development
- Utilizing data, to enhance industrial operations and management
- Data in performance evaluation
- Data in customer segmentation

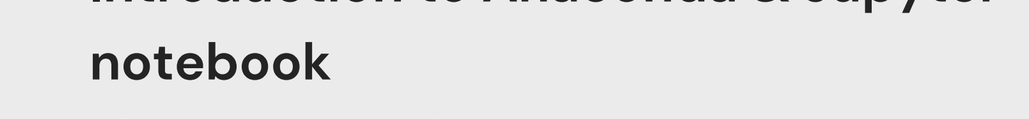
Fundamentals of Statistics

- Mean, Median, Mode
- Standard Deviation, Average.
- Probability, permutations, and
- combinations
- Introduction to Linear Algebra

Fundamentals of programming

- Types of code editors in python
- Introduction to Anaconda & Jupyter notebook
- Flavors of python
- Introduction to Git, GitHub
- Python Fundamentals
- Source code vs Byte code vs Machine code
- Compiler & Interpreter
- Memory Management in Python

TOOLS COVERED



PYTHON PROGRAMMING

Programming Basics & Environment Setup

- Installing Anaconda, Anaconda Basics, and Introduction
- Get familiar with version control, Git, and GitHub.
- Basic GitHub Commands.
- Introduction to Jupyter Notebook environment.
- Basics Jupyter notebook Commands.
- Programming language basics

Strings, Decisions & Loop Control

- Working With Numbers, Booleans and Strings, String types and formatting, String operations
- Simple if Statement, if-else Statement if-elif Statement.
- Introduction to while Loops, for Loops, Using continue and break
- Class Hands-on:

6 programs/coding exercise on string, loop and conditions in classroom

Python Programming Overview

- Python Overview
- Python 2.7 vs Python 3
- Writing your First Python Program
- Lines and Indentation, Python Identifiers
- Various Operators and Operators Precedence
- Getting input from User, Comments, Multi line Comments

PYTHON PROGRAMMING

Functions And Modules

- Introduction To Functions
- Defining & Calling Functions
- Functions With Multiple Arguments

Python Data Types

- List, Tuples, Dictionaries
- Python Lists, Tuples, Dictionarie Accessing Values, Basic Operations indexing, Slicing, and Matrixes
- Built-in Functions & Methods
- Exercises on List, Tuples & Dictionary

Functions And Modules

- Anonymous Functions - Lambda Using Built-In Modules,
- User-Defined
- Modules, Module Namespaces, Iterators And Generators
- Class Hands-on:

8+ Programs to be covered in class of functions, Lambda, modules, Generators and Packages.

File I/O An d Exceptional Handling and Regular Expression

- Opening and Closing Files open Function, file Object Attributes close() Method, Read, write, seek.
- Exception Handling, try-finally Clause
- Raising an Exceptions, User-Defined Exceptions
- Regular Expression- Search and Replace
- Regular Expression Modifiers
- Regular Expression Patterns
- Class hands-on :

10+ Programs to be covered in class from File IO, Reg-ex and exception handling.

Data Analysis Using Pandas

- Pandas : Introduction to Pandas Importing data into Python
- Pandas Data Frames, Indexing Data
- Frames ,Basic Operations With Data frame, Renaming Columns,
- Subsetting and filtering a data frame.

Data Analysis Using Numpy

- Introduction to Numpy. Array
- Creation, Printing Arrays, Basic Operation - Indexing, Slicing and Iterating, Shape Manipulation -
- Changing shape, stacking and splitting of array
- Vector stacking, Broadcasting with Numpy, Numpy for Statistical Operation

Assignment 1

10 Coding exercises on Python Basics - Variables, Operators, Strings, Loops, Control Statement

Assignment 2

10 Python programs and practice set on List, Tuples, Dictionaries & Matrices operations

Assignment 3

10 Coding exercises on Functions, Lambda, Input-Output, File and Regular Expression

PYTHON PROGRAMMING

Data Visualization using Matplotlib

- Matplotlib: Introduction, plot(),Controlling Line Properties, Subplot with Functional Method, Multiple Plot, Working with Multiple Figures, Histograms

Data Visualization using Seaborn

- Seaborn: Intro to Seaborn And Visualizing statistical relationships ,
- Import and Prepare data. Plotting with categorical data and Visualizing linear relationships.
- Seaborn Exercise

CASE STUDY

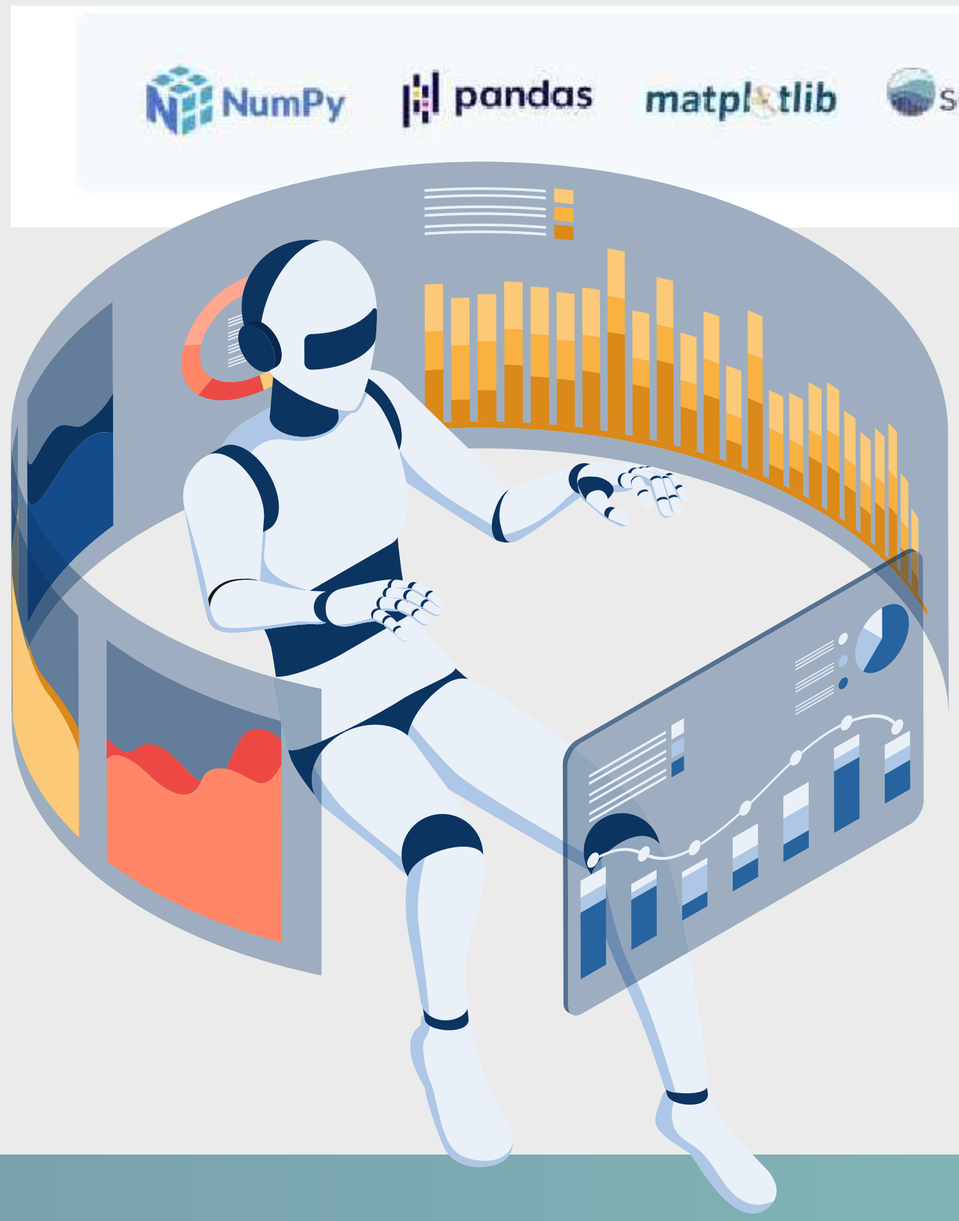
3 Case Study on Numpy, Pandas, Matplotlib 1

Case Study on Pandas And Seaborn

Assessment Test in Python :

2 hour of Assesment Test in Python (Coding & Objective Questions)

Real time Use cases in Python to be Covered in Class with 5 assignments



STATISTICS

Fundamentals of Math and Probability

- Probability distributed function & cumulative distribution function.
- Conditional Probability, Baye's Theorem
- Problem solving for probability assignments
- Random Experiments, Mutually Exclusive Events, Joint Events, Dependent & Independent Events

Introduction to Statistics, Statistical Thinking

- Variable and its types
- Quantitative, Categorical, Discrete, Continuous, *all with examples
- Five Point Summary and Box Plot Outliers, Causes of Outliers, How to treat Outliers, I-QR Method and Z-Score Method

Inferential Statistics

- Central Limit Theorem Point estimate and Interval estimate
- Creating confidence interval for population parameter

All about Population & Sample

- Population vs Sample, Sample Size
- Simple Random Sampling, Systematic
- Sampling, Cluster Sampling, Stratified
- Sampling, Convenience Sampling, Quota Sampling, Snowball Sampling and Judgement Sampling

STATISTICS

Descriptive Statistics

- Measures of Central Tendency – Mean, Median, and Mode
- Measures of Dispersion – Standard
- Deviation, Variance, Range, IQR (Inter-Quartile Range)
- Measure of Symmetricity/ Shape – Skewness and Kurtosis

Inferential Statistics

- Characteristics of Z-distribution and T-Distribution.
- Type of test and rejection region.
- Type of errors in Hypothesis Testing

Hypothesis Testing

- Type of test and Rejection Region
- Type o errors-Type 1 Error, Type 2 Errors. P value method, Z score Method.
- The Chi-Square Test of Independence.
- Regression. Factorial Analysis of Variance.
- Pearson Correlation
- Coefficients in Depth.
- StatisticalSignificance
- Null and Alternative Hypothesis One-tailed and Two-tailed Tests, Critical Value, Rejection region, Inference based on Critical Value
- Binomial Distribution: Assumptions of Binomial Distribution, Normal
- Distribution, Properties of Normal
- Distribution, Z table, Empirical Rule of
- Normal Distribution & Central Limit Theorem and its Applications

Data Processing & Exploratory Data Analysis

- What is Data Wrangling
- Data Pre-processing and cleaning?
- How to Restructure the data?
- What is Data Integration and Transformation

EDA

- Finding and Dealing with Missing Values.
- What are Outliers?
- Using Z-scores to Find Outliers.
- Bivariate Analysis, Scatter Plots and Heatmaps.
- Introduction to Multivariate Analysis

Linear Algebra

- Dot Product, Projecting Point on Axis.
- Matrices in Python, Element Indexing,
- Square Matrix, Triangular Matrix,
- Diagonal Matrix, Identity Matrix,
- Addition of Matrices, Scalar
- Multiplication, Matrix Multiplication,
- Matrix Transpose, Determinant, Trace
- T-Test, Analysis of variance (ANOVA),
- and Analysis of Covariance (ANCOVA)
- Regression analysis in ANOVA

- Class Hands-on:

Problem solving for C.L.T Problem solving Hypothesis Testing Problem solving for T-test, Z-score test Case study and model run for ANOVA, ANCOVA

MACHINE LEARNING

Machine Learning Introduction

- Definition, Examples, and Importance of Machine Learning
- Definition of ML Elements: Algorithm, Model, Predictor Variable, Response Variable, Training – Test Split, Steps in
- Machine Learning, ML Models Type: Supervised
- Learning, Unsupervised Learning and
- Reinforcement Learning

Data Preprocessing

- Encoding the data: Definition,
- Methods: OneHot Encoding, Mean Encoding, Label Encoding, Target Guided Ordinal Encoding

Evaluation Metrics for Classification model

- Confusion Matrix, Accuracy, Misclassification, TPR, FPR, TNR, Precision, Recall, F1 Score, ROC Curve, and AUC.
- Using Python library Sklearn to create the Logistic Regression
- Model and evaluate the model created

Data Preprocessing

- Types of Missing values (MCAR, MAR, MNAR) , Methods to handle missing values
- Outliers, Methods to handle outliers: IQR Method, Z Method
- Feature Scaling: Definition , Methods: Absolute Maximum Scaling, Min-Max Scaler , Normalization, Standardization, Robust Scaling

Logistic Regression Model

- Definition. Why is it called the
- “Regression model”?
- Sigmoid Function, Transformation & Graph of Sigmoid Function

K Nearest Neighbours Model

- Definition, Steps in KNN Model, Types of Distance: Manhattan Distance,
- Euclidean Distance, ‘Lazy Learner Model’.
- Confusion Matrix of Multi Class Classification Using Python library Sklearn to create the K Nearest Neighbours Model and evaluate the model

MACHINE LEARNING

Decision Tree Model

- Definition, Basic Terminologies, Tree Splitting Constraints, Splitting Algorithms: CART, C4.5, ID3, CHAID
- Splitting Methods:
  GINI, Entropy, Chi-Square, and Reduction in Variance Using Python library Sklearn to create the Decision Tree Model and evaluate the model created

• Hyperparameter Tuning

- GridSearchCV, Variable Importance.
- Using Python library Sklearn to create the Random Forest Model and evaluate the model created.
- Use cases

Random Forest Model

- Ensemble Techniques:
- Bagging/bootstrapping & Boosting.
- Definition of Random Forest, OOB Score K-Fold Cross-Validation

Naive Baye's Model

- Definition, Advantages, Baye's Theorem Applicability, Disadvantages of Naive Baye's Model, Laplace's Correction, Types of Classifiers:Gaussian, Multinomial and Bernoulli Using Python library Sklearn to create the Naive Baye's Model and evaluate the model created

CASE STUDY

- Business Case Study for Kart Model
- Business Case Study for Random Forest
- Business Case Study for SVM
- To classify an email as spam or not spam using logistic Regression. Application of Linear Regression for Housing Price Prediction

MACHINE LEARNING

Support Vector Machine(SVM)

Model: Definition, Use Cases, Kernel Function, Aim of Support Vectors, Hyperplane, Gamma Value, Regularization Parameter

Using Python library Sklearn to create and evaluate the SVM Model

Hierarchical Clustering

Dendrogram, Agglomerative Clustering, Divisive Clustering,

Comparison of K Means Clustering and Hierarchical Clustering

Using Python library Sklearn to create and evaluate the clustering model

K Means and Hierarchical Clustering

- Definition of Clustering, Use cases of Clustering
- K Means Clustering Algorithm, Assumptions of K Means Clustering Sum of Squares Curve or Elbow Curve

Principal Component Analysis (PCA)

- Definition, Curse of Dimensionality,Dimensionality Reduction Technique,
- When to use PCA, Use Cases Steps in PCA, EigenValues and EigenVectors, Scree Plot.
- Using Python library Sklearn to create Principal Components

Summary of all Machine Learning Models and Discussion about the Capstone Project

Note : All Machine Learning Algorithms are covered in depth with real time case studies for each algorithm. Once 60% of ML is completed, Capstone Project will be released for the batch.

SQL

SQL and RDBMS

- RDBMS And SQL Operations.
- Single Table Queries - SELECT,WHERE, ORDER BY, Distinct, And, OR Multiple Table Queries: INNER, SELF, CROSS, and OUTER, Join, Left Join,Right Join, Full Join, Union

NoSQL, HBase & MongoDB

- NoSQL Databases
- Introduction to HBase
- HBase Architecture, HBase Components, Storage Model of HBase
- HBase vs RDBMS
- Introduction to Mongo DB, CRUD
- Advantages of MongoDB over RDBMS

Programming with SQL

- Mathematical Functions
- Variables
- Conditional Logic
- Loops
- Custom Functions
- Grouping and Ordering

Advance SQL

- Advance SQL Operations
- Data Aggregations and summarizing the data
- Ranking Functions: Top-N Analysis
  Advanced SQL Queries for Analytics

Programming with SQL

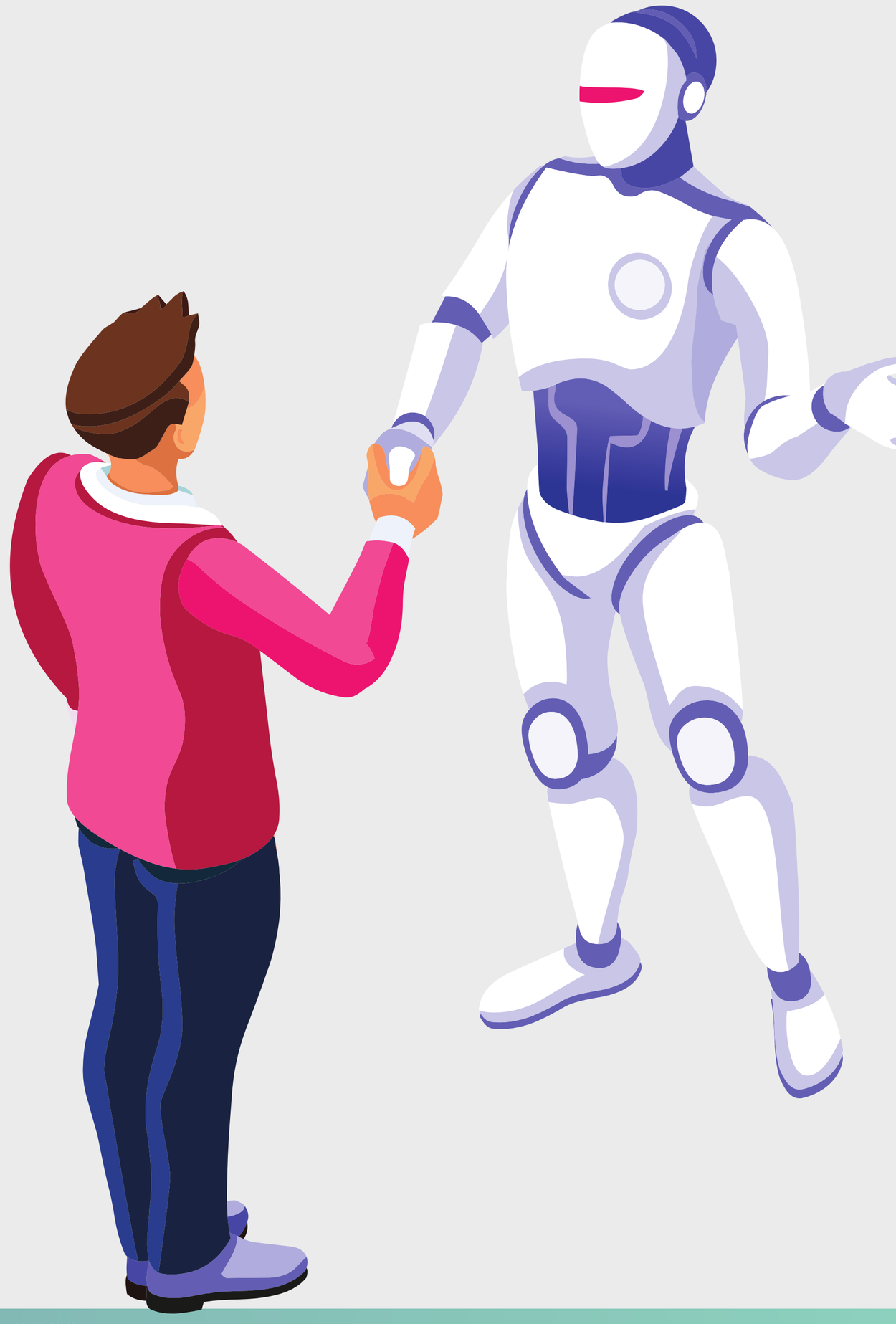
- Partitioning
- Filtering Data
- Subqueries

JSON Data & CRUD

- Basics and CRUD Operation
- Databases, Collection & Documents
- Shell & MongoDB drivers
- What is JSON Data
- Create, Read, Update, Delete Finding, Deleting, Updating, Inserting Elements
  Working with Arrays Understanding
  Schemas and Relations

Assignments

Working with multiple tables
Practice Joins, Grouping and Subqueries
Using GROUP BY and HAVING Clauses
Practice Aggregation Queries



MONGODB

Introduction to MongoDB

- What is MongoDB
- Characteristics and Features
- MongoDB Ecosystem
- Installation process Connecting to MongoDB database
- Introduction to NoSQL
- Introduction of MongoDB module
- What are Object Ids in MongoDB

MongoDB (Advance)

- MongoDB Use cases
- MongoDB Structures
- MongoDB Shell vs MongoDB Server
- Data Formats in MongoDB
- MongoDB Aggregation Framework
- Aggregating Documents
- Working with MongoDB Compass & exploring data visually Understanding Create, Read, Update, Delete Schemas & Relations
- Document Structure
- Working with Numeric Data
- Working on Scheme Designing

Assignments
Obtain the data in the format you want by formulating queries that are both effective and high- performing.

TOOLS COVERED

mongoDB

TABLEAU

Introduction to Tableau

- Connecting to data source
- Creating dashboard pages
- How to create calculated columns
- Different charts

Dashboard and Stories

- Working in Views with Dashboards and Stories
- Working with Sheets
- Fitting Sheets
- Legends and Quick Filters
- Tiled and Floating Layouts, Floating Objects

Visual Analytics

- Getting Started With Visual Analytics Sorting and grouping
- Working with sets, set action
- Filters: Ways to filter, Interactive Filters
- Forecasting and Clustering

Tableau (Advance)

- Mapping
- Coordinate points
- Plotting Latitude and Longitude
- Custom Geocoding
- Polygon Maps
- WMS and Background Image

Hands-on Assignments
Connecting data source and data cleansing Working with various charts Deployment of Predictive model in visualization

TOOLS COVERED

tableau SOFTWARE

POWER BI

Getting Started With Power BI

- Installing Power BI Desktop and Connecting to Data
- Overview of the Workflow in Power BI Desktop
- Introducing the Different Views of the Data Mode Query Editor Interface Working on Data Model

Programming with Power BI

- Working with Time Series
- Understanding aggregation and granularity
- Filters and Slicers in Power BI Maps
- Scatterplots and BI Reports
- Connecting Dataset with Power BI
- Creating a Customer Segmentation
- Dashboard Analyzing the Customer Segmentation Dashboard

Assignments

Create Bar charts

Create Pie charts

Create Tree maps

Create Donut Charts

Create Waterfall Diagrams

Creating Table Calculations for Gender

BIG DATA & SPARKS ANALYTICS

Introduction To Hadoop & Big Data

- Distributed Architecture – A Brief Overview.
- Understanding Big Data
- Introduction To Hadoop, Hadoop Architecture
- HDFS, Overview of MapReduce
- Framework
- Hadoop Master: Slave Architecture
- MapReduce Architecture Use cases of MapReduce

What is Spark

- Introduction to Spark RDD
- Introduction to Spark SQL and Data frames
- Using R-Spark for machine learning

Hands-on:

- Installation and configuration of Spark
- Using R-Spark for machine learning programming

Hands-on

Map reduce Use Case 1:

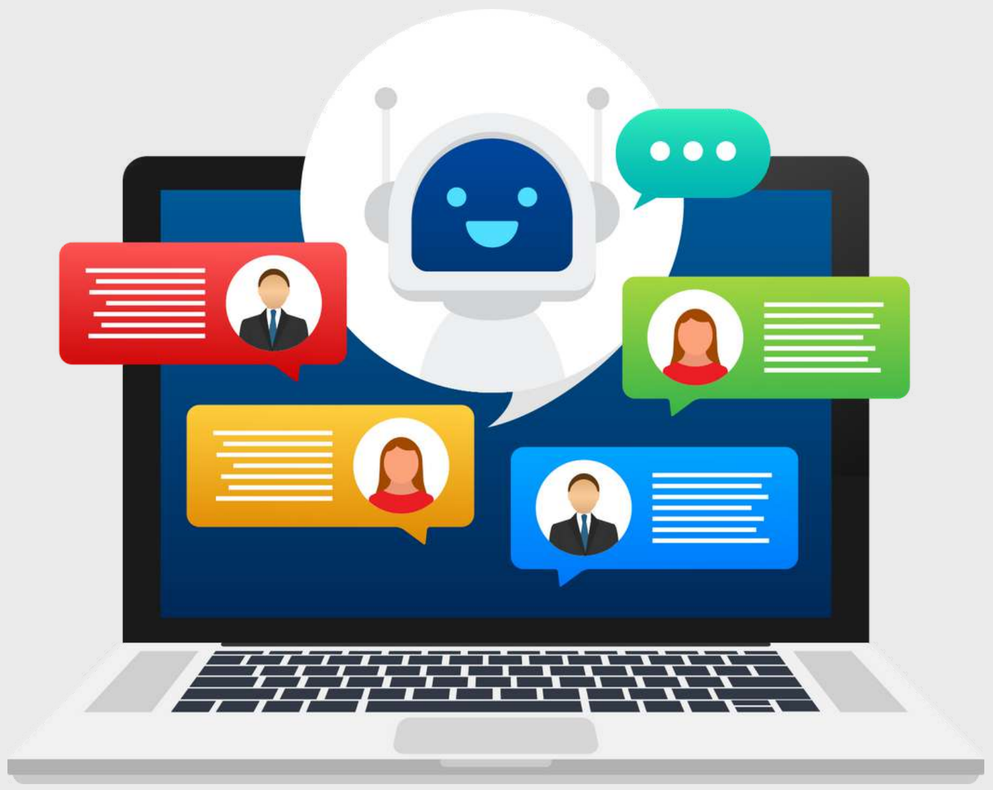
Youtube data analysis

Map reduce Use Case 2:

Uber data analytics Spark RDD programming Spark SQL and Data frameprogramming

TOOLS COVERED

Power BI



TIME SERIES

Introduction to Time Series Forecasting

- Basics of Time Series Analysis and Forecasting
- Method Selection in Forecasting
- Moving Average (MA) Forecast Example
- Different Components of Time Series Data
- Log Based Differencing, Linear Regression for Detrending

Introduction to ARIMA Models

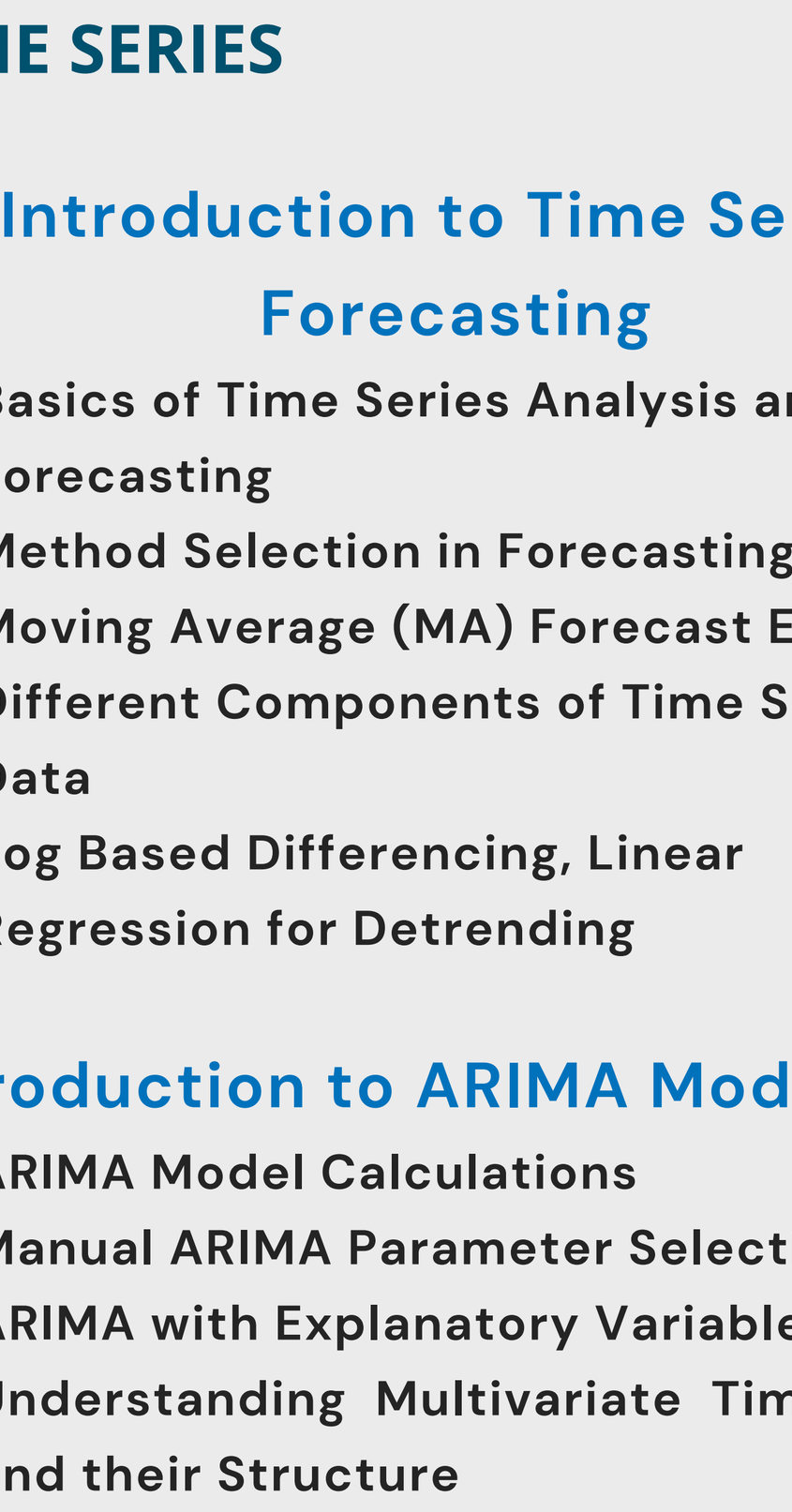
- ARIMA Model Calculations
- Manual ARIMA Parameter Selection
- ARIMA with Explanatory Variables
- Understanding Multivariate Time Series and their Structure
- Checking for Stationarity and Differencing the MTS

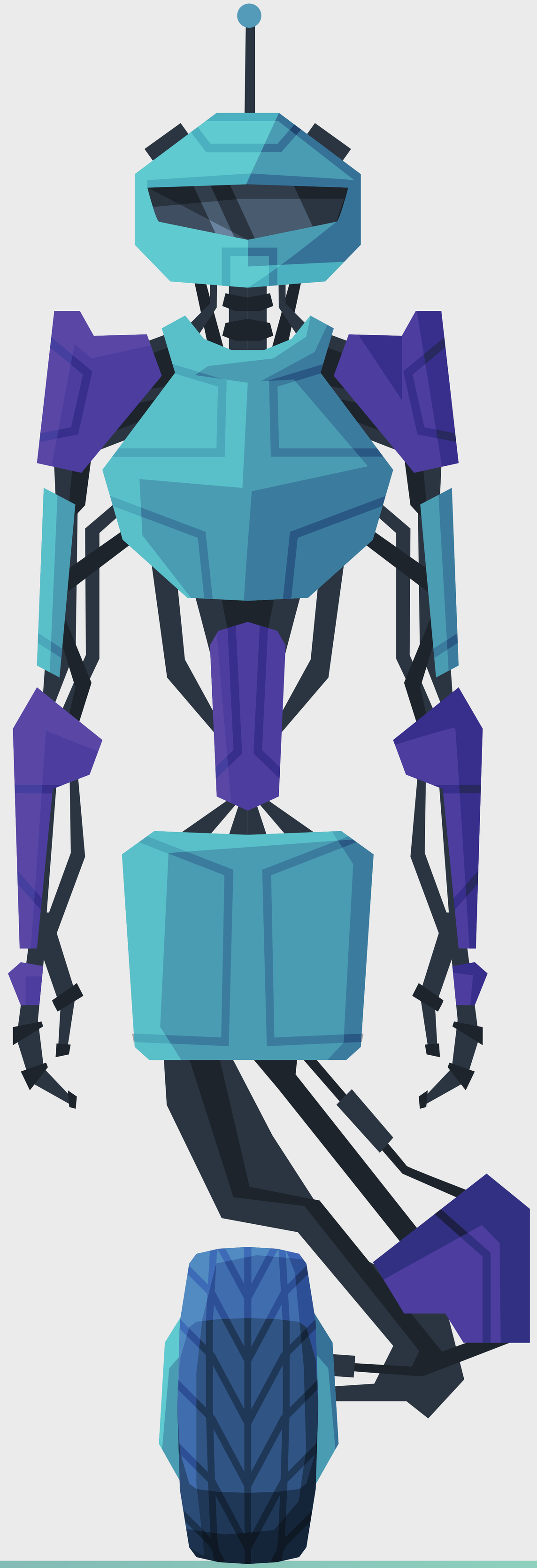
CASE STUDY

Time series classification of smartphone data to predict user behavior Performing Time Series Analysis on Stock Prices

Time series forecasting of sales data

Note: All the assignments and case studies will be covered in-depth with real-time examples





DEEP LEARNING USING TENSORFLOW

Introduction to Deep Learning And TensorFlow

- Neural Network
- Understanding Neural Network Model Installing TensorFlow
- Simple Computation, Constants, and Variables
- Types of file formats in TensorFlow
- Creating A Graph – Graph Visualization
- Creating a Model – Logistic Regression Model Building using tensor flow

Understanding Neural Networks With TensorFlow

- Basic Neural Network
- Single Hidden Layer Model
- Multiple Hidden Layer Model
- Backpropagation – Learning Algorithm and visual representation
- Understand Backpropagation – Using Neural Network Example
- TensorBoard

Project

Building a CNN for Image Classification

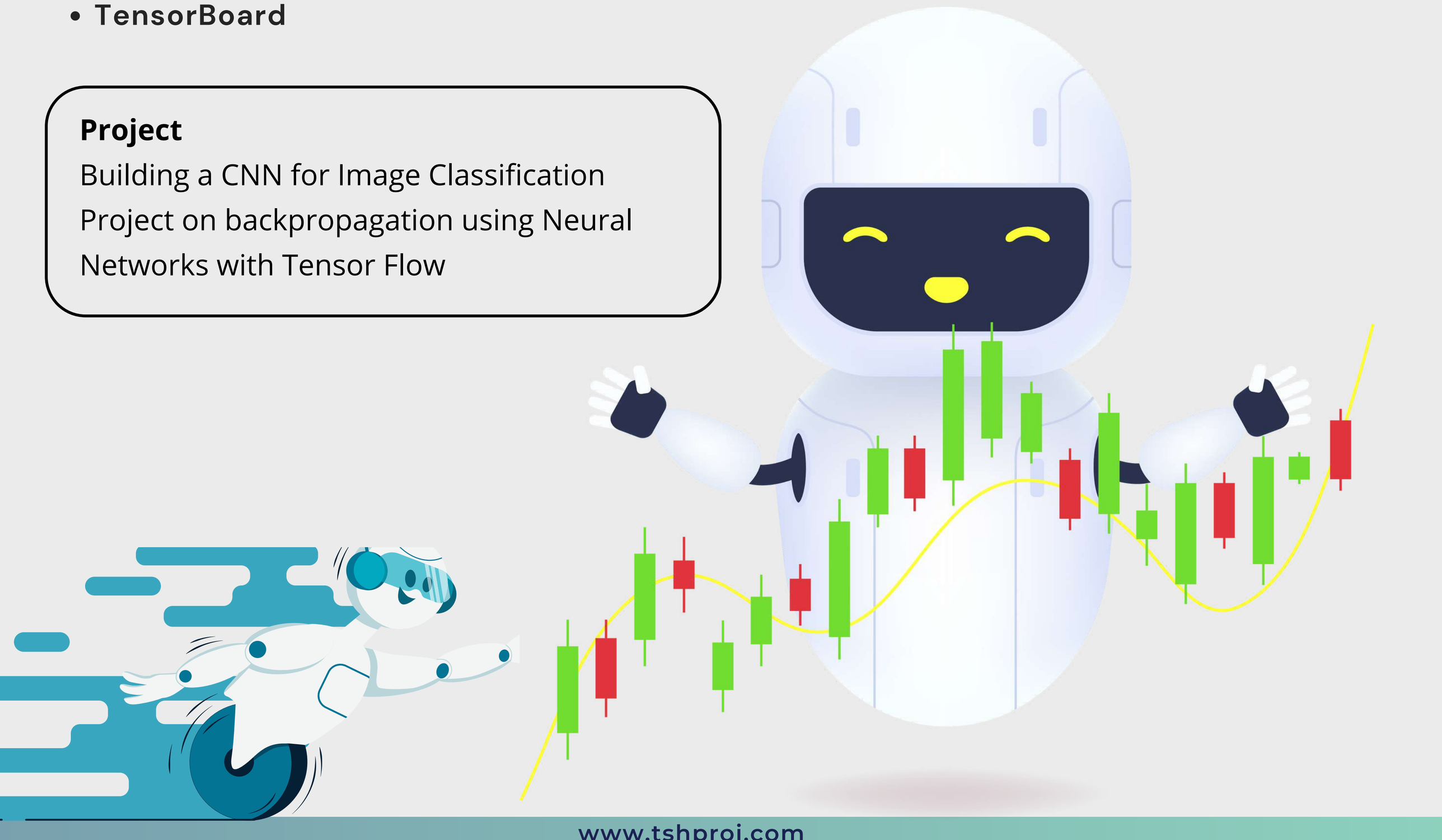
Project on backpropagation using Neural Networks with Tensor Flow

TensorFlow Classification Examples

- Introduction to TensorFlow
- Installing TensorFlow
- Simple Computation, Contents and Variables
- Types of file formats in TensorFlow
- Creating A Graph - Graph Visualization
- Creating a Model - Logistic Regression Model Building
- TensorFlow Classification Examples

Convolutional Neural Network (CNN)

- Convolutional Layer Motivation
- Convolutional Layer Application
- The architecture of a CNN Pooling Layer Application
- Deep CNN Understanding and Visualizing a CNN



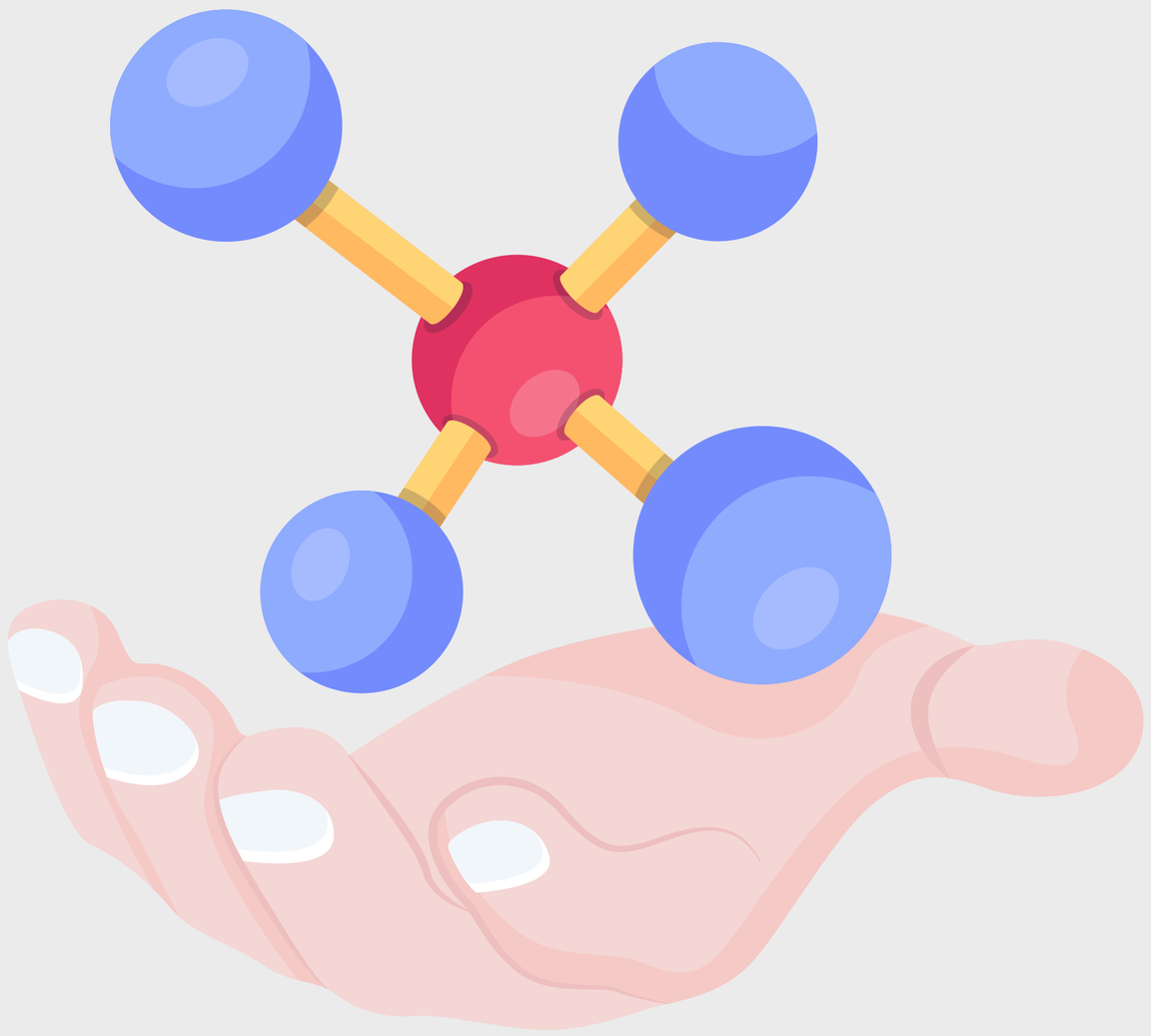
DEEP LEARNING USING TENSORFLOW

Introducing Recurrent Neural Networks skflow: RNNs in skflow

- Application use cases of RNN
- Manual Creation of RNN Long Short-Term Memory (LSTM) And GRU theory
- Restricted Boltzmann Machine(RBM)
- Autoencoders Collaborative Filtering with RBM Dimensionality Reduction with Linear Autoencoder

Understanding Keras API for implementing Neural Networks

- Getting Started With Keras APIs Keras Model
- Sequential And Functional Model, shared layers
- Composing a Model with Keras API Batch Normalization
- Tensor Board With Keras
- Installing Pytorch Matrices
- Torch to NumPy Bridge Variables, Gradients.
- PyTorch Autograd Module
- Linear Regression With PyTorch
- Logistic Regression With Pytorch
- CNN in PyTorch
- Use PyTorch to build CNN Build RNN with PyTorch



Understanding Of TFLearn APIs

- Getting Started With TFLearn
- High-Level API usage -Layers
- Built-in Operations Training and Evaluation- Customizingthe Training Process
- Visualization APIs Sequential And
- Functional Composition Fine-tuning Using TensorBoard with TFLearn

Understanding Keras API for implementing Neural Networks

- Build RNN with PyTorch
- LSTM in PyTorch
- LSTM from CPU to GPU in PyTorch

TOOLS COVERED

Keras
Simple. Flexible. Powerful.

PyTorch

Real-time project

SPAM Prediction using RNN Image Classifier using PyTorch

NATURAL LANGUAGE PROCESSING

Natural Language Processing

- Text Analytics
- Introduction to NLP
- Use cases of NLP algorithms
- NLP Libraries
- Need for Textual Analytics
- Applications of NLP
- Word Frequency Algorithms for NLP Sentiment Analysis

Text Analysis

- Distance Algorithms used in Text Analytics
- String Similarity Cosine Similarity Mechanism – The similarity between two text documents
- Levenshtein distance – measuring the difference between two sequences

Important

Applications of Levenshtein distance

LCS(Longest Common Sequence)

Problems and solutions, LCS Algorithms

KNN

- Information Retrieval Systems
- Information Retrieval – Precision, Recall,F- score TF-IDF
- KNN for document retrieval
- K-Means for document retrieval
- Clustering for document retrieval

Text Pre Processing Techniques

- Need for Pre-Processing
- Various methods to Process the Text data
- Tokenization, Challenges in Tokenization
- Stopping, Stop Word Removal

Stemming

- Stemming – Errors in Stemming
- Types of Stemming Algorithms – Table
- Lookup Approach
- N-Gram Stemmers

Use cases on NLP

Sentiment analysis for marketing

Toxic comments classification Language identification

Generating research papers titles

Application to translate and summarize the news

RESTful API for similarity check

COMPUTER VISION

Computer Vision overview

- Historical Perspective
- Introduction to the four R's of Computer Vision
- OpenCV Installation
- Python API Drawing shapes Image Processing Image Rotation and Thresholding

Image Processing

- Histogram equalization
- Thresholding and Convolution
- Sharpening and edge detection
- Morphological transformations
  Image pyramid

Projects

The Problem of Scale and Shape
Haarcascade - face and eye detection
Contour properties Circle detection
Line detection Watershed segmentation
AI-Based Live Face Identification
System for Crowd

Image Filtering

- Gaussian Blur
- Median Blur Feature Detection -
- Canny Edge Detector
- Use of Neural Network in CV
- Multi-Layer Perceptron

Image Classification and segmentation

- Data-Driven approach
- K-nearest Neighbor
- Linear Classification
- Contours and segmentation

Projects

Single Shot MultiBox Detector,
Object Localization
Find an object in an image Real-time
Use Cases Single Shot MultiBox Detector
Object Localization
How would you find an object in an image
The Problem of Scale and Shape SSD in Tensorflow Haar cascade - face and eye detection

REINFORCEMENT LEARNING

What is Reinforcement Learning – Basics

- Setting up Environment & Installing
- OpenAI Gym.
- OpenAI Gym Basics.
- Terminology & Environment.
- Dynamic Programming – Prediction, Control, and Value Approximation

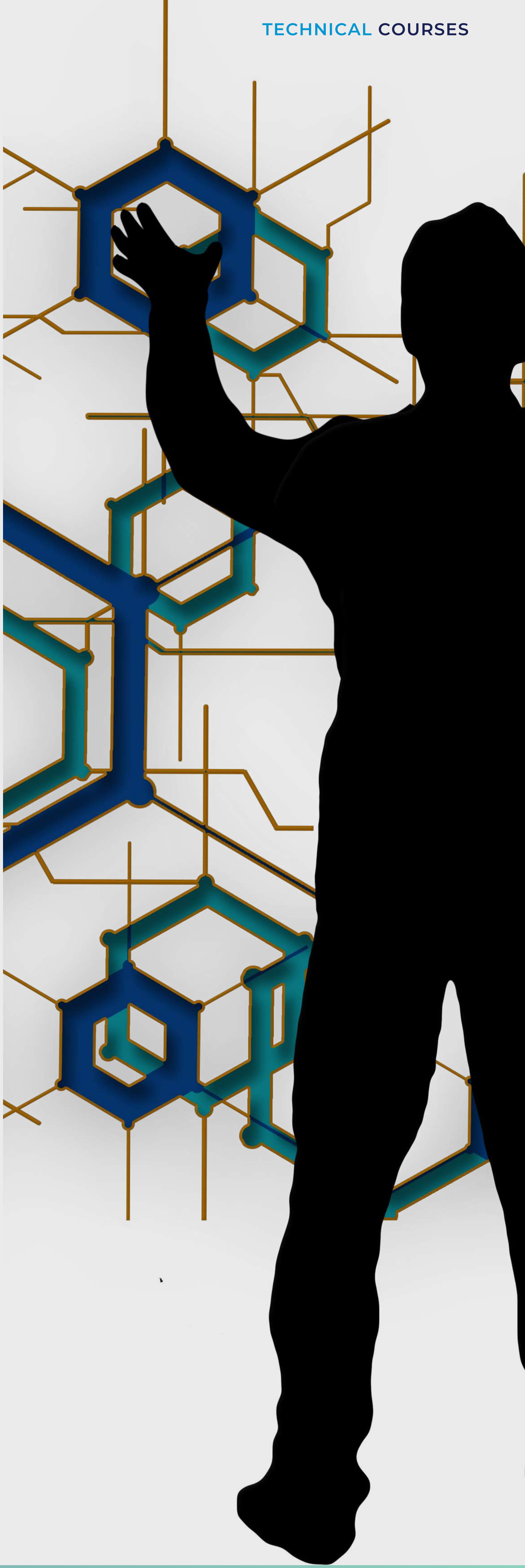
Approximation Methods for Reinforcement Learning

- RBF Networks with CartPole TD Lambda and Policy Gradient Algorithms.
- Temporal difference learning. N-Step Methods TD lambda, Policy Gradient Methods Policy Gradient in TensorFlow for CartPole. Mountain Car Continuous using Tensorflow
- Building Blocks of Reinforcement Learning
- OpenAI Gym Tutorial Random Search Markov Decision Processes Monte Carlo Methods

Important
Deep Q-Learning Techniques Deep Q-Learning in Tensorflow for CartPole

CASE STUDY

- Solving Taxi Environment
- Solving Frozen Lake Environment Reward Discounting



DEPLOYMENT AWS+AZURE

Introduction to AWS and Azure Machine Learning Services

- Overview of AWS SageMaker and Azure Machine Learning
- Key features and benefits of using these platforms
- Understanding different types of machine learning algorithms and use cases

Data Preparation and Feature Engineering

- Understanding the data requirements for machine learning models (e.g. structured vs unstructured data, data size, data quality)
- Data cleaning and preprocessing techniques (e.g. missing value imputation, feature scaling, encoding categorical variables)
- Feature selection and engineering techniques (e.g. PCA, feature importance)

Model Training and Evaluation

- Choosing the right machine learning algorithm and model (e.g. regression, classification, clustering)
- Training models using AWS
- SageMaker and Azure Machine
- Learning (e.g. using built-in algorithms, custom code)
- Evaluating model performance and tuning hyperparameters (e.g. cross-validation, hyperparameter optimization)

Setting up the Environment

- Creating AWS and Azure accounts
- Configuring the required tools and SDKs (e.g. AWS CLI, Azure CLI, Azure PowerShell)
- Understanding the infrastructure requirements for training and deploying models (e.g. EC2 instances, GPU instances, Azure ML Compute)

Model Deployment and Management

- Deploying trained models on AWS SageMaker and Azure Machine Learning (e.g.creating endpoints, batch inference)
- Monitoring model performance and managing versions (e.g. model drift, A/B testing)
- Integration with other services and applications (e.g. AWS Lambda, Azure Functions) techniques (e.g. PCA, feature importance)

Advanced Topics in Machine Learning on AWS and Azure

- Deep learning techniques and architectures (e.g. neural networks, convolutional neural networks, recurrent neural networks)
- Natural Language Processing (NLP) use cases (e.g. text classification, sentiment analysis, language translation)
- Understanding the costs and pricing models for machine learning on AWS and Azure (e.g. instance pricing, storage pricing, model deployment pricing)

AI GENERATIVE TOOLS AND FUTURE TRENDS

Emerging Trends in AI and Generative Modeling

- Exploring other AI generative tools beyond ChatGPT and DALL·E
- Overview of Midjourney
- Discussion on future trends and advancements in AI generative tools
- Open-ended project and/or presentation on a selected topic, incorporating learned concepts

Midjourney

Natural Language Processing and ChatGPT

- Introduction to natural language processing techniques
- Understanding ChatGPT and its architecture
- Hands-on exercises using ChatGPT for text generation and completion tasks
- Fine-tuning ChatGPT for specific applications

ChatGPT

DALL·E: Image Generation with AI

- Introduction to DALL·E and its capabilities
- Exploring image generation using DALL·E
- Hands-on exercises for creating unique images with DALL·E
- Ethical considerations and limitations of AI-generated images

DALL·E

Graph Neural Networks (GNN) for Data Analysis

- Introduction to graph theory and its relevance in data analysis
- Overview of Graph Neural
- Networks (GNN) and their applications
- Hands-on exercises using GNN for tasks such as node classification and link prediction
- Case studies on real-world applications of GNN in data science

DATA STRUCTURES & ALGORITHMS

Array Overview

- The method used to store it in memory
- Difference between a static and a dynamic array
- How can the size of an array be increased

Linked List

- Why we need Linked List
- What is the definition of a singly connected list
- What is a Doubly Linked List, and how does it work
- What is a Circular Connected List, and how does it work

Stack

- What is a stack
- What is the difference between LIFO and FIFO principles
- What is the role of the stack Push(), pop(), isempty(), isfull(), peek(), count(), change(), display(), and other typical stack operations.
- Real-world stack use cases

String

- Find the length of a string,
- Validate, reverse & change case of a string count words and vowels in a string compare strings and find duplicates in a string in a normal way, as well as using bitwise operations and checking whether two strings are anagrams
- Rabin Karp and KMP algorithms

Queue

- How it functions
- Real-life examples
- Linear queues, circular queues, priority queues, and deque queues are examples of queue types
- Enqueue, Dequeue, Peek, Queue Overflow, and Queue Underflow, and other queue operations

Heap

- Data Structure and its implementation.
- Binary heap and various operations like Insertion, Heapify and extract,Decrease key, Delete and Build a map.

Trie

- Properties of trie for a set of strings, searching, inserting, and deleting a node from Trie
- Application, Advantages & Disadvantages of a Trie
- Counting distinct rows in a binary matrix

Segment Tree

- BST implementation of search, insertion, deletion, and floor, self-balancing BST, Tree set, and Treemap, depth and height of nodes
- Level order traversal as well as BST application

Introduction to recursion

- Application to recursion, writing base cases and problems discussed here are kind of Tower of Hanoi, Josephus problem

DATA STRUCTURES & ALGORITHMS

Tree, Binary Search Tree & AVL TreeAVL Tree

- Tree Data Structure and terms like Root, Child node, Parent, Sibling, Leaf node, Internal nodes, Ancestor nodes, and Descendent Implementation of Tree and Tree Traversal (such as Inorder, Preorder, Postorder)

Graph & Recursion

- Graph representation, BFS, DFS, Shortest path in Directed Acyclic graph, Prim’s algorithm and minimum spanning tree
- Dijkstra's shortest path algorithm Kruskal’s algorithm Kosaraju’s algorithm
- Articulation point, Bridges in a graph,Tarjan’s algorithm

Backtracking Algorithm

- Rat in a maze problem
- Knight’s tour problem
- Hamiltonian cycle
- Tug of war

Searching

- Linear search, binary search, BFS, DFS
- Two pointer approach problem, Ternary search, Jump search, Exponential search

Greedy Algorithm

- Activity selection problem
- Fractional Kanpsack
- Kruskal’s minimum spanning tree problem
- Huffman coding, Prim’s MST for Adjacency List Representation
- Greedy Algorithm to find the minimum number of Coins etc

Sorting

- Bubble sort, Bucket sort, Comb sort, Counting sort, Heap Sort, Insertion sort, Merge sort
- Quicksort, Radix sort, Selection sort, Shell sort, Bitcoin sort
- Cocktail sort, Cycle sort, Tim sort

Pattern Searching

- Naive pattern searching
- KMP algorithm
- Finite automata
- Boyer Moore algorithm

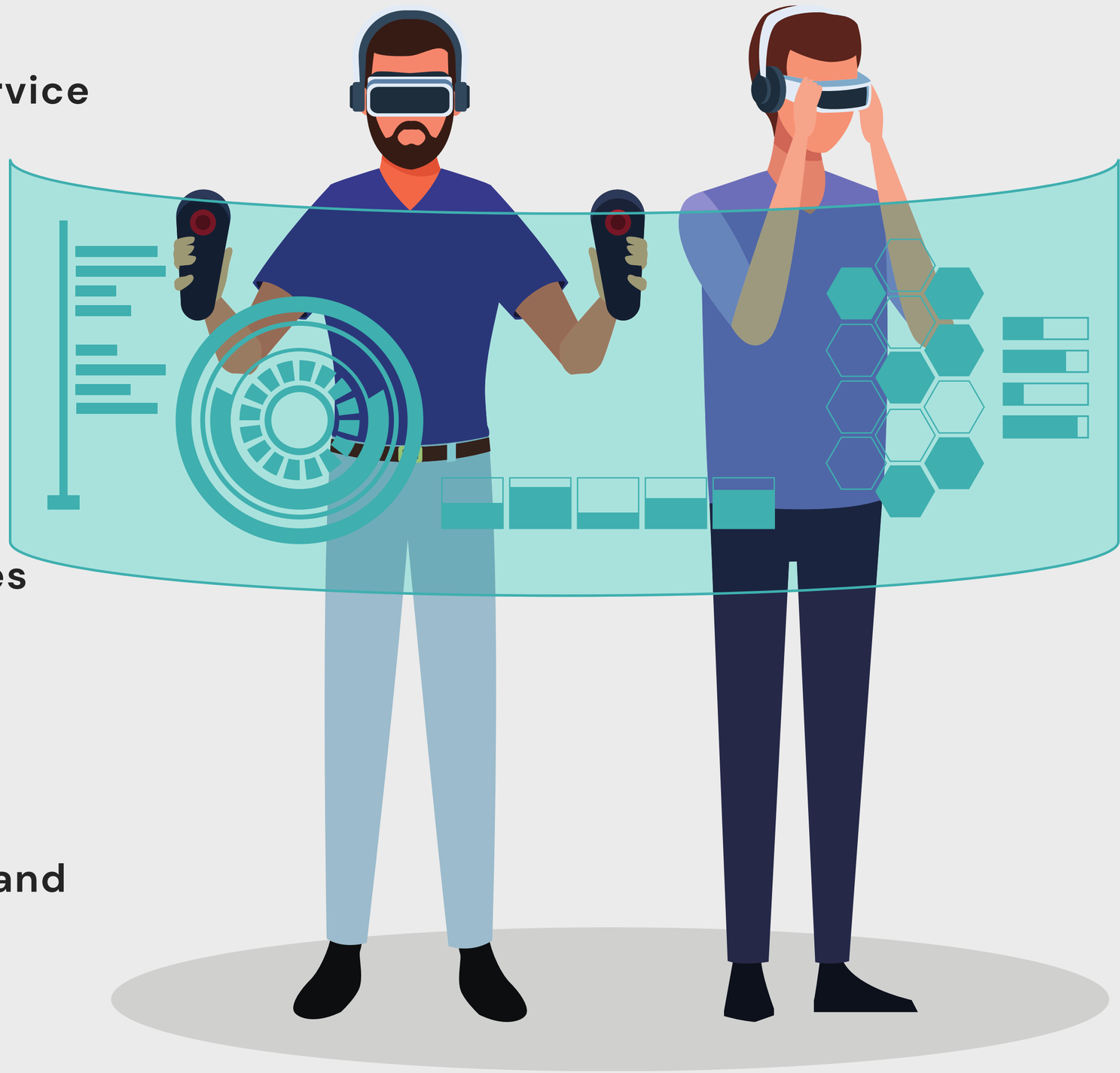
Dynamic Programming

- Edit distance problem using naiveand DP approach
- 0-1 Knapsack problem using naive and DP approach
- An optimal strategy for a game Egg dropping problem Coin change problem

PROJECT MANAGEMENT

Jira Process Part I

- Agile Delivery and Scrum DevOps
- Project Management
- Release Management Process Service Now
- Meetings/Emailing
- Communication with various workstreams
- Change Management
- Resource Management
- Stakeholder Management
- Risk analysis to improve outcomes
- Risk Management
- RAID log
- Realistic time estimates
- Project Charter
- Co-create a project task outline and schedule
- Status Tracking
- Project Management
- Agile Project Management
- Project Management Cycle



JIRA Process Part II

- What & Why Jira
- Delivery Process enabling
- Getting access & requesting a new projects on Jira

PM approaches for Technical Projects

- The project Manager and their role
- The developers and their role
- Testing professional and their role
- Management and their role
- The Front line Managing conflicts between Stakeholders

JIRA Process Part II

- Adding team members to your Jira Project
- Navigating Jira
- Jira Issue Types
- Jira Training assets
- Jira Reports

Agile

- Agile Delivery and Scrum
- Agile & Scrum in a nutshell
- Lifecycle of a Scrum-based project
- Scrum Roles Scrum: Sprint Lifecycle (Ceremonies)
- Scrum Artefacts Business Requirements

EXCEL

Getting started with Excel

- Creating a New Workbook
- Navigating in Excel
- Moving the Cell Pointer
- Using Excel Menus
- Creating Headers, Footers, and Page Numbers
- Adjusting Page Margins and Orientation
- Adding Print Titles and Gridlines, rows to repeat at the top of each page
- Formatting Fonts & Values
- Adjusting Row Height and Column Width
- Changing Cell Alignment
- Adding Borders
- Applying Colors and Patterns
- Using the Format Painter
- Merging Cells, Rotating Text
- Using Auto Fill

Switching Between Sheets in a Workbook

- Inserting and Deleting Worksheets
- Renaming and Moving Worksheets
- Protecting a Workbook
- Hiding Columns, Rows and Sheets
- Splitting and Freezing a Window

Entering Date Values and using AutoComplete

- Editing, Clearing, and Replacing Cell Contents Cutting,
- Copying, and Pasting Cells Moving and Copying Cells with Drag and Drop
- Collecting and Pasting Multiple Items Using the Paste Special Command

Using Excel Toolbars: Hiding, Displaying, and Moving Toolbars

- Entering Values in a Worksheet and Selecting a Cell Range
- Previewing and Printing a Worksheet
- Saving a Workbook & Re-opening a saved workbook

Switching Between Sheets in a Workbook

- Splitting and Freezing a Window
- Inserting Page Breaks
- Advanced Printing Options

Inserting and Deleting Cells, Rows, and Columns

- Using Undo, Redo, and Repeat
- Checking Your Spelling
- Finding and Replacing Information
- Inserting Cell Comments
- Creating a basic Formula
- Cell Referencing
- Calculating Value Totals with
- AutoSum
- Editing & Copying Formulas
- Fixing Errors in Your Formulas
- Formulas with Several Operators
- Cell Ranges
- Conditional Formatting

Working with the Forms Menu

- Sorting, Subtotaling & Filtering Data
- Copy & Paste Filtered Records
- Using Data Validation

EXCEL

Creating & Working with Charts

- Creating a Chart
- Moving and Resizing a Chart
- Formatting and Editing Objects in a Chart
- Changing a Chart's Source Data

Data Analysis & Pivot Tables

- Creating a PivotTable
- Specifying the Data a PivotTable Analyzes
- Changing a PivotTable's Calculation
- Selecting What Appears in a PivotTable
- Grouping Dates in a PivotTable
- Updating a PivotTable
- Formatting and Charting a PivotTable
- Automating Tasks with Macros
- Recording a Macro
- Playing a Macro and Assigning a Macro
- Shortcut Key

Data Analysis & Pivot Tables

- Creating a PivotTable
- Specifying the Data a PivotTable Analyzes
- Changing a PivotTable's Calculation

Changing a Chart Type and Working with Pie Charts

- Adding Titles, Gridlines, and a Data Table
- Formatting a Data Series and Chart Axis
- Using Fill Effects

Using Excel Toolbars: Hiding, Displaying, and Moving Toolbars

- Entering Values in a Worksheet and
- Selecting a Cell Range
- Previewing and Printing a Worksheet
- Saving a Workbook & Re-opening a saved workbook

BUSINESS ANALYTICS

Introduction to Business Analysis

- Understanding the importance of Business Analysis
- Business Analyst Professionals and their role
- The PLC and SDLC
- Waterfall and Iterative SDLCs Agile SDLC
- The product Life Cycle
- Requirement Lifecycle
- Norwaik Aberdeen's Model

Formulating Requirements

- How to focus on collecting good requirements
- Understanding Business and User Requirements
- Understanding Functional and Non-functional requirements
- Requirements Gathering and preparing common document Agile requirements

Analysing and Transforming Requirements

- Decomposition Analysis
- Additive & Subtractive Analysis
- Gap Analysis
- Decision Analysis
- Root Cause Analysis

Stakeholders in Business Analysis

- The project Manager and their role
- The developers and their role
  Testing professional and their role
- Management and their role
- The Front line
- Managing conflicts between
- Stakeholders

Flowchart and Modelling

- Swim Lane Flowcharts
- Entity-Relationship Modelling
- State Transition Modelling
- Data Flow Modelling
- Use Case Modelling
- Business Process Modelling
- UML

Finalising Requirements

- Socialisation
- Presentation
- Change Control

Thank you

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