

DATA SCIENCE Certificate Course

Certificates Awarded by



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

UTMSpace
ESTD 1983
(931427-K)

futureskills
prime
A MeitY • NASSCOM Digital Skilling Initiative



Part Time



Hybrid- Live Online
& Classroom



6 Months

Course Highlights



184
Hours Training



100+ Hours
Assignments and practicals



2+ Capstone
Live Projects



UTM & IBM
Certification



ML Model
Deployment



Job assistance in
Data Science fields



Free Webinars
and latest industry updates



Lifetime
Access to LMS

Prerequisites

- ✓ Need basic computer skills
- ✓ Basic mathematical concepts Knowledge
- ✓ Analytical mindset is recommended



Course Objective

- Work with various data generation sources
- Perform Text Mining to generate Customer Sentiment Analysis
- Analyse structured and unstructured data using different tools and techniques
- Develop an understanding of Descriptive and Predictive Analytics
- Apply Data-driven, Machine Learning approaches for business decisions
- Build models for day-to-day applicability
- Perform Forecasting to take proactive business decisions
- Use Data Concepts to represent data for easy understanding

360DigiTMG Advantages

01

Learning Management System (LMS)

Students will be provided with LMS access for lifetime, which included class recordings, self –paced videos, assignment course works, reference materials. Data sets, algorithms etc

02

10+ years experience training faculty

Faculty with 10+ years of average experience and trained 20,000+ professionals and 10,000+ students from 8-12 countries. Corporate clients include many Fortune 500 companies.

03

Training 20,000+ professionals

Carries a legacy of training 20,000+ professionals and 10,000+ students from across the globe. Our program has been approved by 3 leading international universities / accreditation bodies.

04

Curriculum

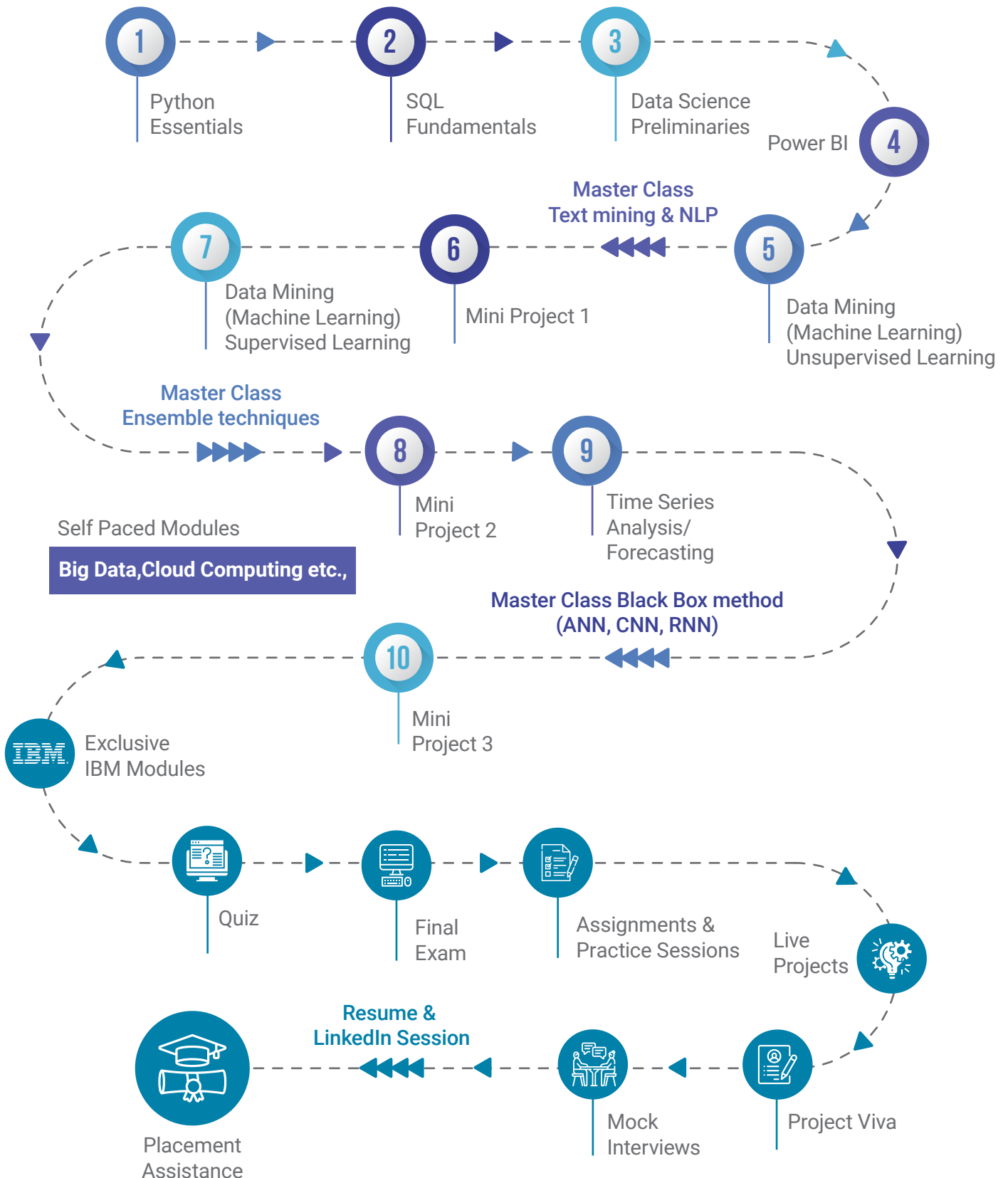
Curriculum has been meticulously designed by industry experts by considering student communities as well as working professionals.

05

Career mentorship & placement assistance

A coordinator will be assigned for you until you complete the program for smooth delivery of your training journey with 360DigiTMG.

Data Science Learning Path



Learning Outcome

- ✓ Understand about the landscape of the various data generation sources
- ✓ Learn about the tools & techniques used in the space of analysing both structured & unstructured data
- ✓ To understand the differences between descriptive analytics & predictive analytics
- ✓ Perform text mining to generate the sentiment analysis of customers
- ✓ To understand the data driven machine learning approaches in taking critical business decisions
- ✓ To understand on how to build prediction models for day-to-day applicability
- ✓ To understand on how to perform forecasting to take proactive business decisions
- ✓ Learn about representing data in most representable format using data visualization concepts

Who Should Attend



Business Analysts, Data Analyst, Data Scientist, Data Engineer, Project Managers for Data Analytics or Data Stream projects



Graduates who are looking to build a career in Data Science, Machine Learning, Forecasting, Business Intelligence, etc.



Students who are aiming to work in IT industry on emerging technologies



Schools, Universities and Colleges looking to upskill their faculties in Digital Courses

Industries applicable: Banking, Insurance, Finance Retail, E commerce, Marketing consultancies, Travel & tourism, Agriculture, Consulting, Customer Service, Education, Engineering, Finance, Government, Health, Mining Hospitality, Hospitals, Human Resources, Information Systems, Information Technology, Law Enforcement, Manufacturing, TeleCommunication, Oil and Gas, Public Relations, Purchasing, Quality Assurance, Software Development, Training etc

Course Modules

Module - 1

Python Introduction

- Introduction to Python Programming
- Installation of Python & Associated Packages
- Graphical User Interface
- Installation of Anaconda Python
- Setting Up Python Environment
- Data Types
- Operators in Python
 - Arithmetic operators
 - Relational operators
 - Logical operators
 - Assignment operators
 - Bitwise operators
 - Membership operators
 - Identity operators
- Data structures
 - Vectors
 - Matrix
 - Arrays
 - Lists
 - Tuple
 - Sets
 - String Representation
 - Arithmetic Operators
 - Boolean Values
 - Dictionary
- Conditional Statements
 - if statement
 - if - else statement
 - if - elif statement
 - Nest if-else
 - Multiple if
 - Switch
- Loops
 - While loop
 - For loop
 - Range()
- Iterator and generator Introduction
- For – else
- Break
- Functions
 - Purpose of a function
 - Defining a function
 - Calling a function
 - Function parameter passing
 - i. Formal arguments
 - ii. Actual arguments
 - iii. Positional arguments
 - iv. Keyword arguments
 - v. Variable arguments
 - vi. Variable keyword arguments
 - vii. Use-Case *args, **kwargs
- Function call stack
 - Locals()
 - Globals()
- Stackframe
- Modules
 - Python Code Files
 - Importing functions from another file
 - `__name__`: Preventing unwanted code execution
 - Importing from a folder
 - Folders Vs Packages
 - `__init__.py`
 - Namespace
 - `__all__`
 - Import *
 - Recursive imports
- File Handling
- Exception Handling
- Regular expressions
- Oops concepts
- Classes and Objects
- Inheritance and Polymorphism
- Multi-Threading

Module - 2

SQL

- What is a Database
- Types of Databases
- DBMS vs RDBMS
- DBMS Architecture
- Normalisation & Denormalization
- Install PostgreSQL
- Install MySQL
- Data Models
- DBMS Language
- ACID Properties in DBMS
- What is SQL
- SQL Data Types
- SQL commands
- SQL Operators
- SQL Keys
- SQL Joins
- GROUP BY, HAVING, ORDER BY
- Subqueries with select, insert, update, delete statements?
- Views in SQL
- SQL Set Operations and Types
- SQL functions
- SQL Triggers
- Introduction to NoSQL Concepts
- SQL vs NoSQL
- Database connection SQL to Python

Module - 3

Data Science - Preliminaries

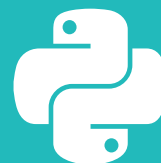
CRISP-ML(Q) - Business & Data Understanding

- All About 360DigiTMG & Innodatatics Inc., USA
- Dos and Don'ts as a participant
- Introduction to Big Data Analytics
- Data and its uses – a case study (Grocery store)
- Interactive marketing using data & IoT – A case study
- Course outline, road map, and takeaways from the course
- Stages of Analytics - Descriptive, Predictive, Prescriptive, etc.
- Cross-Industry Standard Process for Data Mining

Data Preprocessing

- Typecasting
- Handling Duplicates
- Outlier Analysis/Treatment
- Zero or Near Zero Variance Features
- Missing Values
- Discretization / Binning / Grouping
- Encoding: Dummy Variable Creation
- Transformation
- Scaling: Standardization / Normalization

In the next five years, the demand for data scientist with knowledge of Python is expected to go above 10 million.



Exploratory Data Analytics (EDA)

- Machine Learning project management methodology
- Data Collection - Surveys and Design of Experiments
- Data Types namely Continuous, Discrete, Categorical, Count, Qualitative, Quantitative and its identification and application
- Further classification of data in terms of Nominal, Ordinal, Interval & Ratio types
- Balanced versus Imbalanced datasets
- Cross Sectional versus Time Series vs Panel / Longitudinal Data
- Batch Processing vs Real Time Processing
- Structured versus Unstructured vs Semi-Structured Data
- Big vs Not-Big Data
- Data Cleaning / Preparation - Outlier Analysis, Missing Values Imputation Techniques, Transformations, Normalization / Standardization, Discretization
- Sampling techniques for handling Balanced vs. Imbalanced Datasets
- What is the Sampling Funnel and its application and its components?
 - Population
 - Sampling frame
 - Simple random sampling
 - Sample
- Measures of Central Tendency & Dispersion
 - Population
 - Mean/Average, Median, Mode
 - Variance, Standard Deviation, Range

Feature Engineering

- Feature Engineering on Numeric / Non-numeric Data
- Feature Extraction
- Feature Selection



Module - 4

PowerBI

- What is Power BI?
 - Introduction
 - Overview of Power BI
 - Architecture of PowerBI
 - PowerBI and Plans
 - Installation and introduction to PowerBI
- Transforming Data using Power BI Desktop
 - Importing data
 - Changing Database
 - Data Types in PowerBI
 - Basic Transformations
 - Managing Query Groups
 - Splitting Columns
 - Changing Data Types
 - Working with Dates
 - Removing and Reordering Columns
 - Conditional Columns
 - Custom columns
 - Connecting to Files in a Folder
 - Merge Queries
 - Query Dependency View
 - Transforming Less Structured Data
 - Query Parameters
 - Column profiling
 - Query Performance Analytics
 - M-Language

Module - 5

Data Mining (Machine Learning) - Unsupervised Learning

Mathematical Foundations

- Data Optimization
- Derivatives
- Linear Algebra
- Matrix Operations

Clustering / Segmentation

- Clustering 101
- Distance Metrics
- Hierarchical Clustering
- Non-Hierarchical Clustering
- DBSCAN
- Clustering Evaluation metrics

Dimension Reduction

- Principal Component Analysis (PCA)
- Singular Value Decomposition (SVD)

Association Rules

- Association rules mining 101
- Measurement Metrics
- Support
- Confidence
- Lift

Recommender Systems

- User Based Collaborative Filtering
- Similarity Metrics
- Item Based Collaborative Filtering
- Search Based Methods
- SVD Method

Network Analytics

- Entities of a Network
- Properties of the Components of a Network
- Measure the value of a Network
- Community Detection Algorithms

Text Mining and Natural Language Processing (NLP)

- Sources of data
- Bag of words
- Pre-processing, corpus Document Term Matrix (DTM) & TDM
- Word Clouds
- Corpus-level word clouds
- Sentiment Analysis
- Positive Word clouds
- Negative word clouds
- Unigram, Bigram, Trigram
- Semantic network
- Extract, user reviews of the product/services from Amazon and tweets from Twitter
- Install Libraries from Shell
- Extraction and text analytics in Python
- LDA / Latent Dirichlet Allocation
- Topic Modelling
- Sentiment Extraction
- Lexicons & Emotion Mining

Module - 6

Data Mining (Machine Learning) - Supervised Learning

Machine Learning

- Machine Learning primer
- Difference between Regression and Classification
- Evaluation Strategies
- Hyper Parameters
- Metrics
- Underfit and Overfit

Machine Learning Classifier Technique - Naive Bayes

- Probability – Recap
- Bayes Rule
- Naïve Bayes Classifier
- Text Classification using Naive Bayes
- Checking for Underfitting and Overfitting in Naive Bayes
- Generalization and Regulation Techniques to avoid overfitting in Naive Bayes

Machine Learning - KNN Classifier

- Deciding the K value
- Thumb rule in choosing the K value.
- Building a KNN model by splitting the data
- Checking for Underfitting and Overfitting in KNN
- Generalization and Regulation Techniques to avoid overfitting in KNN

Confidence Interval

- Probability & Probability Distribution
- Continuous Probability Distribution / Probability Density Function
- Discrete Probability Distribution / Probability Mass Function
- Normal Distribution
- Standard Normal Distribution / Z distribution
- Z scores and the Z table
- QQ Plot / Quantile - Quantile plot
- Sampling Variation
- Central Limit Theorem
- Sample size calculator
- Confidence interval - concept
- Confidence interval with sigma
- T-distribution / Student's-t distribution
- Confidence interval
- Population parameter with Standard deviation known
- Population parameter with Standard deviation not known

Hypothesis Testing - The '4' Must Know Hypothesis Tests

- Formulating a Hypothesis
- Choosing Null and Alternative Hypotheses
- Type I or Alpha Error and Type II or Beta Error
- Confidence Level, Significance Level, Power of Test
- Comparative study of sample proportions using Hypothesis testing
- 2 Sample t-test
- ANOVA
- 2 Proportion test
- Chi-Square test

Supervised Learning – Regression Techniques

- Scatter diagram
- Correlation analysis
- Correlation coefficient
- Ordinary least squares
- Principles of regression
- Simple Linear Regression
- Exponential Regression, Logarithmic Regression, Quadratic or Polynomial Regression
- Confidence Interval versus Prediction Interval
- Heteroscedasticity / Equal Variance

Multiple Linear Regression - Predictive Modelling

- LINE assumption
- Linearity
- Independence
- Normality
- Equal Variance / Homoscedasticity
- Collinearity (Variance Inflation Factor)
- Multiple Linear Regression
- Model Quality metrics
- Deletion Diagnostics

Logistic Regression

Binary Value Prediction, MLE

- Principles of Logistic regression
- Types of Logistic regression
- Assumption & Steps in Logistic regression
- Analysis of Simple logistic regression results
- Multiple Logistic regression
- Confusion matrix
- False Positive, False Negative
- True Positive, True Negative
- Sensitivity, Recall, Specificity, F1
- Receiver operating characteristics curve (ROC curve)
- Precision Recall (P-R) curve
- Lift charts and Gain charts

Lasso and Ridge Regressions

- Understanding Overfitting (Variance) vs. Underfitting (Bias)
- Generalization error and Regularization techniques
- Different Error functions, Loss functions, or Cost functions
- Lasso Regression
- Ridge Regression

Multinomial and Ordinal Logistic Regression

- Logit and Log-Likelihood
- Category Baseline
- Modeling Nominal categorical data
- Handling Ordinal Categorical Data
- Interpreting the results of coefficient values

Advanced Regression for Count Data

- Poisson Regression
- Poisson Regression with Offset
- Negative Binomial Regression
- Treatment of data with Excessive Zeros
- Zero-inflated Poisson
- Zero-inflated Negative Binomial
- Hurdle Model

37% Salary hike for
Data Scientist roles in India



Kernel Method - SVM

- Hyperplanes
- Best Fit "boundary"
- Linear Support Vector Machine using Maximum Margin
- SVM for Noisy Data
- Non- Linear Space Classification
- Non-Linear Kernel Tricks
- Linear Kernel
- Polynomial
- Sigmoid
- Gaussian RBF
- SVM for Multi-Class Classification
- One vs. All
- One vs. One
- Directed Acyclic Graph (DAG) SVM

Survival Analytics

- Examples of Survival Analysis
- Time to event
- Censoring
- Survival, Hazard, and Cumulative Hazard Functions
- Introduction to Parametric and non-parametric functions

Decision Tree

- Elements of classification tree - Root node, Child Node, Leaf Node, etc.
- Greedy algorithm
- Measure of Entropy
- Attribute selection using Information gain
- Decision Tree C5.0 and understanding various arguments
- Checking for Underfitting and Overfitting in Decision Tree

- Pruning – Pre and Post Prune techniques
- Generalization and Regulation Techniques to avoid overfitting in Decision Tree
- Random Forest and understanding various arguments
- Checking for Underfitting and Overfitting in Random Forest
- Generalization and Regulation Techniques to avoid overfitting in Random Forest

Ensemble Techniques

- Overfitting
- Underfitting
- Voting
- Stacking
- Bagging
- Random Forest
- Boosting
- AdaBoost / Adaptive Boosting Algorithm
- Checking for Underfitting and Overfitting in AdaBoost
- Generalization and Regulation Techniques to avoid overfitting in AdaBoost
- Gradient Boosting Algorithm
- Checking for Underfitting and Overfitting in Gradient Boosting
- Generalization and Regulation Techniques to avoid overfitting in Gradient Boosting
- Extreme Gradient Boosting (XGB) Algorithm
- Checking for Underfitting and Overfitting in XGB
- Generalization and Regulation Techniques to avoid overfitting in XGB

Module - 7

Forecasting/Time Series

Model-Driven Algorithms

- Introduction to time series data
- Steps to forecasting
- Components to time series data
- Scatter plot and Time Plot
- Lag Plot
- ACF - Auto-Correlation Function / Correlogram
- Visualization principles
- Naïve forecast methods
- Errors in the forecast and its metrics - ME, MAD, MSE, RMSE, MPE, MAPE
- Model-Based approaches
- Linear Model
- Exponential Model
- Quadratic Model
- Additive Seasonality
- Multiplicative Seasonality
- Model-Based approaches Continued
- AR (Auto-Regressive) model for errors
- Random walk

Data-Driven Algorithms

- ARMA (Auto-Regressive Moving Average), Order p and q
- ARIMA (Auto-Regressive Integrated Moving Average), Order p , d , and q
- A data-driven approach to forecasting
- Smoothing techniques
- Moving Average
- Exponential Smoothing
- Holt's / Double Exponential Smoothing
- Winters / Holt-Winters
- De-seasoning and de-trending
- Seasonal Indexes

31.4% Employment growth
is projected for Data professionals
between 2020 & 2030



Module - 8

Black Box method (ANN, CNN, RNN)

Introduction to Perceptron and Multilayer Perceptron

- Neurons of a Biological Brain
- Artificial Neuron
- Perceptron
- Perceptron Algorithm
- Use case to classify a linearly separable data
- Multilayer Perceptron to handle non-linear data

Building Blocks of Neural Network - ANN

- Integration functions
- Activation functions
- Weights
- Bias
- Learning Rate (η) - Shrinking Learning Rate, Decay Parameters
- Error functions - Entropy, Binary Cross Entropy, Categorical Cross Entropy, KL Divergence, etc.

Deep Learning Primer

- Artificial Neural Networks
- ANN Structure
- Error Surface
- Gradient Descent Algorithm
- Backward Propagation
- Network Topology
- Principles of Gradient Descent (Manual Calculation)
- Learning Rate (η)
- Batch Gradient Descent
- Stochastic Gradient Descent
- Minibatch Stochastic Gradient Descent
- Optimization Methods: Adagrad, Adadelata, RMSprop, Adam
- Convolution Neural Network (CNN)
- ImageNet Challenge – Winning Architectures
- Parameter Explosion with MLPs
- Convolution Networks
- Recurrent Neural Network
- Language Models
- Traditional Language Model
- Disadvantages of MLP
- Back Propagation Through Time
- Long Short-Term Memory (LSTM)
- Gated Recurrent Network (GRU)

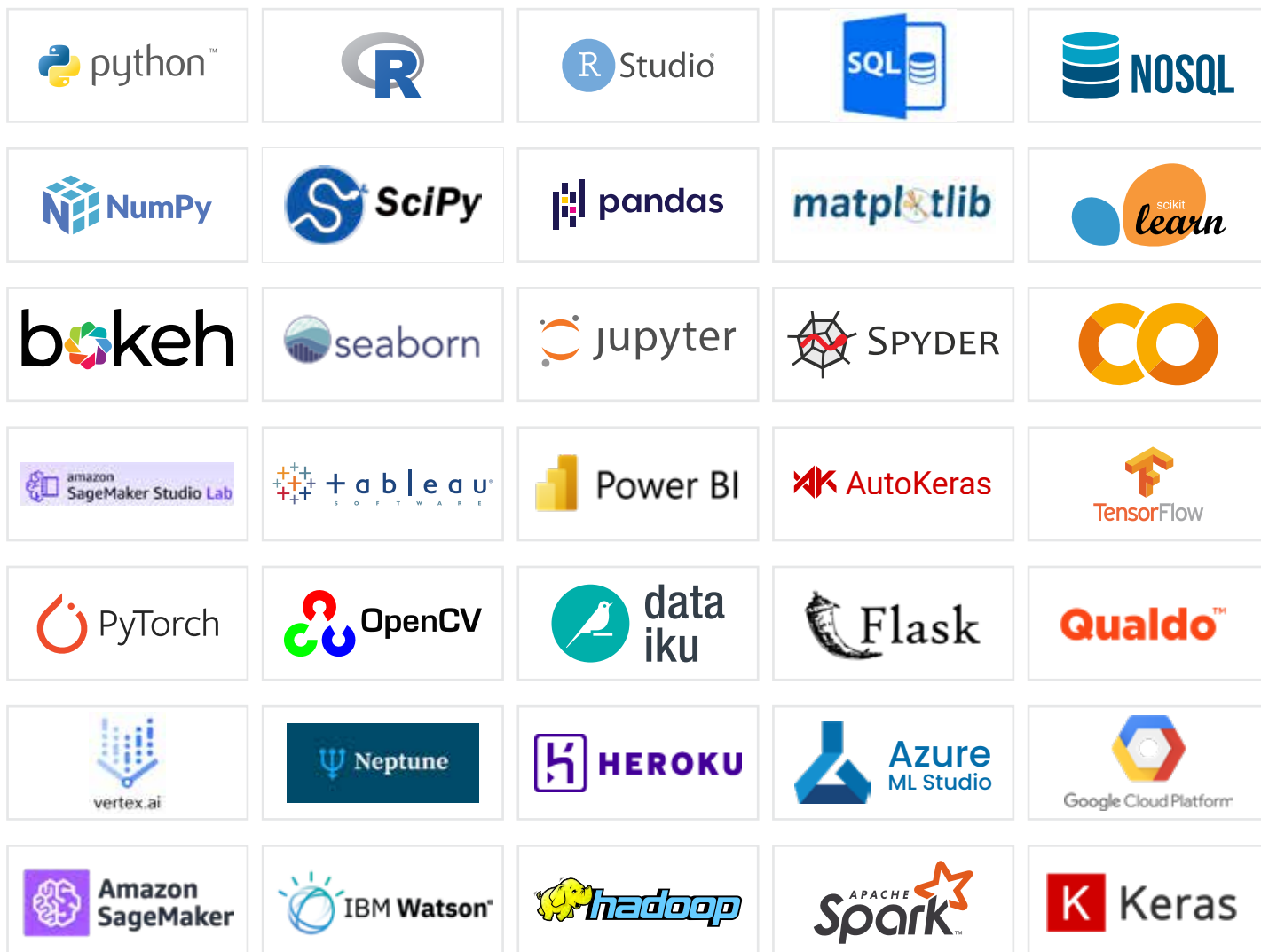
“ The goal is to turn data into information and
information into insight. ”

Carly Fiorina,

former chief executive officer and chair, Hewlett-Packard Company



Tools Covered



Best practical learning experience

e-troduction to Program



Live or Classroom Sessions



Assignments



Weekly Clarification Sessions



Monthly Webinar sessions



Final Exams with
360DigiTMG, IBM & UTM



Virtual Internships



Post-Learning and advanced
course videos



Placement Assistance



Review and Re-attend sessions

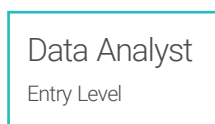
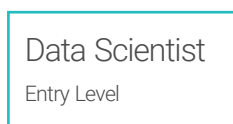


Learning journey continues

Next recommended courses for your career progression



Job roles to aim



Panel of coaches



Data Scientist
Research in Analytics,
Big Data, Deep learning



Senior Data Scientist
Senior Consultant,
Change Management



Data Scientist



Data Scientist

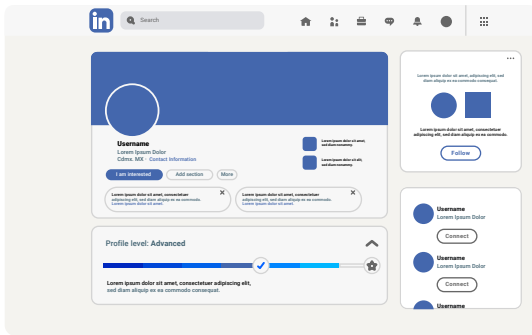
Industry career services



40+ hours
Placement support sessions



3+ mock interviews
with industry experts



Support on LinkedIn
profile preparation



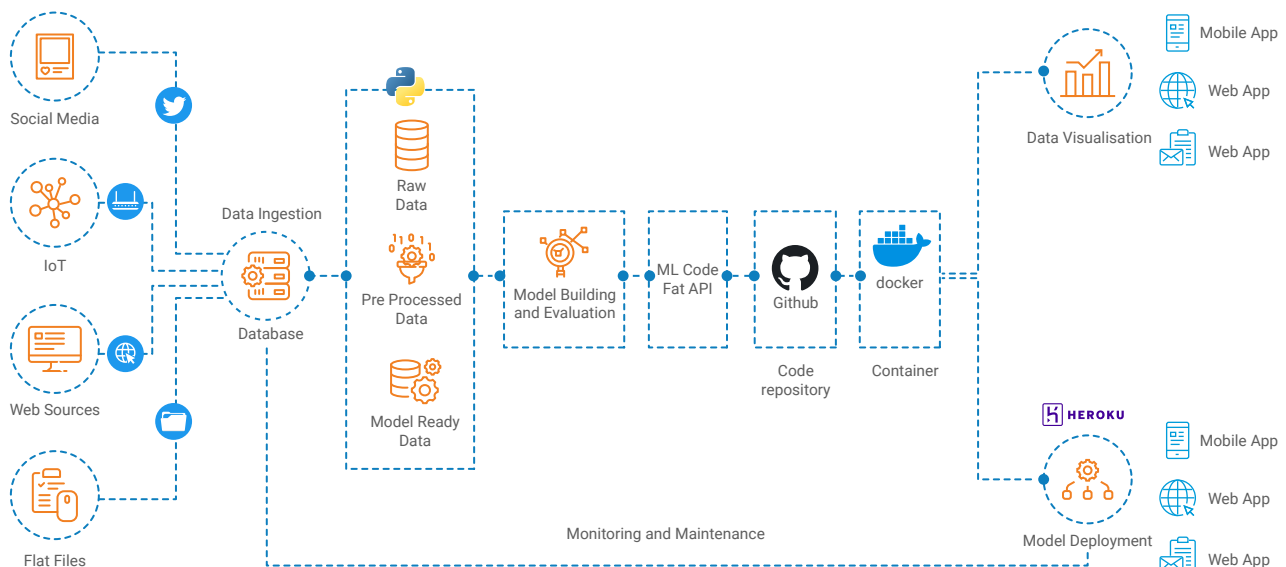
Support on
resume preparation

Live projects in support with

INNO DATATICS
Innovation • Data • Analytics

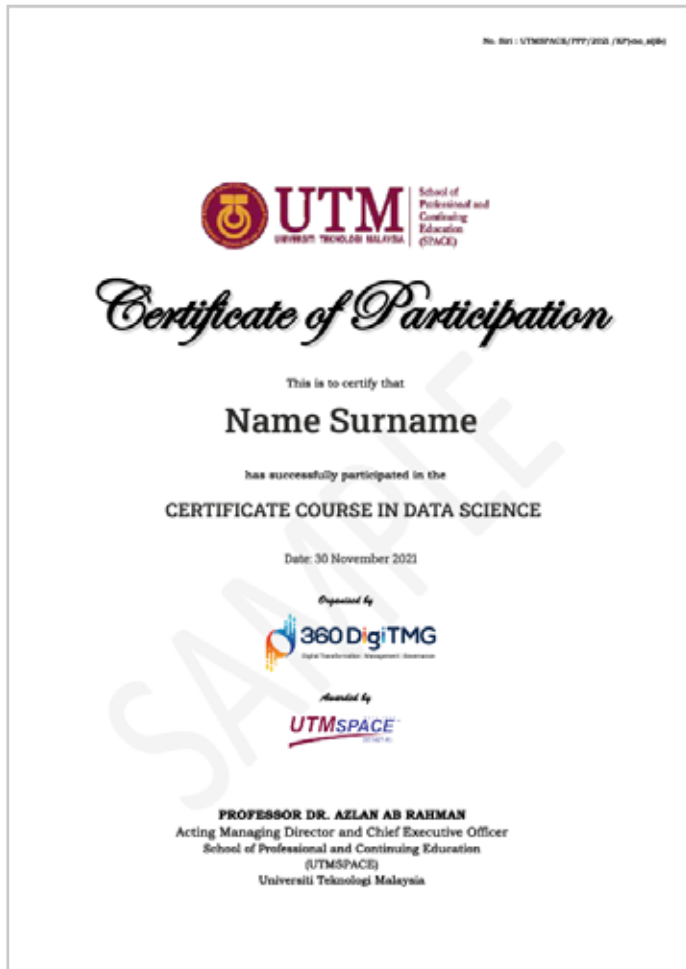
IBM

Panasonic



Get certified! Get recognized!

Upon successfully completing the programme with a minimum 50% score, you will be awarded with a blockchain enabled tamper-proof security digital Certificate on Data Science from 360DigiTMG and digital certificate from UTM & IBM.



All samples shown are for illustration purposes only. Actually certificate might vary based on course enhancements and awarding body

A statement from the leader

CEO's message

We have upped the ante. We have pressed on the gas pedal. We have transformed over years with our AI capabilities-driven learning aids, which includes our AiTutor for effective analysis based on the learning behaviors of students. These insights will make the learning actionable.

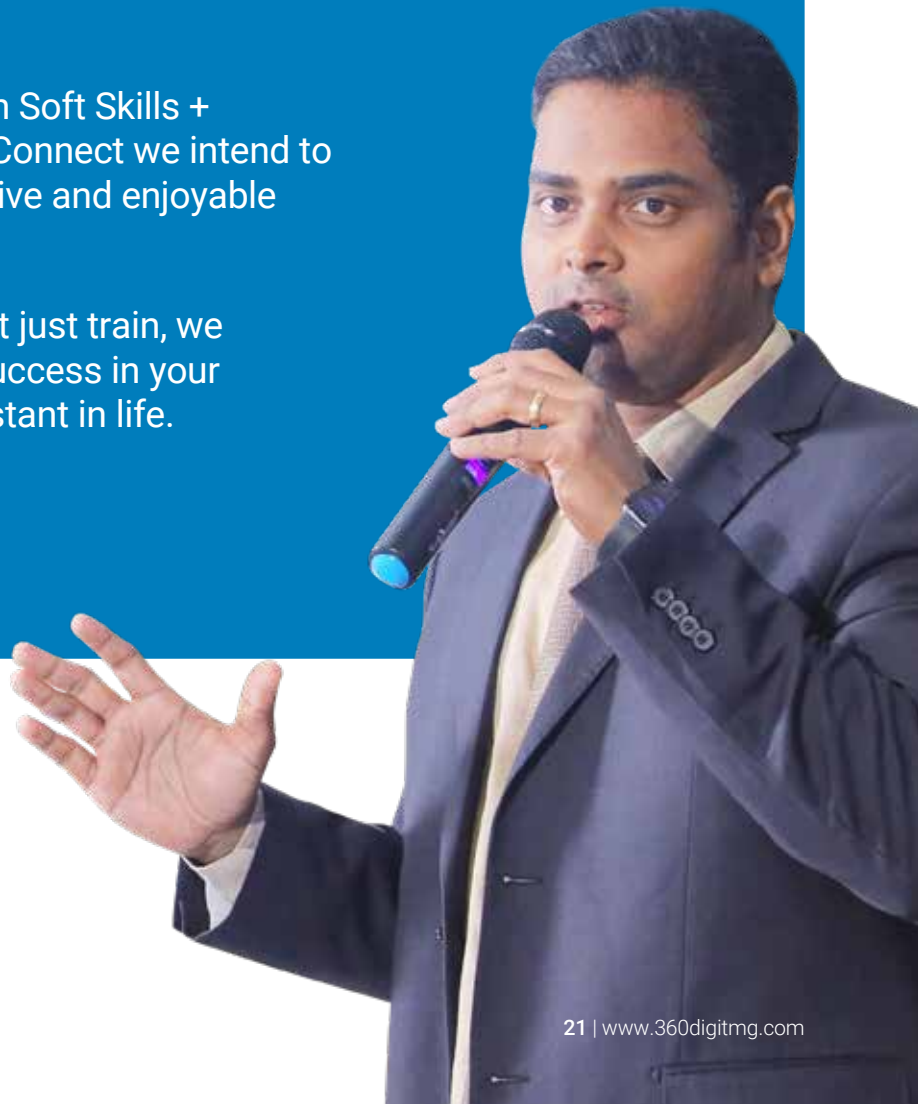
This goes back to our pledge of bringing the best in you and with the killer objective of job placement for our students, we filled "Job - The Ultimate Destiny" in our DNA.

With the introduction of AI driven Soft Skills + Industry Leader Talks + Alumni Connect we intend to make the learning journey lucrative and enjoyable like never before.

With our broad theme - "We don't just train, we transform careers", I wish you success in your upskilling, which is the only constant in life.

Bharani Kumar Depuru

Founder & Director
360DigiTMG and
Innodatatics Inc, USA



Our alumni work at



accenture

Capgemini

amazon

cognizant

HCL

Tech
Mahindra

HEXWARE



verizon

Infosys

tcs TATA
CONSULTANCY
SERVICES

Mindtree

J.P.Morgan

Hewlett Packard
Enterprise



Coca-Cola

vodafone

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SYSTIQUE

HTC
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ibssoftware

KONE

Röhlig
LOGISTICS

virtusa

Medtronic

RHB

BANK OF AMERICA

malaysia
airlines

L&T Infotech

astro

Maybank

HongLeong
Investment Bank

AFFIN BANK

Testimonials



I had great fun and a fabulous experience in this course. The teaching was good but I really felt that the live project experience was the best part of this course. Placement cell is very sincere

Nikhil Miriyala

The course was well structured and our trainer was very thorough in the concepts. Placement training and interview preparations helped me to switch my career to Data Science. Thanks to 360DigiTMG.

Seshadri M



I felt very comfortable with teacher and the subjects taught. They covered most of the concepts and gave us several assignments. Teaching was interactive and lively. I got a lovely job. I am so happy.

Sowjanya V

The faculty went to great depths to clarify our doubts. They gave us a lot of assignments and one very challenging live project. Great place to study.

Venu Panjarla



Accreditation to international certification bodies



The State University
of New York



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School of
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Continuing
Education
(SPACE)



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QUALITY EDUCATION FOR ALL



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