ARTIFICIAL INTELLIGENCE
& MACHINE LEARNING

POST GRADUATE PROGRAM IN

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

TEXAS McCombs
The University of Texas at Austin
McCombs School of Business

GREAT LAKES
EXECUTIVE LEARNING

Great Learning
POWER AHEAD

AI - THE NEXT DIGITAL FRONTIER

60%

Rise In Demand for Artificial Intelligence and Machine Learning experts

Source: Kelly OCG

40%

Of Digital Transformation initiatives will use AI services by 2019 and by 2021, 75% of enterprise applications will use AI

Source: IDC report 2018

$40 BILLION

was spent by companies around the world in developing AI capabilities

Source: McKinsey Global Institute report on Artificial Intelligence

75%

of Indian companies feel that the shortage of skilled professionals is slowing down their adoption of AI

Source: Intel/IDC

GREAT LEARNING

INDIA'S LEADING PROFESSIONAL LEARNING COMPANY

20

Top-ranked programs

400+

Hiring Companies

160+

Countries

750,000

Successful Learners

2000+

Faculty

WHAT MAKES OUR AIML PROGRAM UNIQUE?

1 Covers Artificial Intelligence & Machine Learning technologies and applications including Machine Learning, Deep Learning, Computer Vision, Natural Language Processing, Reinforcement Learning, Neural Network, Tensor Flow and many more.

2 Hands-on program using AI and ML lab and 12+ projects. It features case studies and learning from some of the top global companies like Uber, Netflix, Google, Amazon etc.

3 For every assignment you work as part of this program, you will get to see the solutions of the assignment as recorded walkthroughs. Recorded walkthroughs help you to understand the concepts better and analyze a problem from the view of an expert.

4 As part of this program, you will be making all of your submissions on Github. Github is an online repository which helps you to store all the projects and assignments you have done as part of this program in a single place. Today, most companies look at potential recruits Github profiles to check their technical expertise before hiring them.

5 Designed by leading academic and industry experts along with IIT-Bombay faculty.

BENEFITS OF LEARNING ONLINE

- Develop expertise in popular AI & ML technologies and problem-solving methodologies

- Develop the ability to independently solve business problems using AI & ML

- Develop a verified portfolio with 12+ projects that will showcase the new skills acquired

- Build expertise in AI & ML which are quickly becoming the most sought-after skills around the world

- Learn to use popular AI & ML technologies like Python, Tensorflow and Keras to develop applications

CERTIFICATE

The program is internationally recognized and participants earn dual certificates from The University of Texas at Austin and Great Lakes Executive Learning.

PROGRAM DELIVERY: ONLINE LEARNING

12 Months | 255+ hours of learning

In this format, learning occurs through online videos along with online mentorship sessions every weekend to clear doubts, reinforce concepts and for provide assistance on projects. The mentors come with substantial industry experience which helps learners gain an industry perspective. This guidance plays a critical role in making them industry-ready.

75+
hours of online Mentor and Industry sessions

150+
hours of online learning (self-learning content, reading material, assessments, projects and assignments)
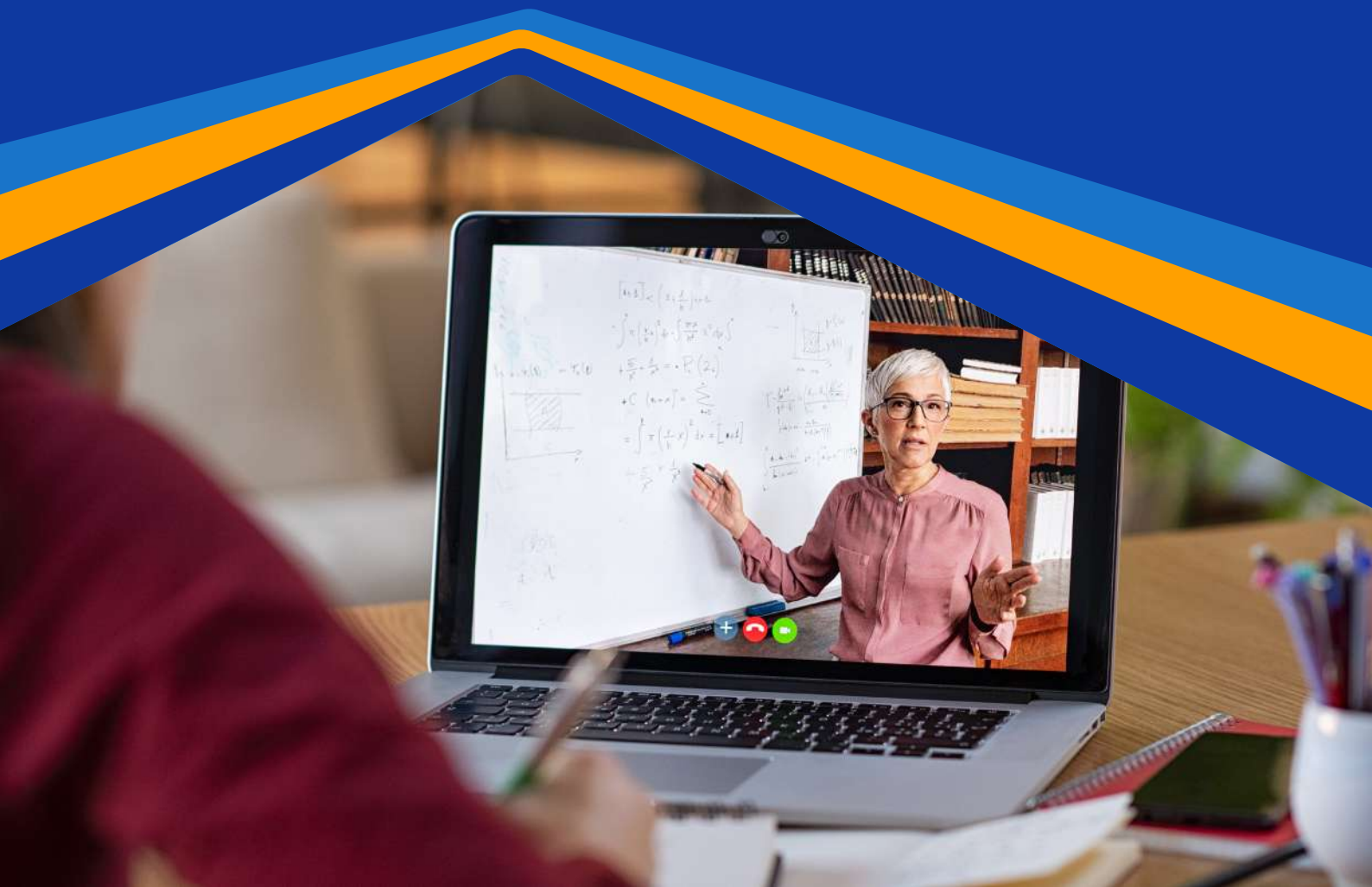
1
Capstone project

10+
hands-on projects

Hackathon
Company sponsored hackathons

PROGRAM CURRICULUM

FOUNDATIONS

Module 1

Introduction to Python

- Python Basics
- Python Functions and Packages
- Working with Data Structures, Arrays, Vectors & Data Frames
- Jupyter Notebook – Installation & function
- Pandas, NumPy, Matplotlib, Seaborn

Self paced module

EDA and Data Processing

- Data Types
- Dispersion & Skewness
- Uni & multi Variate Analysis
- Data imputation
- Identifying and normalizing Outliers

Module 2

Applied Statistics

- Descriptive Statistics
- Probability & Conditional Probability
- Hypothesis Testing
- Inferential Statistics
- Probability Distributions

MACHINE LEARNING

Module 1

Supervised learning

- Linear Regression
- Multiple Variable Linear Regression
- Logistic Regression
- Naive Bayes Classifiers
- k-NN Classification
- Support Vector Machines

Ensemble Techniques

- Decision Trees
- Bagging
- Random Forests
- Boosting

Unsupervised learning

- K-means Clustering
- Hierarchical Clustering
- Dimension Reduction-PCA

Featurisation, Model Selection & Tuning

- Feature engineering
- Model selection and tuning
- Model performance measures
- Regularising Linear models
- ML pipeline
- Bootstrap sampling
- Grid search CV
- Randomized search CV
- K fold cross-validation

Recommendation Systems

- Introduction to Recommendation Systems
- Popularity based model
- Content based Recommendation System
- Collaborative Filtering (User similarity & Item similarity)
- Hybrid Models

Time-series Forecasting

- Introduction to forecasting data
- Properties of Time Series data
- Examples and features of Time Series data
- Naive, Average and Moving Average Forecasting
- Exponential Smoothing
- ARIMA Approach

Model deployment

- Model serialization- pickle and joblib
- Rest APIs- Flask (real-time prediction)
- Docker Containerization
- Kubernetes (using Google cloud)

ARTIFICIAL INTELLIGENCE

Module 1

Introduction to Neural Networks and Deep Learning

- Introduction to Perceptron & Neural Networks
- Activation and Loss functions
- Gradient Descent
- Batch Normalization
- TensorFlow & Keras for Neural Networks
- Hyper Parameter Tuning

Module 2

Computer Vision

- Introduction to Convolutional Neural Networks
- Introduction to images
- Convolution, Pooling, Padding & its mechanisms
- Forward Propagation & Backpropagation for CNNs
- CNN architectures like AlexNet, VGGNet, InceptionNet & ResNet
- Transfer Learning
- Object Detection
- YOLO, R-CNN, SSD
- Semantic Segmentation
- U-Net
- Face Recognition using Siamese Networks
- Instance Segmentation

Module 3

NLP (Natural Language Processing)

- Introduction to NLP
- Stop Words
- Tokenization
- Stemming and lemmatization
- Bag of Words Model
- Word Vectorizer
- TF-IDF
- POS Tagging
- Named Entity Recognition
- Introduction to Sequential data
- RNNs and its mechanisms
- Vanishing & Exploding gradients in RNNs
- LSTMs - Long short-term memory
- GRUs - Gated recurrent unit
- LSTMs Applications
- Time series analysis
- LSTMs with attention mechanism
- Neural Machine Translation
- Advanced Language Models: Transformers, BERT, XLNet

Self paced module

Introduction to Reinforcement Learning (RL)

- RL Framework
- Component of RL Framework
- Examples of RL Systems
- Types of RL Systems
- Q-learning

Introduction to GANs (Generative adversarial networks)

- Introduction to GANs
- Generative Networks
- Adversarial Networks
- How GANs work?
- DCGANs - Deep Convolution GANs
- Applications of GANs

LANGUAGES & TOOLS
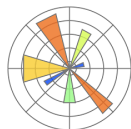
Python, NLP library NLTK

Python ML library Scikit-learn

TensorFlow

Pandas

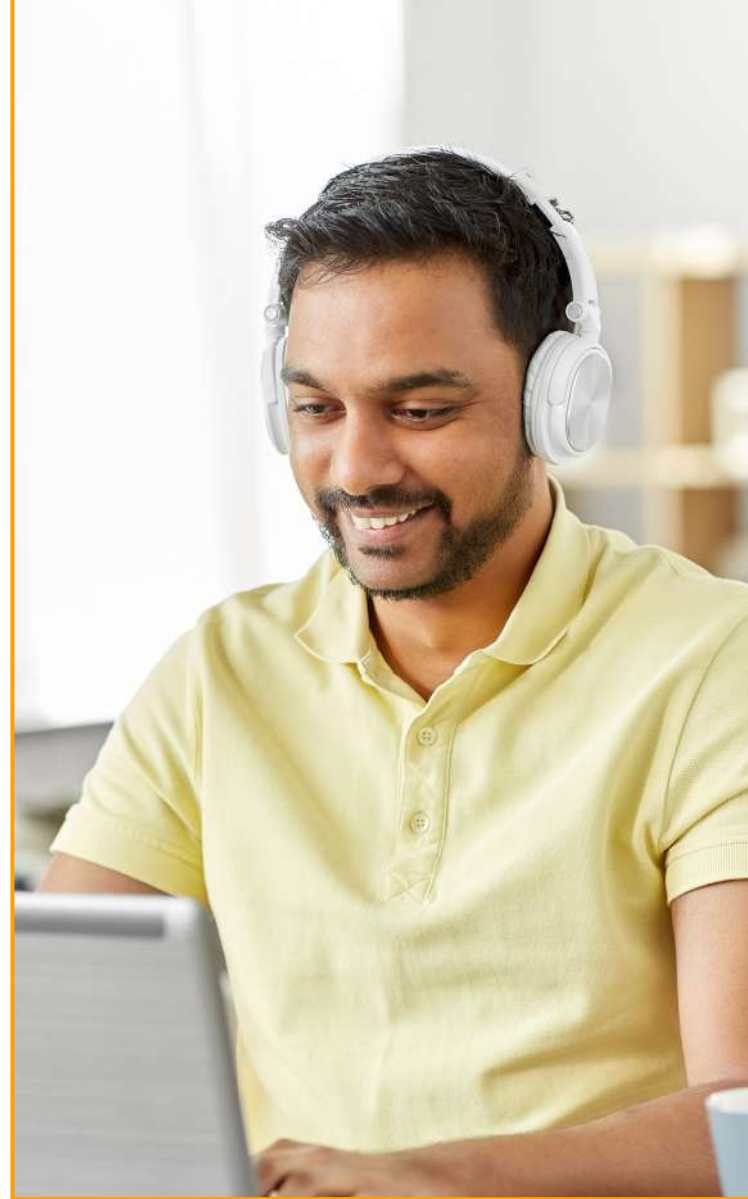GLUON

Scipy

Matplotlib

Numpy

OpenCV

Tkinter

Flask

Keras

spaCy

PROJECTS

1 **To identify the potential customers who have a higher probability to churn using ensemble prediction model**

A telecom company wants to use their historical customer data to predict behaviour to retain customers. You can analyse all relevant customer data and develop focused customer retention programs.

2 **To cluster the vehicles as per their fuel consumption attributes and later train a regression model for an automobile dataset**

The purpose is to classify a given vehicle as one of three types of vehicles, using a set of features extracted from the silhouette. The vehicle may be viewed from one of many different angles.

3 **To create an automation using computer vision to impute dynamic bounding boxes to locate cars or vehicles on the road.**

City X's traffic department wants to understand the traffic density on road during busy hours in order to efficiently program their traffic lights.
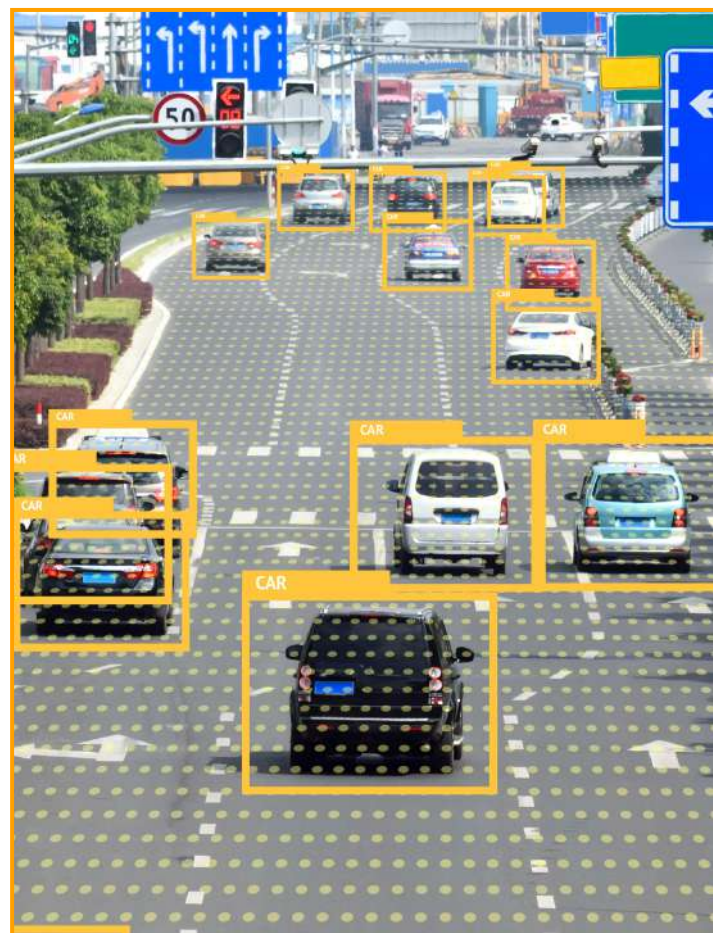
4   Implementing an Image classification neural network to classify Street House View Numbers

Recognizing multi-digit numbers in photographs captured at street level is an important component of modern-day map making. A classic example of a corpus of such street-level photographs is Google's Street View imagery composed of hundreds of millions of geo-located 360-degree panoramic images. The ability to automatically transcribe an address number from a geolocated patch of pixels and associate the transcribed number with a known street address helps pinpoint, with a high degree of accuracy, the location of the building it represents.
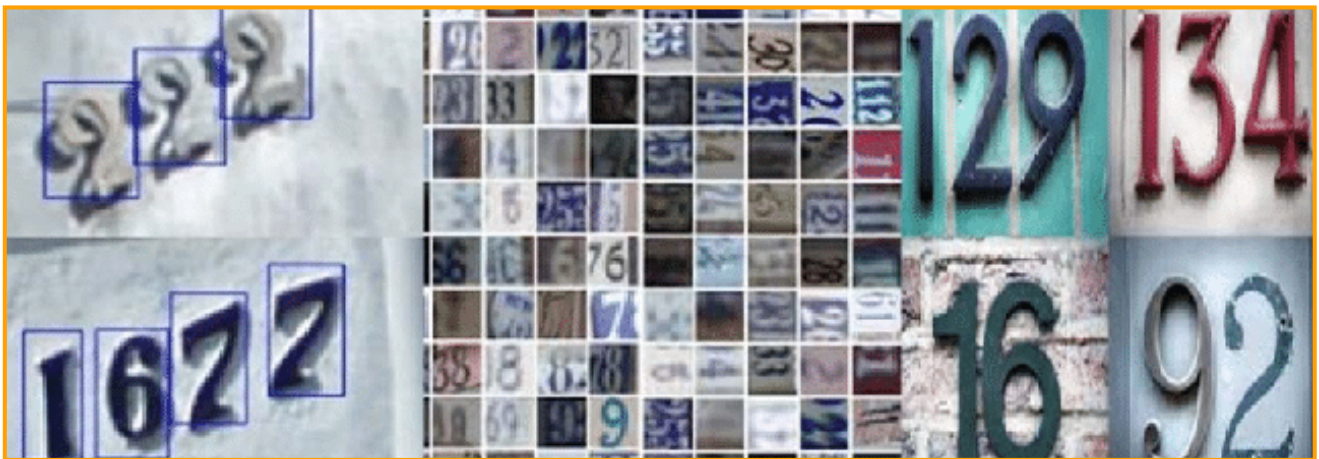
More broadly, recognizing numbers in photographs is a problem of interest to the optical character recognition community. While OCR on constrained domains like document processing is well studied, arbitrary multi-character text recognition in photographs is still highly challenging. This difficulty arises due to the wide variability in the visual appearance of text in the wild on account of a large range of fonts, colors, styles, orientations, and character arrangements. The recognition problem is further complicated by environmental factors such as lighting, shadows, secularities, and occlusions as well as by image acquisition factors such as resolution, motion, and focus blur.

5   Predicting the condition of the patient depending on the received test results

This project has two parts. In the first part we are trying to predict the condition of the patient depending on the received test results on biomechanics features of the patients according to their current conditions. In part II, we need to design a supervised learning prediction model to perform targeted marketing for executing a digital marketing campaign for a bank.

6 **To build a NLP classifier which can use input text parameters to determine the label/s of the blog.**

Classification is probably the most popular task that you would deal with in real life. Text in the form of blogs, posts, articles, etc. is written every second. It is a challenge to predict the information about the writer without knowing about him/her. We are going to create a classifier that predicts multiple features of the author of a given text. We have designed it as a Multi label classification problem.

7 **To build a recommendation system using popularity based and collaborative filtering methods to recommend mobile phones to a user which are most popular and personalised respectively.**

India is the second largest market globally for smartphones after China. About 134 million smartphones were sold across India in the year 2017 and is estimated to increase to about 442 million in 2022. India ranked second in the average time spent on mobile web by smartphone users across Asia Pacific.

The combination of very high sales volumes and the average smartphone consumer behaviour has made India a very attractive market for foreign vendors. As per Consumer behaviour, 97% of consumers turn to a search engine when they are buying a product vs. 15% who turn to social media.

If a seller succeeds to publish smartphones based on user's behaviour/choice at the right place, there are 90% chances that user will enquire for the same. This Case Study is targeted to build a recommendation system based on the individual consumer's behaviour or choice.

8 Sarcasm Detection using Bidirectional LSTMs

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 requires 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.

9 To build a semi-rule based text chat bot which can give static responses to the user depending on the inputs for industrial safety and incidents

Linguistic chatbots have become a must to have automation for large organisations with a huge client base. They serve as a virtual support, Helpdesk, sales agents etc enhancing the business and the customer experience.

10 To build an image classifier and object detection model which can classify a car from an image and identify the location of the car from an image by publishing a bounding box around it
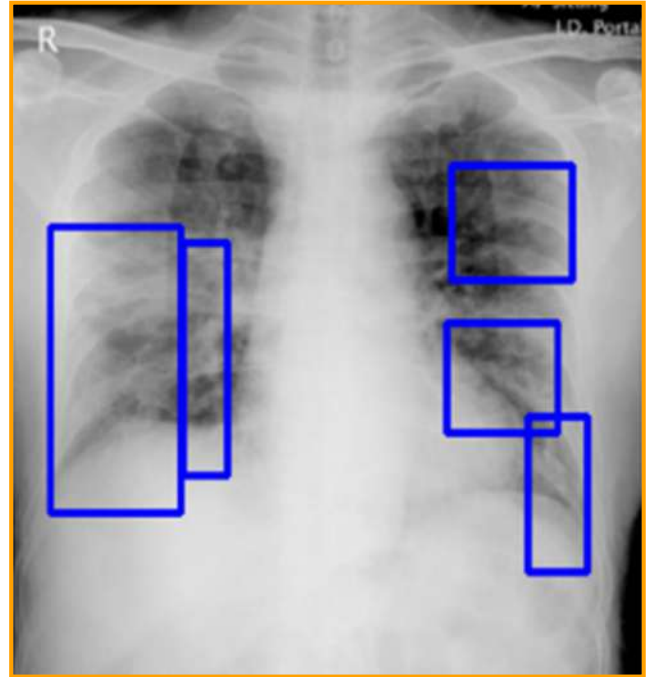
Image classifiers have become a must to have automation for organisations chasing towards employing autonomous AI bots. Computer vision can be used to automate supervision and generate appropriate action triggers if the event is predicted from the image of interest. For example a car moving on the road can be easily identified by a camera as make of the car, type, colour, number plates, etc.
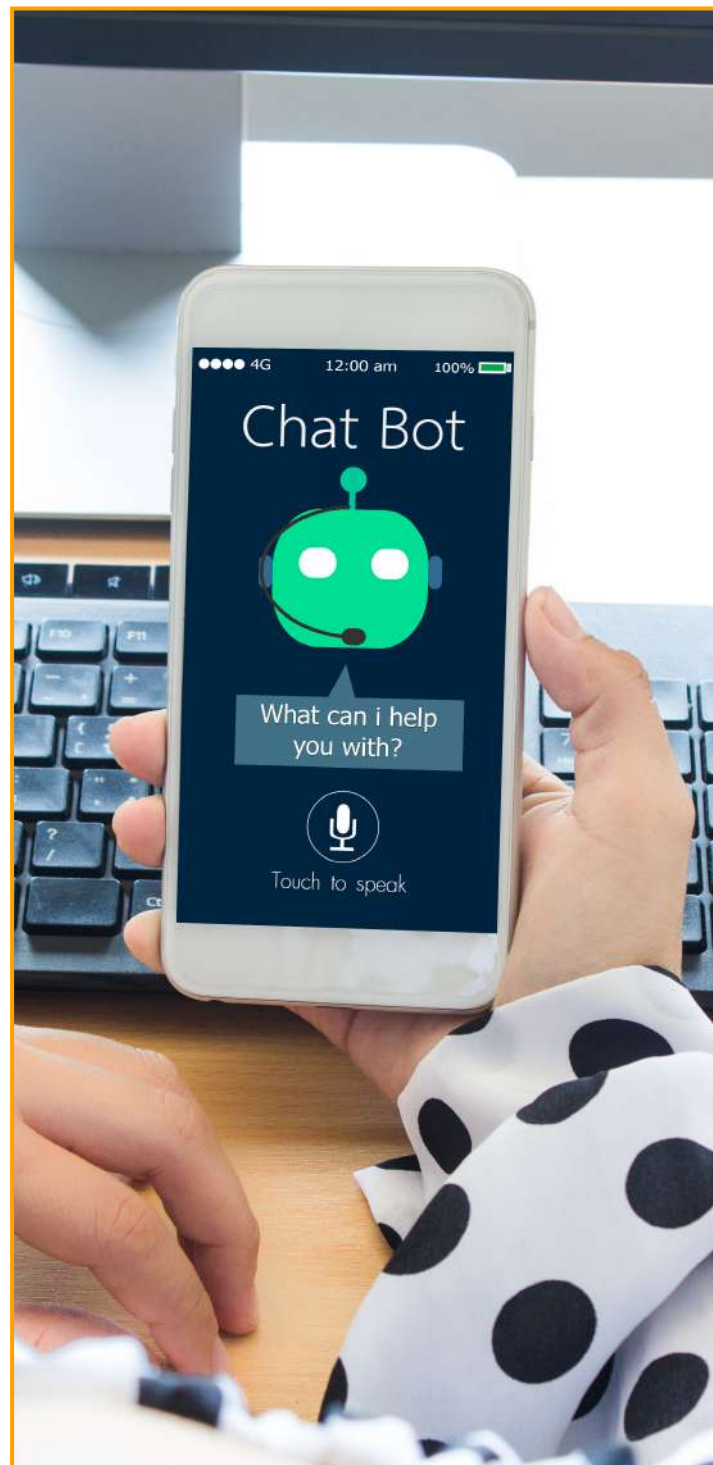
11 **To build an image classifier and object detection model which can classify an chest X-ray image into with/without pneumonia disease and identify the location of the chest X-ray where the disease is localised by publishing a bounding box around it**

The designed model can be used as a micro service within an application which can assist hospitals and patients to detect the health condition of the patient just by scanning the X-ray file generated. Project involves designing a full stack deep learning AI solution covering data warehousing, data cleansing, validation, machine learning model design/ validation/tuning, model freezing/baseline and model deployment using a clickable UI.

12 **To build an image classifier which can classify images of dogs as per their breeds**

Image classifiers have become a must to have automation for organisations chasing towards employing autonomous AI bots. This image classifier can be a micro service for identifying if the captured image is a dog and later identifying which breed or class the animal belongs to. The learnings and experience obtained to design this automation can be trained and deployed on different image/class dataset too.

FACULTY

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Machine Learning
(*Great Learning*)

PROF. ABHINANDA SARKAR
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(*Great Learning*)

DR. ARJUN JAIN
Adjunct Faculty Member,
Department of Computational
and Data Sciences (*IISc*)

DR. AMIT SETHI
Faculty
(*IIT Bombay*)

Faculty has contributed to program curriculum and online learning content only.

TESTIMONIALS

MANISH KUMAR
Senior Engineer, **Tata Consulting
Engineers Limited**

"The program learning experience has been smooth and great. The program is well structured and the learning content provided is up-to-date and covers both theoretical and industrial application aspects. Hands-on exercises and projects at the end of the module are really helpful in gaining confidence."

DHINESH KUMAR GANESHAN
Lead Consultant
Infosys

"Great Learning's PGP-AIML Course is an eye-opener on future technologies and opportunities and is led by industry experts who put their efforts into ensuring that the knowledge is shared in the right sense. They try to help students to gain critical information that is important for their career success."

GREAT ALUMNI WORK IN LEADING COMPANIES

Microsoft	amazon	Google	YAHOO!
Cognizant	DELL	hp	IBM
Adobe	Infosys	accenture	MAERSK
ORACLE	intel	Standard Chartered	AMERICAN EXPRESS
Deloitte.	McKinsey&Company	BARCLAYS	yatra.com
TARGET	HCL	PHILIPS	SONY
Honeywell	NOKIA	vmware	SAP
KPMG	hTC	Deutsche Bank	QUALCOMM
TAJ	verizon	Jio	EY
Flipkart	citi	Capgemini	SAMSUNG
Fractal	J.P.Morgan	zomato	CISCO
RBS	Shell	Hindustan Unilever Limited	BOEING
SIEMENS	Morgan Stanley	Mu Sigma	vodafone

ADMISSION DETAILS

ELIGIBILITY

Applicants should have a Bachelor's degree with a minimum of 50% aggregate marks or equivalent and familiarity with programming. For candidates who do not know Python, we offer a free pre-program tutorial.

SELECTION PROCESS

Apply

Apply by filling a simple online application form

Interview Process

Go through a screening call with the Admission Director's office

Join Program

An offer letter will be rolled out to the selected candidates
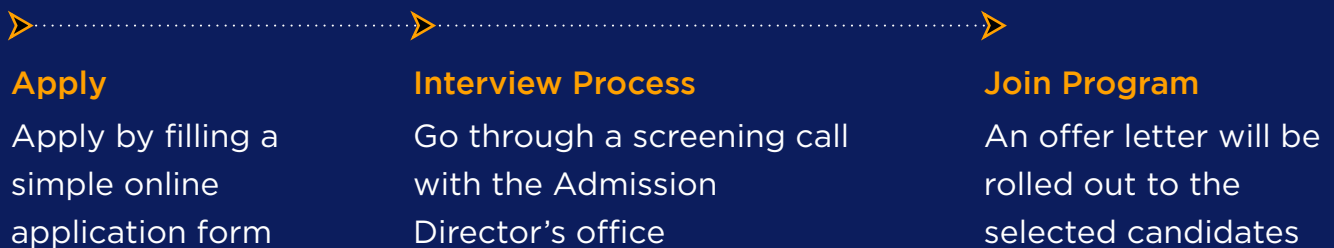
PROGRAM FEE

₹2,40,000+GST

PAYMENTS

Candidates can pay the program fee through net banking, credit cards or debit cards

FINANCIAL AID

With our corporate financial partnerships avail education loans at 0% interest rate*.

HDFC CREDILA
The Education Loan Specialist

zest money

eduvanz
Making Education Accessible

LIQUILOANS

*Conditions Apply. Please reach out to the admissions team for more details.

PROGRAM PARTNERS

TEXAS McCombs
The University of Texas at Austin
McCombs School of Business

The University of Texas—Austin is one of the largest schools in USA. It was founded in 1883. Today UT Austin is a world-renowned higher education, research-intensive institution, serving more than 51,000 students annually with a teaching faculty of around 3,000. University of Texas at Austin is ranked #4 worldwide for Business Analytics according to the QS University rankings 2020.

GREAT LAKES
EXECUTIVE LEARNING

Great Lakes mission is to become a Center of Excellence in fostering managerial leadership and entrepreneurship in the development of human capital through quality research, teaching, residential learning and professional management services.

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Great Learning is one of India's leading ed-tech companies for professional and higher education. It offers comprehensive, industry-relevant programs in Software Engineering, Business Management, Business Analytics, Data Science, Machine Learning, Artificial Intelligence, Cloud Computing, Cyber Security, Digital Marketing, Design Thinking, and more. Great Learning's programs are developed in collaboration with the world's foremost academic institutions like Stanford University, The University of Texas at Austin, Indian Institute of Technology, Madras (IIT Madras), People's Education Society University, Bengaluru (PES University, Bengaluru) and Great Lakes Institute of Management and are constantly reimagined and revamped to address the dynamic needs of the industry. Great Learning is the only ed-tech company to provide these programs in a blended mode, classroom mode and in purely online mode, relying on its vast network of expert mentors and highly qualified faculty to deliver an unmatched learning experience for learners in India and the world over. Having impacted 750,000 learners from over 160+ countries, Great Learning is on a mission to enable transformative learning and career success in the digital economy for professionals and students across the globe.

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APPLY NOW

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