

Post Graduate Certificate in
**MACHINE LEARNING &
DEEP LEARNING**



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About upGrad and IITB

upGrad has delivered over 20 million hours of learning, delivering programs by collaborating with universities across the world including Duke CE, IIT Madras, IIT Bangalore and Deakin Business School among others.

Online education is a fundamental disruption that will have a far-reaching impact. upGrad was founded taking this into consideration. upGrad is an online education platform to help individuals develop their professional potential in the most engaging learning environment. Since inception, upGrad has delivered over 20 million hours of learning, delivering programs by collaborating with universities across the world including Duke CE, Golden Gate University, Edgewood College, IIT Bangalore among others. upGrad is focussed on helping working professionals in their bid to learn, grow and move up in their career through a wide-range of programs designed to improve their expertise.

IITB is a renowned university offering programs specialising in data science, machine learning and artificial intelligence. The IITB faculty includes an average of 15+ yrs of experience & will be covering the conceptual depths of Neural Networks & Deep Learning in

this program. This will be further complemented by industry relevant case studies from major industry verticals by industry leaders with 8+ yrs of experience from upGrad's industry network. The strong career support, industry mentorship and the credibility of this Advanced Certification Programme from IITB will provide you with just the right push to accelerate your career in Machine Learning and Deep Learning!

Who is this program for?

This program is for anyone looking to gain a foothold in the Machine Learning Industry and there is no previous background necessary in this field to undertake this program. As long as you have the passion to learn, this cutting-edge program will ensure you're equipped to kick-start your Machine Learning career. In order to enrol, you must fill out an application form which may begin your journey in ML & Deep Learning!

Program Highlights

For The Industry, By The Industry

Learn and apply concepts on industry projects and work on a mini-capstone project along with personalised industry mentorship.

Student Support Team

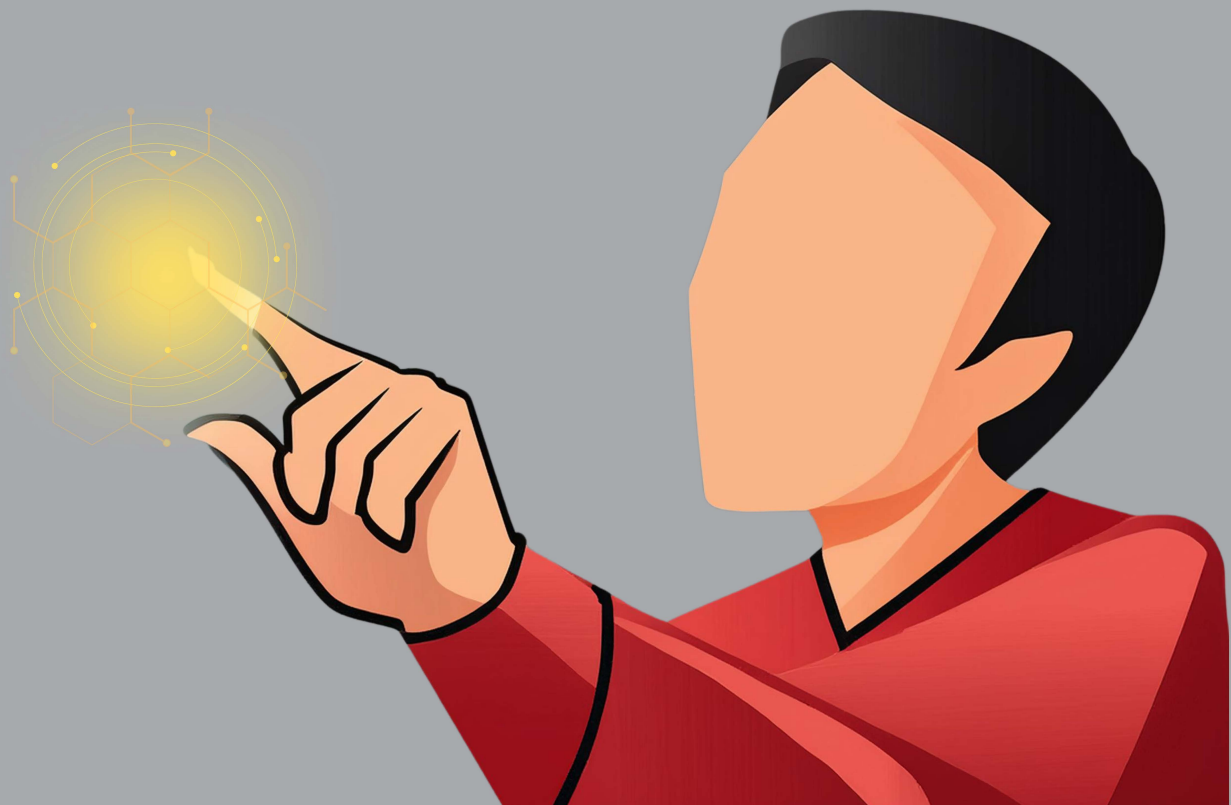
To help resolve your non-academic queries.

Advanced Certification Programme from IIITB

Differentiate yourself from your peers by earning the industry recognized Advanced Certification from IIIT Bangalore.

Unparalleled Learning Experience

Learn the concepts from experienced IIITB faculty and understand the applications from Industry experts to get a blend of theoretical knowledge and practical hands-on experience.





Faculty and Industry Experts



**Prof. Chandrashekar
Ramanathan**

Dean | Academics
IIIT-B

Prof. Chandrashekar has a PhD from Mississippi State University and over 10 years of experience in several multinational organisations.



Prof. G. Srinivasaraghavan
Professor, IIIT-B

Prof. Srinivasaraghavan has a PhD in Computer Science from IIT Kanpur and 18 years of experience with Infosys Technologies and several other well-known organisations.



Prof. S. Sadagopan
Director, IIIT-B

Prof. Sadagopan is currently the Director (President) of IIIT Bangalore. He has an M.S. and a PhD from Purdue University as well as a B.E. (Hons) degree from Madras University.



Dinesh Babu Jayagopi
Assistant Professor, IIIT-B

Prof. Dinesh has a PhD from Ecole Polytechnic Federate Switzerland, M.Sc. from IISc Bangalore in System Science and Signal Processing, and B.Tech.



Mirza Rahim Baig
Lead | Business Analytics
Flipkart

Advanced analytics professional with 8+ years of experience as a consultant in the e-commerce and healthcare domains.



Srinath Srinivasa
Professor & Dean | R&D
IIIT-B

He holds a PhD in Information Systems from the Berlin-Brandenburg Graduate School, Germany, and is a recipient of various international grants.

upGrad Learning Experience

Career Assistance

- **Career Mentorship Sessions (1:1)**
 - Get mentored by an experienced industry expert and receive personalised feedback to achieve your desired outcome
- **High Performance Coaching (1:1)**
 - Get a dedicated career coach after the program to help track your career goals, coach you on your profile, and support you during your career transition journey
- **AI Powered Profile Builder**
 - Obtain specific, AI powered inputs on your resume and LinkedIn structure along with content on real time basis
- **Interview Preparation**
 - Get access to Industry Experts and discuss any queries before your interview
 - Career bootcamps to refresh your technical concepts and improve your soft skills

Learning Support

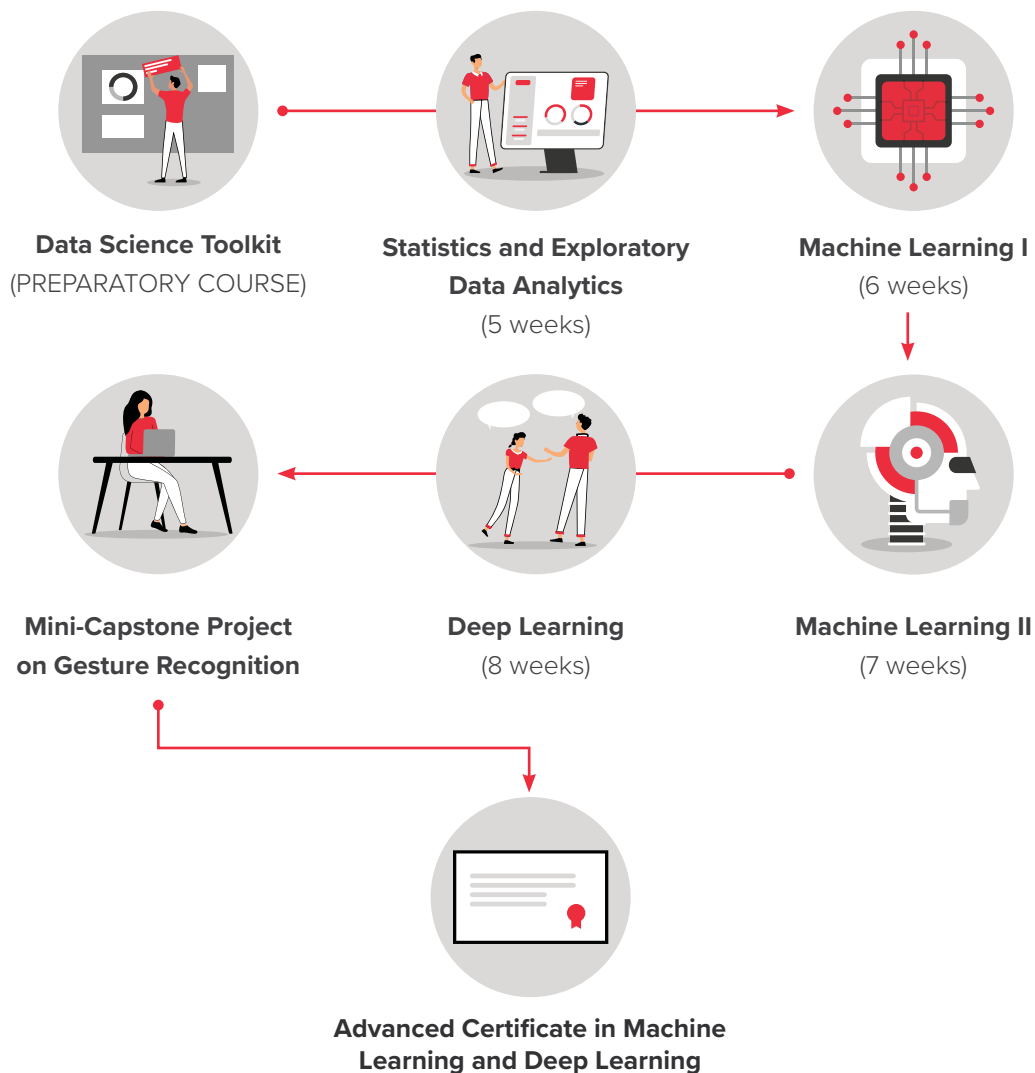
- **Industry Expert Guidance**
 - Interactive Live Sessions with leading industry experts covering curriculum + advanced topics
 - Personalised Industry Session in small groups (of 10-12) with industry experts to augment program curriculum with customized industry based learning
- **Student Support**
 - Student Support is available 7 days a week, 24*7 for non-academic queries
 - You can write to us via studentsupport@upgrad.com Or for urgent queries, use the "Talk to Us" option on the Learn platform.

Practical Learning and Networking

- **Hands-on Projects & Hackathons**
 - 6 projects & assignments and a Mini-Capstone Project to apply your learnings
 - 1 Hackathon every quarter to network & build on core concepts
 - Live coding classes on Kaggle & OpenCV
- **Networking & Learning Experience**
 - Live Discussion forum for peer to peer doubt resolution monitored by technical experts
 - Peer to peer networking opportunities with a alumni pool of 10000+
 - Lab walkthroughs of industry-driven projects
 - Weekly real-time doubt clearing sessions



Learning Path



Programming Tools, Languages & Libraries

Pandas, Matplotlib, Numpy, Seaborn, Scikit-learn, Statsmodels, Open CV, Python, Keras, Tensorflow, MySQL, Excel.

Program Curriculum

DATA SCIENCE TOOLKIT

1

INTRODUCTION TO PYTHON

Build a foundation for the most in-demand programming language of the 21st century.

2

PYTHON FOR DATA SCIENCE

Learn how to manipulate datasets in Python using Pandas, which is the most powerful library for data preparation and analysis.

3

DATA VISUALISATION IN PYTHON

Humans are visual learners and hence no task related to data is complete without visualisation. Learn to plot and interpret various graphs in Python and observe how they make data analysis and drawing insights easier.

4

DATA ANALYSIS USING SQL

Data in companies is definitely not stored in excel sheets! Learn the fundamentals of database and extract information from RDBMS using the structured query language.

5

ADVANCED SQL AND BEST PRACTICES

Apply advanced SQL concepts like windowing and procedures to derive insights from data and answer pertinent business questions.

6

DATA ANALYSIS IN EXCEL

Taught by one of the most renowned data scientists in the country (S.Anand, CEO, Gramener), this module takes you from a beginner level Excel user to an almost professional user.

7

ANALYTICS PROBLEM SOLVING

This module covers concepts of the CRISP-DM framework for business problem-solving.

8

MATH FOR MACHINE LEARNING

Learn the prerequisite mathematical tools and techniques for ML - Linear Algebra and Multivariable Calculus.

STATISTICS AND EXPLORATORY DATA ANALYTICS

1

EXPLORATORY DATA ANALYSIS

Learn how to find and analyse the patterns in the data to draw actionable insights.

2

CLOUD ESSENTIALS: INTRO TO GIT AND GITHUB

Learn version control, collaborating, portfolio making using git. Understand the process of creating repository. Learn the process of creating github portfolio using github pages with jekyll.

3 INFERENCE STATISTICS

Build a strong statistical foundation and learn how to 'infer' insights from a huge population using a small sample.

4 HYPOTHESIS TESTING

Understand how to formulate and validate hypothesis for a population to solve real-life business problems.

5 LENDING CLUB CASE STUDY

Determine which customers are at the risk of default and what are their characteristics so as to avoid providing loans to similar people in the future.

MACHINE LEARNING I

1 LINEAR REGRESSION

Venture into the machine learning community by learning how one variable can be predicted using several other variables through a housing dataset where you will predict the prices of houses based on various factors.

2 LINEAR REGRESSION ASSIGNMENT

Build a model to understand the factors car prices vary on and help a Chinese company enter the US car market.

3 LOGISTIC REGRESSION

Learn your first binary classification technique by determining which customers of a telecom operator are likely to churn to help versus who are not to help business retain customers.

4 NAIVE BAYES

Understand the basic building blocks of Naive Bayes and learn how to build an SMS Spam Ham Classifier using Naive Bayes technique.

5 MODULE SELECTION

Learn the pros and cons of simple and complex models and the different methods for quantifying model complexity, along with regularisation and cross validation.

MACHINE LEARNING II

1 ADVANCED REGRESSION

Understand generalised regression and different feature selection techniques, along with the perils of overfitting and how it can be countered using regularisation.

2 ADVANCED REGRESSION ASSIGNMENT

Build a model to understand the factors house prices vary on and help an American company enter the Australian housing market.

3 SUPPORT VECTOR MACHINE (OPTIONAL)

Learn how to find a maximal marginal classifier using SVM, and use them to detect spam emails, recognise alphabets and more!

4 TREE MODELS

Learn how the human decision making process can be replicated using a decision tree and other powerful ensemble algorithms.

5 MODEL SELECTION: PRACTICAL CONSIDERATIONS

Given a business problem, how do you choose the best algorithm? Learn a few practical tips for doing this here.

6 BOOSTING

Learn how weak learners can be 'boosted' with the help of each other and become strong learners using different boosting algorithms such as Adaboost, GBM, and XGBoost.

7 UNSUPERVISED LEARNING: CLUSTERING

Learn how to group elements into different clusters when you don't have any pre-defined labels to segregate them through K-means clustering, hierarchical clustering, and more.

8 UNSUPERVISED LEARNING: PRINCIPAL COMPONENT ANALYSIS

Understand important concepts related to dimensionality reduction, the basic idea and the learning algorithm of PCA, and its practical applications on supervised and unsupervised problems.

9 TELECOM CHURN CASE STUDY

Solve the most crucial business problem for a leading telecom operator in India and southeast Asia - predicting customer churn.

DEEP LEARNING

1 INTRODUCTION TO NEURAL NETWORKS

Learn the most sophisticated and cutting-edge technique in machine learning - Artificial Neural Networks or ANNs.

2 CONVOLUTIONAL NEURAL NETWORKS -INDUSTRY APPLICATIONS

Learn the basics of CNN and OpenCV and apply it to Computer Vision tasks like detecting anomalies in chest X-Ray scans, vehicle detection to count & categorise them to help the government ascertain the width and strength of the road.

3 CONVOLUTIONAL NEURAL NETWORKS - ASSIGNMENT

Build a neural network from scratch in Tensorflow to identify the type of skin cancer from image.

4 RECURRENT NEURAL NETWORKS

Ever wondered what goes behind machine translation, sentiment analysis, speech recognition etc.? Learn how RNN helps in these areas having sequential data like text, speech, videos, etc.

5 NEURAL NETWORKS PROJECT - GESTURE RECOGNITION

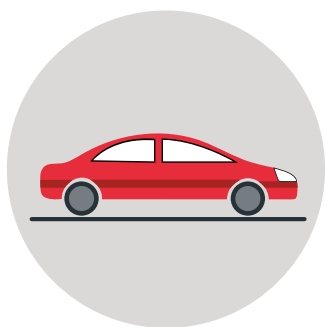
Make a Smart TV system which can control the TV with user's hand gestures as the remote control.

Industry Projects



Investment Analysis

Fill in the shoes of an analyst at an investment bank and determine where the firm should invest. Explain your recommendations in lieu of the analysis conducted.



Car Price Prediction

Build a model to understand the factors car prices vary on and help a Chinese company enter the US car market.



Lending Club Case

Determine which customers are at the risk of default and what are their characteristics so as to avoid providing loans to similar people in the future.



House Price Prediction

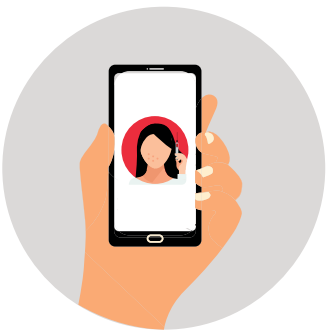
Build a model to understand the factors house prices vary on and help an American company enter the Australian housing market.

Industry Projects



Telecom Churn Case

Solve the most crucial business problem for a leading telecom operator in India and southeast Asia - predicting customer churn.



Skin Cancer Detection

Build a neural network from scratch in Numpy to identify the type of skin cancer from image.

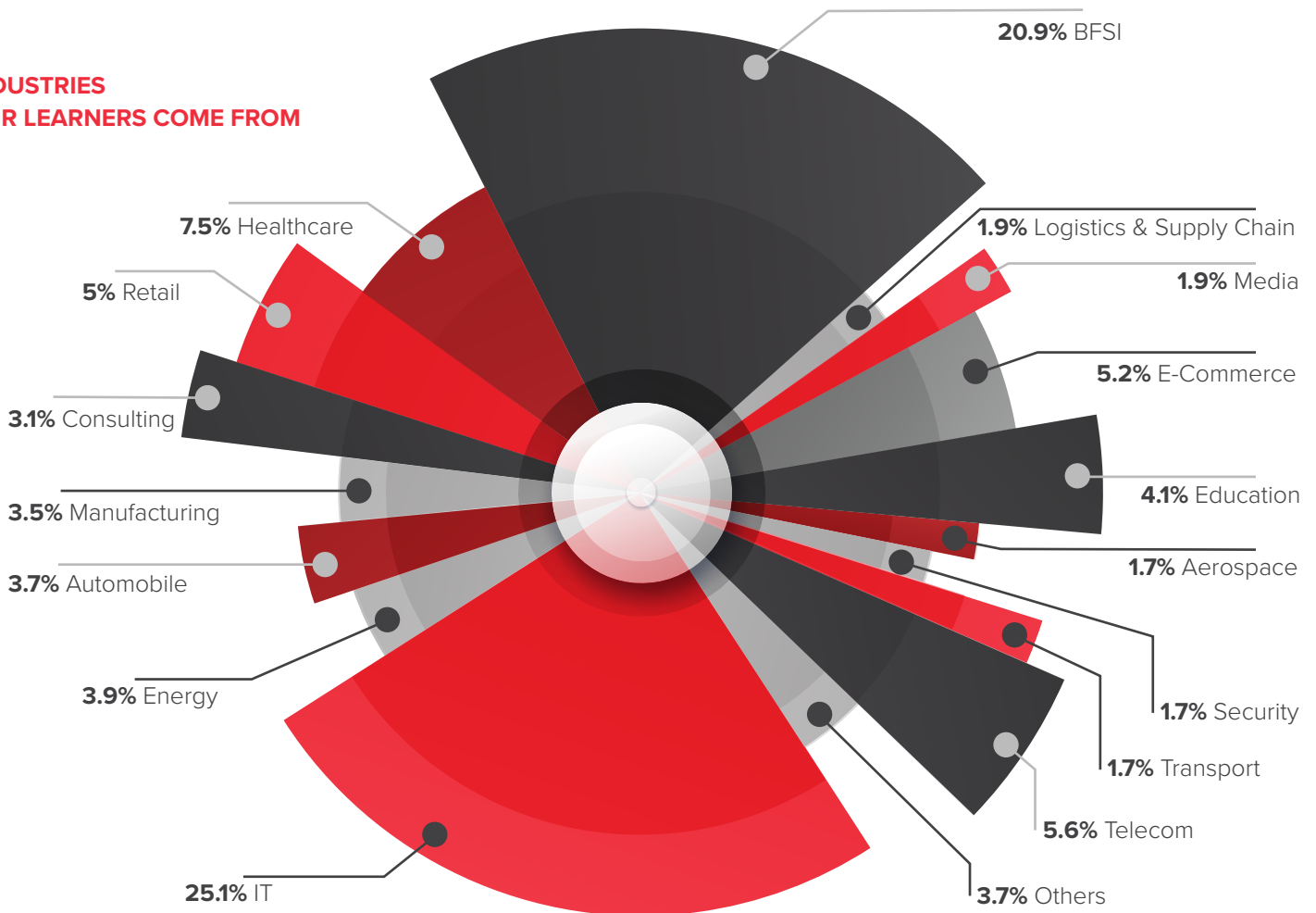


MINI CAPSTONE PROJECT: Gesture Recognition

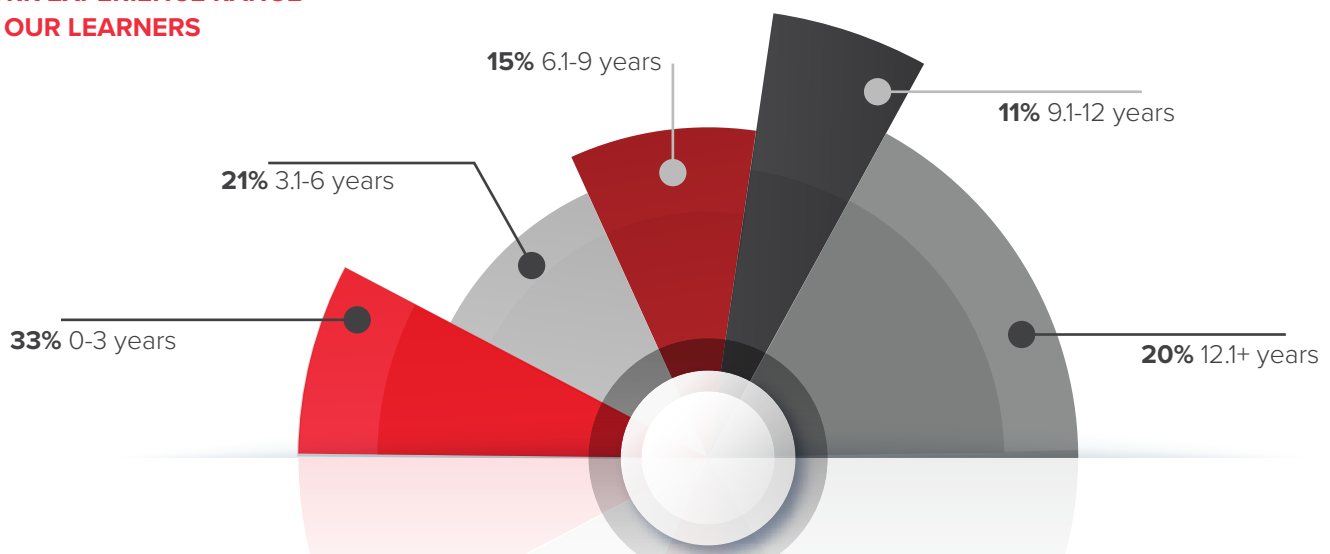
Make a Smart TV system which can control the TV with user's hand gestures as the remote control.

Meet the Class

INDUSTRIES OUR LEARNERS COME FROM



WORK EXPERIENCE RANGE OF OUR LEARNERS



Career Support

Interview Preparation

Pre-recorded content on topics such as:

- Profile building, communications etc
- Problem solving approach
- Approaching guesstimates
- Domain specific interview question bank and much more

Profile Builder (AI-Powered)

An easy to use Resume, LinkedIn and Cover letter preparation tool.

- Resume Score: AI-Driven Resume Score
- Realtime recommendations to improve.
- Match your resume to the JD and check fitment.
- LinkedIn Profile Review.
- Cover Letter creation.

High Performance Coaching

Dedicated coaches working with you to identify best suited career opportunities

- Help you define your value proposition
- Lay out a Career Path and help you adhere to your timelines and goals
- Help you with interview preparations, finding jobs in the market, salary negotiations and other preparation as required

Personalised Industry Session

90-minute sessions biweekly by leading industry experts

- Session categories: Career, Technical and Communications.
- Doubt resolution
- Develop proof of concepts and apply theoretical concepts in the real world
- Assess skill levels
- Peer Networking
- Classroom element
- Business communication sessions and much more

Career mentorship Sessions

Get personalised career advice through 1-1 sessions with industry experts

- Goal setting for better employment results

Program Details and Admission Process

PROGRAM DURATION AND FORMAT

8 Months | Online

PROGRAM FEE

Refer to the website

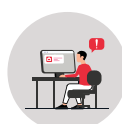
PROGRAM START DATES

Please refer to the [website](#) for the program start dates.

ELIGIBILITY

Bachelor's degree with 50% or equivalent passing marks.

TIME COMMITMENT (12 hours/week)



6 HOURS

Asynchronous learning time.



6 HOURS

Assignments and projects.



LIVE SESSION

Every weekend.

SELECTION PROCESS



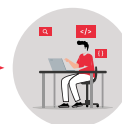
STEP 1: Fill out the Application Form

Fill out an application with details on your professional & educational background.



STEP 2: Review and Shortlisting of Suitable Candidates

Our Admissions Committee will review all applications and will consider the educational and professional background of an applicant. Following this, offer letters will be rolled out so you're assured a great peer group to learn and network with.



STEP 3: Enrollment for Access to Prep Content

Make a quick block payment with assistance from our Loan partners where required, receive immediate access to the prep content and begin your upGrad journey.

For any queries, reach us on the following numbers:

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1900-23-23-06, connect@upgrad.com - Vietnam

Disclaimer: Program fee and payment options are subject to change. Please refer to the website for updated details or speak to our admission counsellor.