Postgraduate Certificate
Deep Computer Vision with Convolutional Neural Networks

tech technological university

tech technological university

Postgraduate Certificate
Deep Computer Vision with Convolutional Neural Networks

» Modality: **online**
» Duration: **6 weeks**
» Certificate: **TECH Technological University**
» Schedule: **at your own pace**
» Exams: **online**

Website: **www.techtitute.com/us/engineering/postgraduate-certificate/deep-computer-vision-convolutional-neural-networks**

Index

01
Introduction

In a highly changing environment such as Engineering, Deep Computer Vision with Convolutional Neural Networks has become a fundamental tool to process images and solve complex problems in various fields. Therefore, this TECH program has been designed to meet the growing demand for highly qualified professionals in this field. With a practical approach and detailed teaching, the program enables students to design and implement solutions for real-world problems in areas such as engineering, robotics and security. In addition, its 100% online format offers them the flexibility to adapt their study to their needs and access the theoretical-practical contents from anywhere and at any time through the most effective methodology, Relearning.
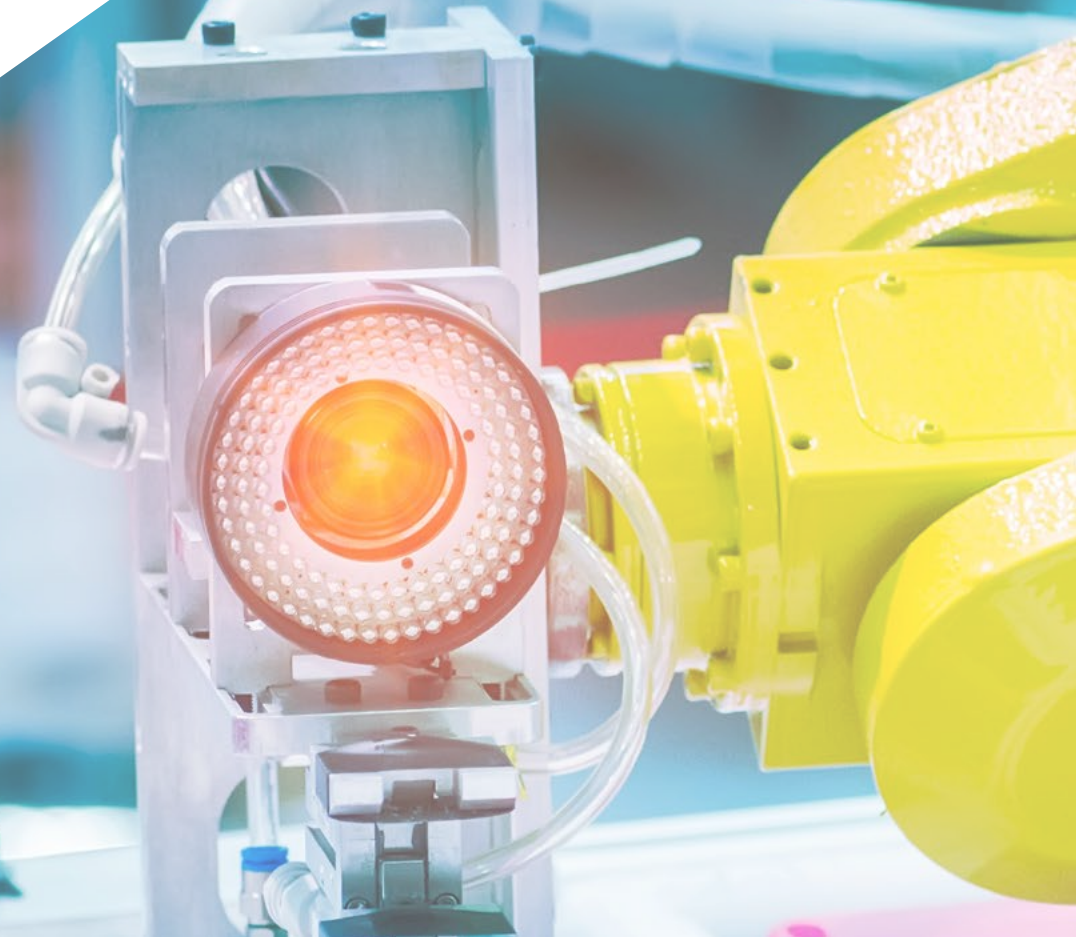
Combine your personal and work responsibilities with your studies thanks to this Postgraduate Certificate. 100% flexible and online"

Deep Computer Vision with Convolutional Neural Networks has become one of the most widely used techniques in modern engineering, thanks to its ability to process images and videos with high efficiency and accuracy. In that sense, Convolutional Neural Networks are able to extract complex features from images and learn patterns in them, which makes them an essential tool for object recognition, real-time object detection and tracking of moving objects in a wide variety of fields, from medicine to security and industrial automation.

In order to meet the growing demand for highly qualified professionals in this area, TECH has designed a program that offers students comprehensive instruction in the latest techniques and tools in image and video processing using Convolutional Neural Networks, including Tensorflow and Keras.

TECH has created a complete program based on its unique Relearning methodology to enhance student learning. This teaching process was conceived so that the graduate integrates the fundamental concepts in a natural and progressive way through repetition. In this way, the student will acquire the necessary skills at their own pace.

In addition, the program has been designed in a completely online format so that the professional can focus exclusively on learning, without having to travel or adjust to a fixed schedule. Moreover, the graduate will have the ability to access the theoretical and practical contents at any time and from anywhere, as long as they have a device with an Internet connection.

This **Postgraduate Certificate in Deep Computer Vision with Convolutional Neural Networks** contains the most complete and up-to-date program on the market. The most important features include:

- The development of case studies presented by experts in Deep Learning
- The graphic, schematic, and practical contents with which they are created, provide practical information on the disciplines that are essential for professional practice
- Practical exercises where self-assessment can be used to improve learning
- Its special emphasis on innovative methodologies
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection

Access a booming sector with great projection and you will be able to excel in a wide variety of applications, such as computer vision, natural language processing, robotics and voice recognition"

Learn to classify and localize in Deep Computer Vision and develop effective CNN architectures with Keras thanks to this exclusive qualification.

With the Relearning methodology you will acquire knowledge progressively and with total flexibility. A program that adapts to you"

You will gain access to the most cutting-edge knowledge of Deep Computer Vision and you will delve into this important branch of artificial intelligence with an effective methodology and in a 100% online format.

The program's teaching staff includes professionals from sector who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

Its multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide an immersive education programmed to learn in real situations.

The design of this program focuses on Problem-Based Learning, by means of which the professional must try to solve the different professional practice situations that are presented throughout the academic course. For this purpose, the student will be assisted by an innovative interactive video system created by renowned experts.

02
Objectives

This academic qualification has been conceived with the purpose of offering the graduate the most advanced theoretical, practical and additional contents in Deep Computer Vision with Convolutional Neural Networks in just 6 weeks. Due to the high level of the demanding syllabus, any professional will be able to achieve their most ambitious goals through a program adapted to their needs, presented in an online format that is 100% accessible and convenient.

Upgrade your competencies in pre-trained models for transfer learning to improve your professional future. This is the best time and you have before you the best program to achieve it"

General Objectives

- Lay the foundation for the key concepts of mathematical functions and their derivatives
- Apply these principles to deep learning algorithms to learn automatically
- Examine the key concepts of Supervised Learning and how they apply to neural network models
- Analyze the training, evaluation, and analysis of neural network models
- Lay the foundation for the key concepts and main applications of deep learning
- Implement and optimizes neural networks with Keras
- Develop expertise in the training of deep neural networks
- Analyze the optimization and regularization mechanisms necessary for deep network training

Specific Objectives

◆ Explore and understand how convolutional and clustering layers work for Visual Cortex architecture

◆ Develop CNN architectures with Keras

◆ Use pre-trained Keras models for object classification, localization, detection and tracking, as well as semantic segmentation

"
You will reach your professional objectives thanks to the aptitudes and skills that this Postgraduate Certificate will provide you with, and you will be accompanied by the best professionals along the way"

03
Course Management

This TECH Postgraduate Certificate is aimed at Engineering professionals interested in updating their knowledge in Advanced Deep Learning . This program has a highly specialized and experienced teaching team in the discipline, which guarantees quality teaching. Students enrolled in this program will be able to take advantage of the experience and practice of the teaching team to face the current challenges in the field of Deep Learning and the challenges it presents within Engineering.

Expand your skills with a teaching team specialized in Advanced Deep Learning and with great professional experience"

Management

Mr. Gil Contreras, Armando

- Lead Big Data Scientist-Big Data at Jhonson Controls
- Data Scientist-Big Data at Opensistemas
- Fund Auditor at Creativity and Technology and PricewaterhouseCoopers
- Professor at EAE Business School
- Degree in Economics from the Instituto Tecnológico de Santo Domingo INTEC
- Master's Degree in Data Science at Centro Universitario de Tecnología y Arte
- Master MBA in International Relations and Business at Centro de Estudios Financieros CEF
- Postgraduate Degree in Corporate Finance at the Instituto Tecnológico de Santo Domingo

Professors

Mr. Delgado Panadero, Ángel

- ML Engenieer at Paradigma Digital
- Computer Vision Engineer at NTT Disruption
- Data Scientist at Singular People
- Data Analyst at Parclick
- Tutor at Master in Big data and Analytics at EAE Business School
- Degree in Physics at the University of Salamanca

Mr. Matos, Dionis

- Data Engineer at Wide Agency Sodexo
- Data Consultant at Tokiota Site
- Data Engineer at Devoteam Testa Home
- Business Intelligence Developer at Ibermatica Daimler
- Máster Big Data and Analytics /Project Management(Minor) at EAE Business School

Mr. Villar Valor, Javier

- Director and Founder Partner Impulsa2
- Chief Operating Officer of Summa Insurance Brokers
- Responsible for identifying improvement opportunities at Liberty Seguros
- Director of Transformation and Professional Excellence at Johnson Controls Iberia
- Responsible for the organization of the company Groupama Seguros
- Responsible for Lean Six Sigma methodology at Honeywell
- Director of Quality and Purchasing at SP & PO
- Professor at the European Business School

04

Structure and Content

The design of the syllabus for this program has been carried out by a team of experts in the field of Engineering, more specifically in Deep Computer Vision. Thanks to this, TECH has shape an exhaustive and intensive program that gathers the information required to master this discipline in 6 weeks of specialization. In addition to the very complete syllabus, hours of additional material have been selected that graduates can use to personalize their work according to their level of demand. All this presented in a convenient, 100%-online program with complete accessibility from any device with an Internet connection.

Enroll now and access a syllabus designed by experts and with high quality content for you to achieve successful learning"

Module 1. *Deep Computer Vision* with Convolutional Neural Networks

1.1.   Visual Cortex Architecture
    1.1.1.   Functions of the Visual Cortex
    1.1.2.   Computational Vision Theory
    1.1.3.   Image Processing Models
1.2.   Convolutional Layers
    1.2.1.   Reuse of Weights in Convolution
    1.2.2.   2D Convolution
    1.2.3.   Activation Functions
1.3.   Grouping Layers and Implementation of Grouping Layers with Keras
    1.3.1.   Pooling and Striding
    1.3.2.   *Flattening*
    1.3.3.   Pooling Types
1.4.   CNN Architecture
    1.4.1.   VGG Architecture
    1.4.2.   AlexNet Architecture
    1.4.3.   ResNet Architecture
1.5.   Implementation of a ResNet-34 CNN using Keras
    1.5.1.   Weight Initialization
    1.5.2.   Input Layer Definition
    1.5.3.   Definition of the Output
1.6.   Use of Pre-trained Keras Models
    1.6.1.   Characteristics of Pre-trained Models
    1.6.2.   Uses of Pre-trained Models
    1.6.3.   Advantages of Pre-trained Models
1.7.   Pre-trained Models for Transfer Learning
    1.7.1.   Transfer Learning
    1.7.2.   Transfer Learning Process
    1.7.3.   Advantages of Transfer Learning

An academic syllabus created by experts with the purpose of providing you with solid knowledge in Deep Computer Vision with Convolutional Neural Networks"

05
Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

"

At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world"

You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

Our program prepares you to face new challenges in uncertain environments and achieve success in your career"

The case method is the most widely used learning system in the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

The student will learn to solve complex situations in real business environments through collaborative activities and real cases.

Relearning Methodology

TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

In 2019, we obtained the best learning results of all online universities in the world.

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.

01 learning from evidence

02 relearning from evidence

03 testing

04 learning from an expert

05 neurocognitive context dependent learning

06 Von-Restorff effect

07 case based learning through storytelling

08 competencies testing (retesting)

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically. This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.

This program offers the best educational material, prepared with professionals in mind:

Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.

Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

Practising Skills and Abilities

They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.

Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.

30%

10%

8%

20%

25%

4%

3%
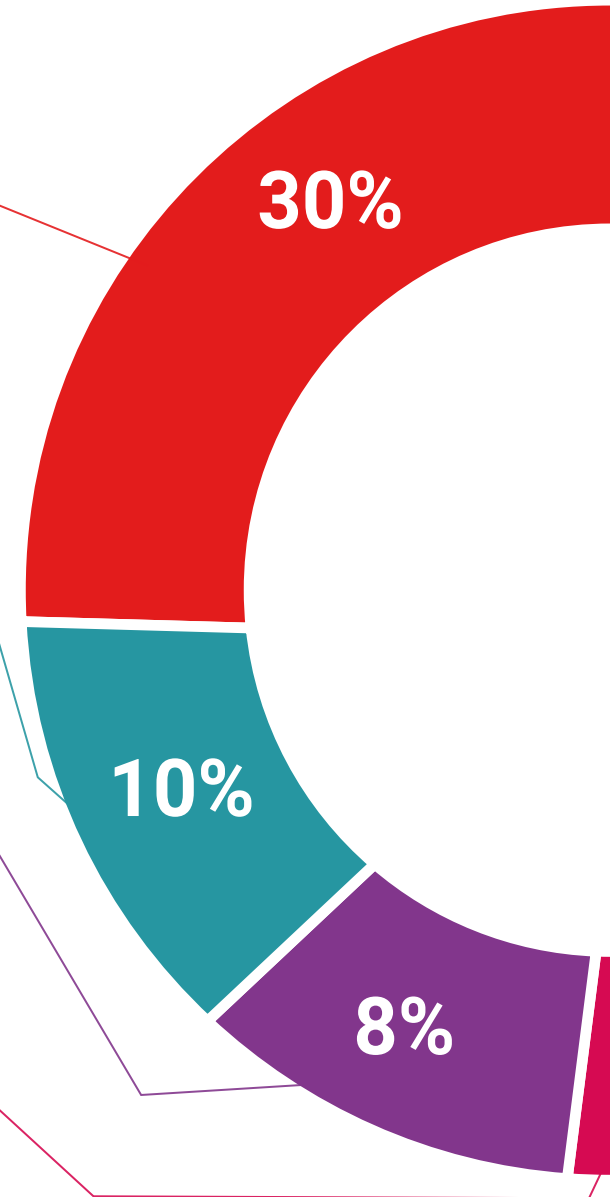
Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.

Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.

06
Certificate

The Postgraduate Certificate in Deep Computer Vision with Convolutional Neural Networks guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.

Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"

This **Postgraduate Certificate in Deep Computer Vision with Convolutional Neural Networks** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Certificate in Deep Computer Vision with Convolutional Neural Networks**

Official No. of Hours: **150 h.**

---

tech technological university

Awards the following

DIPLOMA

to

Mr./Ms. _____, with identification number _____.
For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Deep Computer Vision with Convolutional Neural Networks

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country.   Unique TECH Code: AFWORD23S   techtitute.com/certificates

---

*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

tech technological university

Postgraduate Certificate

Deep Computer Vision with
Convolutional Neural Networks

» Modality: **online**
» Duration: **6 weeks**
» Certificate: **TECH Technological University**
» Schedule: **at your own pace**
» Exams: **online**

Postgraduate Certificate
Deep Computer Vision with Convolutional Neural Networks

tech technological university