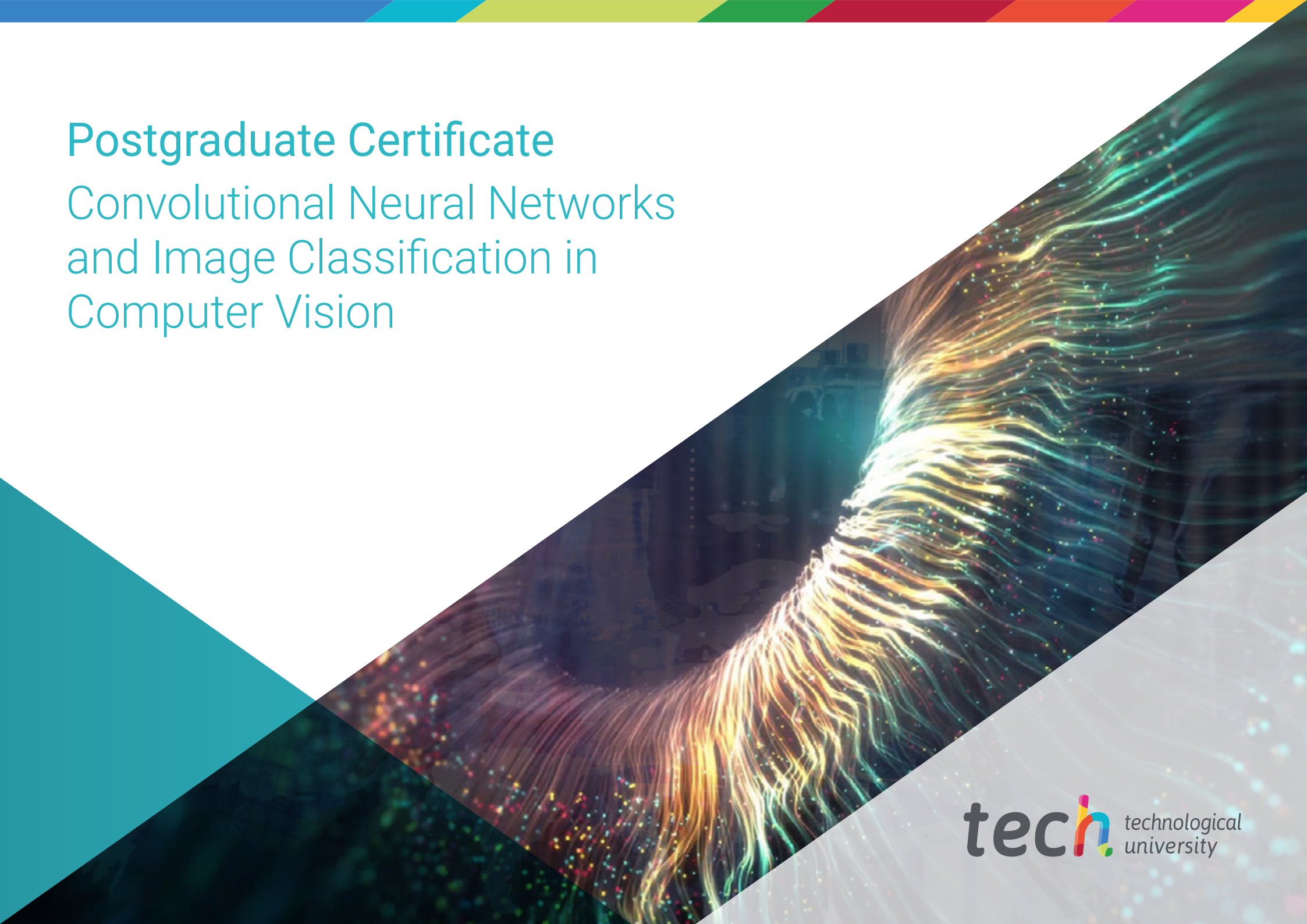
Postgraduate Certificate

Convolutional Neural Networks and Image Classification in Computer Vision



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Postgraduate Certificate

Convolutional Neural Networks and Image Classification in Computer Vision

- Modality: **online**
- Duration: **6 weeks**
- Certificate: **TECH Technological University**
- Dedication: **16h/week**
- Schedule: **at your own pace**
- Exams: **online**

Website: www.techtitute.com/pk/information-technology/postgraduate-certificate/convolutional-neural-networks-image-classification-computer-vision

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01

Introduction

Convolutional neural networks mimic the functioning of neural networks to achieve in-depth learning in numerous tasks. Therefore, these networks are an essential component in the field of artificial intelligence and, especially, in computer vision, since they are perfect for image analysis and classification. This discipline has advanced enormously in recent years and, for that reason, professionals in this field need to catch up in order to be able to work according to the latest developments. This program is offered so that, upon completion, students can apply everything they have learned directly to their work in the field of AI, experiencing immediate career advancement.

Learn, in depth, how convolutional neural networks work and apply them to computer vision, analyzing and classifying all types of images"

The field of Computer Vision is growing, and new tools and knowledge are continually being incorporated to develop it. Therefore, convolutional neural networks are one of the most relevant advances in this field, since, following the operation of neural networks, they provide numerous solutions in this field, especially in image classification.

This Postgraduate Certificate, therefore, offers the professional the most recent advances in this field, so that they can apply them to their work immediately. In this way, the program will delve into issues such as data analysis, metrics, types of CNN layers, the image classification process or model training, among many others.

All this is done following an online teaching methodology that adapts to each student, since it allows them to choose the time and place to study. In addition, students will study under the guidance of a high-level teaching staff composed of working professionals who will teach them, using a range of multimedia resources, everything they need to develop computer vision projects using convolutional neural networks.

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

- Case studies presented by experts in Deep Learning, computer science and computer vision
- The graphic, schematic, and practical contents with which they are created, provide scientific and 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

Computer vision is the present and the future of artificial intelligence and this Postgraduate Certificate will help you to face all its current challenges"

TECH Technological University's innovative teaching methodology includes numerous multimedia teaching resources to make the learning process quicker and more effective"

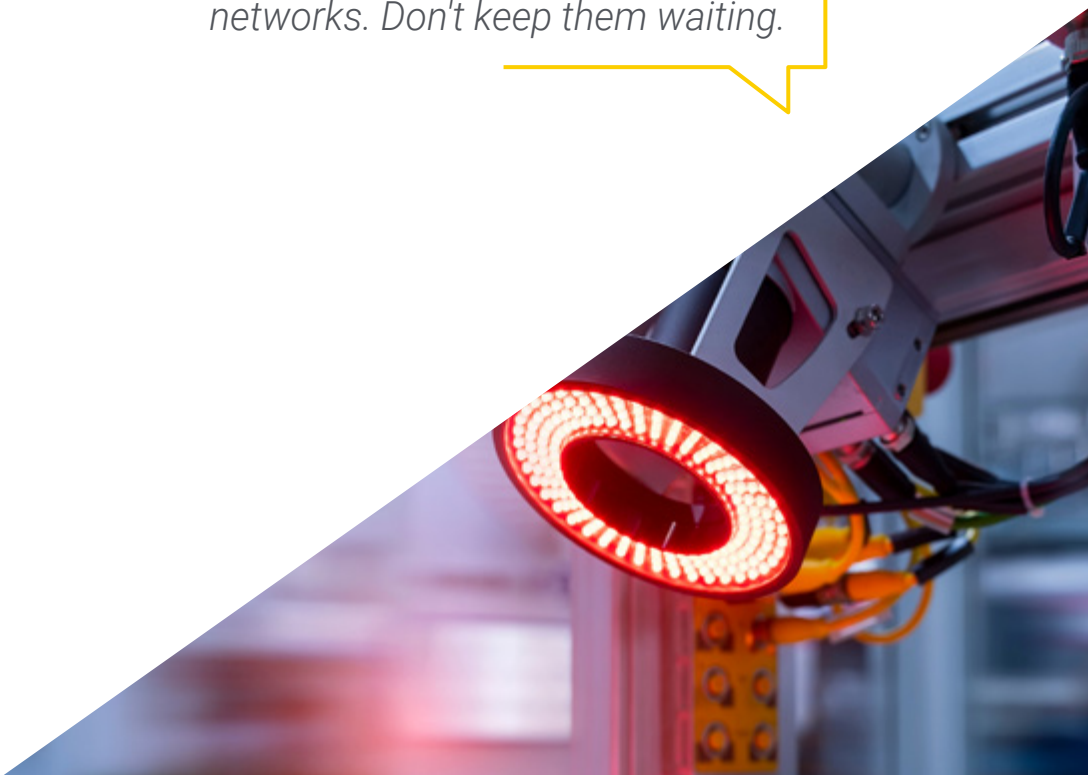
The use of convolutional neural networks is fundamental in the field of computer vision. Enroll now and specialize in this booming field.

Large technology companies are looking for professionals specialized in convolutional neural networks. Don't keep them waiting.

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

The 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 immersive education programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the academic year. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.



02

Objectives

The main objective of this Postgraduate Certificate in Convolutional Neural Networks and Image Classification in Computer Vision is to provide students with up-to-date knowledge so that they are familiar with the latest developments in this complex and exciting technological field. Therefore, at the end of the program, they will be in possession of new tools and knowledge in this field to exercise their professional work according to the most recent advances.

Get up to date and integrate the latest advances in image classification using convolutional neural networks into your professional work"

General Objectives

- Cover convolutional neural networks
- Analyze existing metrics and tools
- Examine the pipeline of an image classification network
- Propose inference methods

The career boost you are looking for is now within your reach. Don't let it go"

Specific Objectives

- Generate specialized knowledge on convolutional neural networks
- Establish evaluation metrics
- Analyze the performance of CNNs for image classification
- Assess Data Augmentation
- Propose techniques to avoid Overfitting
- Examine different architectures
- Compile inference methods

03

Course Management

This Postgraduate Certificate in Convolutional Neural Networks and Image Classification in Computer Vision is taught by a high-level teaching staff. Working professionals with extensive experience in the field of artificial intelligence and computer vision transmit all the keys to succeed in this complex field to the students, emphasizing the enormous developments that this technological field has experienced in recent years.

All the secrets of convolutional neural networks are now just a click away. Enroll now"

Management

Mr. Redondo Cabanillas, Sergio

- Head of Bcnvision's R&D Department
- Project and development manager at Bcnvision
- Machine vision applications engineer at Bcnvision
- Technical Engineering in Telecommunications. Specialization in Image and Sound at the Polytechnic University of Catalonia
- Graduate in Telecommunications. Specialization in Image and Sound by the Polytechnic University of Catalonia
- Lecturer in Cognex vision training for Bcnvision customers
- Teacher in internal courses at Bcnvision to the technical department on vision and advanced development in c#

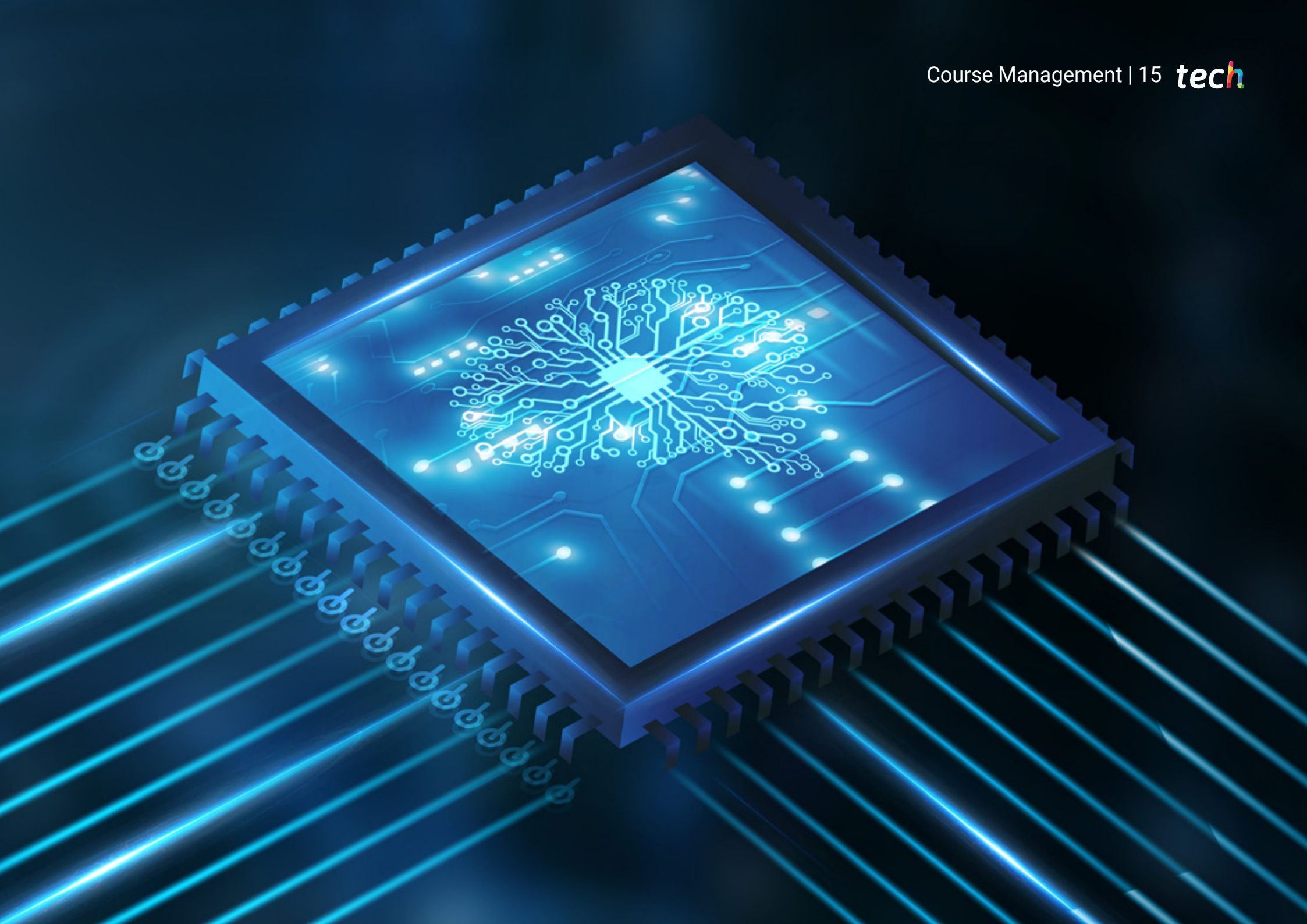
Professors

Mr. Higón Martínez, Felipe

- More than 20 years of experience in different branches of electronics, telecommunications and IT
- Validation and prototyping engineer
- Applications Engineer
- Support Engineer
- Degree in Electronic Engineering from the University of Valencia
- Master's Degree in Advanced and Applied Artificial Intelligence. IA3
- Technical Engineer in Telecommunications

Ms. García Moll, Clara

- Computer Vision Engineer. Satellogic
- Full Stack Developer. Catfons
- Audiovisual Systems Engineering. Pompeu Fabra University (Barcelona)
- Master's Degree in Computer Vision. Autonomous University of Barcelona



04

Structure and Content

This Postgaduate Certificate in Convolutional Neural Networks and Image Classification in Computer Vision follows a structure of 1 specialized module and it delves into issues such as the types of CNN layers, applications of convolutional neural networks, metrics of these networks, existing architectures, model validation after training, analysis of the data obtained or testing the training pipeline, among others.

The latest content in computer vision awaits you. Enroll now and advance in your career"

Module 1. Convolutional Neural Networks and Image Classification

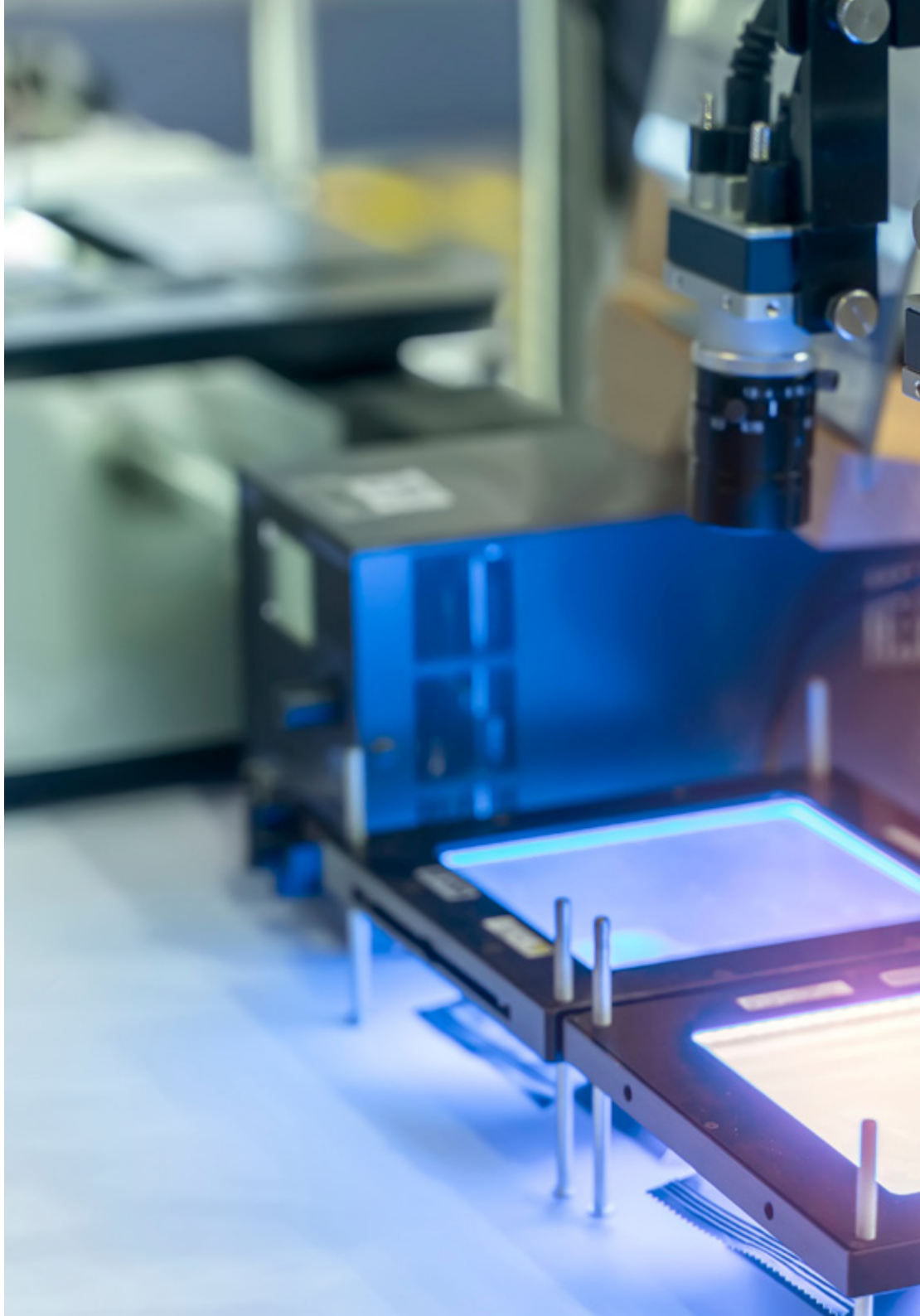
1.1. Convolutional Neural Networks
- 1.1.1. Introduction
- 1.1.2. Convolution
- 1.1.3. CNN Building Blocks

1.2. Types of CNN Layers
- 1.2.1. Convolutional
- 1.2.2. Activation
- 1.2.3. Batch Normalization
- 1.2.4. Polling
- 1.2.5. Fully Connected

1.3. Metrics
- 1.3.1. Matrix Confusion
- 1.3.2. Accuracy
- 1.3.3. Precision
- 1.3.4. Recall
- 1.3.5. F1 Score
- 1.3.6. ROC Curve
- 1.3.7. AUC

1.4. Main Architectures
- 1.4.1. AlexNet
- 1.4.2. VGG
- 1.4.3. Resnet
- 1.4.4. GoogleLeNet

1.5. Image Classification
- 1.5.1. Introduction
- 1.5.2. Analysis of Data
- 1.5.3. Data Preparation
- 1.5.4. Model Training
- 1.5.5. Model Validation



1.6. Practical Considerations for CNN Training
- 1.6.1. Optimizer Selection
- 1.6.2. Learning Rate Scheduler
- 1.6.3. Check Training Pipeline
- 1.6.4. Training with Regularization

1.7. Best Practices in Deep Learning
- 1.7.1. Transfer Learning
- 1.7.2. Fine Tuning
- 1.7.3. Data Augmentation

1.8. Statistical Data Evaluation
- 1.8.1. Number of Datasets
- 1.8.2. Number of Labels
- 1.8.3. Number of Images
- 1.8.4. Data Balancing

1.9. Deployment
- 1.9.1. Saving and Loading Models
- 1.9.2. Onnx
- 1.9.3. Inference

1.10. Case Study: Image Classification
- 1.10.1. Data Analysis and Preparation
- 1.10.2. Testing the Training Pipeline
- 1.10.3. Model Training
- 1.10.4. Model Validation

Specialize in one of the main branches of computer vision with this Postgraduate Certificate"

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.

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

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 has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. 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 course, students 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.

Relearning Methodology

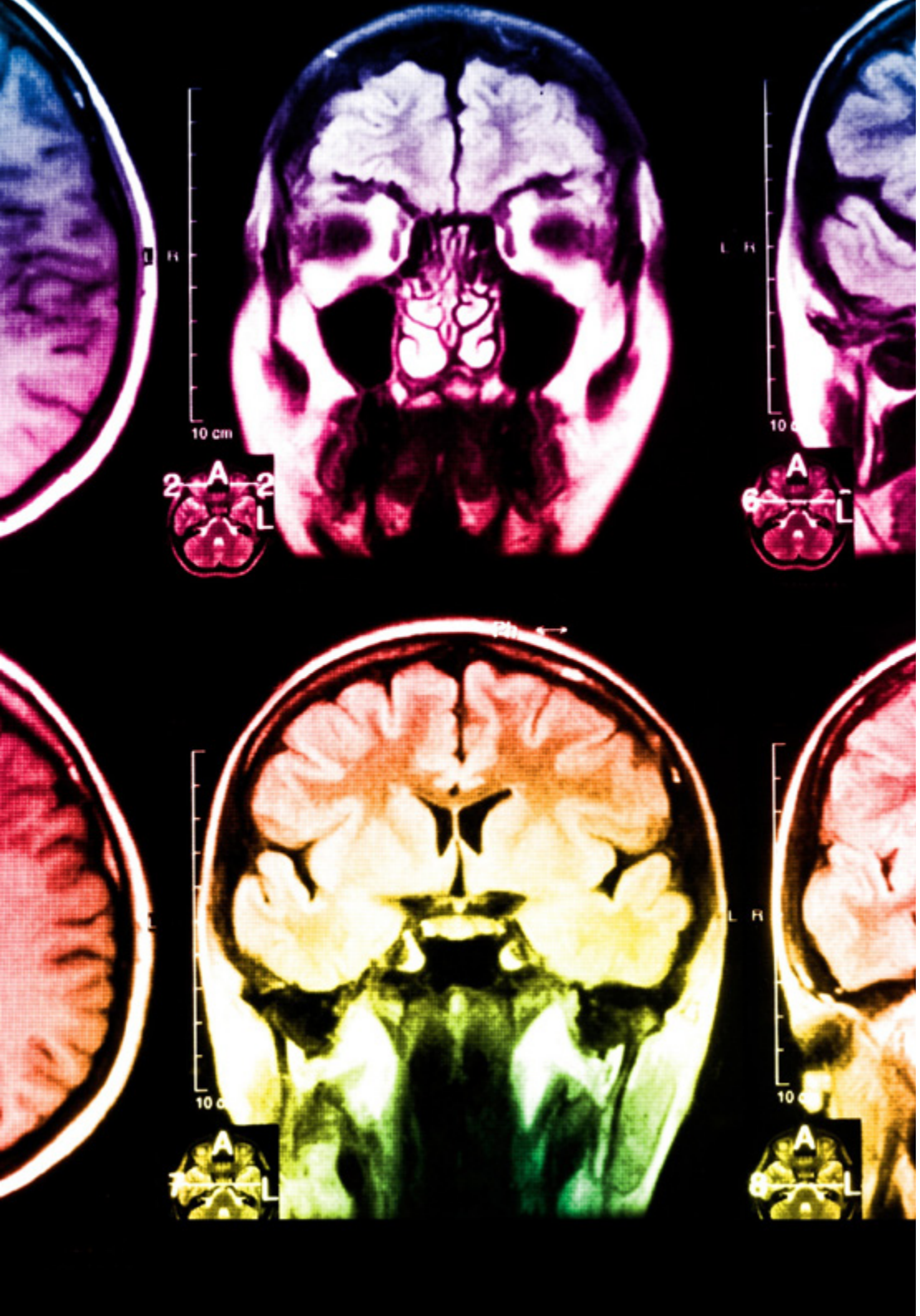
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.



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.

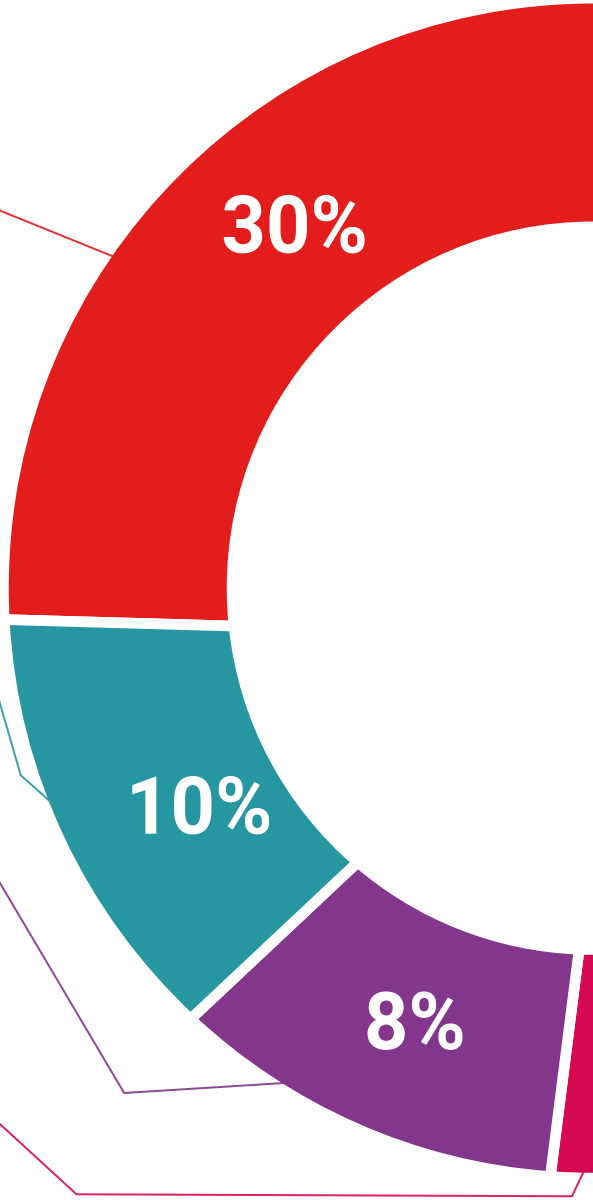
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

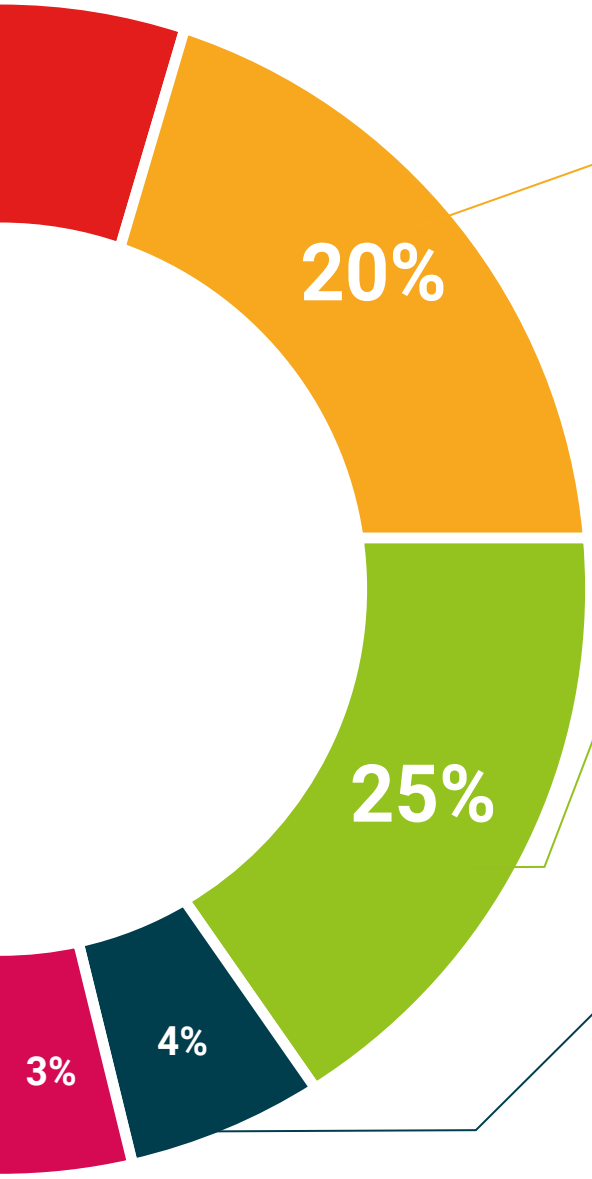
Practising Skills and Abilities

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.





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 Convolutional Neural Networks and Image Classification in Computer Vision 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 Convolutional Neural Networks and Image Classification in Computer Vision** contains the most complete and up-to-date program in 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 certificate 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 Convolutional Neural Networks and Image Classification in Computer Vision**

Official Nº of Hours: **150 h.**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Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Convolutional Neural Networks and Image Classification in Computer Vision

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

Unique TECH Code: AFWORD23S techtitute.com/certificates

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

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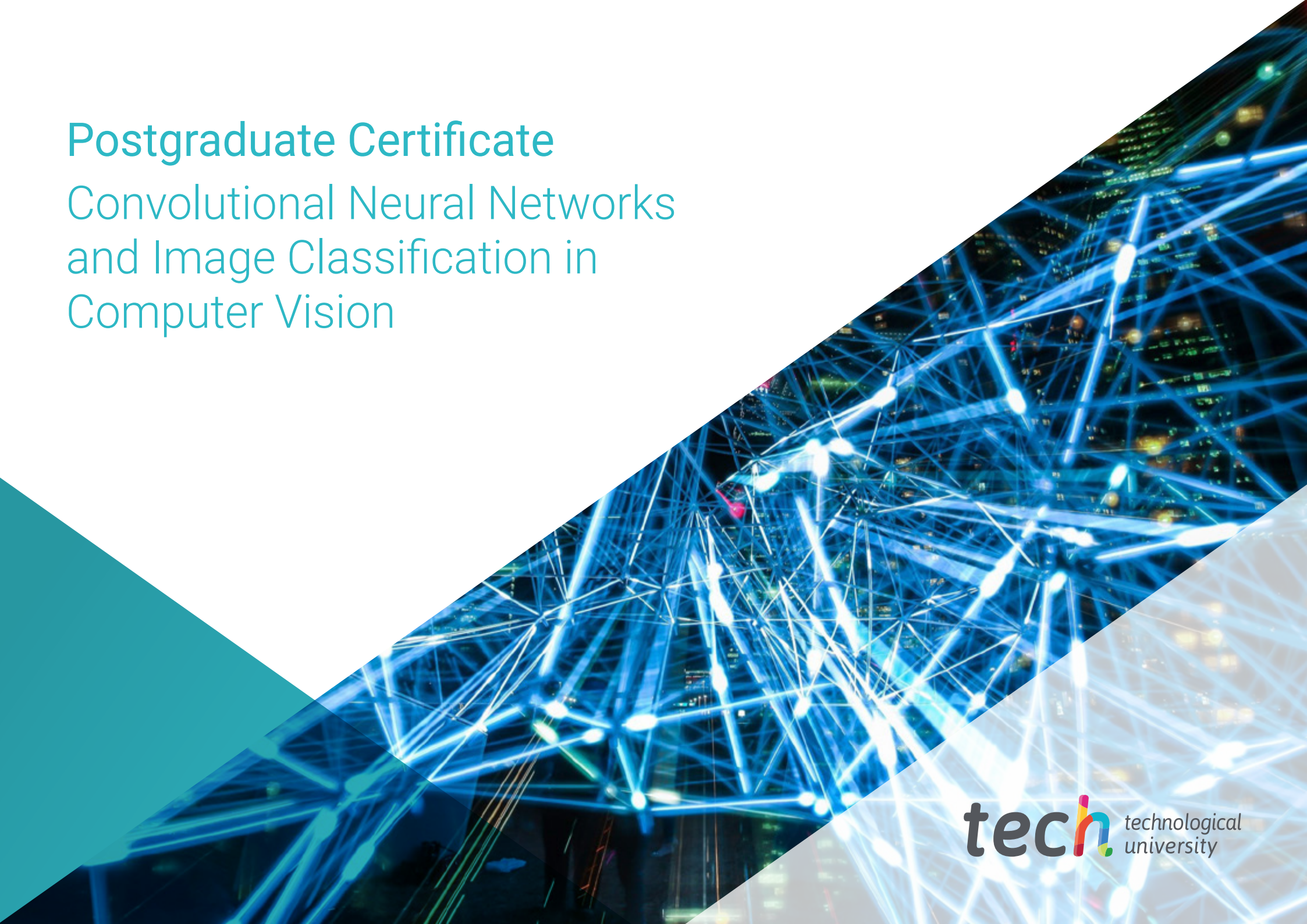

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