Postgraduate Diploma
Computer Vision

Postgraduate Diploma
Computer Vision

- » Modality: **online**
- » Duration: **6 monthst**
- » Certificate: **TECH Global University**
- » Credits: **18 ECTS**
- » Schedule: **at your own pace**
- » Exams: **online**

Website: **www.techtitute.com/us/artificial-intelligence/postgraduate-diploma/postgraduate-diploma-computer-vision**

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01
Introduction

Computer Vision has become one of the most widely used disciplines in the context of Artificial Intelligence (AI). Focused on the development of computer systems, this area uses algorithms and image processing techniques to both analyze and extract useful information from visual data. Its applications are varied, being especially useful in the field of security to analyze environments in real time, recognize objects and identify suspicious activities. Given its many advantages, more and more institutions are demanding the incorporation of experts in this field. For this reason, TECH is launching a university program that will offer the latest advances and the most effective techniques for digital image processing. Also, it is taught in a 100% online format.

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OBS.RedCC.5   x: -5.0, y: 9.4, z: 0.2, h
OBS.RedCC.7   x: -3.1, y: 9.5, z: 0

The current importance of Computer Vision makes this program a safe bet, with a market in continuous growth and full of possibilities"

3D Capture Systems plays a crucial role in society by providing three-dimensional information from the real world. This allows intelligent systems to understand, interact and make decisions more actively in a variety of disciplines. An example of this is the video game industry, which uses these tools to control its experiences and user interfaces. However, such instruments present a number of challenges for specialists. For example, in overlapping environments, these mechanisms face obstacles in capturing complete data due to occlusions.

To help professionals overcome these challenges, TECH presents a Postgraduate Diploma that will provide them with the most advanced techniques for capturing information. Designed by an experienced faculty, the curriculum will address in detail the composition of digital images, emphasizing color spaces. In addition, it will expose the keys for students to make the best use of digital cameras, taking into account factors such as depth of field or resolution. Also, the didactic materials will provide students with the most advanced visualization tools and the most modern computer vision libraries. It will also explore the state of the art of Computer Vision and its wide range of applications.

It should be noted that the methodology of this program reinforces its innovative character. TECH offers a 100% online learning environment, adapted to the needs of busy professionals seeking to advance their careers. In addition, it will employ the *Relearning* methodology, based on the repetition of key concepts to fix knowledge and facilitate learning. In this way, the combination of flexibility and a robust pedagogical approach makes it highly accessible. In addition, students will enter the a library full of multimedia resources in different audiovisual formats (such as interactive summaries and infographics) to make learning dynamic.

This **Postgraduate Diploma in Computer Vision** 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 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 the self-assessment process can be carried out 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

You will delve into the latest innovations in Computer Vision and Machine Learning thanks to this program"

Nurture your professional practice with the most advanced techniques in Digital Image Processing.

" *You will master Cloud Computing to store your files and data remotely"*

Relearning will enable you to learn with less effort and more performance, involving you more in your professional specialization.
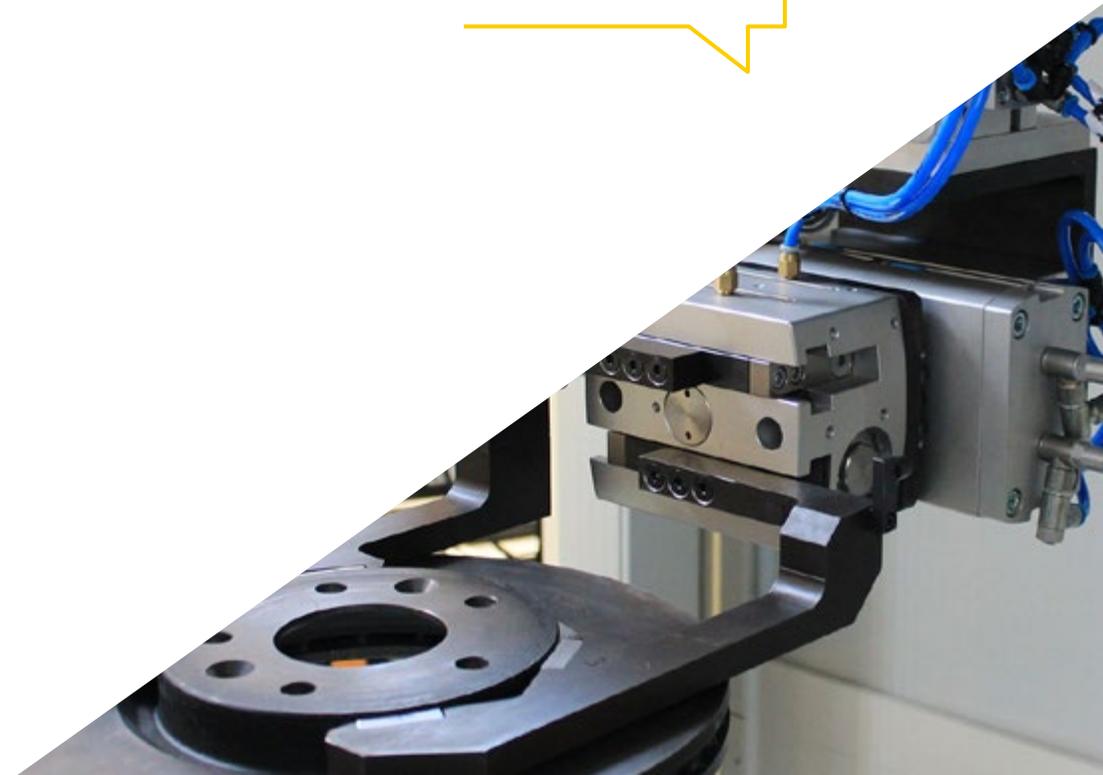
The program's teaching staff includes professionals from the sector who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

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 students will be assisted by an innovative interactive video system created by renowned and experienced experts.

02
Objectives

Thanks to this university program, graduates will acquire a solid understanding of the area of Computer Vision. In this sense, they will keep abreast of the latest advances in this technological field and will be able to incorporate them into their daily work with immediacy. In addition, they will acquire new skills with which they will successfully overcome any challenge that may arise during the course of their work. In addition, they will be highly qualified to carry out innovative solutions with which to stand out in an ever-expanding industry that offers multiple job opportunities.

This program gives you the opportunity to update your knowledge in a real scenario, with the maximum scientific rigor of an institution at the forefront of technology"

General Objectives

- Analyze how the real world is digitized according to the different existing technologies
- Obtain an overview of the devices and hardware used in the computer vision world
- Develop the systems that are changing the world of vision and their functionalities
- Assessing the acquisition techniques to obtain the optimal image
- Analyze the different fields in which vision is applied
- Examine use cases
- Identify where the technological advances in vision are at the moment
- Assess what is being researched and what the next few years will bring
- Examine the different digital image processing libraries available on the market
- Establish a solid foundation in the understanding of digital image processing algorithms and techniques
- Examine filtering algorithms, morphology, pixel modification, etc
- Assess fundamental computer vision techniques

Specific Objectives

Module 1. Computer Vision

- Establish how the human vision system works and how an image is digitized
- Analyze the evolution of computer vision
- Evaluate image acquisition techniques
- Generate specialized knowledge about illumination systems as an important factor when processing an image
- Specify what optical systems exist and evaluate their use
- Examine the 3D vision systems and how these systems provide depth to images
- Develop the different existing systems outside the field visible to the human eye

Module 2. Applications and State-of-the-Art

- Analyze the use of computer vision in industrial applications
- Determine how vision is applied in the autonomous vehicle revolution
- Analyze images in content analysis
- Develop *Deep Learning* algorithms for medical analysis and *Machine Learning* algorithms for operating room assistance
- Analyze the use of vision in commercial applications
- Determine how robots have eyes thanks to artificial vision and how it is applied in space travel
- Establish what augmented reality is and fields of use
- Analyze the Cloud Computing revolution
- Present the State of the Art and what the coming years have in store for us

Module 3. Digital Image Processing

- Examine commercial and open-source digital image processing libraries
- Determine what a digital image is and evaluate the fundamental operations to be able to work with them
- Introduce image filters
- Analyze the importance and use of histograms
- Present tools to modify images pixel by pixel
- Propose image segmentation tools
- Analyze morphological operations and their applications
- Determine the methodology in image calibration
- Evaluate methods for segmenting images with conventional vision

Don't miss the opportunity to boost your career through this innovative program in just 6 months"

03
Course Management

Loyal to its philosophy of offering the highest quality education, TECH has a teaching staff specialized in Machine Vision for the design and delivery of this university program. These professionals have extensive professional experience in this field, which has allowed them to keep abreast of the advances that have occurred in this area. In addition, these specialists are still active and work in prestigious national companies. Therefore, students who immerse themselves in this program will enjoy an immersive experience alongside the best specialists.

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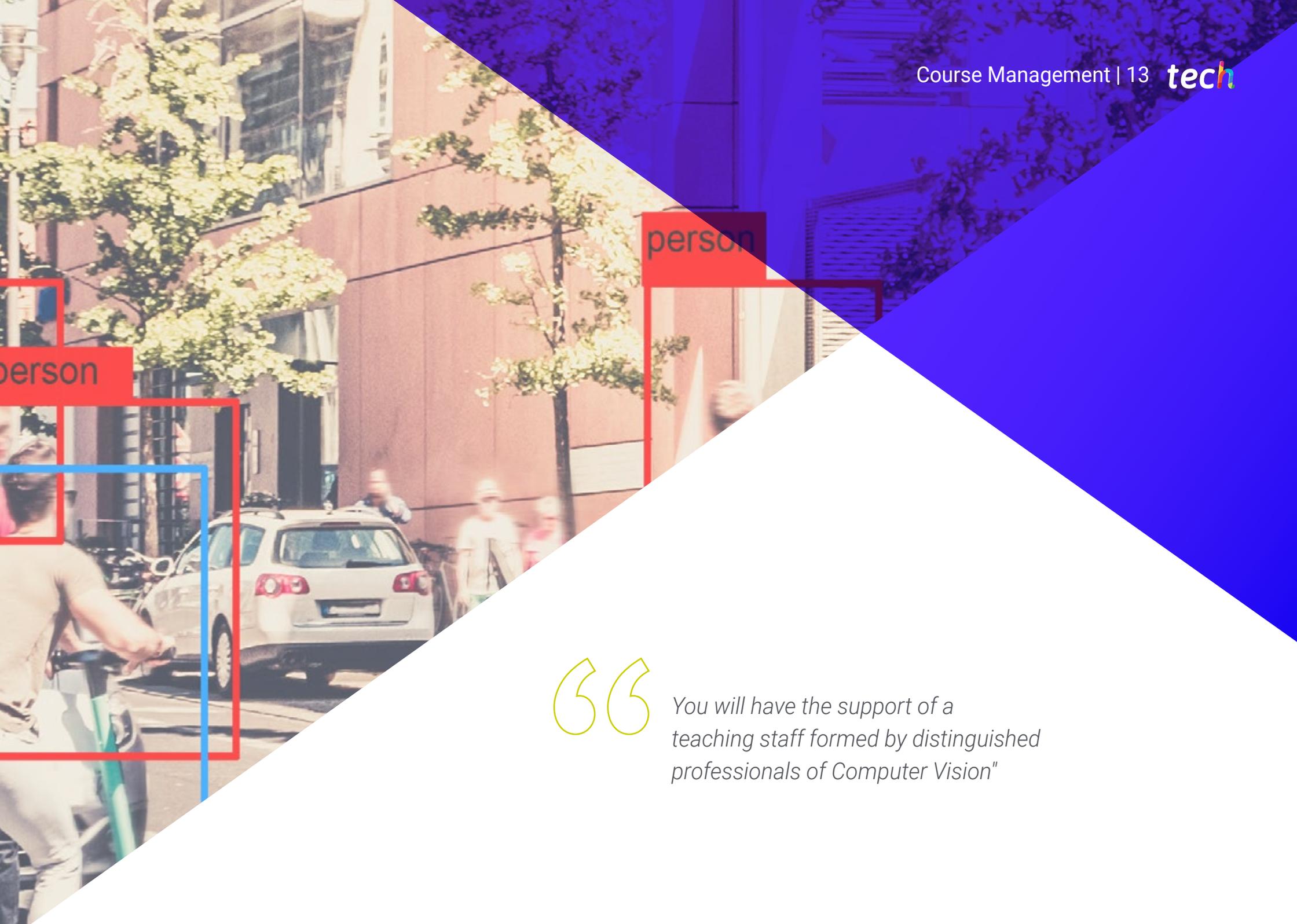
" You will have the support of a teaching staff formed by distinguished professionals of Computer Vision"

Management

Mr. Redondo Cabanillas, Sergio

- Machine Vision Research and Development Specialist at BCN Vision
- Development and *Backoffice* Team Leader at BCN Vision
- Project Manager and development of computer vision solutions
- Sound Technician at Media Arts Studio
- Specialization in Image and Sound by the Polytechnic University of Catalonia
- Graduate in Political Science and Industry from the Autonomous University of Barcelona
- Higher Level Training Cycle in Sound Villar CP

Professors

Mr. Gutiérrez Olabarría, José Ángel

- Project management, software analysis and design and C programming of quality control and industrial computing applications
- Engineer specialized in Computer Vision and sensors
- Market manager for the iron and steel sector, performing customer contact, contracting, market plans and strategic accounts functions
- Computer Engineer from the University of Deusto
- Master's Degree in Robotics and Automation by ETSII/IT of Bilbao
- Diploma in Advanced Studies of the PhD program in Automation and Electronics by ETSII/IT of Bilbao

Mr. Enrich Llopart, Jordi

- Chief Technology Officer of Bcnvision - Machine Vision
- Project and application engineer. Bcnvision - Machine Vision
- Project and application engineer. PICVISA Machine Vision
- Graduated in Telecommunications Technical Engineering. Specialization in Image and Sound by the University School of Engineering of Terrassa (EET) / Polytechnic University of Catalonia (UPC)
- MPM - Master in Project Management. La Salle University - Ramon Llull University
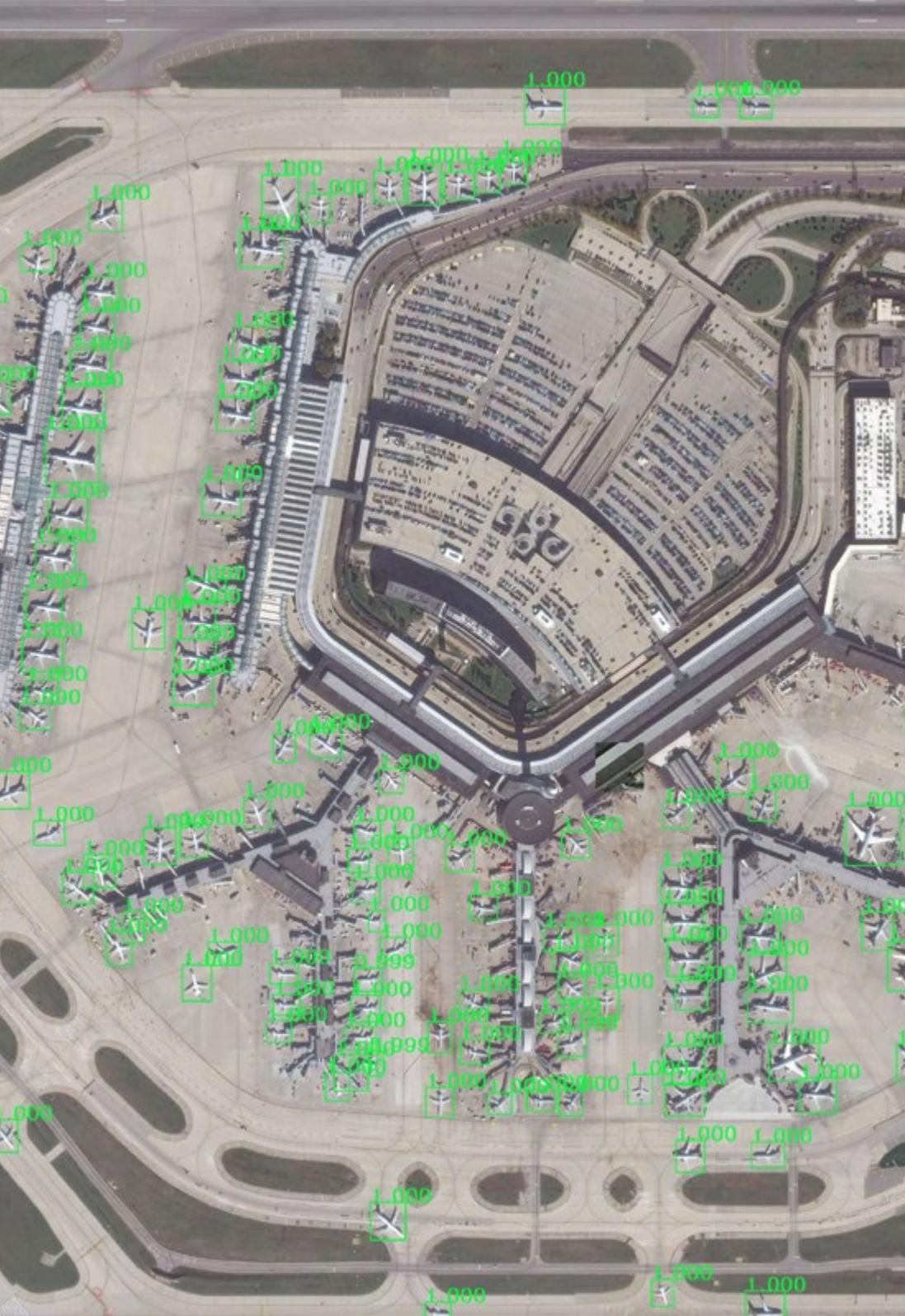
Mr. Bigata Casademunt, Antoni
- Perception Engineer at Computer Vision Center (CVC)
- Machine Learning Engineer at Visium SA, Switzerland
- Degree in Microtechnology from Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland
- Master's degree in Robotics from the Ecole Polytechnique Fédérale de Lausanne (EPFL)

A unique, key, and decisive educational experience to boost your professional development"

04
Structure and Content

This Postgraduate Diploma is made up of 3 complete and updated modules, which cover the latest trends in the field of Computer Vision. Students will delve into the applications of this technology, such as hyperspectral and multispectral cameras. Likewise, the syllabus will delve into fundamental aspects such as the use of computer vision libraries, so that developers can work efficiently with images and videos. Además, durante la capacitación, los estudiantes adquirirán nuevas competencias que podrán aplicar con inmediatez a sus procedimientos habituales para experimentar un salto de calidad en su profesión.

"

*You will learn through real cases
and by solving complex situations in
simulated learning environments"*

Module 1. Computer Vision

Module 2. Applications and State-of-the-Art

2.6. Commercial Applications
  2.6.1. Stock Control
  2.6.2. Video Surveillance, Home Security
  2.6.3. Parking Cameras
  2.6.4. Population Control Cameras
  2.6.5. Speed Cameras
2.7. Vision Applied to Robotics
  2.7.1. Drones
  2.7.2. AGV
  2.7.3. Vision in Collaborative Robots
  2.7.4. The Eyes of the Robots
2.8. Augmented Reality
  2.8.1. Operation
  2.8.2. Devices
  2.8.3. Applications in the Industry
  2.8.4. Commercial Applications
2.9. *Cloud Computing*
  2.9.1. Cloud Computing Platforms
  2.9.2. From Cloud Computing to Production
2.10. Research and State-of-the-Art
  2.10.1. Commercial Applications
  2.10.2. What's Cooking
  2.10.3. The Future of Computer Vision

Module 3. Digital Image Processing

3.1. Computer Vision Development Environment
  3.1.1. Computer Vision Libraries
  3.1.2. Programming Environment
  3.1.3. Visualization Tools
3.2. Digital image Processing
  3.2.1. Pixel Relationships
  3.2.2. Image Operations
  3.2.3. Geometric Transformations
3.3. Pixel Operations
  3.3.1. Histogram
  3.3.2. Histogram Transformations
  3.3.3. Operations on Color Images
3.4. Logical and Arithmetic Operations
  3.4.1. Addition and Subtraction
  3.4.2. Product and Division
  3.4.3. And/Nand
  3.4.4. Or/Nor
  3.4.5. Xor/Xnor
3.5. Filters
  3.5.1. Masks and Convolution
  3.5.2. Linear Filtering
  3.5.3. Non-Linear Filtering
  3.5.4. Fourier Analysis
3.6. Morphological Operations
  3.6.1. Erosion and Dilation
  3.6.2. Closing and Opening
  3.6.3. Top Hat and Black Hat
  3.6.4. Contour Detection
  3.6.5. Skeleton
  3.6.6. Hole Filling
  3.6.7. Convex Hull

No rigid schedules or evaluation timelines. That's what this TECH university program is all about!"

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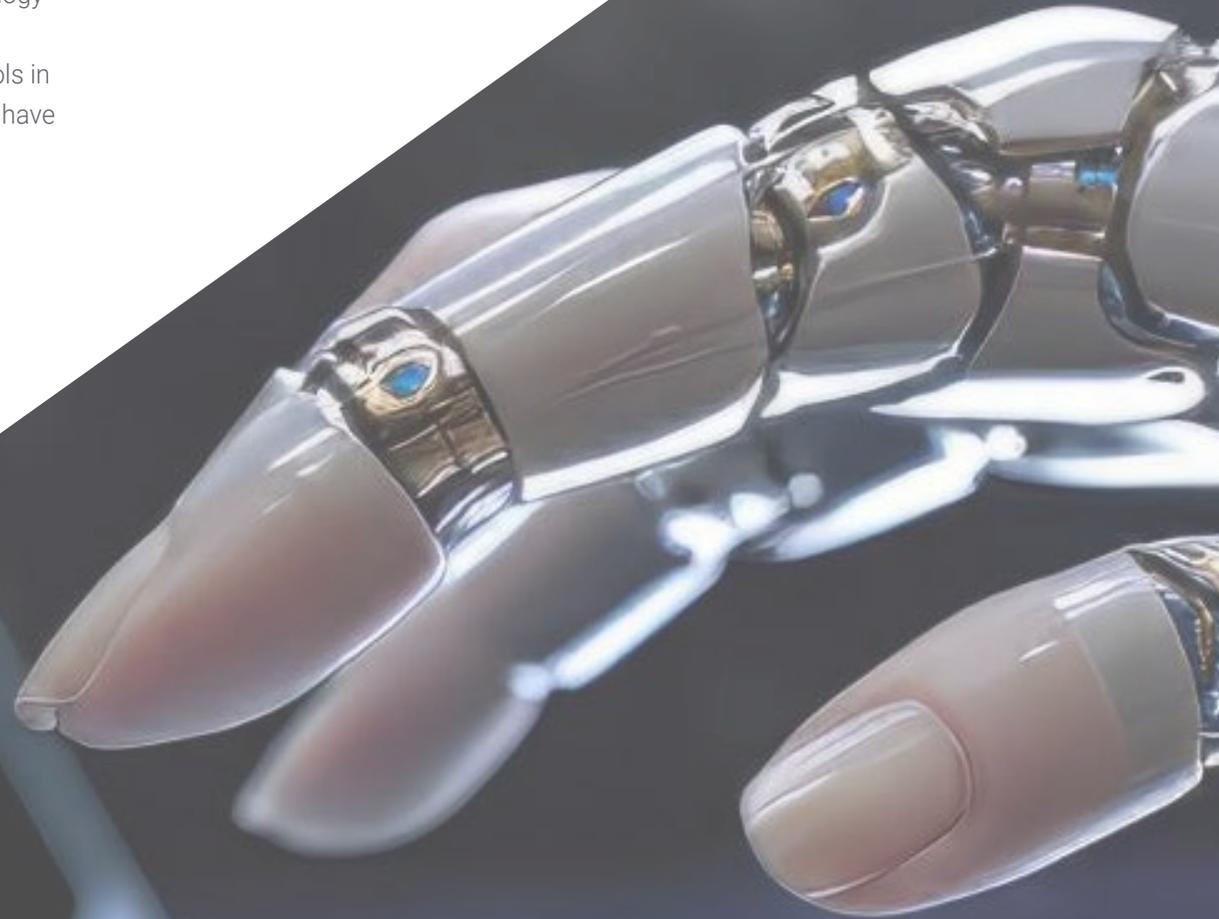
Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

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.

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:
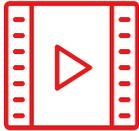
Study Material

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%
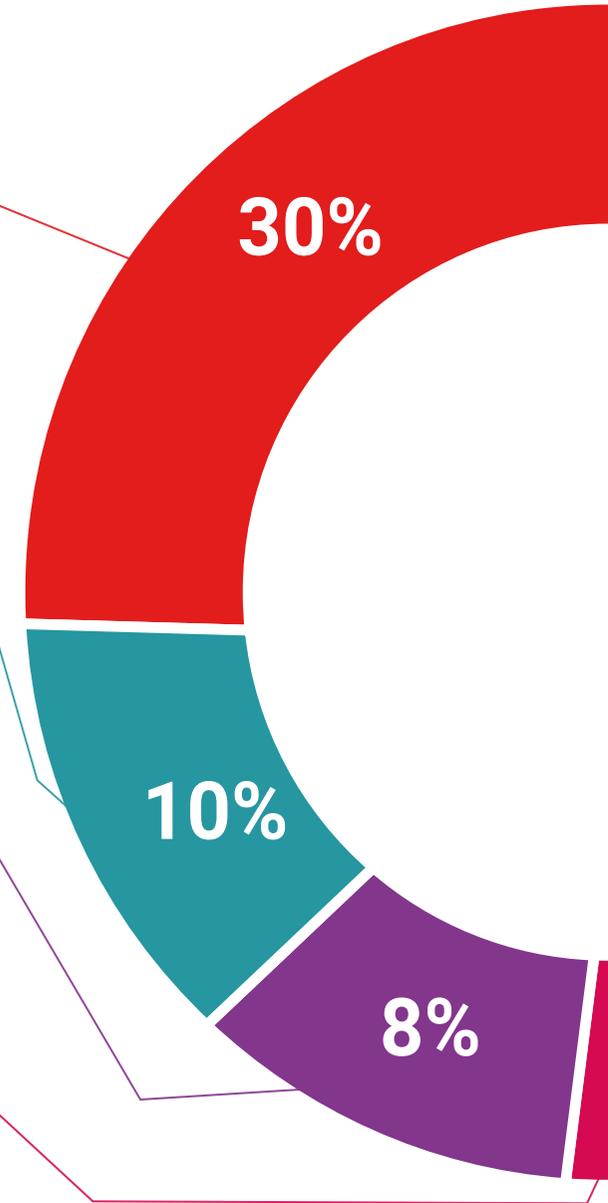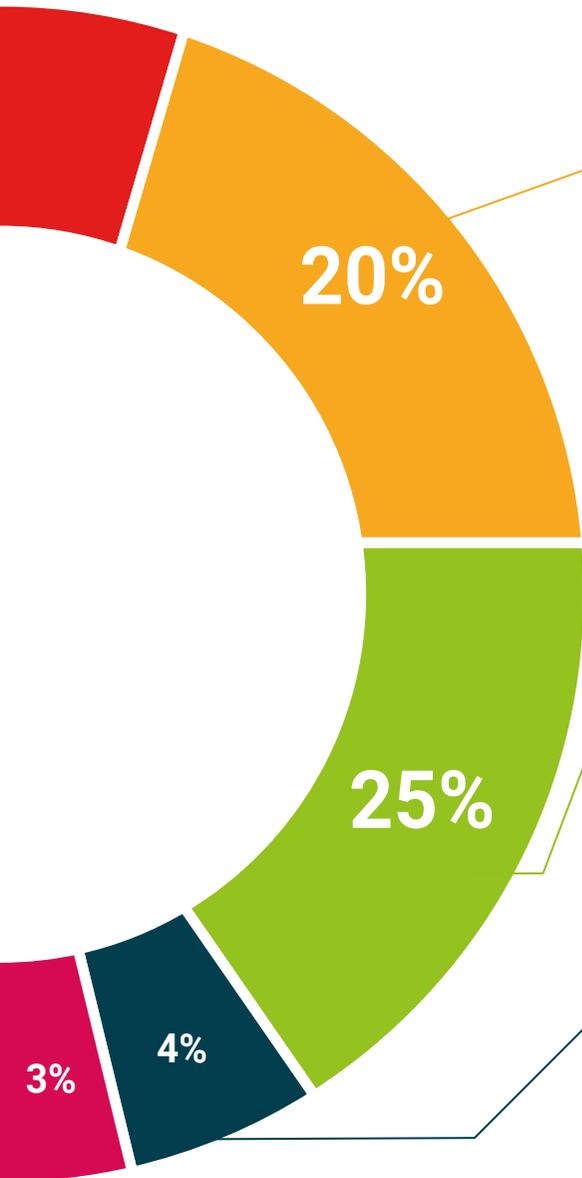
Case Studies

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 Diploma in Computer Vision guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Global University.

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

This program will allow you to obtain your **Postgraduate Diploma in Computer Vision** endorsed by **TECH Global University**, the world's largest online university.

TECH Global University is an official European University publicly recognized by the Government of Andorra (*official bulletin*). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.
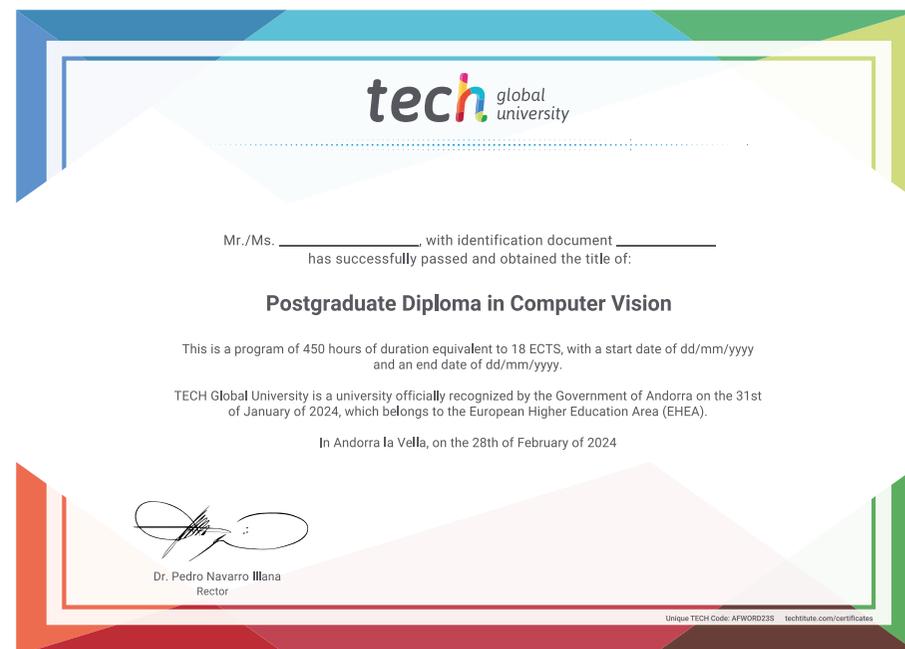
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Computer Vision**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**

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Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Postgraduate Diploma in Computer Vision

This is a program of 450 hours of duration equivalent to 18 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Rector

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 Global University will make the necessary arrangements to obtain it, at an additional cost.

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