Postgraduate Diploma
2D and 3D Image Processing

tec**h**. global university

Postgraduate Diploma
2D and 3D Image Processing

- » 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-2d-3d-image-processing**

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01
Introduction

Within the framework of Machine Vision, Image Processing is an essential stage to meet the objectives set in each project. Its tools help to extract valuable information from digital images for decision making, diagnosis and better understanding of visual content. This is extremely important in the medical field, since they contribute to the segmentation of organs or the three-dimensional reconstruction of anatomical structures. Therefore, healthcare professionals achieve more accurate diagnoses and even plan surgical procedures more reliably by providing a three-dimensional view of the patient's body. Aware of its relevance, TECH has created a 100% online university program that will comprehensively analyze digital image processing.

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You will effectively handle 3D image processing and visualization software thanks to this 100% digital Postgraduate Diploma"

Within Artificial Intelligence, several branches emerge such as robotics, machine learning or computer vision. The latter is gaining more and more prominence in society, as it allows computers to extract valuable information in multiple formats (such as images, videos and other inputs). However, to benefit from this processing, professionals need to have a solid understanding of the particularities of this technique applied to 2D and 3D images. They must also have advanced skills to properly handle software for visualization and metrology.

This is how this Postgraduate Diploma in 2D and 3D Image Processing was born. This university program will provide developers with the most modern tools to efficiently carry out this essential task in the field of artificial vision. To this end, the syllabus will delve into the Fourier Analysis technique so that students can decompose signals and functions into their frequency components. In addition, the syllabus will explore other essential aspects such as object segmentation or the library for 3D data processing. The teaching materials will also focus on the calibration process in a 2D camera/robot system, so that graduates can ensure that these intelligent systems can interact effectively with the visual environment.

On the other hand, TECH will provide its students with a 100% online Virtual Campus, adapted to the needs of working professionals who want to advance in 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. All of this will be accessible remotely, from any portable device, or can be downloaded for offline consultation.

This **Postgraduate Diploma in 2D and 3D Image Processing** 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 it is conceived scientific and practical information on those 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

An academic institution that adapts to you and designs a program that will allow you to reconcile your daily activities with a quality program"

You will specialize in image composition to improve contours with this program of only 450 hours.

With the innovative Relearning methodology, you will enjoy dynamic learning to meet all your professional goals.

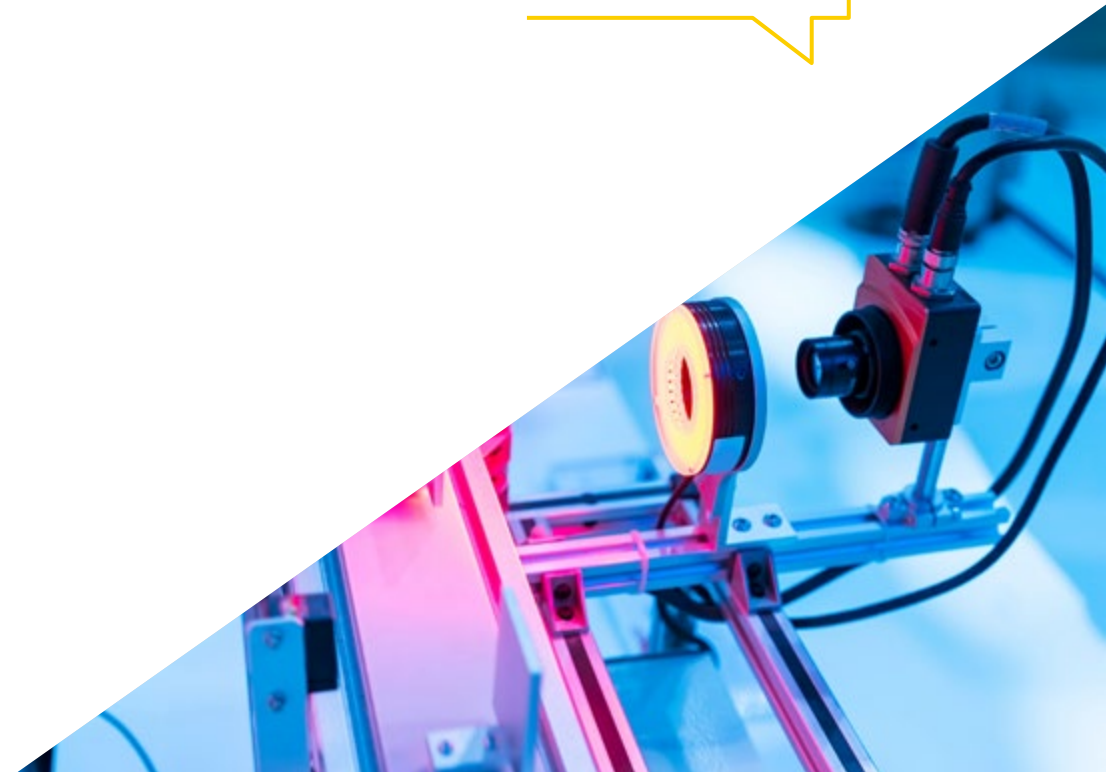*You will delve into the recognition of human emotions from images to identify trends and assess audience sentiments"*

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

This university program will provide graduates with the most revolutionary tools in 2D and 3D Image Processing. In this way, they will apply these instruments to their daily practice with immediacy to experience an immediate progress in their career. This will allow them to develop innovative solutions and stand out in the area of Machine Vision, thus becoming a reference for the technology industry.

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"A high-intensity program that will allow our students to advance quickly and efficiently in their learning"

General Objectives

- Determine how a 3D image is formed and its characteristics

- Introducing the open 3D library

- Analyze the advantages and difficulties of working in 3D instead of 2D

- Establish methods for the processing of 3D images

- Analyze advanced image processing techniques

- Develop tools that combine different computer vision techniques

- Establish problem analysis rules

- Demonstrate how functional solutions can be created to address industrial, commercial, and other problems

- 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
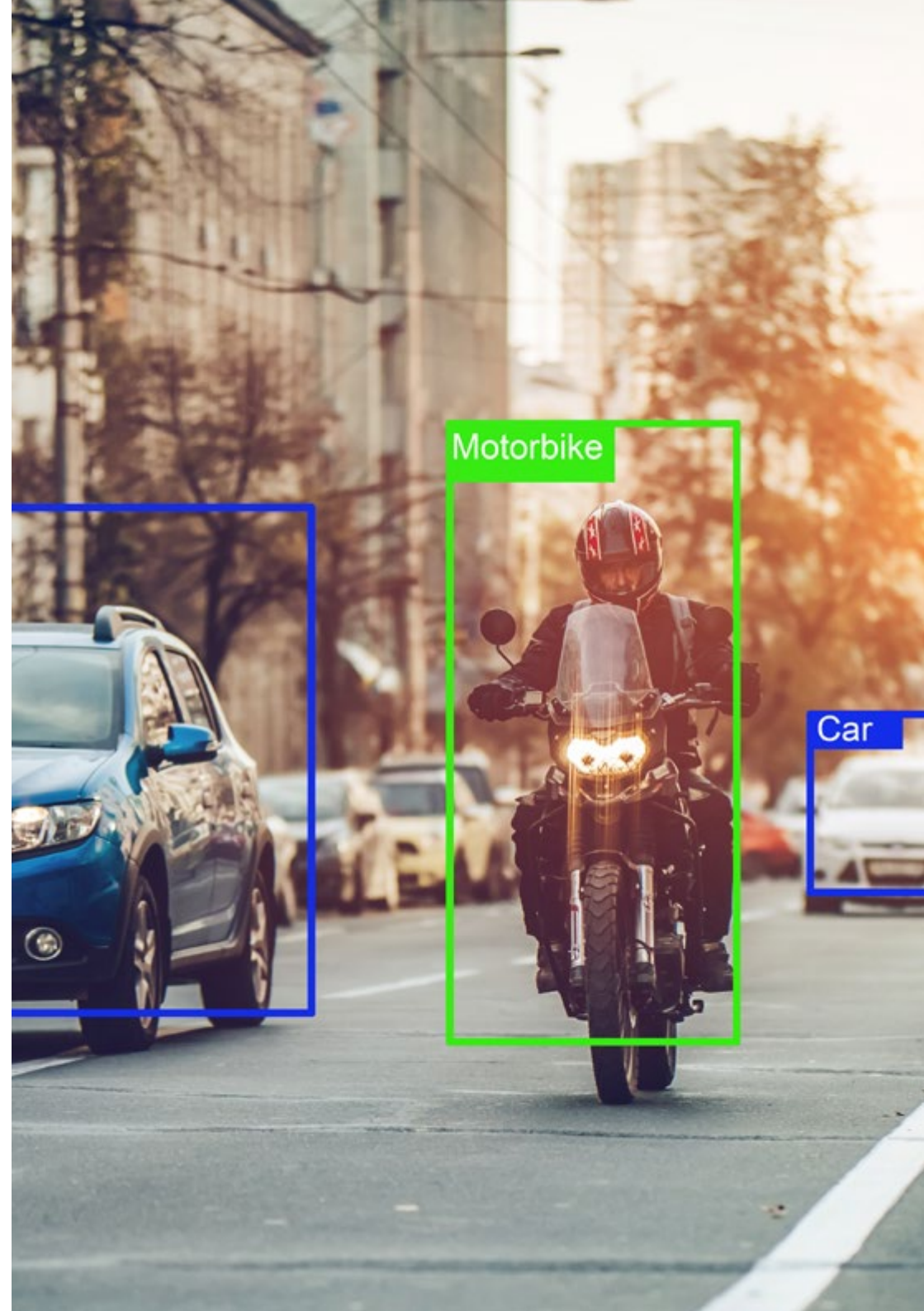
Specific Objectives

Module 1. 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

Module 2. Advanced Digital Image Processing

- Examine advanced digital image processing filters
- Determine contour extraction and analysis tools
- Analyze object search algorithms
- Demonstrate how to work with calibrated images
- Analyze mathematical techniques for geometry analysis
- Evaluate different options in image compositing
- Develop user interface

Module 3. 3D Image Processing

- Examine a 3D image
- Analyze the software used for 3D data processing
- Developing open 3D
- Determine the relevant data in a 3D image
- Demonstrate visualization tools
- Establish denoising filters
- Propose Geometric Calculation tools
- Analyze object detection methodologies
- Evaluate triangulation and scene reconstruction methods

Machine vision is the present and the future of AI. Specialize now in 2D and 3D image processing and experience a professional breakthrough"

Course Management

To preserve the quality that defines its university programs, TECH has the services of a teaching staff of the highest level. These professionals are specialized in T2D and 3D Image Processing, accumulating extensive work experience in this area. In this way, these experts have designed an academic itinerary composed of didactic contents that are fully applicable. This is a guarantee for the students, since they will enrich their procedures with the most advanced knowledge in Computer Vision.

"There is no more expert faculty than this one in image processing for artificial vision"

Management

Mr. Redondo Cabanillas, Sergio

- Machine Vision Research and Development Specialist at BCN Vision
- Development and BackofficeTeam 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. 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

Ms. García Moll, Clara

- Junior Visual Computer Engineer at LabLENI
- Computer Vision Engineer. Satellogic
- Full Stack Developer. Grupo Catfons
- Audiovisual Systems Engineering. Pompeu Fabra University (Barcelona)
- Master's Degree in Computer Vision. Autonomous University of Barcelona
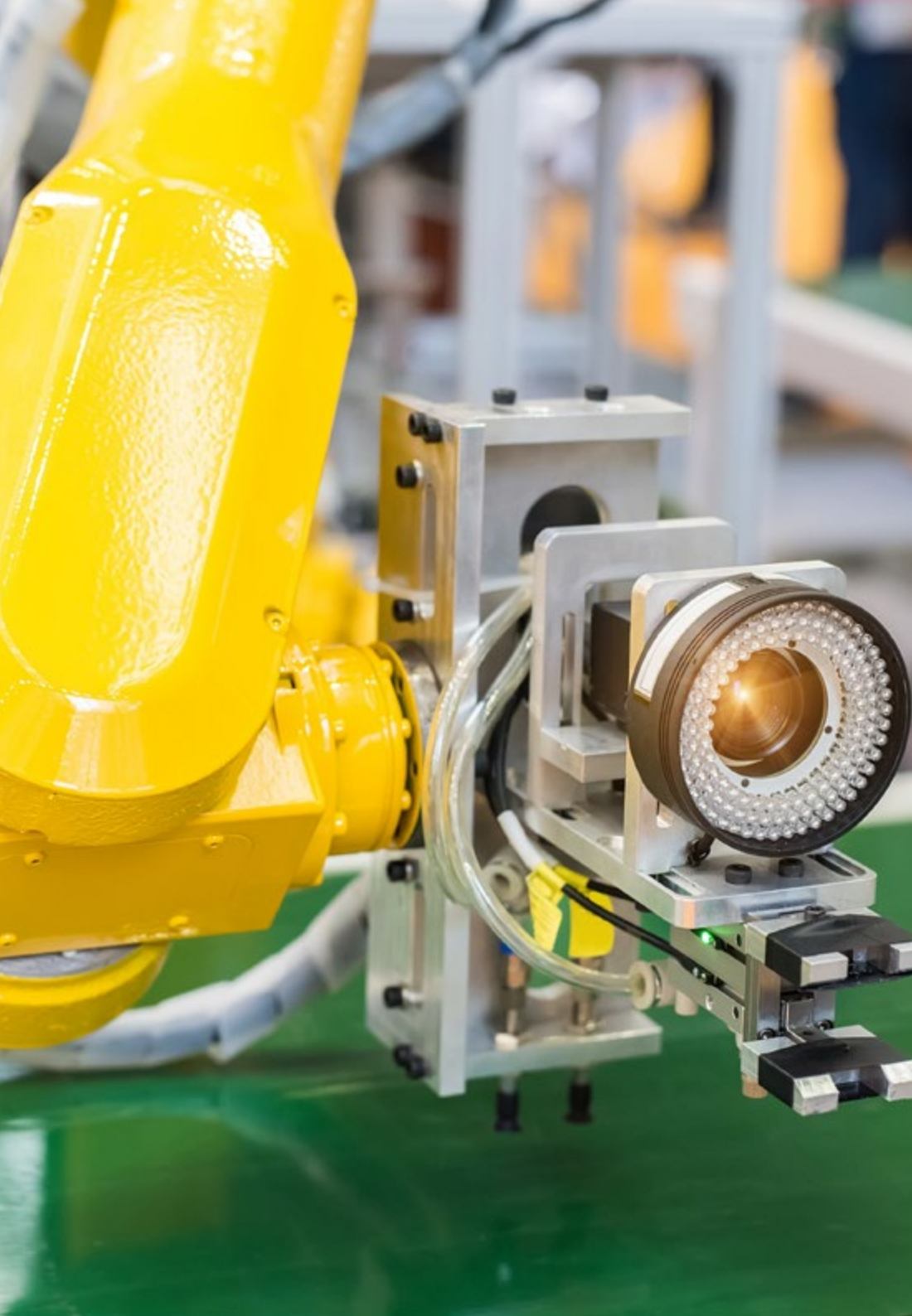
Mr. Bigata Casademunt, Antoni

- 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)

Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice"

04
Structure and Content

This university program is structured in 3 specialized modules in which you will explore the most advanced for solving problems such as image segmentation, morphological operations or code reading. The syllabus will delve into digital image processing, emphasizing aspects such as pixel relationships and geometric transformations. In addition, the didactic contents will delve into the tracking of objects with conventional vision using avant-garde techniques, among which Optical flow stands out. In this way, professionals will have at their disposal state-of-the-art tools to carry out their work successfully.
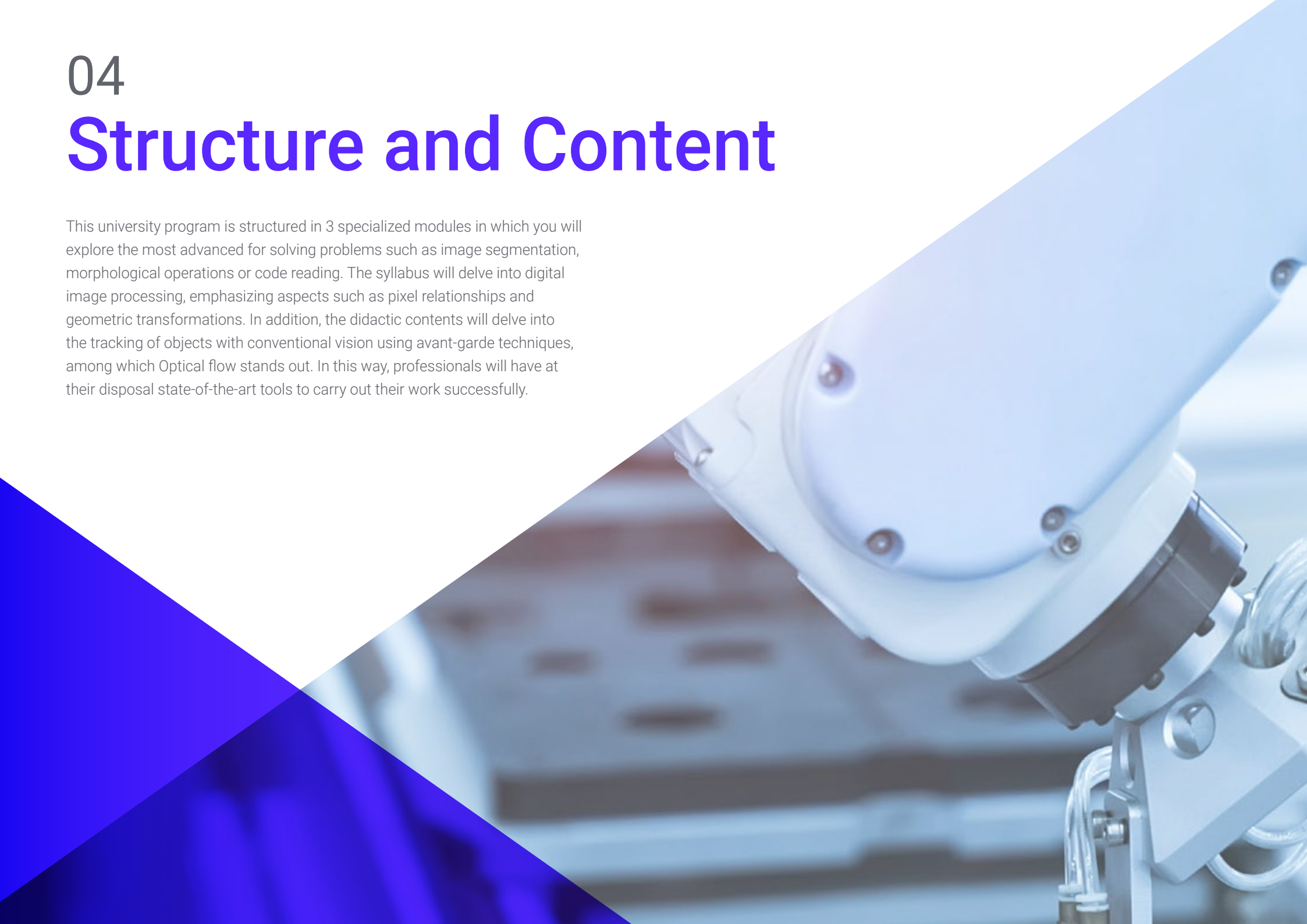
You will delve into the Triangulation of Depth Mapping to enable your robots to make informed and safe decisions in real time"

Module 1. Digital Image Processing

Module 2. Advanced Digital Image Processing

Module 3. 3D Image Processing

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.

30%

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.

10%

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.

8%

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.

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.

Certificate

The Postgraduate Diploma in 2D and 3D Image Processing 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 2D and 3D Image Processing** 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.
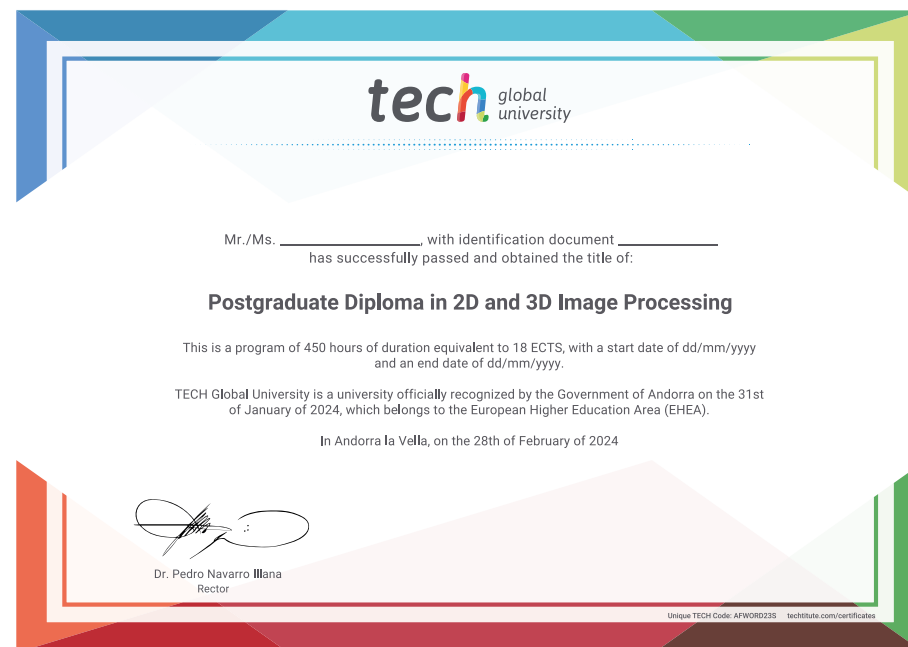
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in 2D and 3D Image Processing**

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 2D and 3D Image Processing

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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