Postgraduate Certificate

Segmentation with Deep Learning in Computer Vision

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Postgraduate Certificate
Segmentation with Deep Learning 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/segmentation-deep-learning-computer-vision

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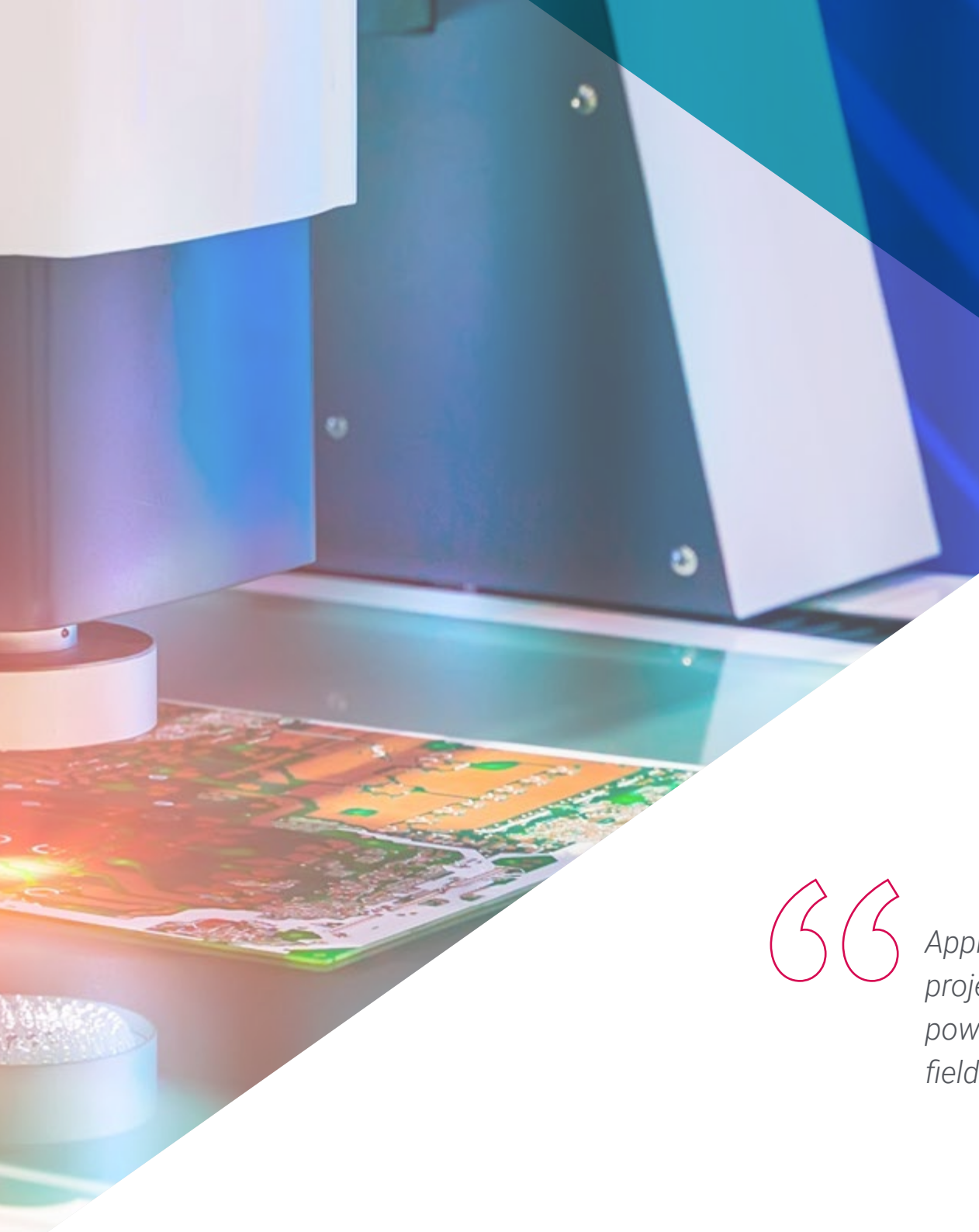
01

Introduction

Segmentation has become one of the most powerful and in-demand computer vision techniques on the market. This method classifies each pixel according to the type of object it analyzes. It has numerous applications, from satellite imaging to diagnostics in healthcare. For this reason, there is an increasing need for professional experts in this area, and this program offers students the opportunity to specialize and deepen their knowledge of the discipline, taking into account the latest developments.



Apply segmentation to your computer vision projects and achieve success by developing powerful tools with numerous applications in fields such as healthcare"

Of the many techniques and procedures included in the field of computer vision, segmentation is one of the most important. It makes it possible to differentiate objects, tissues or materials based on the identification of pixel types, separating the elements and facilitating their analysis. This has applications in areas such as traffic, detecting lanes and signs, in satellite images or in medical diagnostics.

For this reason, this Postgraduate Certificate in Segmentation with Deep Learning in Computer Vision is so important, as it prepares professionals to master one of the most promising fields within artificial intelligence and machine learning. Therefore, this program will delve into issues such as semantic segmentation and instantiated segmentation, cost functions or video segmentation, among others.

All this, following an innovative 100% online teaching methodology that will allow students to choose the time and place to study, while being guided by a high-level teaching staff and enjoying multimedia resources such as interactive summaries, master classes, explanatory videos and practical exercises.

This **Postgraduate Certificate in Segmentation with Deep Learning in Computer Vision** contains the most complete and up-to-date academic program on the market. Its most important features are:

- 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 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

Segmentation is fundamental in the field of computer vision: specialize now with this Postgraduate Certificate".

TECH Technological University's innovative teaching methodology will allow you to balance your work with your studies. Don't think twice and enroll"

In this educational program, you will delve into the many applications of computer vision segmentation.

Join deep learning with segmentation and develop powerful computer vision projects.

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

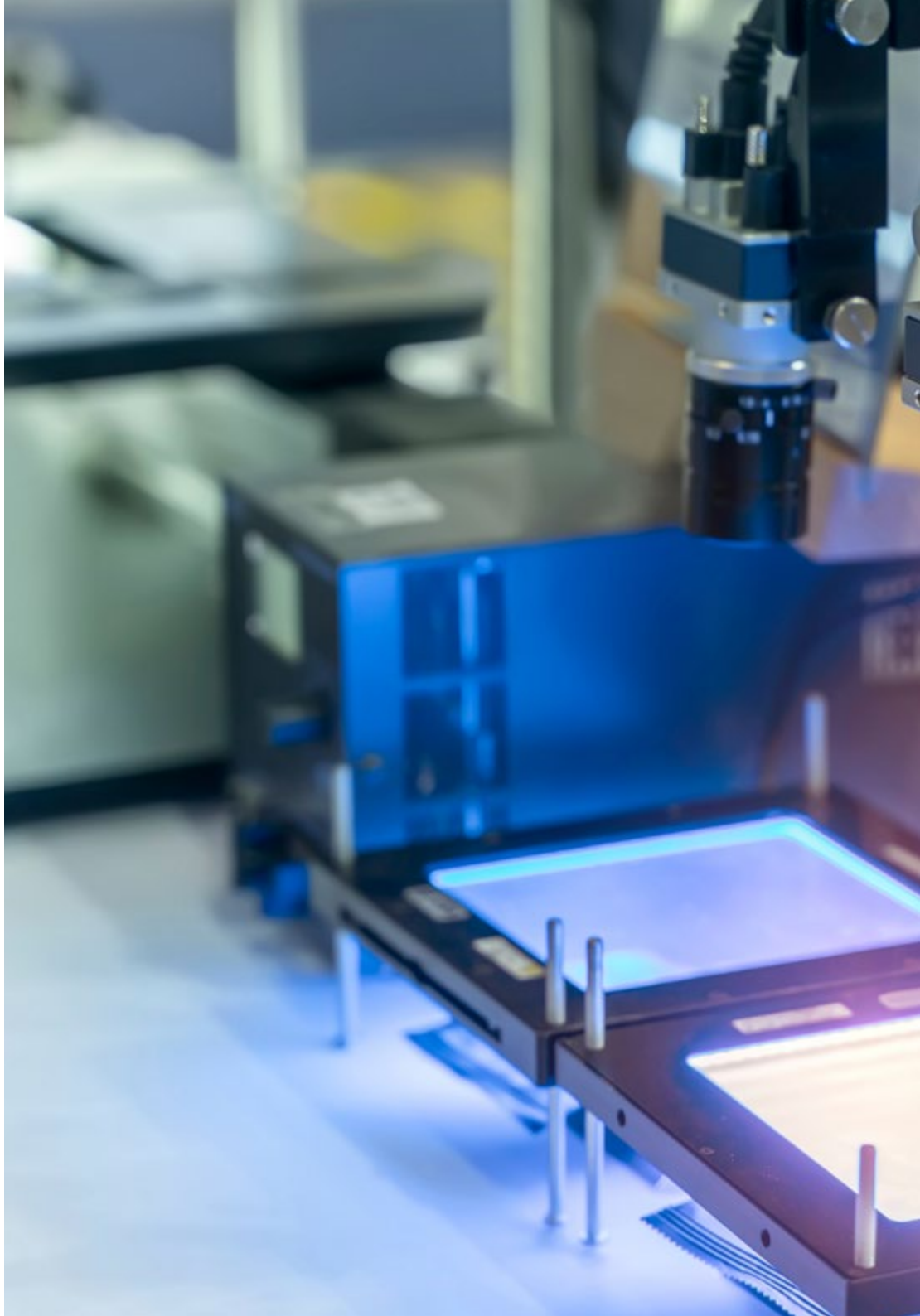
The objective of the Postgraduate Certificate in Segmentation with Deep Learning in Computer Vision is to provide professionals with the latest tools in this field of artificial intelligence, so that they can apply them in their work immediately. As a result, students will be able to advance their careers quickly thanks to the innovative content that they will study throughout this specialized program.

The latest advances in segmentation will allow you to create tools to improve road safety or medical diagnostics"

General Objectives

- Analyze semantic segmentation neural networks and their metrics
- Identify the most common architectures
- Establish Use Cases
- Apply correct cost function for learning

Progress professionally thanks to this Postgraduate Certificate, which will transform you into a very valuable member of your company"



Specific Objectives

- Analyze how semantic segmentation networks work
- Evaluate traditional methods
- Examine evaluation metrics and different architectures
- Examine video domains and cloud points
- Apply theoretical concepts through various examples

03

Course Management

This program has the best teaching staff, composed of leading specialists in computer vision and segmentation with *deep learning*. Therefore, students who complete this Postgraduate Certificate in Segmentation with Deep Learning in Computer Vision will be able to incorporate the latest developments in the discipline into their professional practice, with the help of experts who develop their careers in this area.

Expert teachers provide you with the best segmentation techniques so that you can incorporate them into your work immediately"

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. González González, Diego Pedro

- Software Architect for Artificial Intelligence based systems
- *Deep Learning* and *Machine Learning* Application Developer
- Software architect for embedded systems for railway safety applications
- Industrial Engineer by Miguel Hernández University
- Linux driver developer
- Systems engineer for railway track equipment
- Embedded Systems Engineer
- *Deep Learning* Engineer
- Official Master's Degree in Artificial Intelligence from the International University of La Rioja (Spain)

04

Structure and Content

This Postgraduate Certificate in Segmentation with Deep Learning in Computer Vision contains 1 module, subdivided into 10 units. Students will be able to delve into issues such as semantic segmentation and instantiated segmentation, evaluation metrics, cost functions, self-organizing maps, semantic segmentation applying deep learning or segmentation in video and point clouds, among many others.

Integrate the principles of deep learning with the best segmentation techniques thanks to what you will learn throughout this Postgraduate Certificate"

Module 1. Image Segmentation with *Deep Learning*

1.1. Object Detection and Segmentation
  1.1.1. Semantic Segmentation
    1.1.1.1. Semantic Segmentation Use Cases
  1.1.2. Instantiated Segmentation
    1.1.2.1. Instantiated Segmentation Use Cases
1.2. Evaluation Metrics
  1.2.1. Similarities with Other Methods
  1.2.2. *Pixel Accuracy*
  1.2.3. *Dice Coefficient* (F1 *Score*)
1.3. Cost Functions
  1.3.1. *Dice Loss*
  1.3.2. *Focal Loss*
  1.3.3. *Tversky Loss*
  1.3.4. Other Functions
1.4. Traditional Segmentation Methods
  1.4.1. Threshold Application with *Otsu* and *Riddlen*
  1.4.2. Self-Organizing maps
  1.4.3. GMM-EM Algorithm
1.5. Semantic Segmentation Applying *Deep Learning*: FCN
  1.5.1. FCN
  1.5.2. Architecture
  1.5.3. FCN Applications
1.6. Semantic Segmentation Applying *Deep Learning*: U-NET
  1.6.1. U-NET
  1.6.2. Architecture
  1.6.3. U-NET Application

1.7. Semantic Segmentation Applying *Deep Learning:* Deep Lab
  1.7.1. *Deep Lab*
  1.7.2. Architecture
  1.7.3. Deep Lab Application
1.8. Instantiated Segmentation Applying *Deep Learning*: Mask RCNN
  1.8.1. RCNN *Mask*
  1.8.2. Architecture
  1.8.3. Application of a Mask RCNN
1.9. Video Segmentation
  1.9.1. STFCN
  1.9.2. *Semantic Video* CNNs
  1.9.3. *Clockwork Convnets*
  1.9.4. *Low-Latency*
1.10. Point Cloud Segmentation
  1.10.1. The Point Cloud
  1.10.2. *PointNet*
  1.10.3. A-CNN

You won't find a more comprehensive and in-depth course on segmentation with deep learning. Enroll and check it out"

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

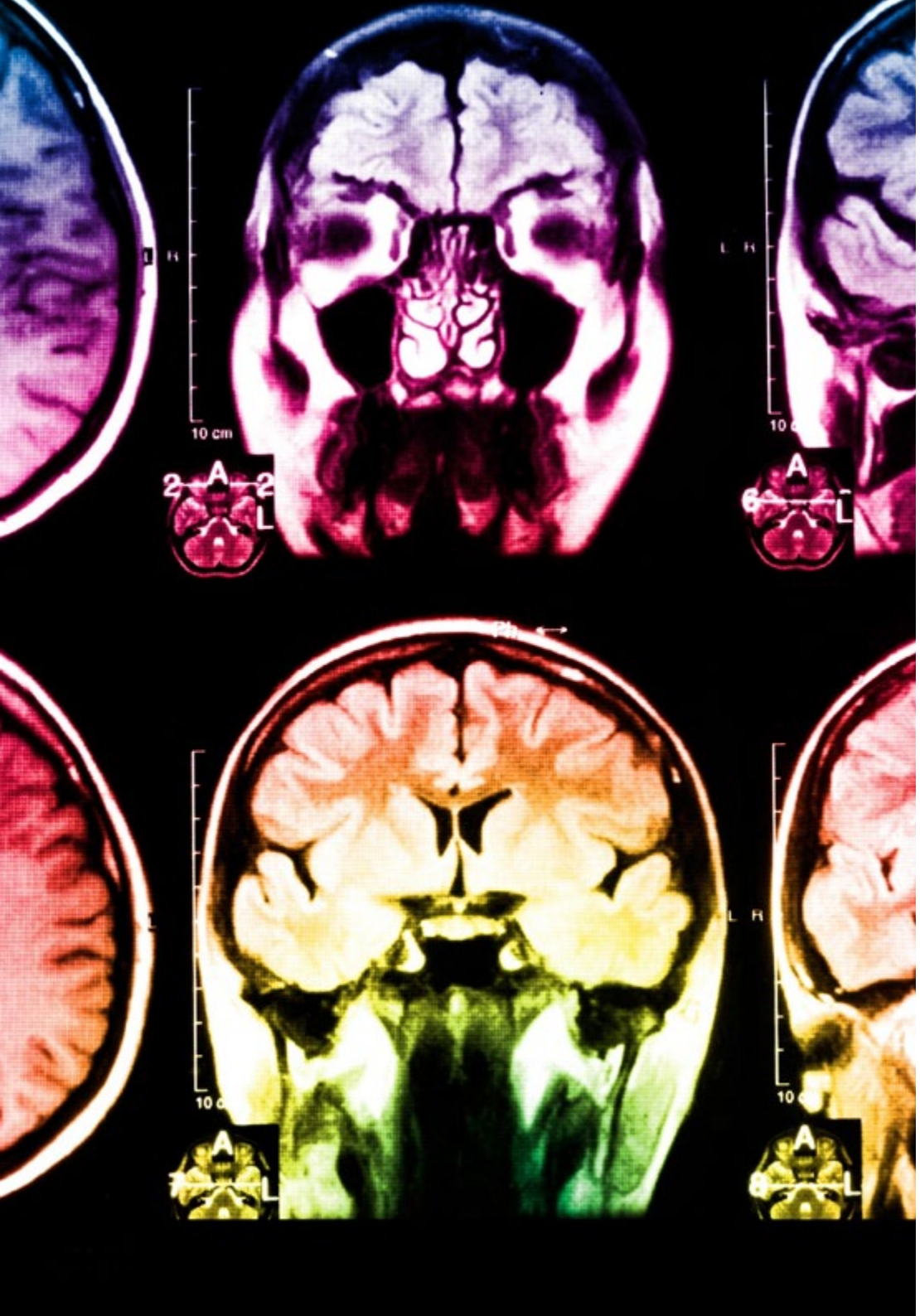
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

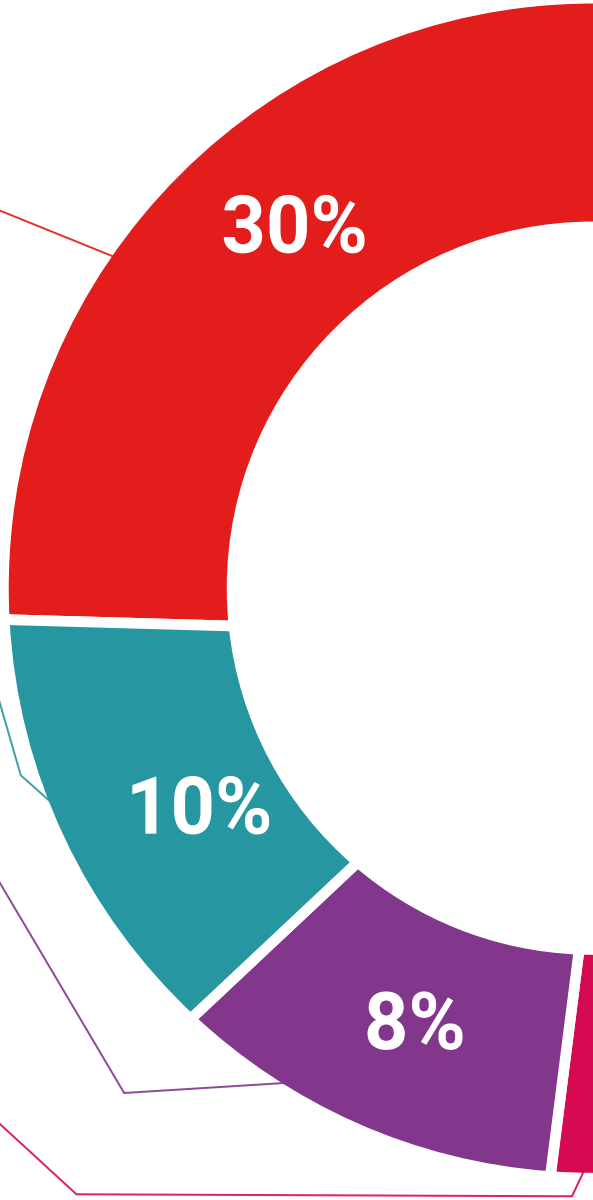
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

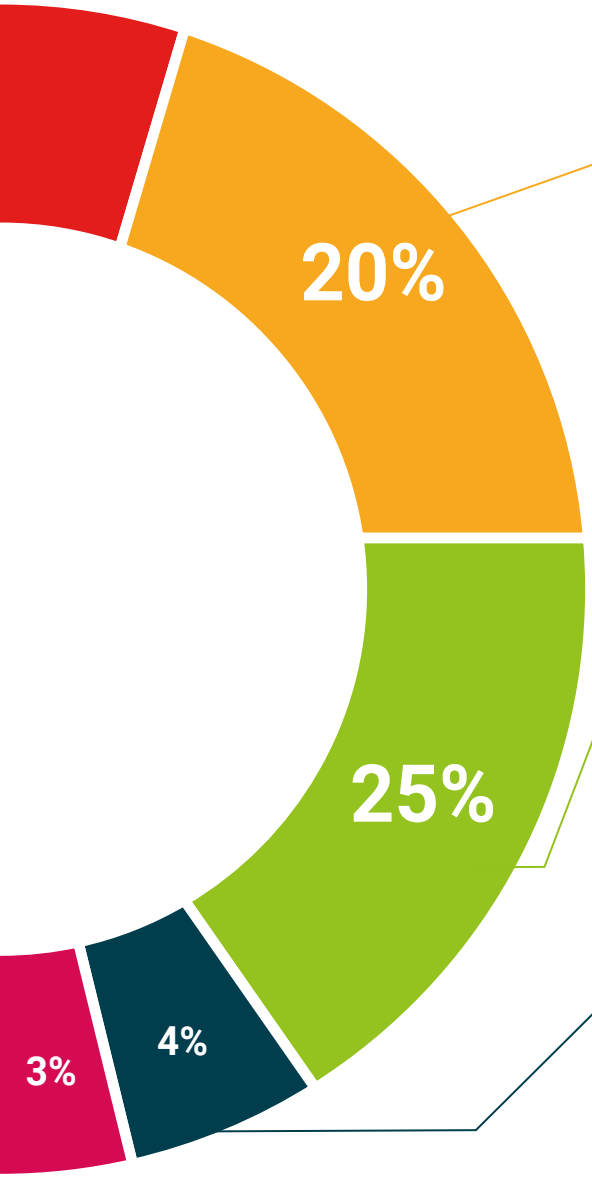
Practising Skills and Abilities

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 Segmentation with Deep Learning 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 Segmentation with Deep Learning Computer Vision** 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 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 Segmentation with Deep Learning in Computer Vision**

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

DIPLOMA

to

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

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Segmentation with Deep Learning 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

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 certificate issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

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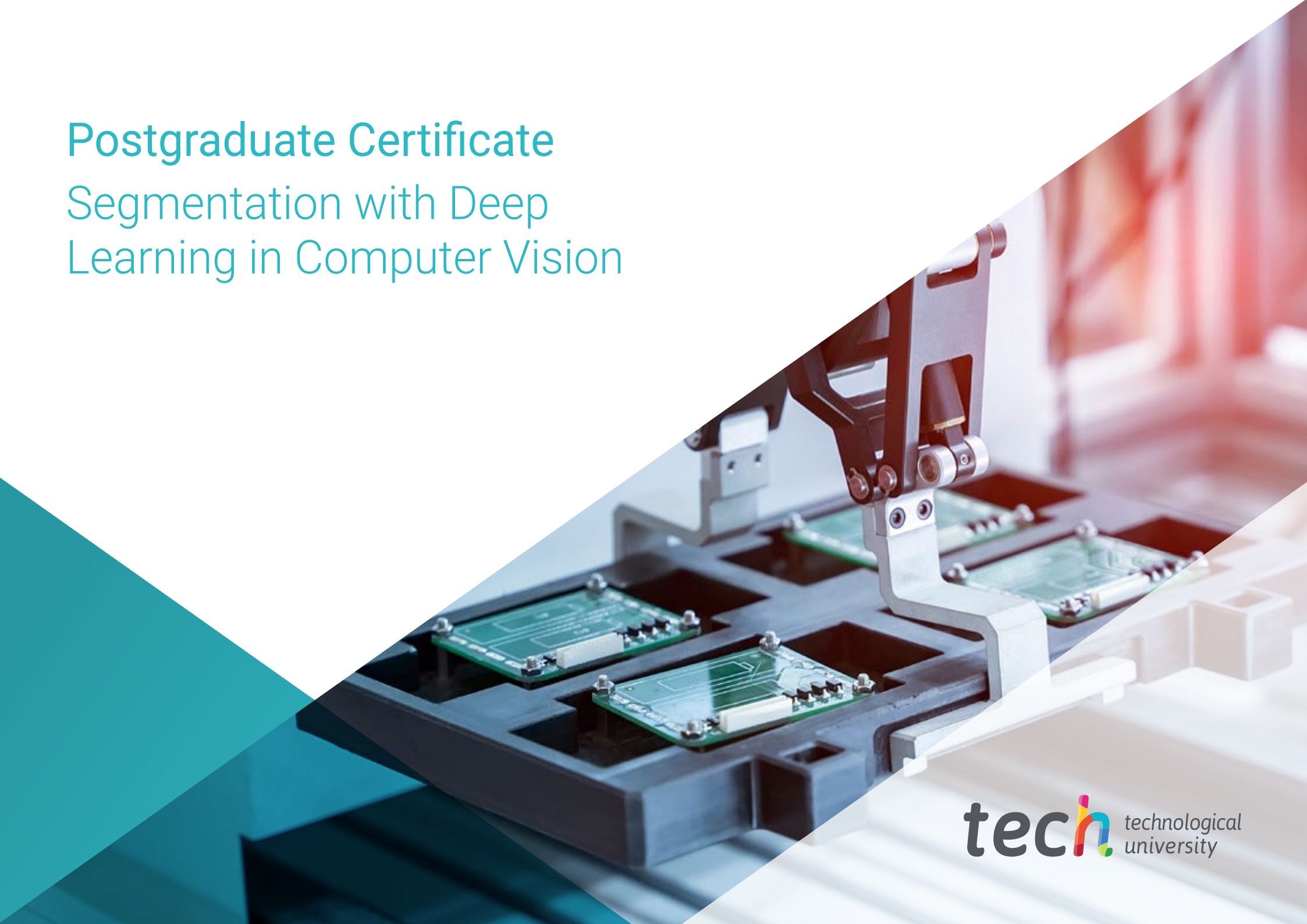

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