Postgraduate Certificate

Neural Networks in Deep Learning

tech global university

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Postgraduate Certificate

Neural Networks in Deep Learning

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

Website:**www.techtitute.com/in/artificial-intelligence/postgraduate-certificate/neural-networks-deep-learning**

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01

Introduction

Considered as a revolution within Artificial Intelligence, Deep Learning has the potential to improve the quality of life in different aspects. To this end, it focuses on training Artificial Neural Networks to perform complex data processing tasks to automate a wide range of applications. For example, doctors use these architectures to make more accurate and earlier diagnoses of diseases thanks to the analysis of medical images (such as CT scans). This also helps to personalize treatments according to the particular needs of each patient, which increases their degree of wellbeing. In view of its growing progress, TECH implements a 100% online program dedicated to Deep Learning that will provide the latest trends in this technological field.

A Postgraduate Certificate designed for you to acquire new skills and get the most out of tools such as Keras and TensorFlow"

According to a recent study conducted by the scientific community, currently more than 60% of companies use Artificial Intelligence and 85% of them consider it a priority investment in their business strategy. This highlights the importance of workers specializing in this area to perform their daily work with maximum efficiency. One of the professional profiles most in demand by organizations is that of an engineer with expertise in Deep Learning. These professionals build Neural Network architectures that emulate the way the human brain operates, to identify patterns and generate predictions using large volumes of data.

In response to this demand, TECH launches a Postgraduate Certificate in Neural Networks in Deep Learning. Designed by experts in this field, the curriculum will immerse students in the process of building these architectures. To this end, the teaching materials will address in detail essential concepts ranging from the connection between the different layers to the training of the network. Students will examine the most relevant principles of Neural Networks, which will allow them to incorporate activation functions, back propagation and even parameter tuning into the models. Likewise, thanks to the syllabus, graduates will use the Keras tool effectively to perform tasks such as the implementation of the Multilayer Perceptron.

It is worth noting that the university program is based on the revolutionary method of Relearning, of which TECH is a pioneer. This teaching system ensures that students assimilate the didactic contents in an agile, progressive and natural way. Moreover, as it is a 100% online learning, students will be able to embark on an educational experience from the comfort of their homes. They will only need an electronic device capable of accessing the Internet to enter the Virtual Campus, where, in addition to the syllabus, they will find a library full of resources in various formats (such as interactive summaries and specialized readings) to reinforce their knowledge in a dynamic way.

This **Postgraduate Certificate in Neural Networks in Deep Learning** 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 Neural Networks in Deep Learning
- The graphic, schematic and practical contents of the program provide Sports 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

Are you looking for a university degree that is compatible with your daily responsibilities? This program will adapt to both your schedule and your learning pace"

You will skillfully manage the Learning Rate hyperparameter to control the magnitude of the adjustments made to the model weights"

Thanks to the Relearning method used by TECH, you will consolidate the key concepts in a natural and progressive way to guarantee the success of your learning.

You will be able to download the entire syllabus from day one, so that you can consult it whenever you want, even from your smartphone.

The program's teaching staff includes professionals from the sector who contribute their work experience to this 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 Postgraduate Certificate in Neural Networks in Deep Learning, graduates will renew their knowledge in this field while obtaining new skills that will broaden their professional horizons. They will also design advanced neural architectures that will learn from data and adapt to specific tasks. On the other hand, they will have the necessary resources to deal with the obstacles that arise during the performance of their different tasks. In this way, professionals will offer innovative solutions in numerous fields such as computer vision, medicine, robotics or finance.

You will master the keys to Deep Learning and learn all its applications to increase your job visibility in a booming technology industry"

General Objectives

- Fundamentalize 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
- Fundamentals of the key concepts and main applications of deep learning
- Implement and optimize neural networks with Keras
- Develop expertise in the training of deep neural networks
- Analyze the optimization and regularization mechanisms required for deep neural network training

Specific Objectives

- Develop the chain rule for calculating derivatives of nested functions
- Analyze how to create new functions from existing functions and how to compute the derivatives of these functions
- Examine the concept of Backward Pass and how derivatives of vector functions are applied to automatic learning
- Learn how to use TensorFlow to build custom models
- Understand how to load and process data using TensorFlow tools
- Fundamentalize the key concepts of NLP natural language processing with RNN and attention mechanisms
- Explore the functionality of Hugging Face transformer libraries and other natural language processing tools for application to vision problems
- Learn how to build and train autoencoder models, GANs, and diffusion models

You will achieve your academic goals in a comfortable way, avoiding long trips to educational institutions thanks to the 100% online modality of TECH"

03

Course Management

To guarantee a high quality educational experience, TECH has brought together the best professionals in the field of Deep Learning. Specialized in Neural Networks, these specialists pour their knowledge and years of professional experience into the teaching materials that make up this Postgraduate Certificate. Committed both to technological progress and to their teaching work, they will offer students all the advances that have been made in this branch of Artificial Intelligence. In this way, students will enjoy a first-class educational experience that will allow them to make the leap to prestigious industries that are experiencing constant growth.

The teachers of this Postgraduate Certificate will provide you with the most innovative techniques for the creation of Neural Networks"

Management

Mr. Gil Contreras, Armando

- Lead Big Data Scientist at Johnson Controls
- Data Scientist-Big Data at Opensistemas S.A
- Fund Auditor at Creatividad and Tecnología (CYTSA)
- Public Sector Auditor at PricewaterhouseCoopers Auditors
- Master's Degree in Data Science from the Centro Universitario de Tecnología y Arte
- MBA in International Relations and Business from the Centro de Estudios Financieros (CEF)
- Bachelor's Degree in Economics from Instituto Tecnológico de Santo Domingo

Professors

Mr. Villar Valor, Javier

- Director and Founding Partner of Impulsa2
- *Chief Operations Officer* (COO) at Summa Insurance Brokers
- Director of Transformation and Operational Excellence at Johnson Controls
- Master in Professional *Coaching*
- Executive MBA from Emlyon Business School, France
- Master's Degree in Quality Management from EOI, Spain
- Computer Engineering from the Universidad Acción Pro-Education and Culture (UNAPEC)

Ms. Delgado Feliz, Benedit

- Administrative Assistant and Electronic Surveillance Operator for the National Drug Control Directorate (DNCD)
- Customer Service at Cáceres y Equipos
- Claims and Customer Service at Express Parcel Services (EPS)
- Microsoft Office Specialist at the National School of Informatics (Escuela Nacional de Informática)
- Social Communicator from the Catholic University of Santo Domingo

Ms. Gil de León, María

- Co-Director of Marketing and Secretary at RAÍZ Magazine
- Copy Editor at Gauge Magazine
- Stork Magazine reader from Emerson College
- B.A. in Writing, Literature and Publishing from Emerson College

Mr. Matos Rodríguez, Dionis

- Data Engineer at Wide Agency Sodexo
- Data Consultant at Tokiota
- Data Engineer at Devoteam
- BI Developer at Ibermática
- Applications Engineer at Johnson Controls
- Database Developer at Suncapital España
- Senior Web Developer at Deadlock Solutions
- QA Analyst at Metaconxept
- Master's Degree in Big Data & Analytics by EAE Business School
- Master's Degree in Systems Analysis and Design
- Bachelor's Degree in Computer Engineering from APEC University

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

Designed by experts in Deep Learning, this program will provide students with a solid foundation on how Neural Networks work. The academic itinerary will delve into the typology of Deep Learning, analyzing aspects such as operations, layers or parameter settings. This will allow students to design neural architectures to recognize patterns in complex data.

In line with this, the syllabus will delve into the establishment of weights, the selection of optimizers and the implementation of metrics to evaluate the performance of projects. In addition, the program will emphasize the importance of Learning Rate to ensure success in training the model.

You will enjoy the most complete and updated syllabus in the academic market, configured as a high learning tool to boost your professional career"

Module 1. Neural Networks, the Basis of Deep Learning

1.1. Deep Learning
- 1.1.1. Types of Deep Learning
- 1.1.2. Applications of Deep Learning
- 1.1.3. Advantages and Disadvantages of Deep Learning

1.2. Operations
- 1.2.1. Sum
- 1.2.2. Product
- 1.2.3. Transfer

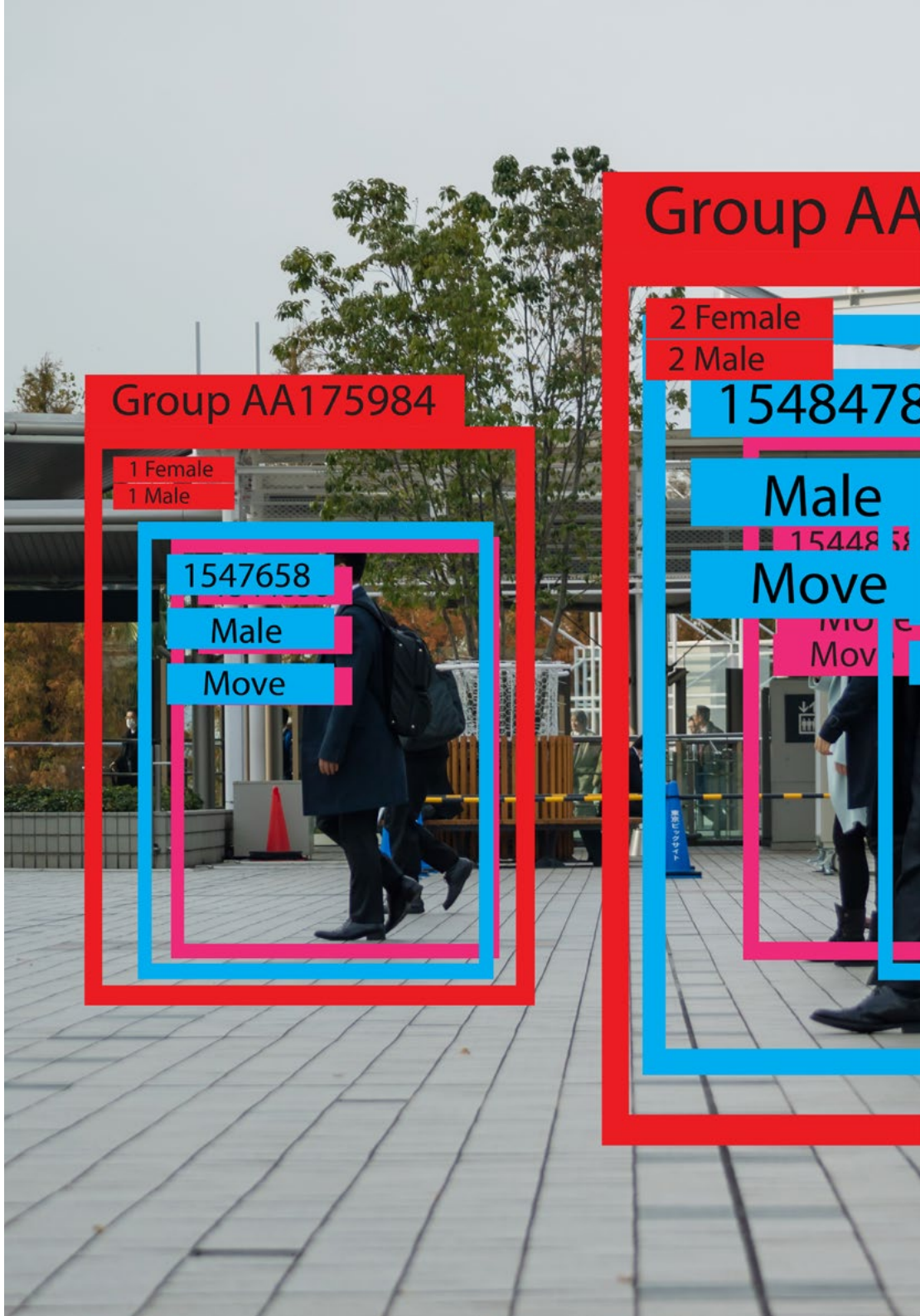
1.3. Layers
- 1.3.1. Input Layer
- 1.3.2. Cloak
- 1.3.3. Output Layer

1.4. Union of Layers and Operations
- 1.4.1. Architecture Design
- 1.4.2. Connection between Layers
- 1.4.3. Forward Propagation

1.5. Construction of the First Neural Network
- 1.5.1. Network Design
- 1.5.2. Establish the Weights
- 1.5.3. Network Training

1.6. Trainer and Optimizer
- 1.6.1. Optimizer Selection
- 1.6.2. Establishment of a Loss Function
- 1.6.3. Establishing a Metric

1.7. Application of the Principles of Neural Networks
- 1.7.1. Activation Functions
- 1.7.2. Backward Propagation
- 1.7.3. Parameter Adjustment



1.8. From Biological to Artificial Neurons
- 1.8.1. Functioning of a Biological Neuron
- 1.8.2. Transfer of Knowledge to Artificial Neurons
- 1.8.3. Establish Relations between the Two

1.9. Implementation of MLP (Multilayer Perceptron) with Keras
- 1.9.1. Definition of the Network Structure
- 1.9.2. Model Compilation
- 1.9.3. Model Training

1.10. Fine Tuning Hyperparameters of Neural Networks
- 1.10.1. Selection of the Activation Function
- 1.10.2. Set the Learning Rate
- 1.10.3. Adjustment of Weights

TECH will rely on the most innovative study materials and multimedia resources in this academic pathway. Enroll now!"

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

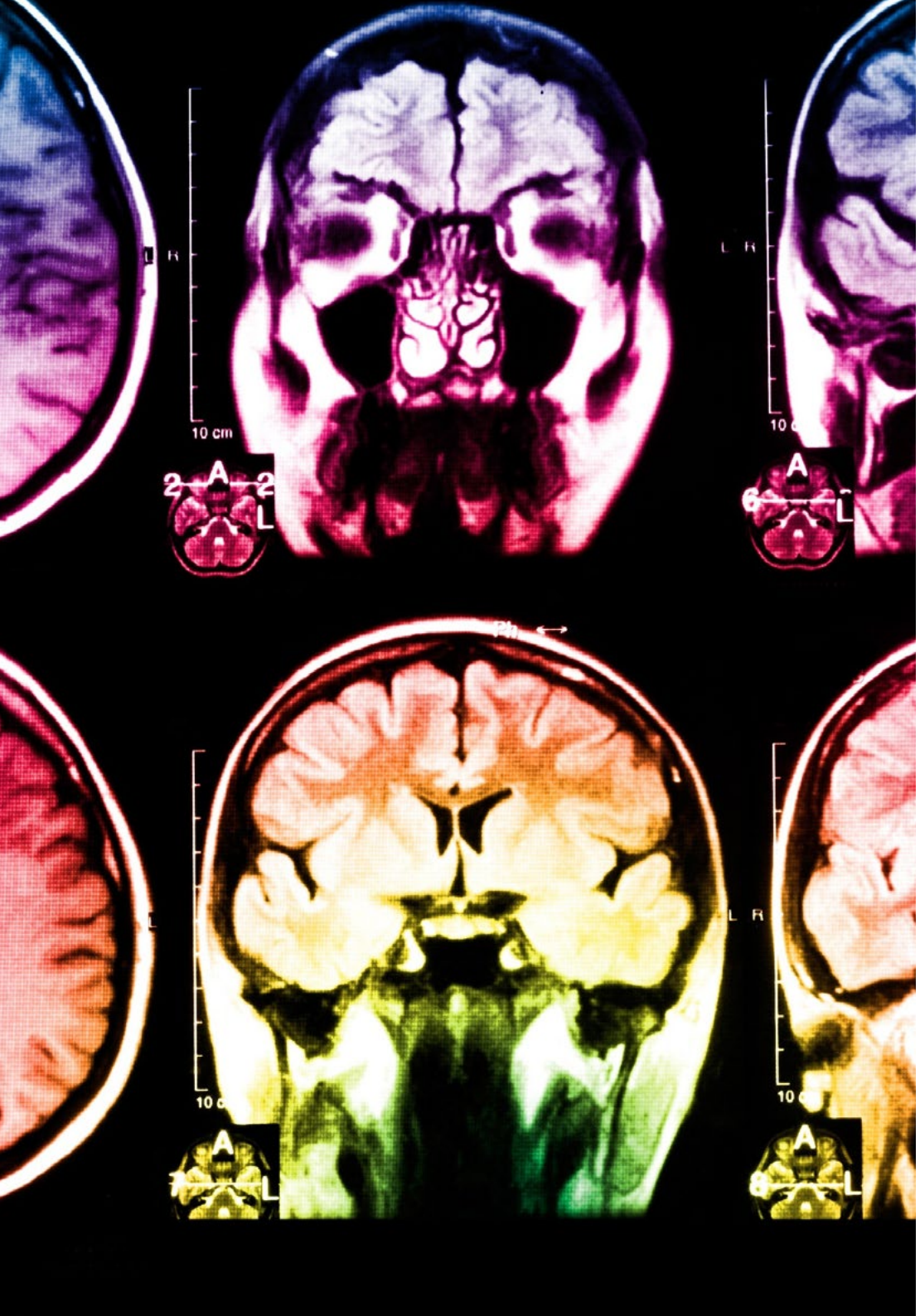
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

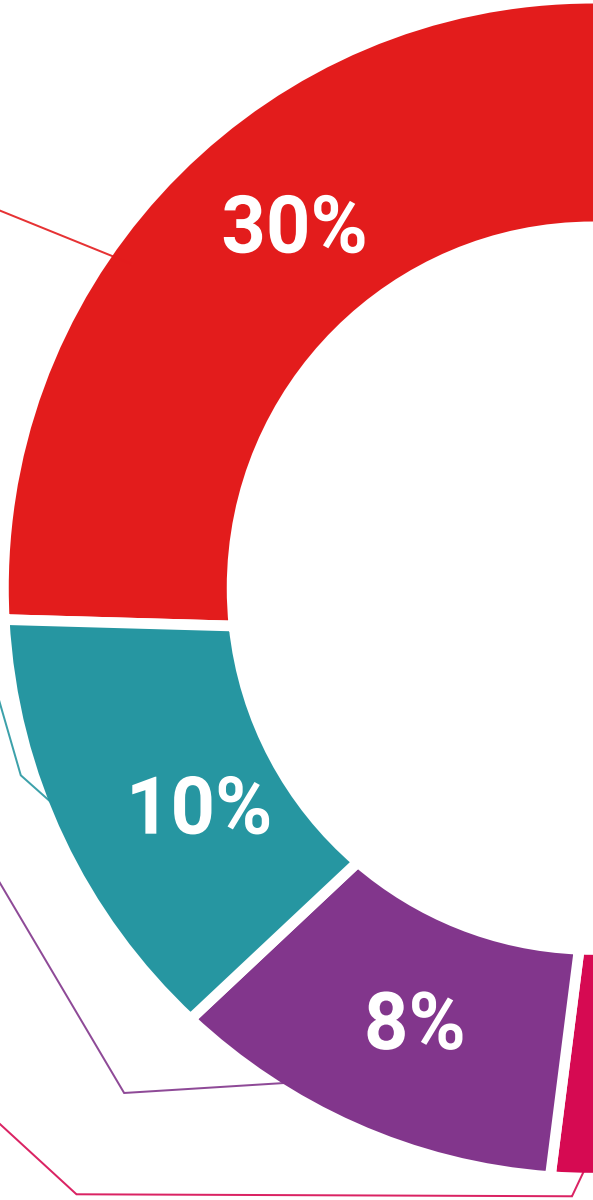
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

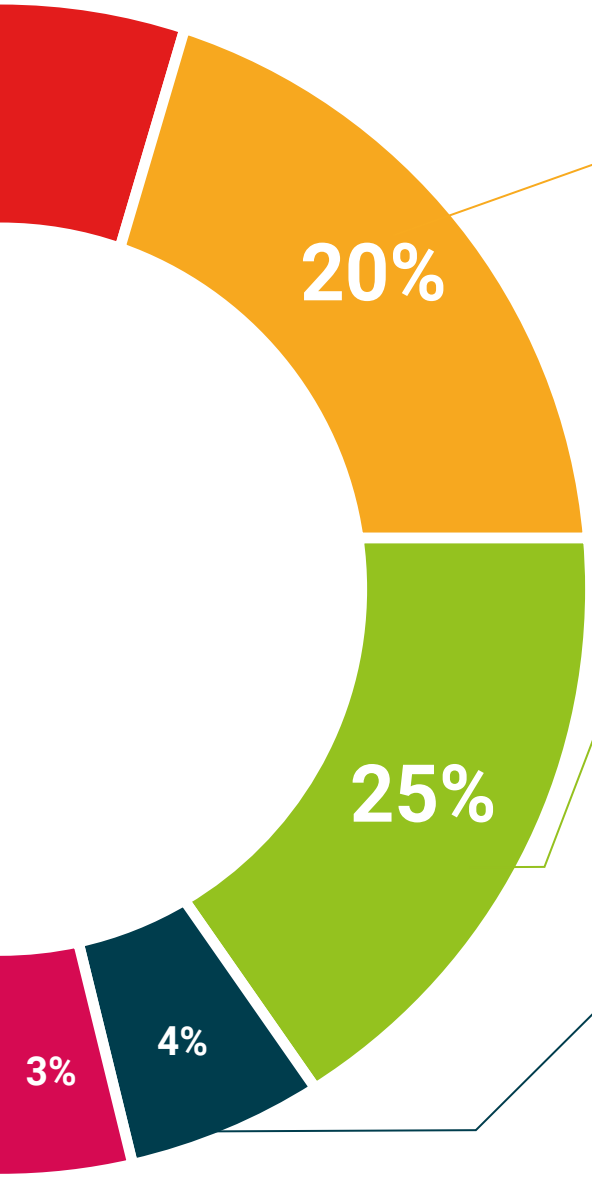
Practising Skills and Abilities

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 Neural Networks in Deep Learning guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate 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 Certificate in Neural Networks in Deep Learning** 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.

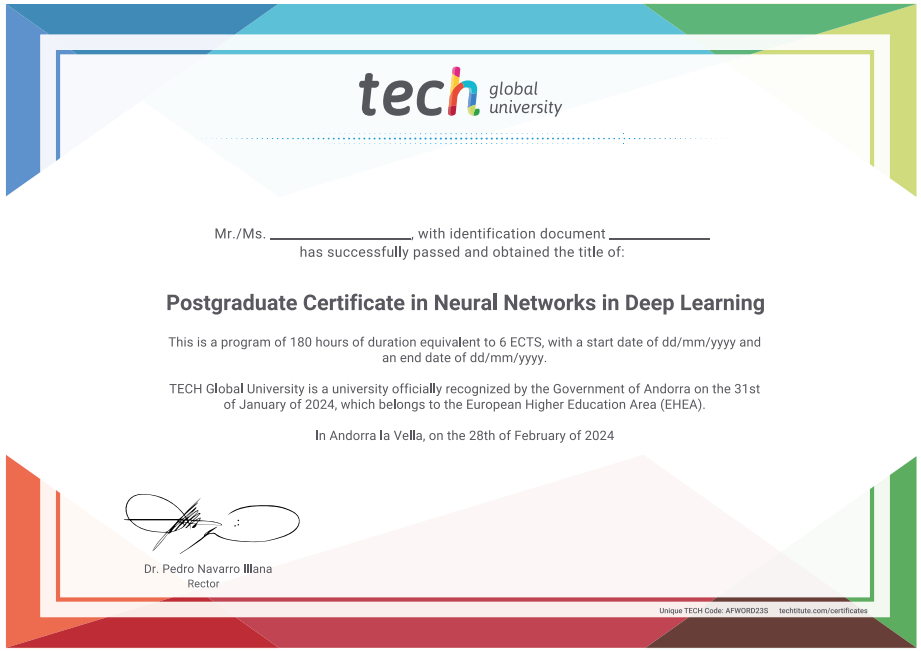
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Neural Networks in Deep Learning**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**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Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Postgraduate Certificate in Neural Networks in Deep Learning

This is a program of 180 hours of duration equivalent to 6 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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Postgraduate Certificate

Neural Networks in Deep Learning

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Postgraduate Certificate

Neural Networks in Deep Learning

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