Postgraduate Diploma

Neural Networks and Deep Learning Training

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Postgraduate Diploma
Neural Networks and Deep Learning Training

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

Website: www.techtitute.com/in/information-technology/postgraduate-diploma/neural-networks-deep-learning-training

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01

Introduction

Today, Artificial Intelligence is transforming the way companies and organizations address their challenges, enabling them to improve the efficiency and quality of their products and services. Artificial neural network training is one of the most important areas of AI, as it allows computers to learn and improve their performance through experience. This has led to a great interest in deep learning, so this degree is perfect for developing advanced practical skills in the design and training of complex neural network algorithms to solve real-world problems. All this under a convenient online modality with which the enrollee will manage the academic resources.

Master the future of technology with this Postgraduate Diploma in Neural Networks and Deep Learning Training"

Artificial Intelligence has become one of the most influential technologies today, and its use has spread to numerous sectors, from healthcare to manufacturing to retail. In this sense, the training of artificial neural networks is a fundamental component of AI and is essential for the development of complex algorithms that can learn and improve through experience.

In this context, the Postgraduate Diploma in Neural Networks and Deep Learning Training is a TECH program designed to provide practical skills in cutting-edge technologies, such as TensorFlow and Keras. Similarly, students will specialize in implementing advanced deep learning solutions in Python.

In addition, the degree is designed to be 100% online, allowing students to complete the program according to their own schedule. The Relearning pedagogical methodology is also a highlight of the degree, as it focuses on experiential learning and practical problem solving to better internalize the concepts. Likewise, students will have great flexibility, with dynamic study resources that they can organize at their convenience.

This **Postgraduate Diploma in Neural Networks and Deep Learning Training** contains the most complete and up-to-date program on the market. The most important features include:

- The development of practical cases presented by experts in Neural Networks and Deep Learning Training
- The graphical, schematic and eminently practical contents with which it is conceived gather technological 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

Design and train complex neural network algorithms to solve real-world problems. What are you waiting for to enroll?"

Enroll in this Postgraduate Diploma and boost skills in building deep learning models and advanced solutions for your projects"

Delve into the world of deep learning and discover how Artificial Intelligence is transforming society.

Specialize by consulting dynamic case studies, interactive diagrams or in-depth videos on how to train artificial networks.

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

Its 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 an immersive education programmed to learn in real situations.

The design of this program focuses on Problem-Based Learning, by means of which the professional must try to solve the different professional practice situations that are presented throughout the academic course. For this purpose, the student will be assisted by an innovative interactive video system created by renowned experts.

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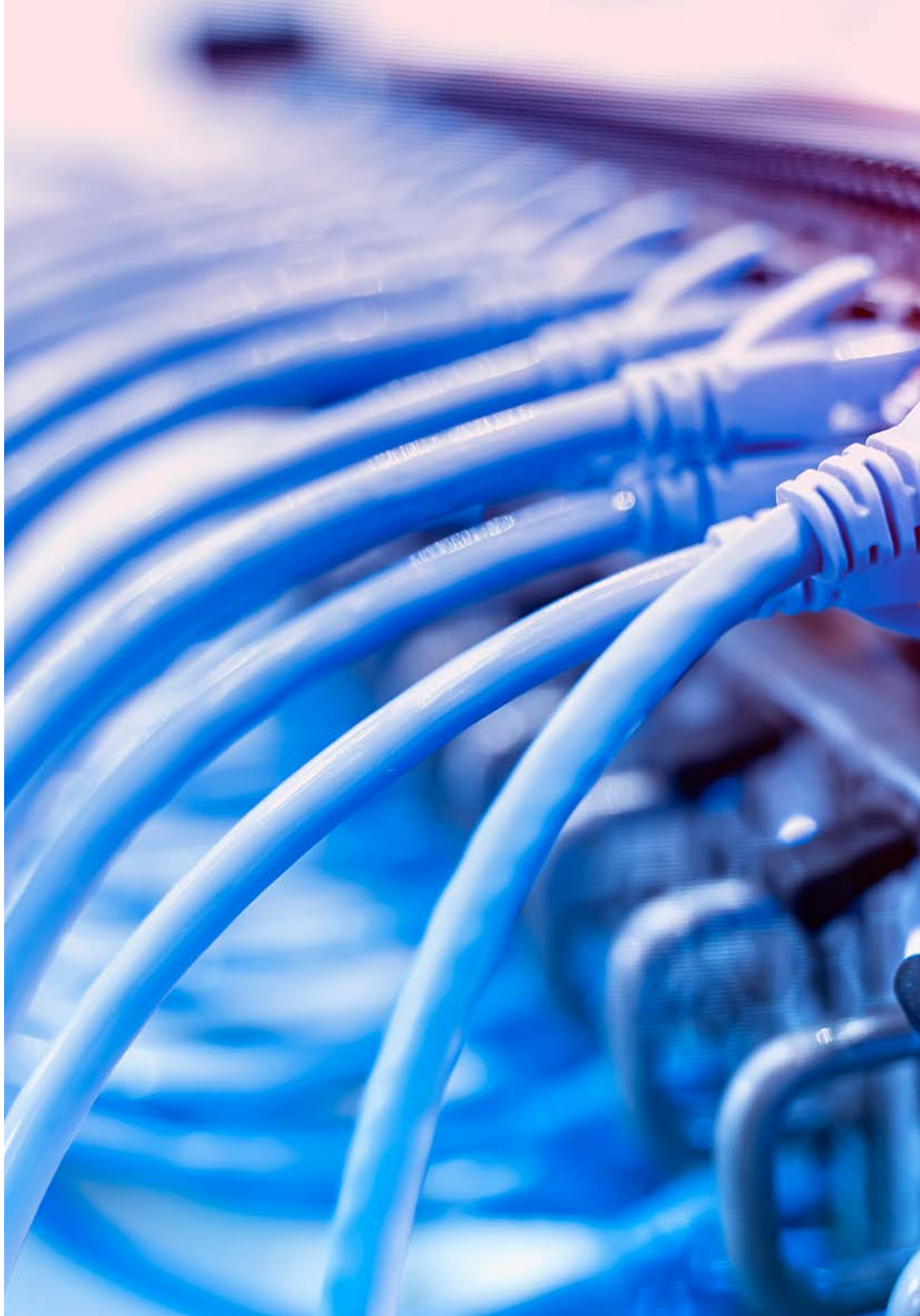
Objectives

By enrolling in this 450-hour educational program, students will have the opportunity to develop skills and knowledge that will allow them to make significant progress in the field of Deep Learning. Thus, TECH focuses on providing innovative and easily accessible pedagogical tools to help students achieve their goals. In addition, it has a team of outstanding and recognized professors in the field of AI, which guarantees a high quality preparation.

Boost your career in IT by proposing innovative solutions to Gradient problems"

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

Module 1. Deep Neural Networks Training

- Analyze gradient problems and how they can be avoided
- Determine how to reuse pre-trained layers to train deep neural networks
- Establish how to program the learning rate to obtain the best results

Module 2. Model Customization and training with TensorFlow

- Determine how to use the TensorFlow API to define custom functions and graphics and custom graphs
- Fundamentally use the tf.data API to load and preprocess data efficiently
- Discuss the TensorFlow Datasets project and how it can be used to facilitate access to preprocessed datasets.

Module 3. Deep Computer Vision with Convolutional Neural Networks

- Explore and understand how convolutional and clustering layers work for Visual Cortex architecture
- Develop CNN architectures with Keras
- Use pre-trained Keras models for object classification, localization, detection, and tracking, as well as semantic segmentation

03

Course Management

The teachers of the Postgraduate Diploma in Neural Networks and Deep Learning Training are experienced professionals in the field of Artificial Intelligence and Deep Learning. Each of them has extensive experience in the design, implementation and training of neural network algorithms and advanced solutions to solve complex problems in different sectors. In addition, they are committed to the academic preparation and teaching of students, providing a quality and practice-oriented education.

Prepare yourself for success in the field of Deep Learning with the keys that will provide you with versed AI experts"

Management

Mr. Gil Contreras, Armando

- Lead Big Data Scientist-Big Data at Jhonson Controls
- Data Scientist-Big Data at Opensistemas
- Fund Auditor at Creatividad y Tecnología and PricewaterhouseCoopers
- Lecturer at EAE Business School
- Degree in Economics from the Technological Institute of Santo Domingo INTEC
- Professional Master's Degree in Data Science at Centro Universitario de Tecnología y Arte
- Master MBA in International Relations and Business at CEF (Centro de Estudios Financieros)
- Postgraduate Certificate in Corporate Finance from the Santo Domingo Institute of Technology.

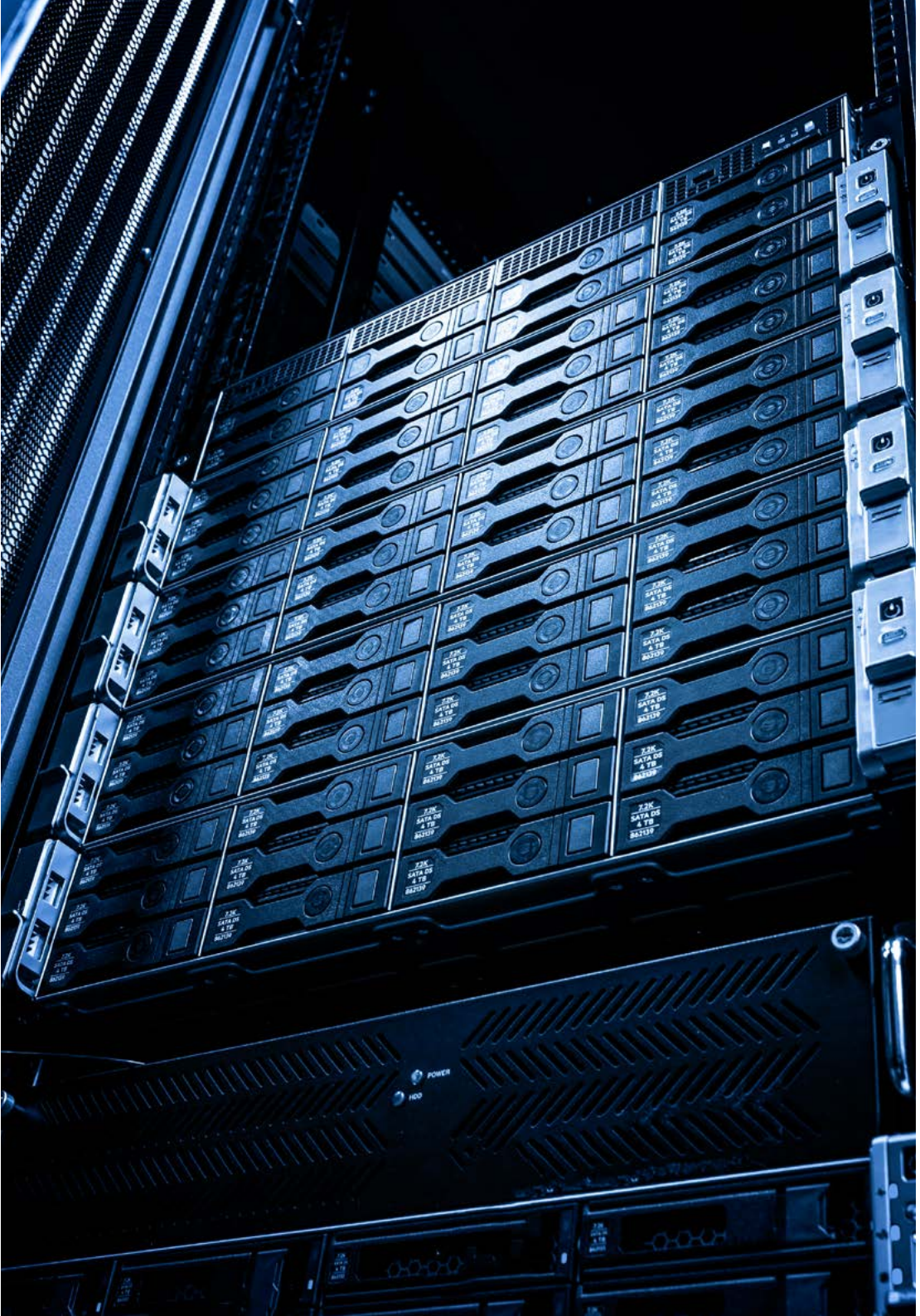
Professors

Mr. Delgado Panadero, Ángel

- ML Engenieer at Paradigma Digital
- Computer Vision Engineer at NTT Disruption
- Data Scientist at Singular People
- Data Analyst at Parclick
- Tutor at Master in Big Data and Analytics at EAE Business School
- Degree in Physics at the University of Salamanca

Mr. Matos, Dionis

- *Data Engineer* at Wide Agency Sodexo
- *Data Consultant at Tokiota Site*
- *Data Engineer at* Devoteam Testa Home
- *Business Intelligence Developer* at Ibermatica Daimler
- Master Big Data and Analytics /Project Management(Minor) at EAE Business



Mr. Villar Valor, Javier

- Director and founding partner Impulsa2
- Head of Operations at Summa Insurance Brokers
- Responsible for identifying opportunities for improvement at Liberty Seguros
- Director of Transformation and Professional Excellence at Johnson Controls Iberia
- Responsible for the organization of the company Groupama Seguros
- Responsible for Lean Six Sigma methodology at Honeywell
- Director of Quality and Purchasing at SP & PO
- Lecturer at the European Business School

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Structure and Content

The Postgraduate Diploma in Neural Networks and Deep Learning Training offers a comprehensive educational program that will take students on a broad academic journey: from neural network training to deep learning.

Computer Vision with convolutional neural networks. In addition, the curriculum is extremely detailed and is supported by a variety of innovative teaching resources that are available to students on the Virtual Campus of the degree.

A comprehensive curriculum with which you will master the reuse of pre-trained layers"

Module 1. Deep Neural Networks Training

1.1. Gradient Problems
- 1.1.1. Gradient Optimization Techniques
- 1.1.2. Stochastic Gradients
- 1.1.3. Weight initialization techniques

1.2. Reuse of pre-trained layers
- 1.2.1. Learning transfer training
- 1.2.2. Feature Extraction
- 1.2.3. Deep Learning

1.3. Optimize
- 1.3.1. Stochastic gradient descent optimizers.
- 1.3.2. Adam and RMSprop optimizers
- 1.3.3. Moment optimizers

1.4. Learning rate scheduling
- 1.4.1. Automatic learning rate control
- 1.4.2. Learning cycles
- 1.4.3. Smoothing terms

1.5. Overfitting
- 1.5.1. Cross Validation
- 1.5.2. Regularization
- 1.5.3. Evaluation Metrics

1.6. Practical Guidelines
- 1.6.1. Model desing
- 1.6.2. Selection of metrics and evaluation parameters
- 1.6.3. Hypothesis testing

1.7. *Transfer Learning*
- 1.7.1. Learning transfer training
- 1.7.2. Feature Extraction
- 1.7.3. Deep Learning

1.8. *Data Augmentation*
- 1.8.1. Image Transformations
- 1.8.2. Synthetic data Generation
- 1.8.3. Text transformation

1.9. Practical Application of Transfer Learning
- 1.9.1. Learning transfer training
- 1.9.2. Feature Extraction
- 1.9.3. Deep Learning

1.10. Regularization
- 1.10.1. L1 and L2
- 1.10.2. Maximum entropy regularization
- 1.10.3. Dropout

Module 2. Model customization and training with TensorFlow

2.1. TensorFlow
- 2.1.1. Using the TensorFlow Library
- 2.1.2. Model training with TensorFlow
- 2.1.3. Operations with graphs in TensorFlow

2.2. TensorFlow and NumPy
- 2.2.1. NumPy computational environment for TensorFlow
- 2.2.2. Using NumPy arrays with TensorFlow
- 2.2.3. NumPy operations for TensorFlow graphs

2.3. Model customization and training algorithms
- 2.3.1. Building custom models with TensorFlow
- 2.3.2. Management of training parameters
- 2.3.3. Use of optimization techniques for training

2.4. TensorFlow functions and graphs
- 2.4.1. Functions with TensorFlow
- 2.4.2. Use of graphs for model training
- 2.4.3. Optimization of graphs with TensorFlow operations

2.5. Data loading and preprocessing with TensorFlow
- 2.5.1. Loading of datasets with TensorFlow
- 2.5.2. Data preprocessing with TensorFlow
- 2.5.3. Using TensorFlow tools for data manipulation

2.6. The tf.data API
- 2.6.1. Using the tf.data API for data processing
- 2.6.2. Constructing data streams with tf.data
- 2.6.3. Use of the tf.data API for training models

2.7. The TFRecord format
- 2.7.1. Using the TFRecord API for Data Serialization
- 2.7.2. Loading TFRecord files with TensorFlow
- 2.7.3. Using TFRecord files for training models

2.8. Keras preprocessing layers
- 2.8.1. Using the Keras preprocessing API
- 2.8.2. Construction of preprocessing pipelined with Keras
- 2.8.3. Using the Keras preprocessing API for model training

2.9. The TensorFlow Datasets project
- 2.9.1. Using TensorFlow Datasets for data loading
- 2.9.2. Data preprocessing with TensorFlow Datasets
- 2.9.3. Using TensorFlow Datasets for Model Training

2.10. Construction of a Deep Learning Application with TensorFlow. Practical Application
- 2.10.1. Building a Deep Learning application with TensorFlow.
- 2.10.2. Training a model with TensorFlow
- 2.10.3. Use of the application for the prediction of results

Module 3. Deep Computer Vision with Convolutional Neural Networks

3.1. The Cortex Visual Architecture
- 3.1.1. Functions of the Visual Cortex
- 3.1.2. Theories of computational vision
- 3.1.3. Models of image processing

3.2. Convolutional layers
- 3.2.1. Reuse of weights in convolution
- 3.2.2. 2D convolution
- 3.2.3. Activation Functions

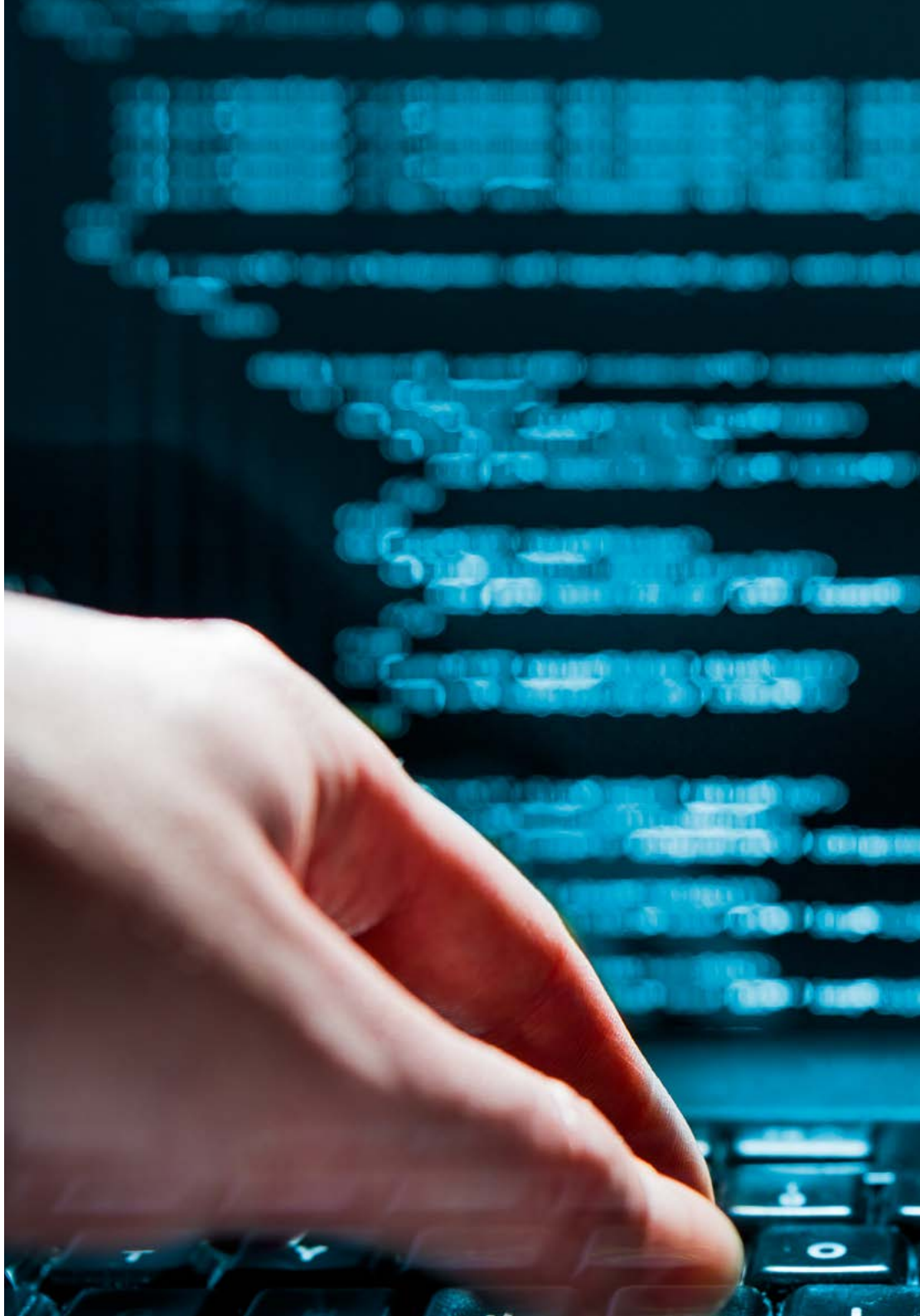
3.3. Grouping layers and implementation of grouping layers with Keras
- 3.3.1. Pooling and Striding
- 3.3.2. *Flattening*
- 3.3.3. Types of Pooling

3.4. CNN Architecture
- 3.4.1. VGG Architecture
- 3.4.2. AlexNet architecture
- 3.4.3. ResNet Architecture

3.5. Implementation of a ResNet-34 CNN using Keras
- 3.5.1. Weight initialization
- 3.5.2. Input layer definition
- 3.5.3. Output definition

3.6. Use of pre-trained Keras models
- 3.6.1. Characteristics of pre-trained models
- 3.6.2. Uses of pre-trained models
- 3.6.3. Advantages of pre-trained models

3.7. Pre-trained models for transfer learning
- 3.7.1. Transfer learning
- 3.7.2. Transfer learning process
- 3.7.3. Advantages of transfer learning



3.8. Classification and Localization in Deep Computer Vision
- 3.8.1. Image Classification
- 3.8.2. Localization of objects in images
- 3.8.3. Object Detection

3.9. Object detection and object tracking
- 3.9.1. Object detection methods
- 3.9.2. Object tracking algorithms
- 3.9.3. Tracking and localization techniques

3.10. Semantic Segmentation
- 3.10.1. Deep learning for semantic segmentation
- 3.10.2. Edge Detection
- 3.10.3. Rule-based segmentation methods

Take the opportunity to get up to speed on the creation of object detection and tracking algorithms"

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

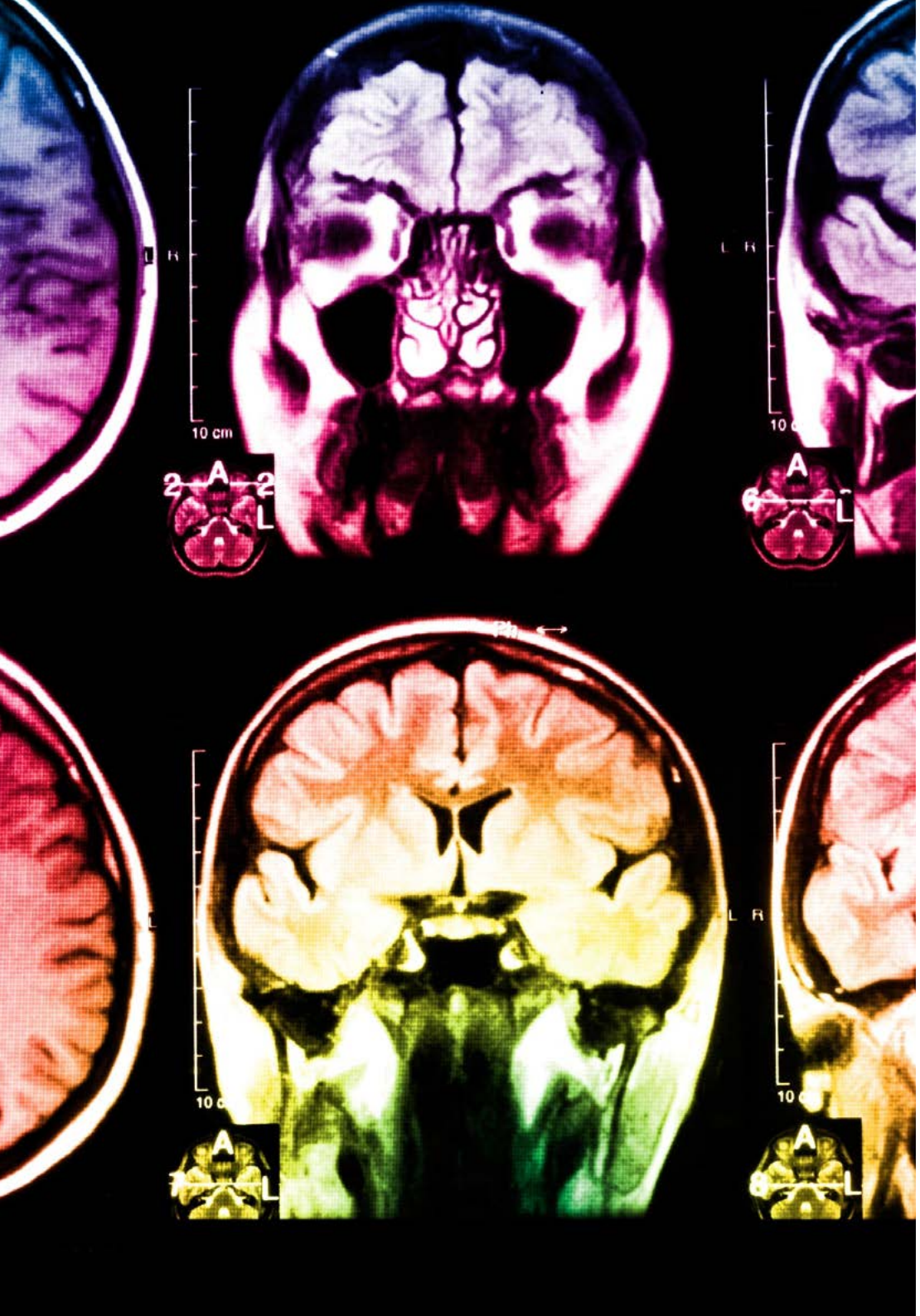
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

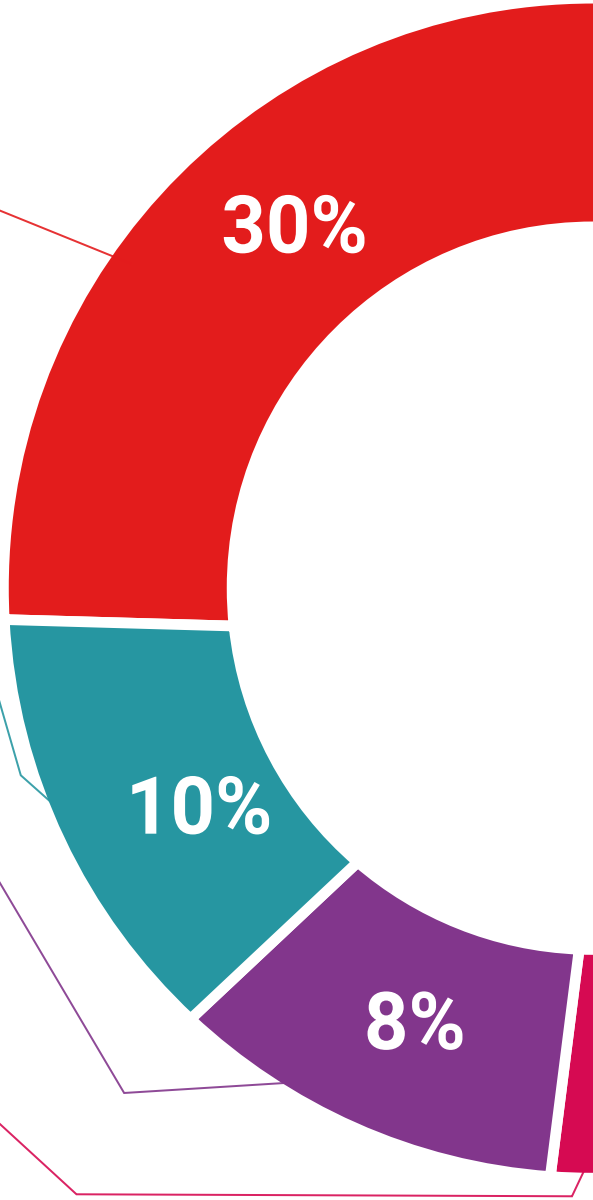
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

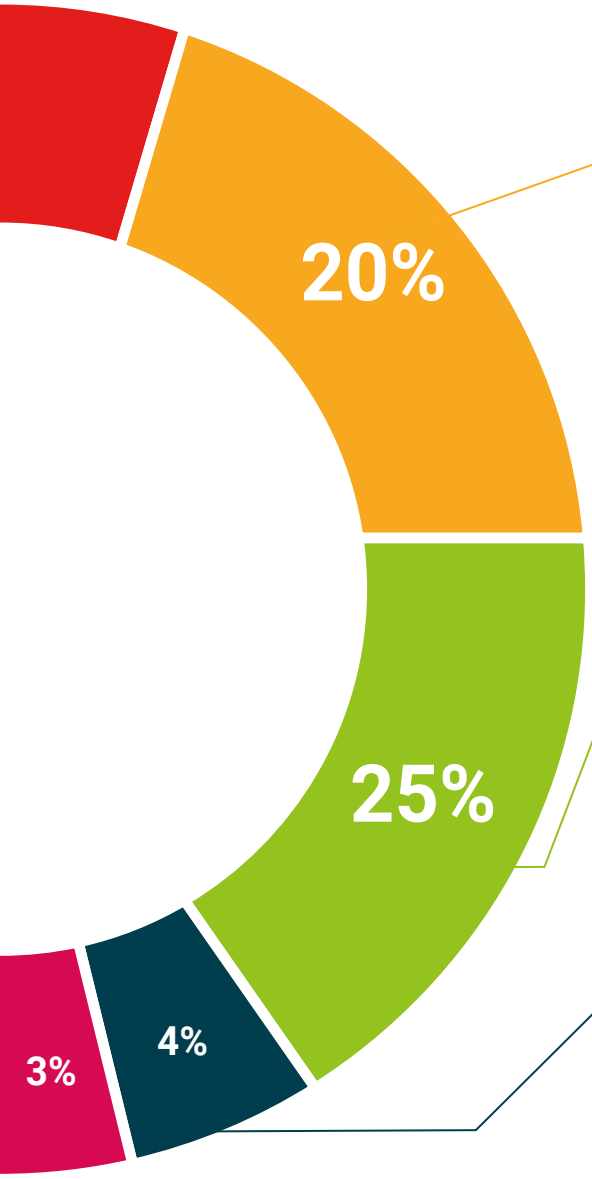
Practising Skills and Abilities

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 Diploma in Neural Networks and Deep Learning Training guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma 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 Diploma in Neural Networks and Deep Learning Training contains the most complete and updated program in the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Diploma** issued by **TECH Technological University via tracked delivery.**

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Diploma, and it meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Program: **Postgraduate Diploma Neural Networks and Deep Learning Training**

Official No. of Hours: **450 h.**


tech technological university

Awards the following

CERTIFICATE

to

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

For having passed and accredited the following program

POSTGRADUATE DIPLOMA

in

Neural Networks and Deep Learning Training

This is a qualification awarded by this University, equivalent to 450 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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Neural Networks and Deep Learning Training

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Postgraduate Diploma

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