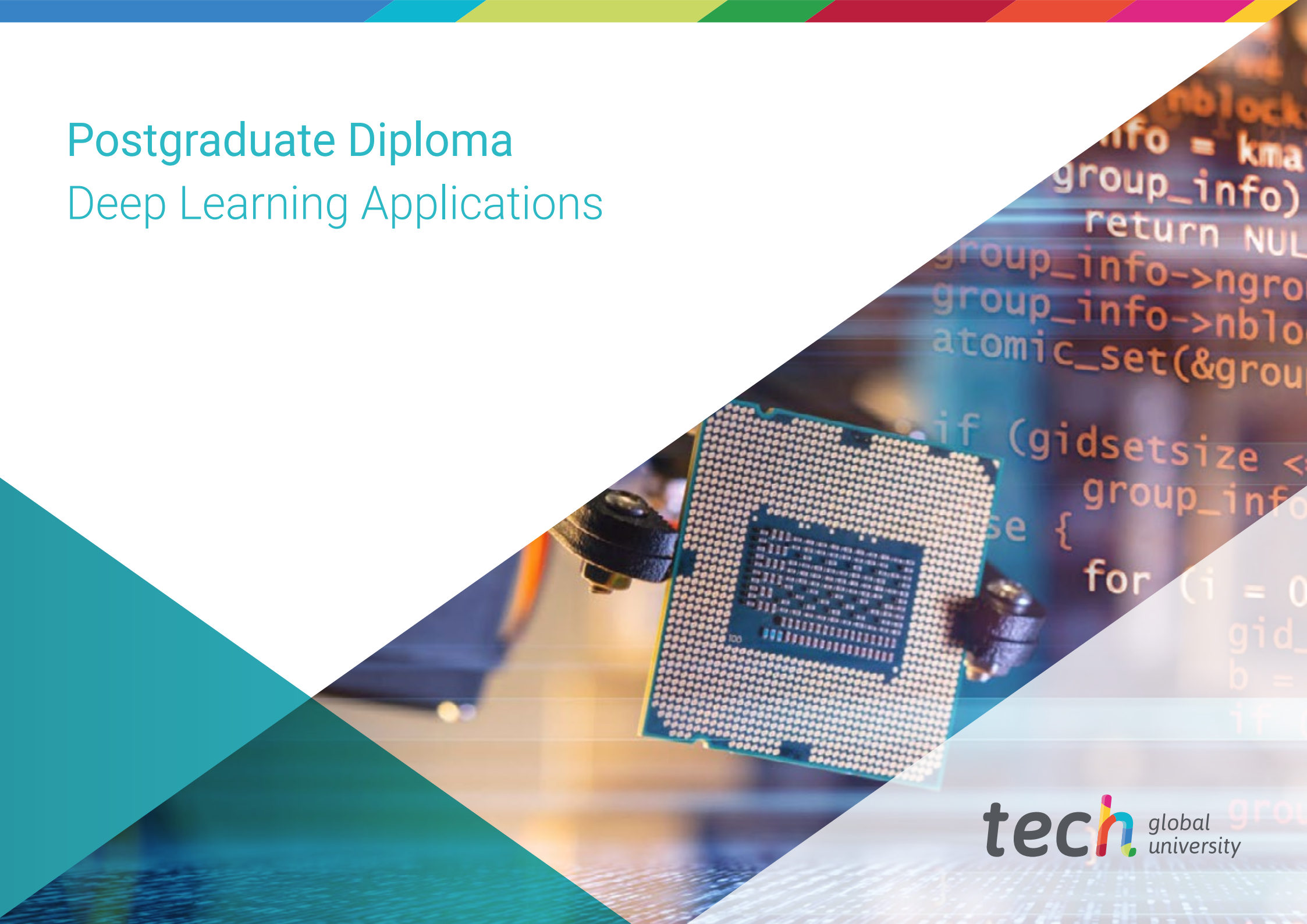
Postgraduate Diploma

Deep Learning Applications



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Postgraduate Diploma
Deep Learning Applications

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

Website: www.techtitute.com/us/information-technology/postgraduate-diploma/postgraduate-diploma-deep-learning-applications

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01

Introduction

Deep Learning has become a key tool in various sectors, from medicine to engineering. This is because this deep learning technique allows machines to analyze large amounts of data and learn through them autonomously, with the undoubted benefits this brings in terms of efficiency. As such, this degree provides an opportunity for the IT professional to get up to speed in a constantly evolving field. The program focuses on the most popular applications of Deep Learning, such as image recognition, Natural Language Processing or data analysis. Under an online modality, the degree allows to manage academic resources at the convenience of the enrolle.

Specialize in the various applications of Deep Learning to contribute to the technological transformation of society"

Deep Learning has enabled the advancement of areas such as Computer Vision, Natural Language Processing and Robotics. Currently, the application of these techniques is increasingly in demand in different sectors such as Medicine, Engineering, Marketing or Security, among others. For example, in Medicine, Deep Learning has proven to be very useful in the early detection of diseases through the analysis of medical images. In Marketing, it can be used to make accurate predictions of consumer behavior and personalize offers.

These are just a few examples that illustrate the importance of specialization in this area. Thus, the Postgraduate Diploma in Deep Learning Applications has been designed, a program that aims to prepare professionals capable of using these techniques in different contexts. The degree consists of modules that address the most popular applications of Deep Learning and enrollees will be updated in the design and training of recurrent neural networks, Autoencoders, GAN and Diffusion Models, among other key points.

In addition, the degree uses the Relearning pedagogical methodology to assimilate the concepts more quickly. Likewise, the flexibility to organize academic resources allows students to adapt their study time to their personal and professional needs. And always completely online.

This **Postgraduate Diploma in Deep Learning Applications** contains the most complete and updated educational program on the market. Its most outstanding features are:

- The development of case studies presented by experts in Deep Learning Applications
- The graphic, 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

You will develop highly demanded skills to excel in an increasingly global industry such as Deep Learning"

Gain a competitive advantage in the job market by generating text through recurrent neural networks"

Expertly evaluate the use of neural networks to improve the accuracy of an agent when making decisions.

Implement advanced reinforcement algorithms to improve agent performance with this Postgraduate Diploma.

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 Postgraduate Diploma, students will have the opportunity to acquire specialized skills and knowledge that will enable them to advance the field of Deep Learning in a meaningful way. For this reason, TECH focuses on offering innovative and easily accessible pedagogical resources to support students in achieving their goals. All with the aim of enabling them to perform with solvency in such a demanding competency area as Deep Learning.

Reach the objectives proposed by TECH and develop practical applications of Natural Language Processing with RNN"

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

You will be a reference in the implementation of PCA techniques with an incomplete linear automatic encoder"

Specific Objectives

Module 1. Processing sequences using RNN and CNN

- Analyze the architecture of recurrent neurons and layers
- Examine the various training algorithms for training RNN models
- Evaluating the performance of RNN models using accuracy and sensitivity metrics

Module 2. NLP Natural Language Processing with RNN and Attention

- Generating text using recurrent neural networks
- Train an encoder-decoder network to perform neural machine translation
- Developing a practical application of natural language processing with RNN and attention

Module 3. Autoencoders, GANs, and Diffusion Models

- Implementing PCA techniques with a linear incomplete autoencoder
- Use convolutional and variational autoencoders to improve the results of autoencoders
- Analyze how GANs and diffusion models can generate new and realistic images
  new and realistic images

03

Course Management

The Postgraduate Diploma in Deep Learning Applications has a team of highly qualified and experienced teachers in the field of Artificial Intelligence and Deep Learning. Each of them has been carefully selected to guarantee a quality and updated specialization. In fact, students will have the opportunity to consult all their doubts through an online platform, where they can receive feedback to strengthen their educational performance.

You will have as a reference the best experts in the field of Deep Learning to specialize with all the guarantees"

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

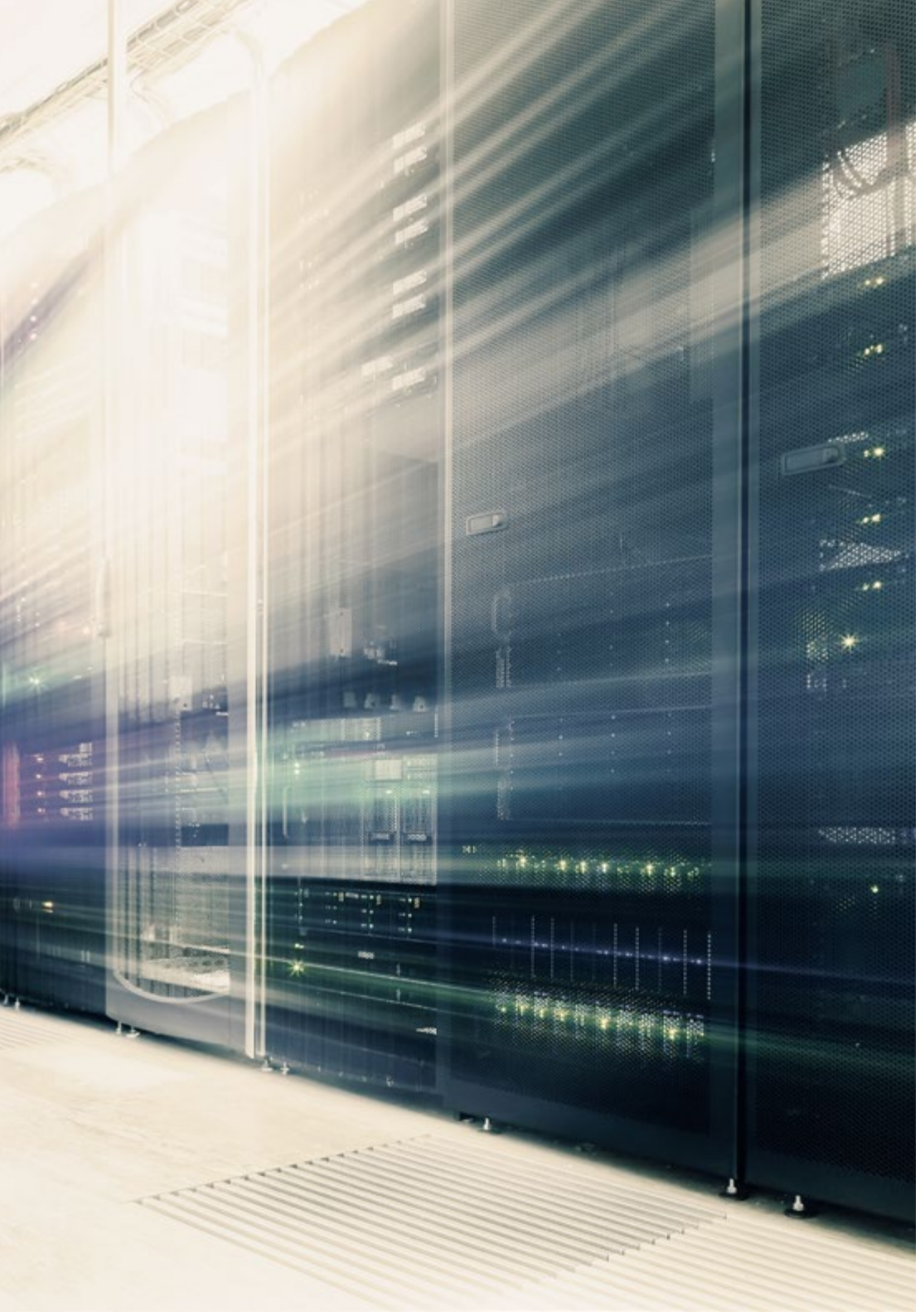
Professors

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 Impulsados
- 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

04

Structure and Content

The Deep Learning Applications Postgraduate Diploma covers a broad academic spectrum, from Natural Language Processing to processing sequences using RNN and CNN. In fact, the curriculum has been designed in a thorough and detailed way, and is supported by several innovative teaching resources that are available to students on the Virtual Campus of the degree. Some of them are videos in detail, case studies or interactive schemes.

A syllabus that proposes a comprehensive tour of recurrent neural networks"

Module 1. Processing sequences using RNN (Recurrent Neural Networks) and CNN (Convolutional Neural Networks)

1.1. Recurrent neurons and layers
- 1.1.1. Types of Neurons Recurring
- 1.1.2. Architecture of a recurrent layer
- 1.1.3. Applications of recurrent layers

1.2. Recurrent Neural Network (RNN) Training
- 1.2.1. Backpropagation over time (BPTT).
- 1.2.2. Stochastic Downward Gradient
- 1.2.3. Regularization in RNN training

1.3. Evaluation of RNN models
- 1.3.1. Evaluation Metrics
- 1.3.2. Cross Validation
- 1.3.3. Hyperparameter tuning

1.4. Prerenal RNNs
- 1.4.1. Prenetrated networks
- 1.4.2. Transfer of learning
- 1.4.3. Fine Tuning

1.5. Forecasting a time series
- 1.5.1. Statistical models for forecasting
- 1.5.2. Time series models
- 1.5.3. Models based on neural networks

1.6. Interpretation of time series analysis results.
- 1.6.1. Main Component Analysis
- 1.6.2. Cluster analysis
- 1.6.3. Correlation Analysis

1.7. Handling of long sequences
- 1.7.1. Long Short-Term Memory (LSTM)
- 1.7.2. Gated Recurrent Units (GRU)
- 1.7.3. 1D Convolutional

1.8. Partial Sequence Learning
- 1.8.1. Deep learning methods
- 1.8.2. Generative models
- 1.8.3. Reinforcement learning

1.9. Practical Application of RNN and CNN
  1.9.1. Natural Language Processing
  1.9.2. Pattern Recognition
  1.9.3. Computer vision
1.10. Differences in classical results
  1.10.1. Classical vs. RNN methods
  1.10.2. Classical vs. CNN methods
  1.10.3. Difference in training time

Module 2. Natural Language Processing (NLP) with Natural Recurrent Networks (NNN) and Attention

2.1. Text generation using RNN
  2.1.1. Training an RNN for text generation
  2.1.2. Natural language generation with RNN
  2.1.3. Text generation applications with RNN
2.2. Training data set creation
  2.2.1. Preparation of the data for training an RNN
  2.2.2. Storage of the training dataset
  2.2.3. Data cleaning and transformation
2.3. Sentiment Analysis
  2.3.1. Classification of opinions with RNN
  2.3.2. Detection of themes in comments
  2.3.3. Sentiment analysis with deep learning algorithms
2.4. Encoder-decoder network for neural machine translation.
  2.4.1. Training an RNN for machine translation
  2.4.2. Use of an encoder-decoder network for machine translation
  2.4.3. Improving the accuracy of machine translation with RNNs
2.5. Attention mechanisms
  2.5.1. Application of care mechanisms in RNN
  2.5.2. Use of care mechanisms to improve the accuracy of the models
  2.5.3. Advantages of attention mechanisms in neural networks

2.6. Transformer models
- 2.6.1. Use of Transformers models for natural language processing
- 2.6.2. Application of Transformers models for vision
- 2.6.3. Advantages of Transformers models

2.7. Transformers for vision
- 2.7.1. Use of Transformers models for vision
- 2.7.2. Image data preprocessing
- 2.7.3. Training of a Transformer model for vision

2.8. Hugging Face Transformer Library
- 2.8.1. Using the Hugging Face Transformers Library
- 2.8.2. Application of the Hugging Face Transformers Library
- 2.8.3. Advantages of the Hugging Face Transformers library

2.9. Other Transformers Libraries. Comparison
- 2.9.1. Comparison between the different Transformers libraries.
- 2.9.2. Use of the other Transformers libraries
- 2.9.3. Advantages of the other Transformers libraries

2.10. Development of an NLP Application with RNN and Attention. Practical Application
- 2.10.1. Development of a natural language processing application with RNN and attention
- 2.10.2. Use of RNN, attention mechanisms and Transformers models in the application
- 2.10.3. Evaluation of the practical application

Module 3. Autoencoders, GANs, and Diffusion Models

3.1. Efficient Data Representations
- 3.1.1. Dimensionality Reduction
- 3.1.2. Deep Learning
- 3.1.3. Compact representations

3.2. PCA realization with an incomplete linear automatic encoder
- 3.2.1. Training process
- 3.2.2. Python implementation
- 3.2.3. Use of test data

3.3. Stacked automatic encoders
- 3.3.1. Deep Neural Networks
- 3.3.2. Construction of coding architectures
- 3.3.3. Use of regularization

3.4. Convolutional autoencoders
- 3.4.1. Design of convolutional models
- 3.4.2. Convolutional model training
- 3.4.3. Results Evaluation

3.5. Automatic encoder denoising
- 3.5.1. Application of filters
- 3.5.2. Design of coding models
- 3.5.3. Use of regularization techniques

3.6. Sparse automatic encoders
- 3.6.1. Increasing coding efficiency
- 3.6.2. Minimizing the number of parameters
- 3.6.3. Using regularization techniques

3.7. Variational automatic encoders
- 3.7.1. Use of variational optimization
- 3.7.2. Unsupervised deep learning
- 3.7.3. Deep latent representations

3.8. Generation of fashion MNIST images
- 3.8.1. Pattern recognition
- 3.8.2. Image generation
- 3.8.3. Training of deep neural networks

3.9. Generative adversarial networks and diffusion models
- 3.9.1. Content generation from images
- 3.9.2. Modeling of data distributions
- 3.9.3. Use of adversarial networks

3.10. Implementation of the Models. Practical Application Practical Application
- 3.10.1. Implementation of the models
- 3.10.2. Use of real data
- 3.10.3. Results Evaluation

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

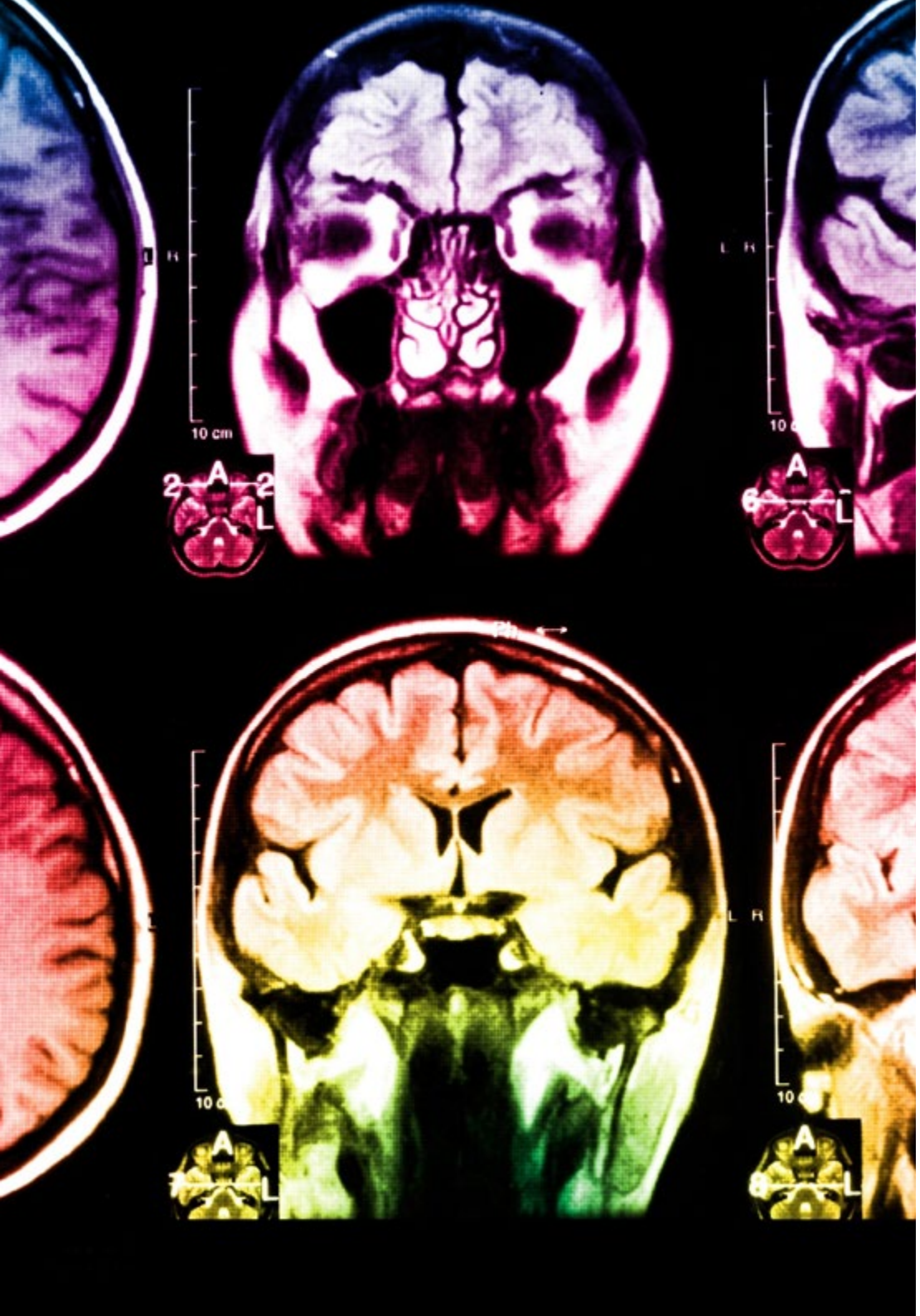
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

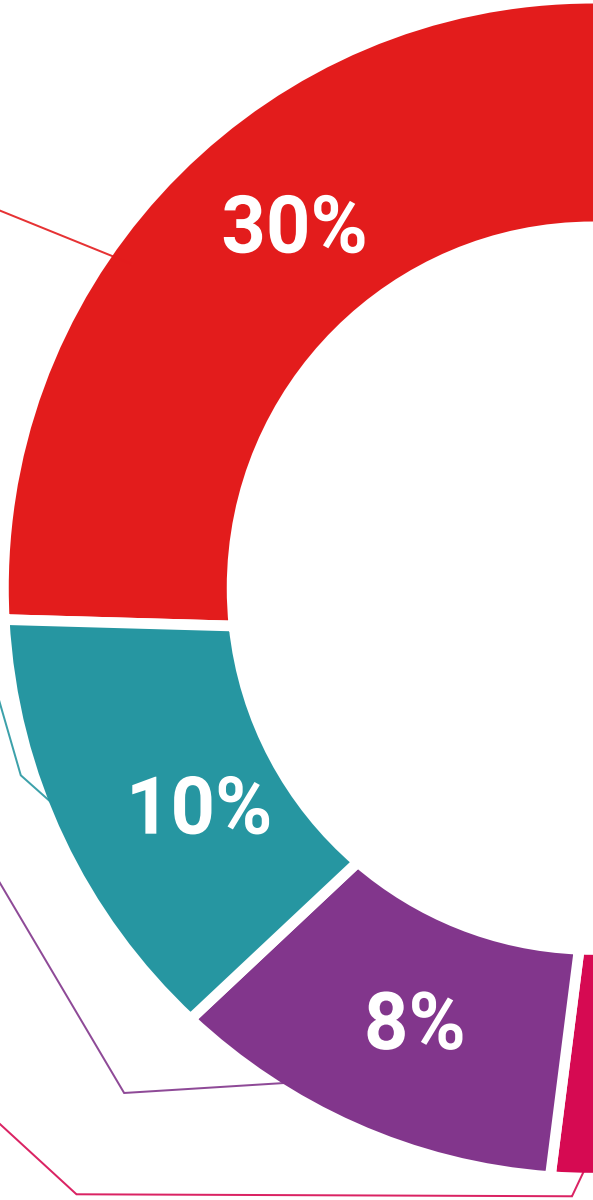
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

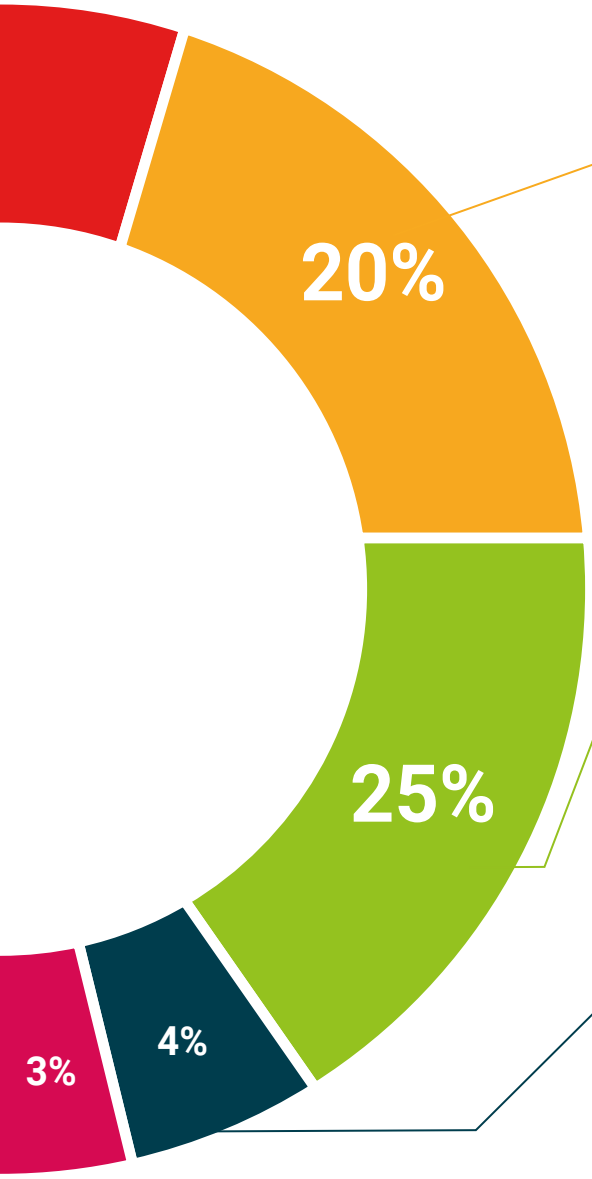
Practising Skills and Abilities

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 Deep Learning 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 Deep Learning Applications** 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 Deep Learning Applications**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**


tech technological university

Awards the following

DIPLOMA

to

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

For having passed and accredited the following program

POSTGRADUATE DIPLOMA

in

Deep Learning Applications

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 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 Diploma
Deep Learning Applications

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