

# Executive Master's Degree Artificial Intelligence in Marketing and Communication

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## Executive Master's Degree Artificial Intelligence in Marketing and Communication

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online
- » Target Group: University Graduates, Diploma and Bachelor's Degree Holders who have previously completed any of the programs in the field of Advertising, Computer Science and/or Business

Website: [www.techtitute.com/us/school-of-business/executive-master-degree/master-artificial-intelligence-marketing-communication](http://www.techtitute.com/us/school-of-business/executive-master-degree/master-artificial-intelligence-marketing-communication)

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# 01

# Welcome

Artificial Intelligence (AI) has provided innovative tools and capabilities that optimize decision making and interaction with consumers. Its importance lies in its ability to analyze huge data sets, identify patterns, trends and consumer behaviors in real time, allowing companies to customize marketing and communication strategies accurately and effectively. In addition, through natural language processing, it allows the automation of interaction with customers, through chatbots and virtual assistants, which streamlines the attention and strengthens the relationship with the brand. For this reason, TECH has created this fully online educational program, based on the revolutionary Relearning methodology.



Executive Master's Degree in Artificial Intelligence in Marketing and Communication  
TECH Technological University



“

*Artificial Intelligence has revolutionized the world of Marketing, optimizing the effectiveness of strategies and fostering a closer and more personalized relationship with customers”*

02

# Why Study at TECH?

TECH is the world's largest 100% online business school. It is an elite business school, with a model based on the highest academic standards. A world-class center for intensive managerial skills education.





“

*TECH is a university at the forefront of technology, and puts all its resources at the student's disposal to help them achieve entrepreneurial success"*

## At TECH Technological University



### Innovation

The university offers an online learning model that balances the latest educational technology with the most rigorous teaching methods. A unique method with the highest international recognition that will provide students with the keys to develop in a rapidly-evolving world, where innovation must be every entrepreneur's focus.

"*Microsoft Europe Success Story*", for integrating the innovative, interactive multi-video system.



### The Highest Standards

Admissions criteria at TECH are not economic. Students don't need to make a large investment to study at this university. However, in order to obtain a qualification from TECH, the student's intelligence and ability will be tested to their limits. The institution's academic standards are exceptionally high...

**95%** | of TECH students successfully complete their studies



### Networking

Professionals from countries all over the world attend TECH, allowing students to establish a large network of contacts that may prove useful to them in the future.

**+100000**

executives prepared each year

**+200**

different nationalities



### Empowerment

Students will grow hand in hand with the best companies and highly regarded and influential professionals. TECH has developed strategic partnerships and a valuable network of contacts with major economic players in 7 continents.

**+500**

collaborative agreements with leading companies



### Talent

This program is a unique initiative to allow students to showcase their talent in the business world. An opportunity that will allow them to voice their concerns and share their business vision.

After completing this program, TECH helps students show the world their talent.



### Multicultural Context

While studying at TECH, students will enjoy a unique experience. Study in a multicultural context. In a program with a global vision, through which students can learn about the operating methods in different parts of the world, and gather the latest information that best adapts to their business idea.

TECH students represent more than 200 different nationalities.



TECH strives for excellence and, to this end, boasts a series of characteristics that make this university unique:



### Analysis

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TECH explores the student's critical side, their ability to question things, their problem-solving skills, as well as their interpersonal skills.



### Academic Excellence

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TECH offers students the best online learning methodology. The university combines the *Relearning* methodology (the most internationally recognized postgraduate learning methodology) with Harvard Business School case studies. A complex balance of traditional and state-of-the-art methods, within the most demanding academic framework.



### Economy of Scale

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TECH is the world's largest online university. It currently boasts a portfolio of more than 10,000 university postgraduate programs. And in today's new economy, **volume + technology = a groundbreaking price**. This way, TECH ensures that studying is not as expensive for students as it would be at another university.



### Learn with the best

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In the classroom, TECH's teaching staff discuss how they have achieved success in their companies, working in a real, lively, and dynamic context. Teachers who are fully committed to offering a quality specialization that will allow students to advance in their career and stand out in the business world.

Teachers representing 20 different nationalities.



*At TECH, you will have access to the most rigorous and up-to-date case analyses in academia"*

03

# Why Our Program?

Studying this TECH program means increasing the chances of achieving professional success in senior business management.

It is a challenge that demands effort and dedication, but it opens the door to a promising future. Students will learn from the best teaching staff and with the most flexible and innovative educational methodology.



“

*We have highly qualified teachers and the most complete syllabus on the market, which allows us to offer you education of the highest academic level”*

This program will provide you with a multitude of professional and personal advantages, among which we highlight the following:

**01**

### A Strong Boost to Your Career

By studying at TECH, students will be able to take control of their future and develop their full potential. By completing this program, students will acquire the skills required to make a positive change in their career in a short period of time.

*70% of students achieve positive career development in less than 2 years.*

**02**

### Develop a strategic and global vision of the company

TECH offers an in-depth overview of general management to understand how each decision affects each of the company's different functional fields.

*Our global vision of companies will improve your strategic vision.*

**03**

### Consolidate the student's senior management skills

Studying at TECH means opening the doors to a wide range of professional opportunities for students to position themselves as senior executives, with a broad vision of the international environment.

*You will work on more than 100 real senior management cases.*

**04**

### You will take on new responsibilities

The program will cover the latest trends, advances and strategies, so that students can carry out their professional work in a changing environment.

*45% of graduates are promoted internally.*

05

### Access to a powerful network of contacts

TECH connects its students to maximize opportunities. Students with the same concerns and desire to grow. Therefore, partnerships, customers or suppliers can be shared.

*You will find a network of contacts that will be instrumental for professional development.*

06

### Thoroughly develop business projects

Students will acquire a deep strategic vision that will help them develop their own project, taking into account the different fields in companies.

*20% of our students develop their own business idea.*

07

### Improve soft skills and management skills

TECH helps students apply and develop the knowledge they have acquired, while improving their interpersonal skills in order to become leaders who make a difference.

*Improve your communication and leadership skills and enhance your career.*

08

### You will be part of an exclusive community

Students will be part of a community of elite executives, large companies, renowned institutions, and qualified teachers from the most prestigious universities in the world: the TECH Technological University community.

*We give you the opportunity to study with a team of world-renowned teachers.*

# 04

# Objectives

This program outlines ambitious goals: from equipping students with a deep understanding of how AI transforms the Marketing and Communication landscape, to enabling them to design innovative strategies based on accurate data and predictive analytics. In this way, professionals will be able to lead personalized campaigns, using AI to decipher trends, anticipate needs and cultivate strong relationships with diverse audiences.





“

*This Executive Master's Degree will mark your path towards the creation of impactful and meaningful experiences for tomorrow's consumers"*

TECH makes the goals of their students their own goals too.

Working together to achieve them

The Executive Master's Degree in Artificial Intelligence in Marketing and Communication will enable students to:

01

Understand the principles of Digital Marketing transformation through the use of AI and master the use of tools to optimize SEO and SEM strategies

04

Use AI and Email Marketing for advanced personalization and automation in campaigns

02

Apply AI techniques in the management and analysis of social networks to boost reach and interaction, as well as improve communication with customers on different platforms

03

Design and develop effective chatbots and Virtual Assistants for Digital Marketing strategies, also applying predictive analytics and Big Data techniques

05

Master prompt engineering in ChatGPT and AI image generation to optimize the interaction of Marketing campaigns and the generation of content for blogs and social networks



06

Apply AI techniques in the creation of videos to enrich and diversify audiovisual content in Marketing

08

Develop evaluation and measurement methods to analyze the impact of AI-generated content in Marketing strategies



09

Implement strategies for Marketing process automation using AI, efficiently integrating diverse data and platforms

07

Strategically integrate AI-generated content into complete Digital Marketing strategies, researching and anticipating future trends to stay ahead of the curve

10

Apply AI techniques to optimize advertising campaigns, maximizing their effectiveness, and personalize audiences for accurate and effective targeting

11

Use AI in email marketing to automate processes and personalize campaigns in an advanced way

14

Use data visualization tools with AI to generate accurate and understandable campaign and communications reports

12

Perform AI sentiment analysis on social media and customer feedback to understand perceptions and opinions, optimize pricing and promotions for a more effective pricing strategy

13

Apply AI techniques in the analysis of large volumes of data to obtain relevant marketing insights

15

Apply AI in market research to identify relevant trends and patterns, segmenting it accurately and effectively



16

Implement predictive analytics in marketing to support strategic decision making

18

Master techniques and tools for lead scoring, identifying and prioritizing high-potential opportunities

19

Implement AI in customer relationship management to improve interaction and satisfaction, as well as to predict customer needs

17

Use AI in marketing return on investment (ROI) measurement to evaluate strategy effectiveness

20

Perform competitive analysis with AI to identify strengths, weaknesses, and opportunities in the marketplace



# 05 Skills

This Executive Master's Degree will prepare professionals to lead at the forefront of Digital Marketing, equipping them with specialized skills in Artificial Intelligence. As such, they will gain advanced knowledge in AI content generation, process automation, data analytics and AI-based decision making, as well as AI-driven sales. Graduates will not only be adept at implementing cutting-edge technologies, but will also be prepared to anticipate and leverage emerging trends, offering a competitive advantage in a dynamic and constantly evolving job market.





“

*You will be fully qualified to implement Artificial Intelligence in business environments, generating tangible and rapid impact”*

01

Apply AI tools to optimize SEO, SEM and improve search engine visibility

02

Implement automation and predictive analytics in social media to boost online presence

03

Create effective ChatGPT prompts and get targeted results in content generation

04

Apply tools such as Midjourney and DALL-E for image creation, and Fliki for video generation, developing practical skills in the creation of visual content with AI

05

Personalize user experiences on websites and applications using advanced AI techniques



06

Use key data analytics tools with AI, including Big Data techniques, data visualization, and predictive models

08

Apply AI sentiment analysis to social media and customer feedback, optimizing interaction and improving brand awareness

09

Master the automation and optimization of online ad buying through programmatic advertising with AI

07

Develop, integrate and manage chatbots and virtual assistants to improve customer interactions

10

Apply AI to email marketing strategies for campaign customization and automation



06

# Structure and Content

The Executive Master's Degree in Artificial Intelligence in Marketing and Communication is designed to address unique and advanced topics. The inclusion of specific modules, such as "Content Generation with AI" and "Automation and Optimization of Marketing Processes with AI", will provide unparalleled depth in key areas. The focus on ethics, future trends and integration of success stories, will offer a comprehensive and practical understanding of how AI redefines today's Digital Marketing strategies.



“

*You will acquire the fundamental skills and competencies to incorporate AI resources into sales management and lead generation"*

## Syllabus

This Executive Master's Degree in Artificial Intelligence in Marketing and Communication stands out for its comprehensive and advanced approach. The diversity of modules, which includes areas such as content generation; automation and process optimization; data analytics and AI-based decision making; as well as sales and lead generation, will provide professionals with a holistic perspective of how to integrate Artificial Intelligence into various facets of Digital Marketing.

Unlike other programs, this one distinguishes itself by offering comprehensive content that covers, from essential fundamentals to future trends, ensuring that students acquire in-depth and up-to-date knowledge. Furthermore, it will not only focus on theory, but will also offer practical application through case studies and success analysis, enabling graduates to develop practical and strategic skills.

Furthermore, special attention to ethical considerations and future trends will ensure that graduates are prepared to meet the challenges and take advantage of emerging opportunities in the dynamic field of Artificial Intelligence in Marketing. It is a syllabus focused on professional improvement for the achievement of work objectives that is offered through an innovative and flexible online learning system, allowing participants to combine teaching with their other tasks.

In this way, to facilitate the assimilation and retention of all concepts, TECH bases all its programs on the innovative and effective *Relearning* methodology. Under this approach, students will strengthen their understanding with the repetition of key concepts, presented in various audiovisual formats to achieve a natural and gradual acquisition of skills.

This Executive Master's Degree takes place over 24 months and is divided into 20 modules:

<b>Module 1</b>	Fundamentals of Artificial Intelligence
<b>Module 2</b>	Data Types and Data Life Cycle
<b>Module 3</b>	Data in Artificial Intelligence
<b>Module 4</b>	Data Mining. Selection, Pre-Processing and Transformation
<b>Module 5</b>	Algorithm and Complexity in Artificial Intelligence
<b>Module 6</b>	Intelligent Systems
<b>Module 7</b>	Machine Learning and Data Mining
<b>Module 8</b>	Neural Networks, the Basis of Deep Learning
<b>Module 9</b>	Deep Neural Networks Training
<b>Module 10</b>	Model Customization and Training with TensorFlow



<b>Module 11</b>	Deep Computer Vision with Convolutional Neural Networks
<b>Module 12</b>	Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) and Attention
<b>Module 13</b>	Autoencoders, GANs and Diffusion Models
<b>Module 14</b>	Bio-Inspired Computing
<b>Module 15</b>	Artificial Intelligence: Strategies and Applications
<b>Module 16</b>	Artificial Intelligence in Digital Marketing Strategies
<b>Module 17</b>	Content Generation with AI
<b>Module 18</b>	Automation and Optimization of Marketing Processes with AI
<b>Module 19</b>	Analysis of Communication and Marketing Data for Decision Making
<b>Module 20</b>	Sales and Lead Generation with Artificial Intelligence

### Where, When and How is it Taught?

TECH offers the possibility to develop this Executive Master's Degree in Artificial Intelligence in Marketing and Communication completely online. Throughout the 12 months of the educational program, you will be able to access all the contents of this program at any time, allowing you to self-manage your study time.

*A unique, key, and decisive educational experience to boost your professional development and make the definitive leap.*

**Module 1. Fundamentals of Artificial Intelligence**

**1.1. History of Artificial Intelligence**

- 1.1.1. When Do We Start Talking About Artificial Intelligence?
- 1.1.2. References in Film
- 1.1.3. Importance of Artificial Intelligence
- 1.1.4. Technologies that Enable and Support Artificial Intelligence

**1.2. Artificial Intelligence in Games**

- 1.2.1. Game Theory
- 1.2.2. Minimax and Alpha-Beta Pruning
- 1.2.3. Simulation: Monte Carlo

**1.3. Neural Networks**

- 1.3.1. Biological Fundamentals
- 1.3.2. Computational Model
- 1.3.3. Supervised and Unsupervised Neural Networks
- 1.3.4. Simple Perceptron
- 1.3.5. Multilayer Perceptron.

**1.4. Genetic Algorithms**

- 1.4.1. History
- 1.4.2. Biological Basis
- 1.4.3. Problem Coding
- 1.4.4. Generation of the Initial Population
- 1.4.5. Main Algorithm and Genetic Operators
- 1.4.6. Evaluation of Individuals: Fitness

**1.5. Thesauri, Vocabularies, Taxonomies**

- 1.5.1. Vocabulary
- 1.5.2. Taxonomy
- 1.5.3. Thesauri
- 1.5.4. Ontologies
- 1.5.5. Knowledge Representation: Semantic Web

**1.6. Semantic Web**

- 1.6.1. Specifications RDF, RDFS and OWL
- 1.6.2. Inference/ Reasoning
- 1.6.3. Linked Data

**1.7. Expert systems and DSS**

- 1.7.1. Expert Systems
- 1.7.2. Decision Support Systems

**1.8. Chatbots and Virtual Assistants**

- 1.8.1. Types of Assistants: Voice and Text Assistants
- 1.8.2. Fundamental Parts for the Development of an Assistant: Intents, Entities and Dialog Flow
- 1.8.3. Integrations: Web, Slack, Whatsapp, Facebook
- 1.8.4. Assistant Development Tools: Dialog Flow, Watson Assistant

**1.9. AI Implementation Strategy**

**1.10. Future of Artificial Intelligence**

- 1.10.1. Understand How to Detect Emotions Using Algorithms
- 1.10.2. Creating a Personality: Language, Expressions and Content
- 1.10.3. Trends of Artificial Intelligence
- 1.10.4. Reflections

**Module 2. Data Types and Data Life Cycle****2.1. Statistics**

- 2.1.1. Statistics: Descriptive Statistics, Statistical Inferences
- 2.1.2. Population, Sample, Individual
- 2.1.3. Variables: Definition, Measurement Scales

**2.2. Types of Data Statistics**

- 2.2.1. According to Type
  - 2.2.1.1. Quantitative: Continuous Data and Discrete Data
  - 2.2.1.2. Qualitative: Binomial Data, Nominal Data and Ordinal Data
- 2.2.2. According to their Shape
  - 2.2.2.1. Numeric
  - 2.2.2.2. Text
  - 2.2.2.3. Logical
- 2.2.3. According to its Source
  - 2.2.3.1. Primary
  - 2.2.3.2. Secondary

**2.3. Life Cycle of Data**

- 2.3.1. Stages of the Cycle
- 2.3.2. Milestones of the Cycle
- 2.3.3. FAIR Principles

**2.4. Initial Stages of the Cycle**

- 2.4.1. Definition of Goals
- 2.4.2. Determination of Resource Requirements
- 2.4.3. Gantt Chart
- 2.4.4. Data Structure

**2.5. Data Collection**

- 2.5.1. Methodology of Data Collection
- 2.5.2. Data Collection Tools
- 2.5.3. Data Collection Channels

**2.6. Data Cleaning**

- 2.6.1. Phases of Data Cleansing
- 2.6.2. Data Quality
- 2.6.3. Data Manipulation (with R)

**2.7. Data Analysis, Interpretation and Result Evaluation**

- 2.7.1. Statistical Measures
- 2.7.2. Relationship Indexes
- 2.7.3. Data Mining

**2.8. Data Warehouse (Datawarehouse)**

- 2.8.1. Elements that Comprise it
- 2.8.2. Design
- 2.8.3. Aspects to Consider

**2.9. Data Availability**

- 2.9.1. Access
- 2.9.2. Uses
- 2.9.3. Security/Safety

**2.10. Regulatory Aspects**

- 2.10.1. Data Protection Law
- 2.10.2. Good Practices
- 2.10.3. Other Normative Aspects

**Module 3. Data in Artificial Intelligence****3.1. Data Science**

- 3.1.1. Data Science
- 3.1.2. Advanced Tools for Data Scientists

**3.2. Data, Information and Knowledge**

- 3.2.1. Data, Information and Knowledge
- 3.2.2. Types of Data
- 3.2.3. Data Sources

**3.3. From Data to Information**

- 3.3.1. Data Analysis
- 3.3.2. Types of Analysis
- 3.3.3. Extraction of Information from a *Dataset*

**3.4. Extraction of Information Through Visualization**

- 3.4.1. Visualization as an Analysis Tool
- 3.4.2. Visualization Methods
- 3.4.3. Visualization of a Data Set

**3.5. Data Quality**

- 3.5.1. Quality Data
- 3.5.2. Data Cleaning
- 3.5.3. Basic Data Pre-Processing

**3.6. Dataset**

- 3.6.1. *Dataset* Enrichment
- 3.6.2. The Curse of Dimensionality
- 3.6.3. Modification of Our Data Set

**3.7. Unbalance**

- 3.7.1. Classes of Unbalance
- 3.7.2. Unbalance Mitigation Techniques
- 3.7.3. Balancing a Dataset

**3.8. Unsupervised Models**

- 3.8.1. Unsupervised Model
- 3.8.2. Methods
- 3.8.3. Classification with Unsupervised Models

**3.9. Supervised Models**

- 3.9.1. Supervised Model
- 3.9.2. Methods
- 3.9.3. Classification with Supervised Models

**3.10. Tools and Good Practices**

- 3.10.1. Good Practices for Data Scientists
- 3.10.2. The Best Model
- 3.10.3. Useful Tools

## Module 4. Data Mining: Selection, Pre-Processing and Transformation

### 4.1. Statistical Inference

- 4.1.1. Descriptive Statistics vs. Statistical Inference
- 4.1.2. Parametric Procedures
- 4.1.3. Non-Parametric Procedures

### 4.2. Exploratory Analysis

- 4.2.1. Descriptive Analysis
- 4.2.2. Visualization
- 4.2.3. Data Preparation

### 4.3. Data Preparation

- 4.3.1. Integration and Data Cleaning
- 4.3.2. Normalization of Data
- 4.3.3. Transforming Attributes

### 4.4. Missing Values

- 4.4.1. Treatment of Missing Values
- 4.4.2. Maximum Likelihood Imputation Methods
- 4.4.3. Missing Value Imputation Using Machine Learning

### 4.5. Noise in the Data

- 4.5.1. Noise Classes and Attributes
- 4.5.2. Noise Filtering
- 4.5.3. The Effect of Noise

### 4.6. The Curse of Dimensionality

- 4.6.1. Oversampling
- 4.6.2. Undersampling
- 4.6.3. Multidimensional Data Reduction

### 4.7. From Continuous to Discrete Attributes

- 4.7.1. Continuous Data Vs. Discrete Data
- 4.7.2. Discretization Process

### 4.8. The Data

- 4.8.1. Data Selection
- 4.8.2. Prospects and Selection Criteria
- 4.8.3. Selection Methods

### 4.9. Instance Selection

- 4.9.1. Methods for Instance Selection
- 4.9.2. Prototype Selection
- 4.9.3. Advanced Methods for Instance Selection

### 4.10. Data Pre-Processing in Big Data Environments

## Module 5. Algorithm and Complexity in Artificial Intelligence

### 5.1. Introduction to Algorithm Design Strategies

- 5.1.1. Recursion
- 5.1.2. Divide and Conquer
- 5.1.3. Other Strategies

### 5.2. Efficiency and Analysis of Algorithms

- 5.2.1. Efficiency Measures
- 5.2.2. Measuring the Size of the Input
- 5.2.3. Measuring Execution Time
- 5.2.4. Worst, Best and Average Case
- 5.2.5. Asymptotic Notation
- 5.2.6. Criteria for Mathematical Analysis of Non-Recursive Algorithms
- 5.2.7. Mathematical Analysis of Recursive Algorithms
- 5.2.8. Empirical Analysis of Algorithms

### 5.3. Sorting Algorithms

- 5.3.1. Concept of Sorting
- 5.3.2. Bubble Sorting
- 5.3.3. Sorting by Selection
- 5.3.4. Sorting by Insertion
- 5.3.5. Merge Sort
- 5.3.6. Quick Sort

### 5.4. Algorithms with Trees

- 5.4.1. Tree Concept
- 5.4.2. Binary Trees
- 5.4.3. Tree Paths
- 5.4.4. Representing Expressions
- 5.4.5. Ordered Binary Trees
- 5.4.6. Balanced Binary Trees

### 5.5. Algorithms Using Heaps

- 5.5.1. Heaps
- 5.5.2. The Heapsort Algorithm
- 5.5.3. Priority Queues

### 5.6. Graph Algorithms

- 5.6.1. Representation
- 5.6.2. Traversal in Width
- 5.6.3. Depth Travel
- 5.6.4. Topological Sorting

### 5.7. Greedy Algorithms

- 5.7.1. Greedy Strategy
- 5.7.2. Elements of the Greedy Strategy
- 5.7.3. Currency Exchange
- 5.7.4. Traveler's Problem
- 5.7.5. Backpack Problem

### 5.8. Minimal Path Finding

- 5.8.1. The Minimum Path Problem
- 5.8.2. Negative Arcs and Cycles
- 5.8.3. Dijkstra's Algorithm

### 5.9. Greedy Algorithms on Graphs

- 5.9.1. The Minimum Covering Tree
- 5.9.2. Prim's Algorithm
- 5.9.3. Kruskal's Algorithm
- 5.9.4. Complexity Analysis

### 5.10. Backtracking

- 5.10.1. Backtracking
- 5.10.2. Alternative Techniques

**Module 6. Intelligent Systems****6.1. Agent Theory**

- 6.1.1. Concept History
- 6.1.2. Agent Definition
- 6.1.3. Agents in Artificial Intelligence
- 6.1.4. Agents in Software Engineering

**6.2. Agent Architectures**

- 6.2.1. The Reasoning Process of an Agent
- 6.2.2. Reactive Agents
- 6.2.3. Deductive Agents
- 6.2.4. Hybrid Agents
- 6.2.5. Comparison

**6.3. Information and Knowledge**

- 6.3.1. Difference between Data, Information and Knowledge
- 6.3.2. Data Quality Assessment
- 6.3.3. Data Collection Methods
- 6.3.4. Information Acquisition Methods
- 6.3.5. Knowledge Acquisition Methods

**6.4. Knowledge Representation**

- 6.4.1. The Importance of Knowledge Representation
- 6.4.2. Definition of Knowledge Representation According to Roles
- 6.4.3. Knowledge Representation Features

**6.5. Ontologies**

- 6.5.1. Introduction to Metadata
- 6.5.2. Philosophical Concept of Ontology
- 6.5.3. Computing Concept of Ontology
- 6.5.4. Domain Ontologies and Higher-Level Ontologies
- 6.5.5. How to Build an Ontology?

**6.6. Ontology Languages and Ontology Creation Software**

- 6.6.1. Triple RDF, Turtle and N
- 6.6.2. RDF Schema
- 6.6.3. OWL
- 6.6.4. SPARQL
- 6.6.5. Introduction to Ontology Creation Tools
- 6.6.6. Installing and Using Protégé

**6.7. Semantic Web**

- 6.7.1. Current and Future Status of the Semantic Web
- 6.7.2. Semantic Web Applications

**6.8. Other Knowledge Representation Models**

- 6.8.1. Vocabulary
- 6.8.2. Global Vision
- 6.8.3. Taxonomy
- 6.8.4. Thesauri
- 6.8.5. Folksonomy
- 6.8.6. Comparison
- 6.8.7. Mind Maps

**6.9. Knowledge Representation Assessment and Integration**

- 6.9.1. Zero-Order Logic
- 6.9.2. First-Order Logic
- 6.9.3. Descriptive Logic
- 6.9.4. Relationship between Different Types of Logic
- 6.9.5. Prolog: Programming Based on First-Order Logic

**6.10. Semantic Reasoners, Knowledge-Based Systems and Expert Systems**

- 6.10.1. Concept of Reasoner
- 6.10.2. Reasoner Applications
- 6.10.3. Knowledge-Based Systems
- 6.10.4. MYCIN: History of Expert Systems
- 6.10.5. Expert Systems Elements and Architecture
- 6.10.6. Creating Expert Systems

**Module 7. Machine Learning and Data Mining**

**7.1. Introduction to Knowledge Discovery Processes and Basic Concepts of Machine Learning**

- 7.1.1. Key Concepts of Knowledge Discovery Processes
- 7.1.2. Historical Perspective of Knowledge Discovery Processes
- 7.1.3. Stages of the Knowledge Discovery Processes
- 7.1.4. Techniques Used in Knowledge Discovery Processes
- 7.1.5. Characteristics of Good Machine Learning Models
- 7.1.6. Types of Machine Learning Information
- 7.1.7. Basic Learning Concepts
- 7.1.8. Basic Concepts of Unsupervised Learning

**7.2. Data Exploration and Pre-processing**

- 7.2.1. Data Processing
- 7.2.2. Data Processing in the Data Analysis Flow
- 7.2.3. Types of Data
- 7.2.4. Data Transformations
- 7.2.5. Visualization and Exploration of Continuous Variables
- 7.2.6. Visualization and Exploration of Categorical Variables
- 7.2.7. Correlation Measures
- 7.2.8. Most Common Graphic Representations
- 7.2.9. Introduction to Multivariate Analysis and Dimensionality Reduction

**7.3. Decision Trees**

- 7.3.1. ID Algorithm
- 7.3.2. Algorithm C
- 7.3.3. Overtraining and Pruning
- 7.3.4. Analysis of Results

**7.4. Evaluation of Classifiers**

- 7.4.1. Confusion Matrixes
- 7.4.2. Numerical Evaluation Matrixes
- 7.4.3. Kappa Statistic
- 7.4.4. ROC Curves

**7.5. Classification Rules**

- 7.5.1. Rule Evaluation Measures
- 7.5.2. Introduction to Graphic Representation
- 7.5.3. Sequential Overlay Algorithm

**7.6. Neural Networks**

- 7.6.1. Basic Concepts
- 7.6.2. Simple Neural Networks
- 7.6.3. *Backpropagation* Algorithm
- 7.6.4. Introduction to Recurrent Neural Networks

**7.7. Bayesian Methods**

- 7.7.1. Basic Probability Concepts
- 7.7.2. Bayes' Theorem
- 7.7.3. Naive Bayes
- 7.7.4. Introduction to Bayesian Networks

**7.8. Regression and Continuous Response Models**

- 7.8.1. Simple Linear Regression
- 7.8.2. Multiple Linear Regression
- 7.8.3. Logistic Regression
- 7.8.4. Regression Trees
- 7.8.5. Introduction to Support Vector Machines (SVM)
- 7.8.6. Goodness-of-Fit Measures

**7.9. Clustering**

- 7.9.1. Basic Concepts
- 7.9.2. Hierarchical Clustering
- 7.9.3. Probabilistic Methods
- 7.9.4. EM Algorithm
- 7.9.5. B-Cubed Method
- 7.9.6. Implicit Methods

**7.10. Text Mining and Natural Language Processing (NLP)**

- 7.10.1. Basic Concepts
- 7.10.2. Corpus Creation
- 7.10.3. Descriptive Analysis
- 7.10.4. Introduction to Feelings Analysis



**Module 8.** Neural Networks, the Basis of Deep Learning**8.1. Deep Learning**

- 8.1.1. Types of Deep Learning
- 8.1.2. Applications of Deep Learning
- 8.1.3. Advantages and Disadvantages of Deep Learning

**8.2. Surgery**

- 8.2.1. Sum
- 8.2.2. Product
- 8.2.3. Transfer

**8.3. Layers**

- 8.3.1. Input layer
- 8.3.2. Cloak
- 8.3.3. Output layer

**8.4. Union of Layers and Operations**

- 8.4.1. Architecture Design
- 8.4.2. Connection between layers
- 8.4.3. Forward propagation

**8.5. Construction of the first neural network**

- 8.5.1. Network Design
- 8.5.2. Establish the weights
- 8.5.3. Network Training

**8.6. Trainer and Optimizer**

- 8.6.1. Optimizer Selection
- 8.6.2. Establishment of a Loss Function
- 8.6.3. Establishing a Metric

**8.7. Application of the Principles of Neural Networks**

- 8.7.1. Activation Functions
- 8.7.2. Backward Propagation
- 8.7.3. Parameter Adjustment

**8.8. From Biological to Artificial Neurons**

- 8.8.1. Functioning of a Biological Neuron
- 8.8.2. Transfer of Knowledge to Artificial Neurons
- 8.8.3. Establish Relations Between the Two

**8.9. Implementation of MLP (Multilayer Perceptron) with Keras**

- 8.9.1. Definition of the Network Structure
- 8.9.2. Model Compilation
- 8.9.3. Model Training

**8.10. Fine tuning hyperparameters of neural networks**

- 8.10.1. Selection of the Activation Function
- 8.10.2. Set the *Learning Rate*
- 8.10.3. Adjustment of Weights

**Module 9.** Deep Neural Networks Training**9.1. Gradient Problems**

- 9.1.1. Gradient Optimization Techniques
- 9.1.2. Stochastic Gradients
- 9.1.3. Weight Initialization Techniques

**9.2. Reuse of Pre-Trained Layers**

- 9.2.1. Learning transfer training
- 9.2.2. Feature Extraction
- 9.2.3. Deep Learning

**9.3. Optimizers**

- 9.3.1. Stochastic Gradient Descent Optimizers
- 9.3.2. Optimizers Adam and *RMSprop*
- 9.3.3. Moment Optimizers

**9.4. Programming of the learning rate**

- 9.4.1. Automatic Learning Rate Control
- 9.4.2. Learning Cycles
- 9.4.3. Smoothing Terms

**9.5. Overfitting**

- 9.5.1. Cross Validation
- 9.5.2. Regularization
- 9.5.3. Evaluation Metrics

**9.6. Practical Guidelines**

- 9.6.1. Model Design
- 9.6.2. Selection of metrics and evaluation parameters
- 9.6.3. Hypothesis Testing

**9.7. Transfer Learning**

- 9.7.1. Learning transfer training
- 9.7.2. Feature Extraction
- 9.7.3. Deep Learning

**9.8. Data Augmentation**

- 9.8.1. Image Transformations
- 9.8.2. Synthetic Data Generation
- 9.8.3. Text Transformation

**9.9. Practical Application of Transfer Learning**

- 9.9.1. Learning Transfer Training
- 9.9.2. Feature Extraction
- 9.9.3. Deep Learning

**9.10. Regularization**

- 9.10.1. L and L
- 9.10.2. Regularization by Maximum Entropy
- 9.10.3. Dropout

## Module 10. Model Customization and Training with TensorFlow

### 10.1. TensorFlow

- 10.1.1. Use of the TensorFlow Library
- 10.1.2. Model Training with TensorFlow
- 10.1.3. Operations with Graphs in TensorFlow

### 10.2. TensorFlow and NumPy

- 10.2.1. NumPy Computing Environment for TensorFlow
- 10.2.2. Using NumPy Arrays with TensorFlow
- 10.2.3. NumPy operations for TensorFlow Graphs

### 10.3. Model Customization and Training Algorithms

- 10.3.1. Building Custom Models with TensorFlow
- 10.3.2. Management of Training Parameters
- 10.3.3. Use of Optimization Techniques for Training

### 10.4. TensorFlow Features and Graphs

- 10.4.1. Functions with TensorFlow
- 10.4.2. Use of Graphs for Model Training
- 10.4.3. Graphs Optimization with TensorFlow Operations

### 10.5. Loading and Preprocessing Data with TensorFlow

- 10.5.1. Loading Data Sets with *TensorFlow*
- 10.5.2. Preprocessing Data with *TensorFlow*
- 10.5.3. Using TensorFlow Tools for Data Manipulation

### 10.6. The tf.data API

- 10.6.1. Using the tf.data API for Data Processing
- 10.6.2. Construction of Data Streams with tf.data
- 10.6.3. Using the tf.data API for Model Training

### 10.7. The TFRecord Format

- 10.7.1. Using the TFRecord API for data serialization
- 10.7.2. TFRecord File Upload with TensorFlow
- 10.7.3. Using TFRecord files for Model Training

### 10.8. Layers of preprocessing of Keras

- 10.8.1. Using the Keras Preprocessing API
- 10.8.2. Preprocessing *Pipelined* Construction with Keras
- 10.8.3. Using the Keras Preprocessing API for Model Training

### 10.9. The *TensorFlow Datasets* Project

- 10.9.1. Using TensorFlow Datasets for data loading
- 10.9.2. Preprocessing Data with TensorFlow Datasets
- 10.9.3. Using TensorFlow Datasets for model training

### 10.10. Building a Deep Learning App with TensorFlow

- 10.10.1. Practical Application
- 10.10.2. Building a Deep Learning App with TensorFlow
- 10.10.3. Model training with TensorFlow
- 10.10.4. Using the application to predict results

**Module 11. Deep Computer Vision with Convolutional Neural Networks****11.1. The Visual Cortex Architecture**

- 11.1.1. Functions of the Visual Cortex
- 11.1.2. Theories of Computational Vision
- 11.1.3. Models of Image Processing

**11.2. Convolutional Layers**

- 11.2.1. Reuse of Weights in Convolution
- 11.2.2. Convolution D
- 11.2.3. Activation Functions

**11.3. Layers of grouping and implementation of layers of grouping with Keras**

- 11.3.1. Pooling and Striding
- 11.3.2. Flattening
- 11.3.3. Types of Pooling

**11.4. CNN Architecture**

- 11.4.1. VGG Architecture
- 11.4.2. AlexNet Architecture
- 11.4.3. Architecture ResNet

**11.5. Implementing a CNN ResNet-using Keras**

- 11.5.1. Weight Initialization
- 11.5.2. Input Layer Definition
- 11.5.3. Output Definition

**11.6. Use of pre-trained Keras models**

- 11.6.1. Characteristics of Pre-trained Models
- 11.6.2. Uses of Pre-trained Models
- 11.6.3. Advantages of Pre-trained Models

**11.7. Pre-trained Models for Transfer Learning**

- 11.7.1. Transfer Learning
- 11.7.2. Transfer Learning Process
- 11.7.3. Advantages of Transfer Learning

**11.8. Deep Computer Vision Classification and Localization**

- 11.8.1. Image Classification
- 11.8.2. Localization of Objects in Images
- 11.8.3. Object Detection

**11.9. Object Detection and Object Tracking**

- 11.9.1. Object Detection Methods
- 11.9.2. Object Tracking Algorithms
- 11.9.3. Tracking and Localization Techniques

**11.10. Semantic Segmentation**

- 11.10.1. Deep Learning for Semantic Segmentation
- 11.10.2. Edge Detection
- 11.10.3. Segmentation methods based on rules

**Module 12. Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) and Attention**

**12.1. Text Generation using RNN**

- 12.1.1. Training an RNN for Text Generation
- 12.1.2. Natural Language Generation with RNN
- 12.1.3. Text Generation Applications with RNN

**12.2. Training Data Set Creation**

- 12.2.1. Preparation of the Data for Training an RNN
- 12.2.2. Storage of training data set
- 12.2.3. Data Cleaning and Transformation
- 12.2.4. Sentiment Analysis

**12.3. Rating of reviews with RNN**

- 12.3.1. Detection of Themes in Comments
- 12.3.2. Sentiment analysis with deep learning algorithms

**12.4. Encoder-Decoder Network for Neural Machine Translation**

- 12.4.1. Training an RNN for Machine Translation
- 12.4.2. Use of an *encoder-decoder* network for machine translation
- 12.4.3. Improving the Accuracy of Machine Translation with RNNs

**12.5. Attention Mechanisms**

- 12.5.1. Application of care mechanisms in NRN
- 12.5.2. Use of Care Mechanisms to Improve the Accuracy of the Models
- 12.5.3. Advantages of attention mechanisms in neural networks

**12.6. Transformer Models**

- 12.6.1. Using TransformersModels for Natural Language Processing
- 12.6.2. Application of Transformers Models for Vision
- 12.6.3. Advantages of Transformers Models

**12.7. Transformers for Vision**

- 12.7.1. Use of *Transformers* Models for Vision
- 12.7.2. Image Data Preprocessing
- 12.7.3. Training a Transformers Model for Vision

**12.8. Hugging Face's Transformers Bookstore**

- 12.8.1. Using the Hugging Face's TransformersLibrary
- 12.8.2. Hugging Face's TransformersLibrary Application
- 12.8.3. Advantages of Hugging Face's TransformersLibrary

**12.9. Other Transformers Libraries. Comparison**

- 12.9.1. Comparison Between Different TransformersLibraries
- 12.9.2. Use of the Other Transformers Libraries
- 12.9.3. Advantages of the Other Transformers Libraries

**12.10. Development of an NLP Application with RNN and Attention. Practical Application**

- 12.10.1. Development of a Natural Language Processing Application with RNN and Attention
- 12.10.2. Use of RNN, Attention Mechanisms and Transformers Models in the Application
- 12.10.3. Evaluation of the Practical Application

**Module 13. Autoencoders, GANs, and Diffusion Models****13.1. Representation of Efficient Data**

- 13.1.1. Dimensionality Reduction
- 13.1.2. Deep Learning
- 13.1.3. Compact Representations

**13.2. PCA Realization with an Incomplete Linear Automatic Encoder**

- 13.2.1. Training Process
- 13.2.2. Implementation in Python
- 13.2.3. Use of Test Data

**13.3. Stacked Automatic Encoders**

- 13.3.1. Deep Neural Networks
- 13.3.2. Construction of Coding Architectures
- 13.3.3. Use of Regularization

**13.4. Convolutional Autoencoders**

- 13.4.1. Design of Convolutional Models
- 13.4.2. Convolutional Model Training
- 13.4.3. Results Evaluation

**13.5. Automatic Encoder Denoising**

- 13.5.1. Filter Application
- 13.5.2. Design of Coding Models
- 13.5.3. Use of Regularization Techniques

**13.6. Sparse Automatic Encoders**

- 13.6.1. Increasing Coding Efficiency
- 13.6.2. Minimizing the Number of Parameters
- 13.6.3. Using Regularization Techniques

**13.7. Variational Automatic Encoders**

- 13.7.1. Use of Variational Optimization
- 13.7.2. Unsupervised Deep Learning
- 13.7.3. Deep Latent Representations

**13.8. Generation of fashion MNIST images**

- 13.8.1. Pattern Recognition
- 13.8.2. Image Generation
- 13.8.3. Deep Neural Networks Training

**13.9. Generative adversarial networks and dissemination models**

- 13.9.1. Content Generation from Images
- 13.9.2. Modeling of Data Distributions
- 13.9.3. Use of Adversarial Networks

**13.10. Implementation of the Models**

- 13.10.1. Practical Application
- 13.10.2. Implementation of the Models
- 13.10.3. Use of Real Data
- 13.10.4. Results Evaluation

**Module 14. Bio-Inspired Computing****14.1. Introduction to Bio-Inspired Computing**

- 14.1.1. Introduction to Bio-Inspired Computing

**14.2. Social Adaptation Algorithms**

- 14.2.1. Bio-Inspired Computation Based on Ant Colonies
- 14.2.2. Variants of Ant Colony Algorithms
- 14.2.3. Particle Cloud Computing

**14.3. Genetic Algorithms**

- 14.3.1. General Structure
- 14.3.2. Implementations of the Major Operators

**14.4. Space Exploration-Exploitation Strategies for Genetic Algorithms**

- 14.4.1. CHC Algorithm
- 14.4.2. Multimodal Problems

**14.5. Evolutionary Computing Models (I)**

- 14.5.1. Evolutionary Strategies
- 14.5.2. Evolutionary Programming
- 14.5.3. Algorithms Based on Differential Evolution

**14.6. Evolutionary Computation Models (II)**

- 14.6.1. Evolutionary Models Based on Estimation of Distributions (EDA)
- 14.6.2. Genetic Programming

**14.7. Evolutionary Programming Applied to Learning Problems**

- 14.7.1. Rules-Based Learning
- 14.7.2. Evolutionary Methods in Instance Selection Problems

**14.8. Multi-Objective Problems**

- 14.8.1. Concept of Dominance
- 14.8.2. Application of Evolutionary Algorithms to Multi-Objective Problems

**14.9. Neural Networks (I)**

- 14.9.1. Introduction to Neural Networks
- 14.9.2. Practical Example with Neural Networks

**14.10. Neural Networks (II)**

- 14.10.1. Use Cases of Neural Networks in Medical Research
- 14.10.2. Use Cases of Neural Networks in Economics
- 14.10.3. Use Cases of Neural Networks in Artificial Vision

**Module 15. Artificial Intelligence: Strategies and Applications**

**15.1. Financial Services**

- 15.1.1. The implications of Artificial Intelligence (AI) in financial services. Opportunities and challenges
- 15.1.2. Case Uses
- 15.1.3. Potential Risks Related to the Use of AI
- 15.1.4. Potential Future Developments/Uses of AI

**15.2. Implications of Artificial Intelligence in the Healthcare Service**

- 15.2.1. Implications of AI in the Healthcare Sector. Opportunities and Challenges
- 15.2.2. Case Uses

**15.3. Risks Related to the Use of AI in the Health Service**

- 15.3.1. Potential Risks Related to the Use of AI
- 15.3.2. Potential Future Developments/Uses of AI

**15.4. Retail**

- 15.4.1. Implications of AI in Retail. Opportunities and Challenges
- 15.4.2. Case Uses
- 15.4.3. Potential Risks Related to the Use of AI
- 15.4.4. Potential Future Developments/Uses of AI

**15.5. Industry**

- 15.5.1. Implications of AI in Industry. Opportunities and Challenges
- 15.5.2. Case Uses

**15.6. Potential risks related to the use of AI in industry**

- 15.6.1. Case Uses
- 15.6.2. Potential Risks Related to the Use of AI
- 15.6.3. Potential Future Developments/uses of AI

**15.7. Public Administration**

- 15.7.1. AI implications for public administration. Opportunities and Challenges
- 15.7.2. Case Uses
- 15.7.3. Potential Risks Related to the Use of AI
- 15.7.4. Potential Future Developments/uses of AI

**15.8. Educational**

- 15.8.1. AI implications for education. Opportunities and Challenges
- 15.8.2. Case Uses
- 15.8.3. Potential Risks Related to the Use of AI
- 15.8.4. Potential Future Developments/uses of AI

**15.9. Forestry and Agriculture**

- 15.9.1. Implications of AI in Forestry and Agriculture. Opportunities and Challenges
- 15.9.2. Case Uses
- 15.9.3. Potential Risks Related to the Use of AI
- 15.9.4. Potential Future Developments/Uses of AI

**15.10. Human Resources**

- 15.10.1. Implications of AI for Human Resources Opportunities and Challenges
- 15.10.2. Case Uses
- 15.10.3. Potential Risks Related to the use of AI
- 15.10.4. Potential Future Developments/uses of AI

**Module 16.** Artificial Intelligence in Digital Marketing Strategies**16.1. Digital Marketing Transformation with AI**

- 16.1.1. Introduction to Digital Transformation
- 16.1.2. Impact on Content Strategy
- 16.1.3. Automation of Marketing Processes
- 16.1.4. Development of Customer Experience

**16.2. AI Tools for SEO and SEM**

- 16.2.1. Keyword Optimization with AI
- 16.2.2. Competition Analysis
- 16.2.3. Search Trend Forecast
- 16.2.4. Intelligent Audience Segmentation

**16.3. IA Application in Social Media**

- 16.3.1. Sentiment Analysis
- 16.3.2. Social Trend Detection
- 16.3.3. Publication Automation
- 16.3.4. Automated Content Generation

**16.4. AI tools for Customer Communication**

- 16.4.1. Personalized Chatbots
- 16.4.2. Automated E-mail Response Systems
- 16.4.3. Real-Time Response Optimization
- 16.4.4. Customer Feedback Analysis

**16.5. Personalization of the User Experience of AI-enabled Tools and Websites**

- 16.5.1. Personalized Recommendations
- 16.5.2. User Interface Adaptation
- 16.5.3. Dynamic Audience Segmentation
- 16.5.4. Intelligent A/B Testing

**16.6. Chatbots and Virtual Assistants in Marketing Digital**

- 16.6.1. Proactive Interaction
- 16.6.2. Multichannel Integration
- 16.6.3. Contextual Responses
- 16.6.4. Conversation Analytics

**16.7. Programmatic Advertising with AI**

- 16.7.1. Advanced Segmentation
- 16.7.2. Real-Time Optimization
- 16.7.3. Automatic Bidding
- 16.7.4. Analysis of Results

**16.8. Predictive Analytics and Big Data in Digital Marketing**

- 16.8.1. Market Trends Forecast
- 16.8.2. Advanced Attribution Models
- 16.8.3. Predictive Audience Segmentation
- 16.8.4. Sentiment Analysis in Big Data

**16.9. AI and Email Marketing for Campaign Customization and Automation**

- 16.9.1. Dynamic List Segmentation
- 16.9.2. Dynamic Content in Emails
- 16.9.3. Workflow Automation
- 16.9.4. Open Rate Optimization

**16.10. Future Trends in AI for Digital Marketing**

- 16.10.1. Advanced Conversational AI
- 16.10.2. Augmented Reality Integration
- 16.10.3. Emphasis on AI Ethics
- 16.10.4. AI in Content Creation

**Module 17.** Content Generation with IA

**17.1. Prompt Engineering in ChatGPT**

- 17.1.1. Quality Improvement of the Generated Content
- 17.1.2. Model Performance Optimization Strategies
- 17.1.3. Effective Prompts Design

**17.2. AI Image Generation Tools**

- 17.2.1. Object Recognition and Generation
- 17.2.2. Applying Custom Styles and Filters to Images
- 17.2.3. Methods to Improve the Visual Quality of Images

**17.3. Video Creation with AI**

- 17.3.1. Tools to Automate Video Editing
- 17.3.2. Voice Synthesis and Automatic Dubbing
- 17.3.3. Techniques for Object Tracking and Animation

**17.4. Text Generation with AI for Blogging and Social Media Creation**

- 17.4.1. Strategies for Improving SEO Positioning in Generated Content
- 17.4.2. Using AI to Predict and Generate Content Trends
- 17.4.3. Creating Attractive Headlines

**17.5. Personalization of Content with AI for Different Audiences**

- 17.5.1. Identification and Analysis of Audience Profiles
- 17.5.2. Dynamic Adaptation of Content according to User Profiles
- 17.5.3. Predictive Audience Segmentation

**17.6. Ethical Considerations for the Responsible Use of AI in Content Generation**

- 17.6.1. Transparency in Content Generation
- 17.6.2. Preventing Bias and Discrimination in Content Generation
- 17.6.3. Control and Human Supervision in Generative Processes

**17.7. Analysis of Successful Cases in Content Generation with AI**

- 17.7.1. Identification of Key Strategies in Successful Cases
- 17.7.2. Adaptation to Different Sectors
- 17.7.3. Importance of Collaboration between AI Specialists and Industry Practitioners

**17.8. Integration of AI-generated Content in Digital Marketing Strategies**

- 17.8.1. Optimization of Advertising Campaigns with Content Generation
- 17.8.2. Personalization of User Experience
- 17.8.3. Automation of Marketing Processes

**17.9. Future Trends in Content Generation with AI**

- 17.9.1. Advanced and Seamless Text, Image and Audio Integration
- 17.9.2. Hyper-personalized Content Generation
- 17.9.3. Improved AI Development in Emotion Detection

**17.10. Evaluation and Measurement of the Impact of AI-generated Content**

- 17.10.1. Appropriate Metrics to Evaluate the Performance of Generated Content
- 17.10.2. Measurement of Audience Engagement
- 17.10.3. Continuous Improvement of Content through Analytics



**Module 18.** Automation and Optimization of Marketing Processes with AI

**18.1. Marketing Automation with AI**

- 18.1.1. Audience Segmentation Based on AI
- 18.1.2. Workflow Automation
- 18.1.3. Continuous Optimization of Online Campaigns

**18.2. Integration of Data and Platforms in Automated Marketing Strategies**

- 18.2.1. Analysis and Unification of Multichannel Data
- 18.2.2. Interconnection between Different Marketing Platforms
- 18.2.3. Real-Time Data Updating

**18.3. Optimization of Advertising Campaigns with AI**

- 18.3.1. Predictive Analysis of Advertising Performance
- 18.3.2. Automatic Advertisement Personalization According to Target Audience
- 18.3.3. Automatic Budget Adjustment Based on Results

**18.4. Audience Personalization with AI**

- 18.4.1. Content Segmentation and Personalization
- 18.4.2. Personalized Content Recommendations
- 18.4.3. Automatic Identification of Audiences or Homogeneous Groups

**18.5. Automation of Responses to Customers through AI**

- 18.5.1. Chatbots and Machine Learning
- 18.5.2. Automatic Response Generation
- 18.5.3. Automatic Problem Solving

**18.6. AI in Email Marketing for Automation and Customization**

- 18.6.1. Automation of Email Sequences
- 18.6.2. Dynamic Customization of Content According to Preferences
- 18.6.3. Intelligent Segmentation of Mailing Lists

**18.7. Sentiment Analysis with AI in Social Media and Customer Feedback**

- 18.7.1. Automatic Sentiment Monitoring in Comments
- 18.7.2. Personalized Responses to Emotions
- 18.7.3. Predictive Reputation Analysis

**18.8. Price and Promotion Optimization with AI**

- 18.8.1. Automatic Price Adjustment Based on Predictive Analysis
- 18.8.2. Automatic Generation of Offers Adapted to User Behavior
- 18.8.3. Real-Time Competitive and Price Analysis

**18.9. Integration of AI into Existing Marketing Tools**

- 18.9.1. Integration of AI Capabilities with Existing Marketing Platforms
- 18.9.2. Optimization of Existing Functionalities
- 18.9.3. Integration with CRM Systems

**18.10. Trends and Future of Marketing Automation with AI**

- 18.10.1. AI to Improve User Experience
- 18.10.2. Predictive Approach to Marketing Decisions
- 18.10.3. Conversational Advertising

**Module 19.** Analysis of Communication

**Module 19.** Analysis of Communication and Marketing Data for Decision Making

**19.1. Specific Technologies and Tools for Communication and Marketing Data Analysis**

- 19.1.1. Tools for Analyzing Conversations and Trends in Social Media
- 19.1.2. Systems to Identify and Evaluate Emotions in Communications
- 19.1.3. Use of Big Data to Analyze Communications

**19.2. Applications of AI in the Analysis of Large Volumes of Marketing Data**

- 19.2.1. Automatic Processing of Massive Data
- 19.2.2. Identification of Behavioral Patterns
- 19.2.3. Optimization of Algorithms for Data Analysis

**19.3. Data Visualization and Reporting Tools for Campaigns and Communications with AI**

- 19.3.1. Creation of Interactive Dashboards
- 19.3.2. Automatic Report Generation
- 19.3.3. Predictive Visualization of Campaign Results

**19.4. Application of AI in Market Research**

- 19.4.1. Automatic Survey Data Processing
- 19.4.2. Automatic Identification of Audience Segments
- 19.4.3. Market Trend Prediction

**19.5. Predictive Analytics in Marketing for Decision Making**

- 19.5.1. Predictive Models of Consumer Behavior
- 19.5.2. Campaign Performance Prediction
- 19.5.3. Automatic Adjustment of Strategic Optimization

**19.6. Market Segmentation with AI**

- 19.6.1. Automated Analysis of Demographic Data
- 19.6.2. Identification of Interest Groups
- 19.6.3. Dynamic Personalization of Offers

**19.7. Marketing Strategy Optimization with AI**

- 19.7.1. Use of AI to Measure Channel Effectiveness
- 19.7.2. Strategic Automatic Adjustment to Maximize Results
- 19.7.3. Scenario Simulation

**19.8. AI in Marketing ROI Measurement**

- 19.8.1. Conversion Attribution Models
- 19.8.2. ROI Analysis using AI
- 19.8.3. Customer Lifetime Value Estimation

**19.9. Success Stories in Data Analytics with AI**

- 19.9.1. Demonstration by Practical Cases in which AI has Improved Results
- 19.9.2. Cost and Resource Optimization
- 19.9.3. Competitive Advantages and Innovation

**19.10. Challenges and Ethical Considerations in AI Data Analysis**

- 19.10.1. Biases in Data and Results
- 19.10.2. Ethical Considerations in Handling and Analyzing Sensitive Data
- 19.10.3. Challenges and Solutions for Making AI Models Transparent

**Module 20. Sales and Lead Generation with Artificial Intelligence****20.1. AI Application in the Sales Process**

- 20.1.1. Automation of Sales Tasks
- 20.1.2. Predictive Analysis of the Sales Cycle
- 20.1.3. Optimization of Pricing Strategies

**20.2. Techniques and Tools for Lead Generation with AI**

- 20.2.1. Automated Prospect Identification
- 20.2.2. User Behavior Analysis
- 20.2.3. Personalization of Content for Engagement

**20.3. Lead Scoring with AI**

- 20.3.1. Automated Evaluation of Lead Qualification
- 20.3.2. Lead Analysis Based on Interactions
- 20.3.3. Lead Scoring Model Optimization

**20.4. AI in Customer Relationship Management**

- 20.4.1. Automated Follow-up to Improve Customer Relationships
- 20.4.2. Personalized Customer Recommendations
- 20.4.3. Automation of Personalized Communications

**20.5. Implementation and Success Cases of Virtual Assistants in Sales**

- 20.5.1. Virtual Assistants for Sales Support
- 20.5.2. Customer Experience Improvement
- 20.5.3. Conversion Rate Optimization and Sales Closing

**20.6. Customer Needs Prediction with AI**

- 20.6.1. Purchase Behavior Analysis
- 20.6.2. Dynamic Offer Segmentation
- 20.6.3. Personalized Recommendation Systems

**20.7. Sales Offer Personalization with AI**

- 20.7.1. Dynamic Adaptation of Sales Proposals
- 20.7.2. Behavior-Based Exclusive Offers
- 20.7.3. Creation of Customized Packs

**20.8. Competition Analysis with IA**

- 20.8.1. Automated Competitor Monitoring
- 20.8.2. Automated Comparative Price Analysis
- 20.8.3. Predictive Competitive Surveillance

**20.9. Integration of AI in Sales Tools**

- 20.9.1. Compatibility with CRM Systems
- 20.9.2. Empowerment of Sales Tools
- 20.9.3. Predictive Analysis in Sales Platforms

**20.10. Innovations and Predictions in the Sales Environment**

- 20.10.1. Augmented Reality in Shopping Experience
- 20.10.2. Advanced Automation in Sales
- 20.10.3. Emotional intelligence in Sales Interactions

07

# 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"*

## TECH Business School uses the 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"*



*This program prepares you to face business challenges in uncertain environments and achieve business success.*



*Our program prepares you to face new challenges in uncertain environments and achieve success in your career.*

### A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch to present executives with challenges and business decisions at the highest level, whether at the national or international level. 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 business reality is taken into account.

“

*You will learn, through collaborative activities and real cases, how to solve complex situations in real business environments”*

The case method has been the most widely used learning system among the world's leading business 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 we face in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They must integrate all their knowledge, research, 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.

*Our online system will allow you to organize your time and learning pace, adapting it to your schedule. You will be able to access the contents from any device with an internet connection.*

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 online business school is the only one in the world licensed to incorporate 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.

With this methodology we have 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, markets, and financial 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 specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to 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.



### Management Skills Exercises

They will carry out activities to develop specific executive competencies in each thematic area. Practices and dynamics to acquire and develop the skills and abilities that a high-level manager needs to develop in the context of the globalization we live in.



### 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 senior management 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.



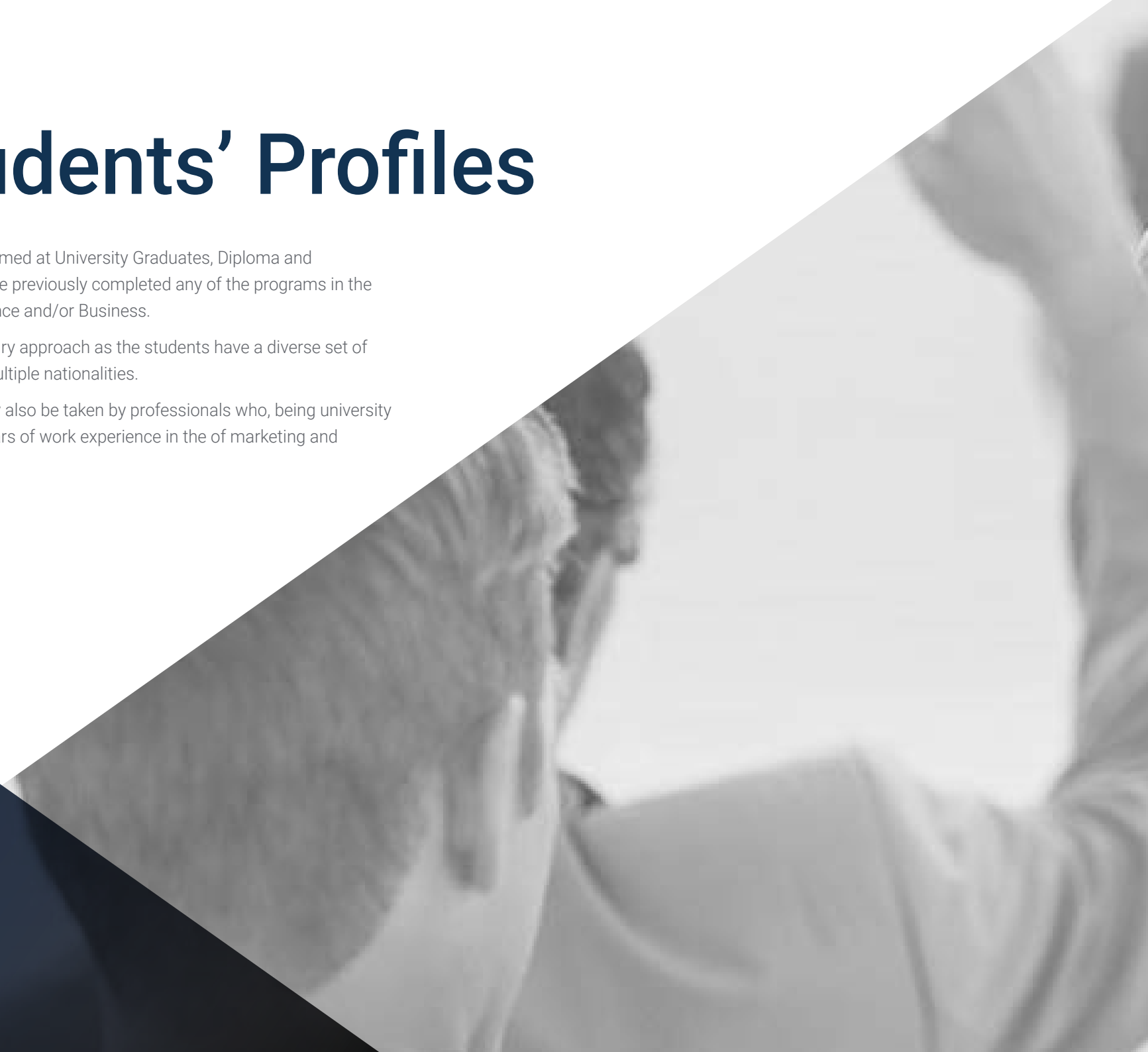
08

# Our Students' Profiles

The Executive Master's Degree is aimed at University Graduates, Diploma and Bachelor's Degree Holders who have previously completed any of the programs in the field of Advertising, Computer Science and/or Business.

This program uses a multidisciplinary approach as the students have a diverse set of academic profiles and represent multiple nationalities.

The Executive Master's Degree may also be taken by professionals who, being university graduates in any area, have two years of work experience in the of marketing and communication field.





“

*You will access the latest developments in Artificial Intelligence, applied to Marketing and Communication, in no less than 3,000 hours of exclusive resources"*

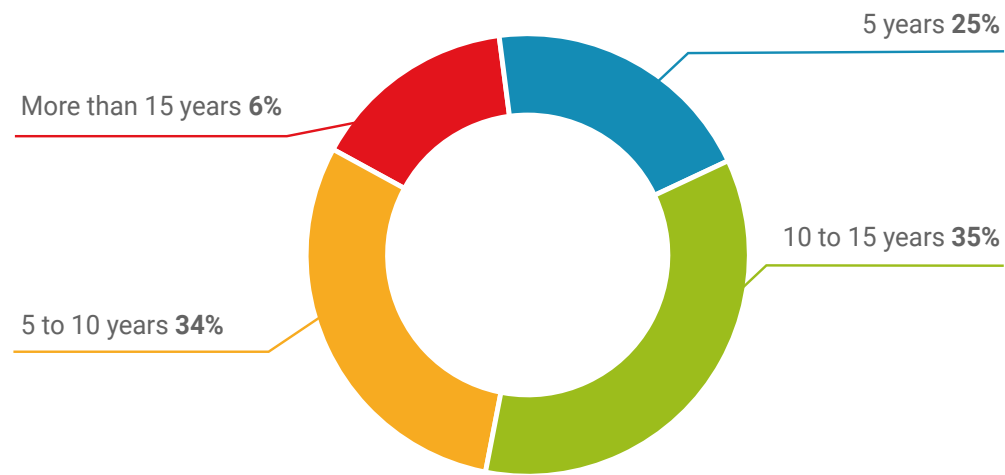
### Average Age

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Between **35** and **45** years old

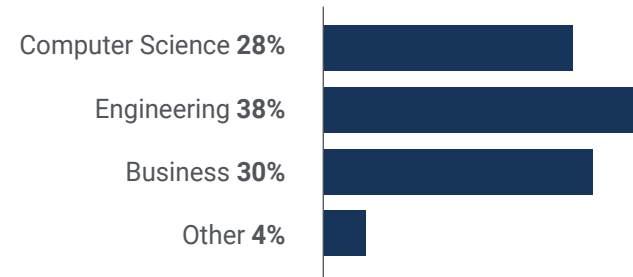
### Years of Experience

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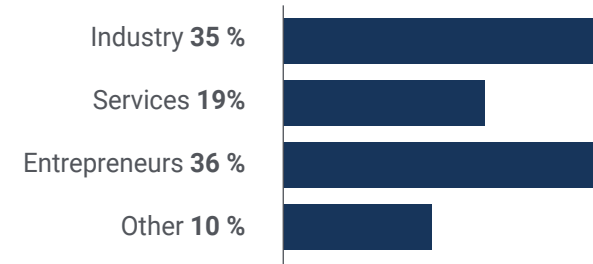
### Training

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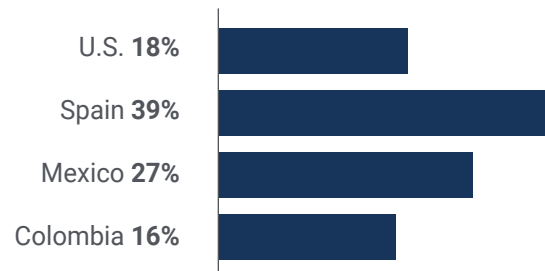
### Educational Profile

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## Geographical Distribution

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## Lucía Sánchez Perdomo

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CEO

*"The Executive Master's Degree has been incredibly useful for me. This experience has allowed me to learn about the many improvements I can apply using innovative Artificial Intelligence tools. I am eager to apply them in my company and start developing creative strategies together with my Marketing Department"*

09

# Course Management

The faculty of this Executive Master's Degree has been meticulously selected for their experience and expertise at the intersection of AI and the world of Marketing and Communication. With a unique combination of theory and practical application, these experts will guide graduates' path to a deep understanding of how AI redefines market strategies, empowering them to confidently lead and shape the future of Marketing and Communication.





“

*Learn from the best! You will take your training to the maximum with the support of recognized professionals in Artificial Intelligence"*

## Management



### Dr. Arturo Peralta Martín-Palomino

- ♦ CEO and CTO at Prometheus Global Solutions
- ♦ CTO at Korporate Technologies
- ♦ CTO at AI Shephers GmbH
- ♦ Consultant and Strategic Business Advisor at Alliance Medical
- ♦ Director of Design and Development at DocPath
- ♦ PhD. in Psychology from the University of Castilla - La Mancha
- ♦ PhD in Economics, Business and Finance from the Camilo José Cela University
- ♦ PhD in Psychology from University of Castilla – La Mancha
- ♦ Máster in Executive MBA por la Universidad Isabel I
- ♦ Master's Degree in Sales and Marketing Management, Isabel I University
- ♦ Expert Master's Degree in Big Data by Hadoop Training
- ♦ Master's Degree in Advanced Information Technologies from the University of Castilla - la Mancha
- ♦ Member of: SMILE Research Group



### Mr. Sánchez Mansilla, Rodrigo

- ◆ Digital Marketing Specialist
- ◆ Digital Advisor at AI Shepherds GmbH
- ◆ Digital Account Manager at Kill Draper
- ◆ Digital Manager at Kuarere
- ◆ Digital Marketing Manager at Arconi Solutions, Deltoid Energy and Brinergy Tech
- ◆ Founder and National Sales and Marketing Manager
- ◆ Máster's Degree in Digital Marketing (MDM) by The Power Business School
- ◆ Degree in Business Administration (BBA) by the Buenos Aires University

## Professors

### Ms. Parreño Rodríguez, Adelaida

- ◆ Technical Developer & Energy Communities Engineer at the University of Murcia
- ◆ Manager in Research & Innovation in European Projects at the University of Murcia
- ◆ Technical Developer & Energy/Electrical Engineer & Researcher in PHOENIX Project and FLEXUM (ONENET) Project
- ◆ Content Creator in Global UC3M Challenge
- ◆ Ginés Huertas Martínez Award (2023)
- ◆ Master's Degree in Renewable Energies by the Polytechnic University of Cartagena
- ◆ Degree in Electrical Engineering (bilingual) from the Carlos III University of Madrid

### Ms. González Risco, Verónica

- ◆ Digital Marketing Specialist
- ◆ Freelance Digital Marketing Consultant
- ◆ Product Marketing/International Business Development at UNIR - The University on the Internet
- ◆ Digital Marketing Specialist at Código Kreativo Comunicación SL
- ◆ Master's Degree in Online Marketing and Advertising Management by Indisoft -Upgrade
- ◆ Diploma in Business Administration from the University of Almeria

10

# Impact on Your Career

We are aware that studying a program like this entails great economic, professional and, of course, personal investment.

The ultimate goal of this great effort should be to achieve professional growth.



“

*Become an innovation leader and achieve business success by graduating from the best Executive Master's Degree in the online educational field"*

### Are you ready to take the leap? Excellent professional development awaits you

The Executive Master's Degree in Artificial Intelligence in Marketing and Communication from TECH is an intensive program that prepares you to face challenges and business decisions in the field of Artificial Intelligence in Marketing and Communication. The main objective is to promote your personal and professional growth. Helping you achieve success.

If you want to improve yourself, make a positive change at a professional level, and network with the best, then this is the place for you.

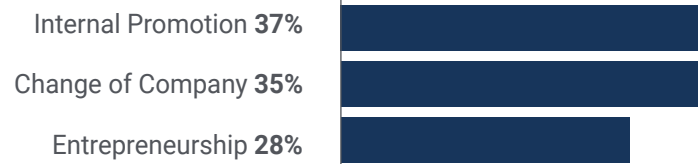
*Raise your professional profile by efficiently mastering the technologies of the future with this exclusive university program that only TECH puts at your fingertips.*

*TECH has 99% employability among its graduates. Register now and excel in the labor market.*

### When the change occurs



### Type of change



## Salary increase

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This program represents a salary increase of more than **26.24%** for our students





11

# Benefits for Your Company

This program contributes to elevating the organization's talent to its maximum potential through the instruction of high-level leaders.

In addition, participating in this university option is a unique opportunity to access a powerful network of contacts in which to find future professional partners, customers or suppliers.



“

*In the digital era, managers must integrate new processes and strategies that bring about significant changes and organizational development. This is only possible through training and university and university updating”*

Developing and retaining talent in companies is the best long-term investment.

01

### **Growth of talent and intellectual capital**

The professional will introduce the company to new concepts, strategies, and perspectives that can bring about significant changes in the organization.

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02

### **Retaining high-potential executives to avoid talent drain**

This program strengthens the link between the company and the professional and opens new avenues for professional growth within the company.

03

### **Building agents of change**

You will be able to make decisions in times of uncertainty and crisis, helping the organization overcome obstacles.

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04

### **Increased international expansion possibilities**

Thanks to this program, the company will come into contact with the main markets in the world economy.



05

### **Project Development**

The professional can work on a real project or develop new projects in the field of R & D or business development of your company.

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06

### **Increased competitiveness**

This program will equip students with the skills to take on new challenges and drive the organization forward.

# 12 Certificate

The Executive Master's Degree in Artificial Intelligence in Marketing and Communication guarantees students, in addition to the most rigorous and up-to-date education, access to a Executive Master's Degree diploma issued by TECH Technological University.



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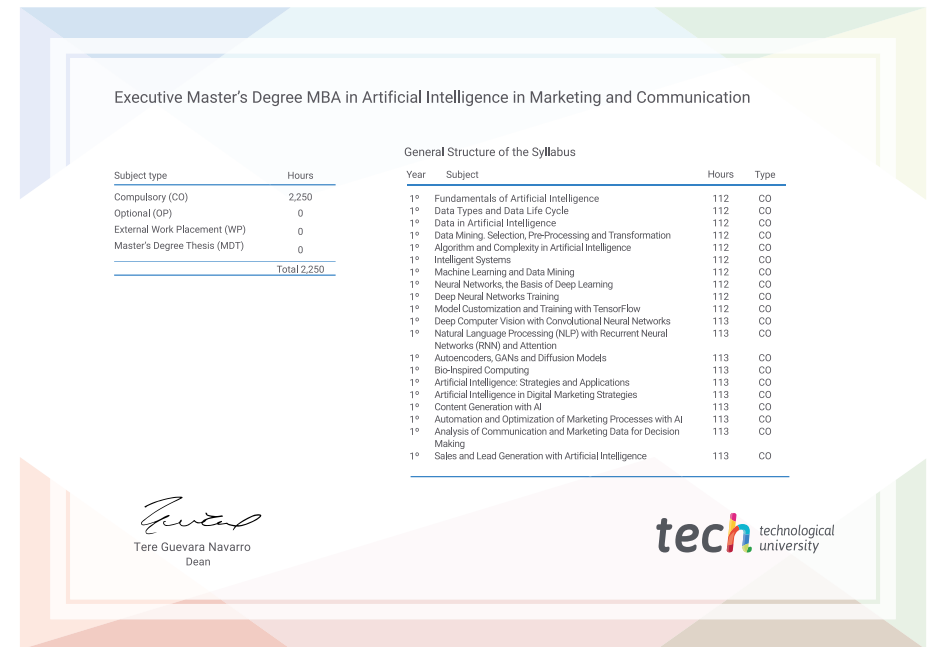
*Successfully complete this program  
and receive your university qualification  
without having to travel or fill out  
laborious paperwork”*

This **Executive Master's Degree in Artificial Intelligence in Marketing and Communication** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Executive Master's Degree diploma** issued by **TECH Technological University** via tracked delivery\*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Executive Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Executive Master's Degree in Artificial Intelligence in Marketing and Communication**  
 Official N° of Hours: **2,250 h.**



\*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.



## Executive Master's Degree Artificial Intelligence in Marketing and Communication

- » Modality: **online**
- » Duration: **12 months**
- » Certificate: **TECH Technological University**
- » Dedication: **16h/week**
- » Schedule: **at your own pace**
- » Exams: **online**



# Executive Master's Degree Artificial Intelligence in Marketing and Communication