Professional Master's Degree

Artificial Intelligence in Marketing and Communication

TECH is a member of:

International Communication Association

tech global university

tech global university

Professional Master's Degree
Artificial Intelligence in Marketing and Communication

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **90 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/artificial-intelligence/professional-master-degree/master-artificial-intelligence-marketing-communication**

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01

Introduction to the Program

Artificial Intelligence (AI) is one of the latest trends that have revolutionized areas such as Marketing and Communication. This technology provides professionals with advanced tools to optimize their relationships with consumers. Its importance lies in the fact that it allows the analysis of large amounts of data about the behavior and preferences of the audience. This information translates into more precise strategies, personalized messaging, and optimized content, enhancing the customer experience and significantly increasing conversion rates. In response to this evolution, TECH has developed an innovative university degree focused on data analysis in communication, providing professionals with the keys to strategic decision-making. All of this is offered in a 100% online format, designed to adapt to students' needs.

Thanks to this program, you will master the most innovative Artificial Intelligence techniques to optimize your Marketing and Communication campaigns"

In a highly competitive environment, digital marketing companies strive to stand out by implementing the most advanced Machine Learning solutions to optimize their platforms. Personalizing the user experience has become a strategic priority, as it strengthens trust and fosters loyalty.

In this context, Virtual Assistants stand out as a key tool. These intelligent systems offer personalized 24/7 support, resolving inquiries in real time and ensuring a constant global digital presence. Their integration not only improves customer interaction but also boosts operational efficiency and reinforces brand image. However, Marketing and Communication face key challenges ranging from data ethics and privacy to strategic integration with traditional methods. Lack of transparency in algorithms can affect consumer trust, while automated content generation poses risks regarding quality and authenticity. Additionally, the saturation of digital information demands more innovative strategies to differentiate without overwhelming the user.

In response to this demand, TECH presents an innovative program in Artificial Intelligence in Marketing and Communication designed to equip professionals with the most effective AI-driven strategies. Developed by experts in the field, this program delves into Predictive Analytics and the keys to data-driven decision making.

Moreover, the program offers a comprehensive approach by exploring market research, strategic data visualization, and AI-powered lead generation. Its theoretical-practical methodology includes dynamic learning materials such as interactive summaries, videos, and case studies. Thanks to its 100% online format, students can access the program anytime and from any internet-connected device, with no scheduling restrictions or need for in-person attendance. This flexibility allows them to manage their learning at their own pace.

This **Professional Master's Degree in Artificial Intelligence in Marketing and Communication** contains the most complete and up-to-date educational program on the market. Its most notable features are:

- The development of practical case studies presented by experts in Artificial Intelligence in Marketing and Communication
- The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- Practical exercises where the self-assessment process can be carried out to improve learning
- Special emphasis on innovative methodologies in Artificial Intelligence in Marketing and Communication
- 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 learn how to decipher consumer behavior with Artificial Intelligence to create strategies that revolutionize the market"

Artificial Intelligence in the optimization of advertising campaigns and data-driven decision making"

You will boost the impact of your marketing efforts through advanced personalization, strengthening your connection with your audience and improving conversion rates.

Take full advantage of TECH's Relearning methodology: organize your learning at your own pace, with complete flexibility and no scheduling restrictions.

It includes in its teaching staff professionals belonging to the field of Artificial Intelligence in Marketing and Communication, who bring to this program their work experience, as well as recognized specialists from leading companies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide an immersive learning experience designed to prepare for real-life situations.

This program is designed around Problem-Based Learning, whereby the student must try to solve the different professional practice situations that arise throughout the program. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts.

02

Why Study at TECH?

TECH is the world's largest online university. With an impressive catalog of more than 14,000 university programs, available in 11 languages, it is positioned as a leader in employability, with a 99% job placement rate. In addition, it has a huge faculty of more than 6,000 professors of the highest international prestige.

Study at the largest online university in the world and ensure your professional success. The future begins at TECH”

The world's best online university, according to FORBES

The prestigious Forbes magazine, specialized in business and finance, has highlighted TECH as "the best online university in the world" This is what they have recently stated in an article in their digital edition in which they echo the success story of this institution, "thanks to the academic offer it provides, the selection of its teaching staff, and an innovative learning method oriented to form the professionals of the future".

The best top international faculty

TECH's faculty is made up of more than 6,000 professors of the highest international prestige. Professors, researchers and top executives of multinational companies, including Isaiah Covington, performance coach of the Boston Celtics; Magda Romanska, principal investigator at Harvard MetaLAB; Ignacio Wistuba, chairman of the department of translational molecular pathology at MD Anderson Cancer Center; and D.W. Pine, creative director of TIME magazine, among others.

The world's largest online university

TECH is the world's largest online university. We are the largest educational institution, with the best and widest digital educational catalog, one hundred percent online and covering most areas of knowledge. We offer the largest selection of our own degrees and accredited online undergraduate and postgraduate degrees. In total, more than 14,000 university programs, in ten different languages, making us the largest educational institution in the world.

The most complete syllabuses on the university scene

TECH offers the most complete syllabuses on the university scene, with programs that cover fundamental concepts and, at the same time, the main scientific advances in their specific scientific areas. In addition, these programs are continuously updated to guarantee students the academic vanguard and the most demanded professional skills. and the most in-demand professional competencies. In this way, the university's qualifications provide its graduates with a significant advantage to propel their careers to success.

A unique learning method

TECH is the first university to use Relearning in all its programs. This is the best online learning methodology, accredited with international teaching quality certifications, provided by prestigious educational agencies. In addition, this innovative academic model is complemented by the "Case Method", thereby configuring a unique online teaching strategy. Innovative teaching resources are also implemented, including detailed videos, infographics and interactive summaries.

The official online university of the NBA

TECH is the official online university of the NBA. Thanks to our agreement with the biggest league in basketball, we offer our students exclusive university programs, as well as a wide variety of educational resources focused on the business of the league and other areas of the sports industry. Each program is made up of a uniquely designed syllabus and features exceptional guest hosts: professionals with a distinguished sports background who will offer their expertise on the most relevant topics.

Leaders in employability

TECH has become the leading university in employability. Ninety-nine percent of its students obtain jobs in the academic field they have studied within one year of completing any of the university's programs. A similar number achieve immediate career enhancement. All this thanks to a study methodology that bases its effectiveness on the acquisition of practical skills, which are absolutely necessary for professional development.

Google Premier Partner

The American technology giant has awarded TECH the Google Premier Partner badge. This award, which is only available to 3% of the world's companies, highlights the efficient, flexible and tailored experience that this university provides to students. The recognition not only accredits the maximum rigor, performance and investment in TECH's digital infrastructures, but also places this university as one of the world's leading technology companies.

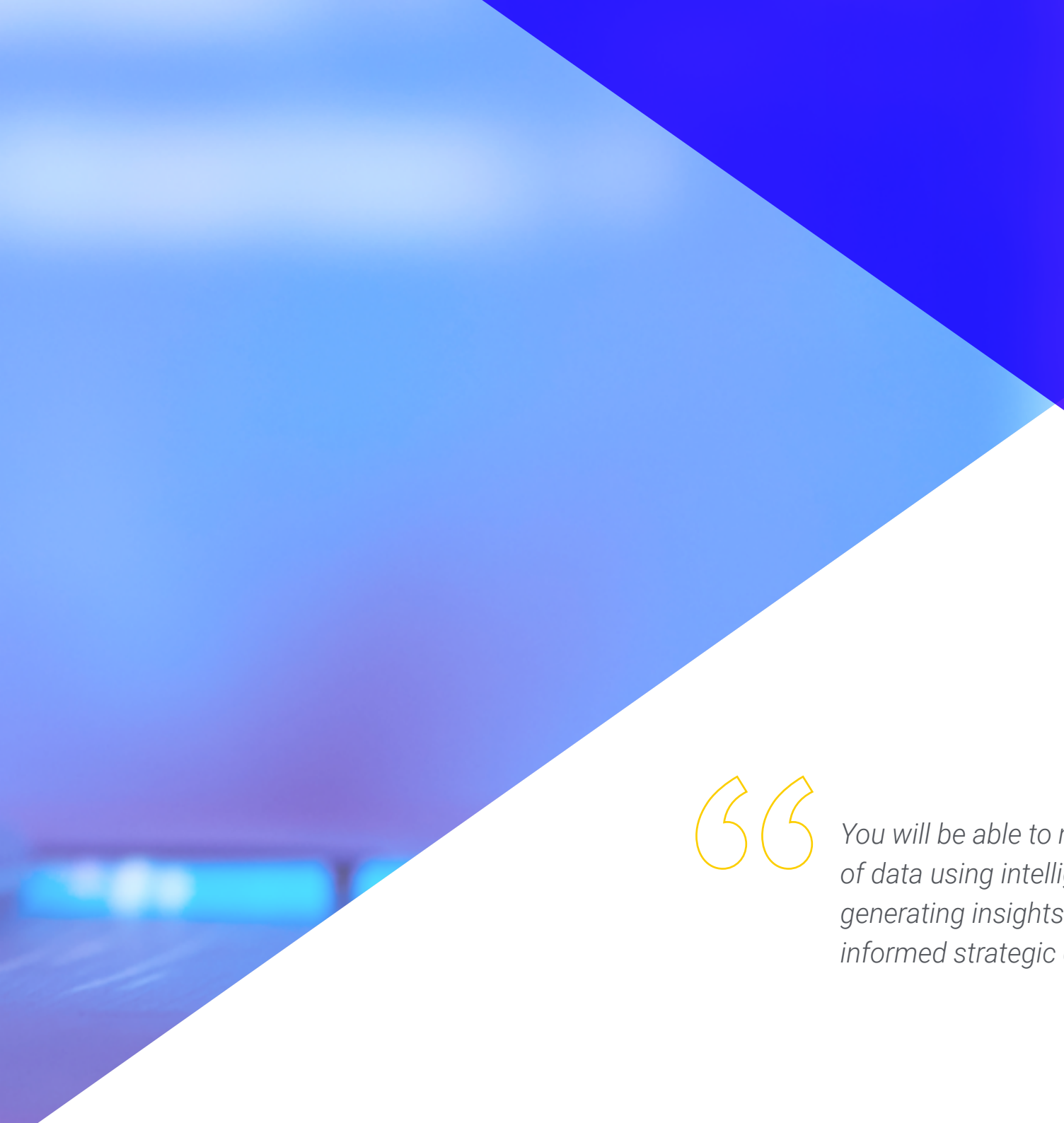
The top-rated university by its students

Students have positioned TECH as the world's top-rated university on the main review websites, with a highest rating of 4.9 out of 5, obtained from more than 1,000 reviews. These results consolidate TECH as the benchmark university institution at an international level, reflecting the excellence and positive impact of its educational model.

03

Syllabus

This university program offers an in-depth focus on Artificial Intelligence applied to Marketing and Digital Communication. Throughout the syllabus, graduates will acquire key knowledge in data analysis and mining, algorithms, and machine learning. They will also explore advanced techniques such as neural networks, computer vision, and natural language processing—essential for content automation and campaign personalization. With a practical approach, professionals will have innovative tools to optimize digital strategies, improve lead generation, and transform corporate communication.



You will be able to manage large volumes of data using intelligent systems tools, generating insights that enable highly informed strategic decision-making"

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 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 Its 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 Evaluation of Results
- 2.7.1. Statistical Measures
- 2.7.2. Relationship Indexes
- 2.7.3. Data Mining

2.8. 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

2.10. Regulatory Framework
- 2.10.1. Data Protection Law
- 2.10.2. Good Practices
- 2.10.3. Other Regulatory 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. Discreet 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. Sorting by Merge (Merge_Sort)
- 5.3.6. Sorting Quickly (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. Result Analysis

7.4. Evaluation of Classifiers
- 7.4.1. Confusion Matrices
- 7.4.2. Numerical Evaluation Matrices
- 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. Operations
- 8.2.1. Sum
- 8.2.2. Product
- 8.2.3. Transfer

8.3. Layers
- 8.3.1. Input Layer
- 8.3.2. Hidden Layer
- 8.3.3. Output Layer

8.4. Layer Bonding 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. Transfer Learning 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. Learning Rate Programming
- 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. Transfer Learning 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. Transfer Learning 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. Graph Optimization with TensorFlow Operations

10.5. Loading and Preprocessing Data with TensorFlow
- 10.5.1. Loading Data Sets with TensorFlow
- 10.5.2. Pre-Processing 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. Keras Pre-Processing Layers
- 10.8.1. Using the Keras Pre-Processing API
- 10.8.2. Pre-Processing Pipelined Construction with Keras
- 10.8.3. Using the Keras Pre-Processing API for Model Training

10.9. The TensorFlow Datasets Project
- 10.9.1. Using TensorFlow Datasets for Data Loading
- 10.9.2. Data Preprocessing 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 Applications
- 10.10.2. Building a Deep Learning App with TensorFlow
- 10.10.3. Model Training with TensorFlow
- 10.10.4. Using the Application for the Prediction of 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. Grouping Layers and Implementation of Grouping Layers 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. ResNet Architecture

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. Learning by Transfer
- 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
- 11.10.1. Edge Detection
- 11.10.1. Rule-Based Segmentation Methods

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 the Training Dataset
- 12.2.3. Data Cleaning and Transformation
- 12.2.4. Sentiment Analysis

12.3. Classification of Opinions 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 RNN
- 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 Transformers Models 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 Pre-Processing
- 12.7.3. Training a Transformers Model for Vision

12.8. Hugging Face's Transformers Library
- 12.8.1. Using Hugging Face's Transformers Library
- 12.8.2. Hugging Face's Transformers Library Application
- 12.8.3. Advantages of Hugging Face's Transformers Library

12.9. Other Transformers Libraries. Comparison
- 12.9.1. Comparison Between Different Transformers Libraries
- 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 Applications
- 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. Noise Suppression of Automatic Encoders
- 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 Diffusion 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 Studies
- 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 Healthcare Service
- 15.2.1. Implications of AI in the Healthcare Sector. Opportunities and Challenges
- 15.2.2. Case Studies

15.3. Risks Related to the Use of AI in Healthcare 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 Studies
- 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 Studies

15.6. Potential Risks Related to the Use of AI in Industry
- 15.6.1. Case Studies
- 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 Studies
- 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 Studies
- 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 Studies
- 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 in Human Resources. Opportunities and Challenges
- 15.10.2. Case Studies
- 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 and ChatGPT
- 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: Keyword Insights and DiiB
- 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 with MonkeyLearn
- 16.3.2. Social Trend Detection
- 16.3.3. Publication Automation with Metricool
- 16.3.4. Automated Content Generation with Predis

16.4. AI tools for Customer Communication
- 16.4.1. Custom Chatbots Using Dialogflow
- 16.4.2. Automated Email Response Systems Using Mailchimp
- 16.4.3. Real-Time Response Optimization Using Freshchat
- 16.4.4. Customer Feedback Analysis Using SurveyMonkey

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 with VWO (Visual Website Optimizer)

16.6. Chatbots and Virtual Assistants in Marketing Digital
- 16.6.1. Proactive Interaction with Customers.ai
- 16.6.2. Multichannel Integration Using Tars
- 16.6.3. Contextual Responses with Chatfuel
- 16.6.4. Conversation Analytics Using Botpress

16.7. Programmatic Advertising with AI
- 16.7.1. Advanced Segmentation with Adroll
- 16.7.2. Real-Time Optimization Using WordStream
- 16.7.3. Automatic Bidding Using BidIQ
- 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 with Brevo
- 16.9.4. Optimizing Open Rate with Benchmark Email

16.10. Future Trends in AI for Digital Marketing
- 16.10.1. Advanced Conversational AI
- 16.10.2. Augmented Reality Integration Using ZapWorks
- 16.10.3. Emphasis on AI Ethics
- 16.10.4. AI in Content Creation

Module 17. Content Generation with AI

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 through ChatGPT
- 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. AI Text Generation for Blogging and Social Media Creation through ChatGPT
- 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 AI Content to Different Audiences Using Optimizely
- 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 Using Hubspot
- 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 through Google Ads
- 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. Social Media Sentiment Analysis with AI and Customer Feedback through Lexalytics
- 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 Promotions Optimization with AI through Vendavo
- 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 and Marketing Data for Decision Making

19.1. Specific Technologies and Tools for Communication and Marketing Data Analysis using Google Analytics 4
- 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. AI Applications in Marketing Big Data Analytics such as Google BigQuery
- 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 through Quid
- 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 Forecasting
- 19.5.3. Automatic Adjustment of Strategic Optimization

19.6. Market Segmentation with AI using Meta
- 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 with GA4
- 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. Application of AI in the Sales Process through Salesforce
- 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. Lead Generation Techniques and Tools with AI through Hubspot
- 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 using Hubspot
- 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 Tracking 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

04

Teaching Objectives

Committed to academic excellence, this university degree provides in-depth knowledge about the impact of AI on marketing and communication. In this way, graduates will be highly qualified to design innovative strategies based on data and predictive analytics, optimizing personalization and audience engagement. Additionally, they will master machine learning to anticipate needs, enhance decision-making, and apply the latest trends in artificial intelligence, driving more effective and future-oriented campaigns.

You will create personalized experiences for users, improving retention and loyalty through the use of Machine Learning"

General Objectives

- Understand the fundamentals of how Artificial Intelligence is transforming Digital Marketing strategies
- Develop, integrate and manage chatbots and virtual assistants to improve customer interactions
- Delve into the automation and optimization of online ad buying through programmatic advertising with Artificial Intelligence
- Interpret large volumes of data for strategic decision making in Digital Marketing
- Apply AI to email marketing strategies for personalization and campaign automation
- Explore emerging trends in Artificial Intelligence for Digital Marketing and understand their potential impact on the industry

You will implement chatbots, virtual assistants and automated care solutions that optimize the user experience significantly"

Specific Objectives

Module 1. Fundamentals of Artificial Intelligence

- Understand the fundamental concepts of Artificial Intelligence applied to Digital Marketing, including its evolution and impact on business strategies
- Apply specific AI tools for search engine optimization, improving the visibility and effectiveness of digital campaigns

Module 2. Data Types and Life Cycle

- Perform the most descriptive statistics, taking into account factors ranging from the population to its sources
- Properly differentiate the data life cycle, taking into account the FAIR Principles
- Employ the Gantt Chart tool to manage both projects and communication of planning and scheduling tasks
- Perform data collection and data cleansing functions

Module 3. Data in Artificial Intelligence

- Implement advanced automation techniques, such as advertising campaign optimization and efficient CRM management with AI-based tools
- Develop skills in lead identification and qualification using Artificial Intelligence, improving effectiveness in both lead generation and lead management

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

- Gain extensive insight into statistical inference
- Perform effective treatments of missing values, applying maximum likelihood imputation methods
- Select data based on major perspectives and criteria
- Drive data preprocessing work in Big Data environments

Module 5. Algorithm and Complexity in Artificial Intelligence

- Understand the fundamentals of algorithmics and computational complexity in the context of Artificial Intelligence
- Become familiar with the key concepts of algorithms, data structures and algorithm design techniques used in applications
- Study and apply search, optimization and Machine Learning algorithms in Artificial Intelligence problems
- Explore how existing algorithms can be improved and new algorithms developed to address AI challenges

Module 6. Intelligent Systems

- Analyze in depth the Theory of Agents, to know what factors influence Artificial Intelligence and software engineering
- Perform an effective evaluation of data quality, keeping in mind the distinction between information and knowledge
- Build domain ontologies at a higher level and master their respective languages
- Delve into the current and future state of the semantic web in order to carry out innovation processes

Module 7. Machine Learning and Data Mining

- Delve deeply into the key concepts of Machine Learning discovery processes
- Explore data processing, visualization and exploration of variables
- Master the mechanisms of Neural Networks, using the *Backpropagation* Algorithm appropriately
- Analyze text mining and natural language processing

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

- Obtain a comprehensive view on Deep Learning and its various applications in the communication domain
- Design architectures taking into account the connection between layers and forward propagation
- Build Neural Networks establishing both weights and training
- Apply the basic principles of Neural Networks, adjusting parameters as necessary

Module 9. Deep Neural Networks Training

- Identify Gradient problems and perform techniques to optimize them
- Perform learning rate scheduling by applying smoothing terms
- Acquire practical guidelines in model design, selection of metrics and evaluation parameters
- Execute maximum entropy regularization procedures

Module 10. Model Customization and Training with TensorFlow

- Conduct model training with TensorFlow, performing operations with graphs
- Effectively customize models and training algorithms
- Gain a broad understanding of TensorFlow functions and graphs
- Use the tf.data API for data processing

Module 11. Deep Computer Vision with Convolutional Neural Networks

- Master the CortexVisual Architecture, taking into account the functions of the visual cortex and the theories of computer vision
- Implement a CNN *ResNet* using Keras
- Perform transfer learning processes, knowing its advantages
- Execute object detection methods and tracking techniques

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

- Generate texts using RNN and handle their natural language in an optimal way
- Create training data sets and perform the corresponding cleaning and transformation of the information
- Use encoder-decoder networks for machine translation
- Employ Transformer Models for language vision

Module 13. Autoencoders, GANs and Diffusion Models

- Represent data in an efficient way, reducing dimensionality through deep learning
- Perform PCA processes with an incomplete linear autoencoder
- Eliminate noise from automatic encoders by applying filters and regularization techniques
- Generate fashion MNIST images

Module 14. Bio-Inspired Computing

- Efficiently employ social adaptation algorithms using ant colony and particle cloud-based computing
- Apply space exploration-exploitation strategies for genetic algorithms
- Delve into the different models of evolutionary computation
- Understand the various uses of Neural Networks in fields such as medical research, economics or computer vision

Module 15. Artificial Intelligence: Strategies and Applications

- Address the implications of AI in financial services to overcome challenges and seize opportunities
- Understand the implications of Machine Learning in healthcare services, Retail, Education and Public Administration

Module 16. Artificial Intelligence in Digital Marketing Strategies

- Perform Digital Marketing transformation processes with Artificial Intelligence
- Control the most advanced tools of Machine Learning for customer communication
- Personalize users' experiences on websites and social media
- Develop *chatbots* and virtual assistants in Digital Marketing

Module 17. Content Generation with AI

- Master AI systems for SEO and SEM optimization
- Execute Predictive Analytics and using *Big Data* in Digital Marketing
- Use *Email Marketing* for Personalization and Automation in Campaigns
- Analyze future trends in AI for Digital Marketing

Module 18. Automation and Optimization of Marketing Processes with AI

- Develop marketing automation processes with Artificial Intelligence
- Optimize Advertising Campaigns through Machine Learning
- Optimize advertising campaigns through Machine Learning
- Analyze sentiment with AI on social media, leveraging customer feedback

Module 19. Communication and Marketing Data Analysis for Decision Making

- Master specific technologies for the analysis of Communication and Marketing data
- Apply AI to the analysis of large volumes of data
- Develop Predictive Analytics for Informed Decision Making
- Improve Marketing strategies with Artificial Intelligence

Module 20. Sales and Leads Generation with Artificial Intelligence

- Nurture Leads generation tools and procedures with AI
- Implement Virtual Assistants in Sales Processes
- Predict consumer needs through Machine Learning
- Learn about the main innovations and predictions in the sales field

05

Career Opportunities

Professionals who participate in this program in Artificial Intelligence in Marketing and Communication will be prepared to access a wide range of career opportunities in sectors where automation, data analysis and personalization of strategies are key to success Among the main job opportunities are roles such as Marketing strategist based on Artificial Intelligence, data analyst, among others They will also be able to work in advertising agencies, corporate marketing departments, technology companies and startups focused on optimizing user experiences through Artificial Intelligence

You will be prepared to solve ethical and legal issues arising from the use of Artificial Intelligence, ensuring regulatory compliance in data management"

Graduate Profile

The graduate profile of this program is characterized by a solid combination of technical knowledge and strategic vision in the application of Artificial Intelligence to Marketing and communication. At the end of the program, professionals will be able to design, implement and optimize digital marketing campaigns based on Artificial Intelligence, using machine learning models and predictive analytics to improve decision making. In addition, they will have skills for process automation, intelligent content generation and personalization of digital experiences, which will allow them to lead the digital transformation in their organizations and provide innovative solutions in an increasingly competitive market.

Evolve in the Marketing sector by personalizing digital experiences with AI and revolutionize the way brands connect with their audience. Enroll now.

- **Process Automation and Optimization:** Ability to implement artificial intelligence solutions that streamline repetitive tasks, improve operational efficiency, and personalize the user experience
- **Development and Implementation of Artificial Intelligence Models:** Knowledge of machine learning, neural networks, and natural language processing to design and apply predictive models in digital marketing campaigns
- **Content Generation with Artificial Intelligence:** Proficiency in generative AI tools and technologies for the automated creation of text, images, and videos tailored to different audiences and platforms
- **AI-Based Marketing Strategies:** Competence in designing innovative campaigns supported by artificial intelligence, optimizing customer segmentation, personalization, and conversion

After completing the program, you will be able to use your knowledge and skills in the following positions:

1. Digital Marketing Director with AI: Leads marketing strategies based on artificial intelligence, optimizing segmentation, personalization, and campaign automation.
2. **Data Analysis Specialist for Marketing and Communication:** Interprets large volumes of data to extract strategic insights and improve business decision-making.
3. **AI Marketing Consultant:** Advises companies on the implementation of AI solutions to enhance the efficiency and profitability of their communication and advertising strategies.
4. **Digital Transformation and Automation Manager:** Leads the integration of artificial intelligence into marketing, sales, and customer service processes to optimize user experience and customer loyalty.
5. **AI-Generated Content Strategist:** Oversees the production of automated and personalized content through AI to improve engagement with target audiences.
6. **Programmatic Advertising and Campaign Optimization Specialist:** Uses predictive models and AI algorithms to maximize the impact and return on investment in digital advertising.
7. Intelligent Customer Experience Manager: Implements AI solutions to enhance customer interaction through chatbots, virtual assistants, and real-time personalization.
8. **Consumer Behavior and Trend Analyst:** Applies artificial intelligence to predict consumption patterns and design data-driven marketing strategies.
9. **Digital Communication Innovation Leader:** Designs and manages digital transformation projects that incorporate Artificial Intelligence into corporate communication.
10. **Entrepreneur in AI Technologies for Marketing and Communication:** Develops innovative AI-based solutions to optimize marketing, advertising, and customer engagement strategies.

Become the AI expert companies are looking for and master machine learning to drive more strategic campaigns"

06

Study Methodology

TECH is the world's first university to combine the **case study** methodology with **Relearning**, a 100% online learning system based on guided repetition.

This disruptive pedagogical strategy has been conceived to offer professionals the opportunity to update their knowledge and develop their skills in an intensive and rigorous way. A learning model that places students at the center of the educational process giving them the leading role, adapting to their needs and leaving aside more conventional methodologies.

TECH will prepare you to face new challenges in uncertain environments and achieve success in your career"

The student: the priority of all TECH programs

In TECH's study methodology, the student is the main protagonist.
The teaching tools of each program have been selected taking into account the demands of time, availability and academic rigor that, today, not only students demand but also the most competitive positions in the market.

With TECH's asynchronous educational model, it is students who choose the time they dedicate to study, how they decide to establish their routines, and all this from the comfort of the electronic device of their choice. The student will not have to participate in live classes, which in many cases they will not be able to attend. The learning activities will be done when it is convenient for them. They can always decide when and from where they want to study.

"At TECH you will NOT have live classes (which you might not be able to attend)"

The most comprehensive study plans at the international level

TECH is distinguished by offering the most complete academic itineraries on the university scene. This comprehensiveness is achieved through the creation of syllabi that not only cover the essential knowledge, but also the most recent innovations in each area.

By being constantly up to date, these programs allow students to keep up with market changes and acquire the skills most valued by employers. In this way, those who complete their studies at TECH receive a comprehensive education that provides them with a notable competitive advantage to further their careers.

And what's more, they will be able to do so from any device, pc, tablet or smartphone.

> *TECH's model is asynchronous, so it allows you to study with your pc, tablet or your smartphone wherever you want, whenever you want and for as long as you want"*

Case Studies and Case Method

The case method has been the learning system most used by the world's best business schools. Developed in 1912 so that law students would not only learn the law based on theoretical content, its function was also to present them with real complex situations. In this way, they could make informed decisions and value judgments about how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

With this teaching model, it is students themselves who build their professional competence through strategies such as Learning by Doing or Design Thinking, used by other renowned institutions such as Yale or Stanford.

This action-oriented method will be applied throughout the entire academic itinerary that the student undertakes with TECH. Students will be confronted with multiple real-life situations and will have to integrate knowledge, research, discuss and defend their ideas and decisions. All this with the premise of answering the question of how they would act when facing specific events of complexity in their daily work.

Relearning Methodology

At TECH, case studies are enhanced with the best 100% online teaching method: Relearning.

This method breaks with traditional teaching techniques to put the student at the center of the equation, providing the best content in different formats. In this way, it manages to review and reiterate the key concepts of each subject and learn to apply them in a real context.

In the same line, and according to multiple scientific researches, reiteration is the best way to learn. For this reason, TECH offers between 8 and 16 repetitions of each key concept within the same lesson, presented in a different way, with the objective of ensuring that the knowledge is completely consolidated during the study process.

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.

A 100% online Virtual Campus with the best teaching resources

In order to apply its methodology effectively, TECH focuses on providing graduates with teaching materials in different formats: texts, interactive videos, illustrations and knowledge maps, among others. All of them are designed by qualified teachers who focus their work on combining real cases with the resolution of complex situations through simulation, the study of contexts applied to each professional career and learning based on repetition, through audios, presentations, animations, images, etc.

The latest scientific evidence in the field of Neuroscience points to the importance of taking into account the place and context where the content is accessed before starting a new learning process. Being able to adjust these variables in a personalized way helps people to remember and store knowledge in the hippocampus to retain it in the long term. This is a model called Neurocognitive context-dependent e-learning that is consciously applied in this university qualification.

In order to facilitate tutor-student contact as much as possible, you will have a wide range of communication possibilities, both in real time and delayed (internal messaging, telephone answering service, email contact with the technical secretary, chat and videoconferences).

Likewise, this very complete Virtual Campus will allow TECH students to organize their study schedules according to their personal availability or work obligations. In this way, they will have global control of the academic content and teaching tools, based on their fast-paced professional update.

The online study mode of this program will allow you to organize your time and learning pace, adapting it to your schedule"

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that assess real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.

The university methodology top-rated by its students

The results of this innovative teaching model can be seen in the overall satisfaction levels of TECH graduates.

The students' assessment of the teaching quality, the quality of the materials, the structure of the program and its objectives is excellent. Not surprisingly, the institution became the top-rated university by its students according to the global score index, obtaining a 4.9 out of 5.

Access the study contents from any device with an Internet connection (computer, tablet, smartphone) thanks to the fact that TECH is at the forefront of technology and teaching.

You will be able to learn with the advantages that come with having access to simulated learning environments and the learning by observation approach, that is, Learning from an expert.

As such, the best educational materials, thoroughly prepared, will be available in this program:

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.

This content is then adapted in an audiovisual format that will create our way of working online, with the latest techniques that allow us to offer you high quality in all of the material that we provide you with.

Practicing Skills and Abilities

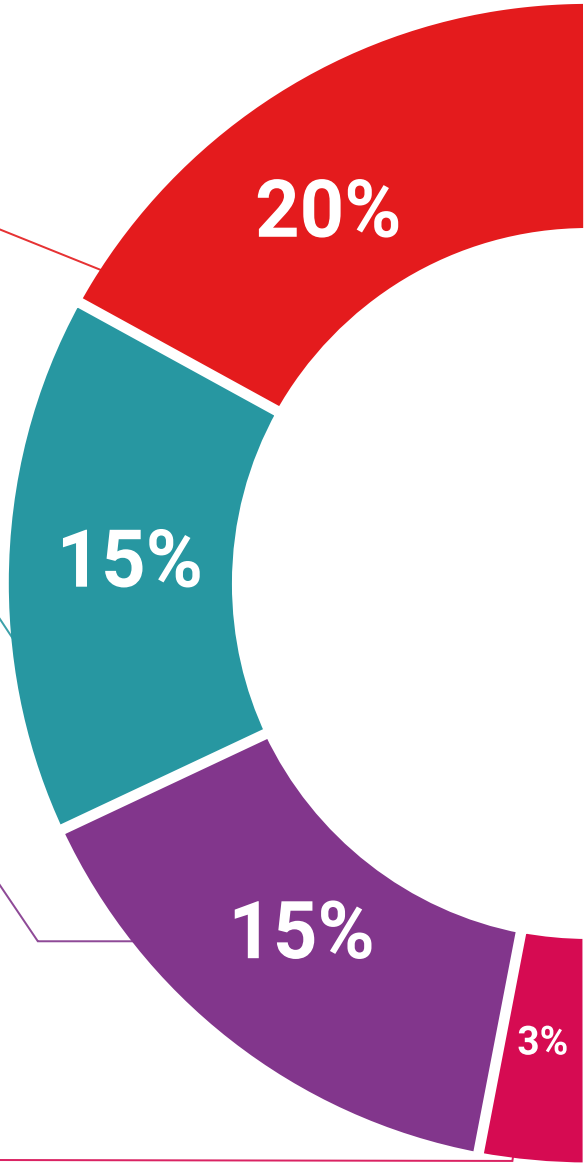
You will carry out activities to develop specific competencies and skills in each thematic field. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop within the framework of the globalization we live in.

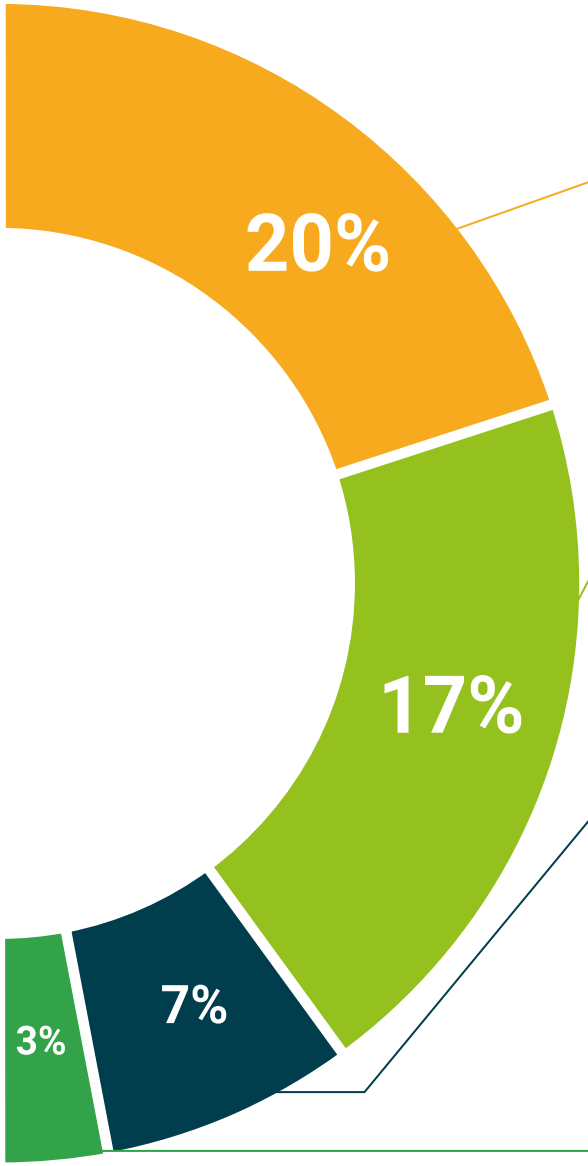
Interactive Summaries

We present 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".

Additional Reading

Recent articles, consensus documents, international guides... In our virtual library you will have access to everything you need to complete your education.





Case Studies

Students will complete a selection of the best case studies in the field.
Cases that are presented, analyzed, and supervised by the best specialists in the world.

Testing & Retesting

We periodically assess and re-assess your knowledge throughout the program. We do this on 3 of the 4 levels of Miller's Pyramid.

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 for future difficult decisions.

Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical and effective way to help students progress in their learning.

07

Teaching Staff

The professors who teach this university program applied to Artificial Intelligence in Marketing represent the forefront of knowledge and experience in this multidisciplinary field. It should be noted that these professionals have years of experience working in reputation institutions in the communications industry, where they have contributed innovative proposals to build customer loyalty. Mixing theory with practice, their commitment to continuous learning, their dedication to cutting-edge research and their ability to guide and motivate graduates make them exceptional mentors for those seeking to make a quality leap in their careers.

You will enjoy a syllabus put together by authentic references in the use of Artificial Intelligence in Marketing and Communication"

Management

Dr. Peralta Martín-Palomino, Arturo

- CEO and CTO at Prometeus Global Solutions
- CTO at Korporate Technologies
- CTO at AI Shepherds GmbH
- Consultant and Strategic Business Advisor at Alliance Medical
- Director of Design and Development at DocPath
- Doctorate in Psychology from the University of Castilla La Mancha
- Doctorate in Economics, Business and Finance from the Camilo José Cela University
- Doctorate in Psychology from University of Castilla La Mancha
- Master's Degree in Executive MBA from the Isabel I University
- Master's Degree in Sales and Marketing Management from the 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 Advisor at AI Shepherds GmbH
- Digital Account Manager at Kill Draper
- Head of Digital at Kuarere
- Digital Marketing Manager at Arconi Solutions, Deltoid Energy and Brinergy Tech
- *Founder and National Sales and Marketing Manager*
- Master's Degree in Digital Marketing (MDM) by The Power Business School
- Bachelor's Degree in Business Administration (BBA) from the University of Buenos Aires

Professors

Ms. Parreño Rodríguez, Adelaida

- *Technical Developer & Energy Communities Engineer at the University of Murcia*
- *Technical Developer & Energy Communities Engineer at the University of Murcia*
- *Manager in Research & Innovation in European Projects at the University of Murcia*
- 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

- 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 Studies from the University of Almería

08

Certificate

The Professional 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 diploma for the Professional Master's Degree issued by TECH Global University.

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

This private qualification will allow you to obtain a diploma for the **Professional Master's Degree in Artificial Intelligence in Marketing and Communication** 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 private qualification**, 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.

TECH is a member of the **International Communication Association (ICA)**, which focuses on improving academic research processes in communication sciences. Thanks to the professionals who make up the ICA and the benefits it offers its members, students have access to a wide variety of educational materials and teaching resources focused on professional development, accompanied by a network of professionals and companies dedicated to excellence in the industry.

TECH is a member of:

International Communication Association

Title: **Professional Master's Degree in Artificial Intelligence in Marketing and Communication**

Modality: **Online**

Duration: **12 months.**

Accreditation: **60 ECTS**

tech global university

Mr./Ms. _____ with identification document _____
has successfully passed and obtained the title of:

Professional Master's Degree in Artificial Intelligence in Marketing and Communication

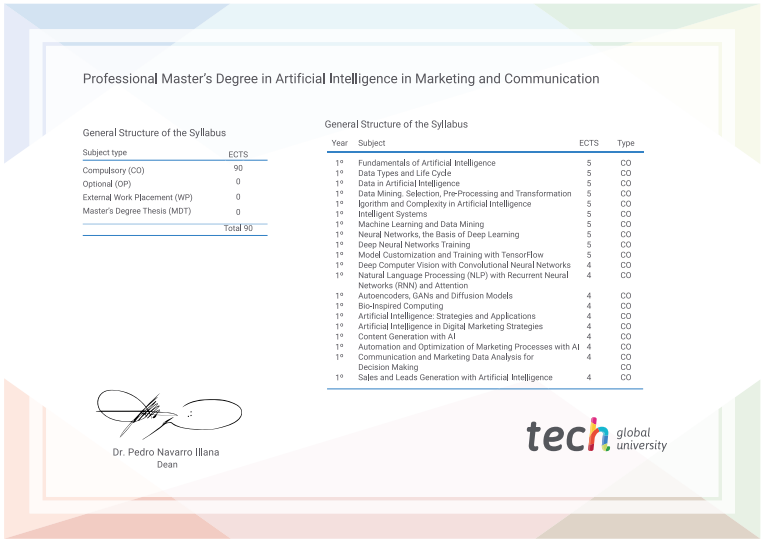
This is a private qualification of 2,700 hours of duration equivalent to 90 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Dean

Unique TECH Code: AFWOR023S techtitute.com/certificates



Professional Master's Degree in Artificial Intelligence in Marketing and Communication

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	90
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
	Total 90

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Fundamentals of Artificial Intelligence	5	CO
1º	Data Types and Life Cycle	5	CO
1º	Data in Artificial Intelligence	5	CO
1º	Data Mining. Selection, Pre-Processing and Transformation	5	CO
1º	Igorithm and Complexity in Artificial Intelligence	5	CO
1º	Intelligent Systems	5	CO
1º	Machine Learning and Data Mining	5	CO
1º	Neural Networks, the Basis of Deep Learning	5	CO
1º	Deep Neural Networks Training	5	CO
1º	Model Customization and Training with TensorFlow	5	CO
1º	Deep Computer Vision with Convolutional Neural Networks	4	CO
1º	Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) and Attention	4	CO
1º	Autoencoders, GANs and Diffusion Models	4	CO
1º	Bio-Inspired Computing	4	CO
1º	Artificial Intelligence: Strategies and Applications	4	CO
1º	Artificial Intelligence in Digital Marketing Strategies	4	CO
1º	Content Generation with AI	4	CO
1º	Automation and Optimization of Marketing Processes with AI	4	CO
1º	Communication and Marketing Data Analysis for Decision Making	4	CO
1º	Sales and Leads Generation with Artificial Intelligence	4	CO

Dr. Pedro Navarro Illana
Dean

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*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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Professional Master's Degree
Artificial Intelligence in Marketing and Communication

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **90 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Professional Master's Degree

Artificial Intelligence in Marketing and Communication

TECH is a member of:

International Communication Association

tech global university