Professional Master's Degree

Artificial Intelligence in Digital Marketing

tech global university

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Professional Master's Degree
Artificial Intelligence in Digital Marketing

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

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

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01

Introduction

The implementation of Artificial Intelligence in the field of Digital Marketing allows analyzing large amounts of data quickly and accurately, which facilitates the identification of patterns, trends and consumer preferences. By better understanding audience behavior, companies can personalize their Marketing strategies, offering relevant content and products at the right time, which increases the effectiveness of campaigns and customer satisfaction. In addition, AI can automate repetitive tasks such as audience targeting, ad optimization and performance analysis.

This is how this comprehensive, 100% online and flexible TECH program is born, based on the revolutionary Relearning methodology.

You will integrate Artificial Intelligence into Digital Marketing to boost your brand's ability to connect more effectively with your target audience, all through TECH's revolutionary Relearning methodology"

The use of Artificial Intelligence in Digital Marketing offers the opportunity to analyze large volumes of data in real time, allowing marketers to gain deep insights into user behavior, facilitating informed decision making. It also enables the creation of more accurate audience profiles, allowing for more effective segmentation and the delivery of personalized content, which significantly improves the user experience

This Professional Master's Degree, in which students will address content personalization and recommendations with Adobe Sensei, audience segmentation, market analysis, trend prediction and buying behaviors. In addition, it will cover campaign optimization and the application of AI in personalized advertising, advanced ad targeting, ad budget optimization and predictive analytics for campaign optimization

It will also delve into the integration of Artificial Intelligence to personalize the user experience in Digital Marketing, including optimization of website navigation and usability, virtual assistance and automated customer service. Finally, advanced data analysis techniques will be explored, including advanced audience segmentation, the processing and automated analysis of large volumes of data, the generation of insights and recommendations based on data, and the prediction of campaign results and conversions

This 100% online university program will provide graduates with the ease of being able to study it comfortably, wherever and whenever they want. Therefore, they will only need a device with an Internet connection to access all the contents. All this under the guidance of Relearning methodology, consisting in the reiteration of the key concepts for an optimal assimilation of the syllabus. It is a modality according to the current time, with all the guarantees to position the Marketing professional in a highly demanded sector

This **Professional Master's Degree in Artificial Intelligence in Digital Marketing** contains the most complete and up-to-date program on the market. The most important features include:

- The development of case studies presented by experts in Artificial Intelligence in Digital Marketing
- 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 self-assessment can be used to improve learning
- Its special emphasis on innovative methodologies
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection

You'll implement machine learning algorithms to optimize ad campaigns, automatically adjusting targeting and budget to maximize ROI"

Enroll now! You will access a complete and specialized qualification in leveraging the most advanced Artificial Intelligence tools and techniques in the field of Marketing and eCommerce"

You will delve into the creation of real-time customer profiles, as well as the generation of personalized offers and product recommendations, through an extensive library of innovative multimedia resources.

You will delve into ethics and responsibility in the use of AI in eCommerce and prepare yourself to meet the challenges and seize the emerging opportunities in this ever-evolving field.

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

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive education programmed to learn in real situations.

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

02

Objectives

The main objective of the Professional Master's Degree is to provide graduates with comprehensive and specialized education in the use of the latest Artificial Intelligence technologies to optimize Marketing and E-Commerce strategies. Through a practical and results-oriented approach, the program will prepare professionals to effectively apply AI tools and techniques to personalize content, improve audience segmentation, predict trends and buying behavior, optimize advertising campaigns, automate processes, and offer highly personalized user experiences.

You will develop practical skills for the implementation and management of AI tools and platforms to carry out your Digital Marketing campaigns"

General Objectives

- Understand the theoretical foundations of Artificial Intelligence
- Study the different types of data and understand the data lifecycle
- Evaluate the crucial role of data in the development and implementation of AI solutions
- Delve into algorithms and complexity to solve specific problems
- Explore the theoretical basis of neural networks for Deep Learning development
- Explore bio-inspired computing and its relevance in the development of intelligent systems
- Implement Artificial Intelligence applications in Digital Marketing and e-commerce to improve the efficiency and effectiveness of strategies
- Improve user experience in Digital Marketing by using Artificial Intelligence for dynamic personalization of websites, applications and content
- Implement Artificial Intelligence systems for the automation of e-Commerceprocesses, from inventory management to customer service
- Research and apply predictive AI models to identify emerging trends in the marketplace and anticipate customer needs
- Collaborate on cross-functional projects to integrate Artificial Intelligence solutions with existing Digital Marketing platforms and develop new strategies
- Evaluate the impact of Artificial Intelligence technologies on Digital Marketing and e-commerce, both from a business and ethical perspective

Specific Objectives

Module 1. Fundamentals of Artificial Intelligence

- Analyze the historical evolution of Artificial Intelligence, from its beginnings to its current state, identifying key milestones and developments
- Understand the functioning of neural networks and their application in learning models in Artificial Intelligence
- Study the principles and applications of genetic algorithms, analyzing their usefulness in solving complex problems
- Analyze the importance of thesauri, vocabularies and taxonomies in structuring and processing data for Artificial Intelligence systems

Module 2. Data Types and Data Life Cycle

- Understand the fundamental concepts of statistics and their application in data analysis
- Identify and classify the different types of statistical data, from quantitative to qualitative data
- Analyze the life cycle of data, from generation to disposal, identifying key stages
- Explore the initial stages of the data life cycle, highlighting the importance of data planning and structure
- Study data collection processes, including methodology, tools and collection channels
- Explore the *Datawarehouse* concept, with emphasis on the elements that comprise it and its design

Module 3. Data in Artificial Intelligence

- Master the fundamentals of data science, covering tools, types and sources for information analysis
- Explore the process of transforming data into information using data mining and visualization techniques
- Study the structure and characteristics of *datasets*, understanding their importance in the preparation and use of data for Artificial Intelligence models
- Use specific tools and best practices in data handling and processing, ensuring efficiency and quality in the implementation of Artificial Intelligence

Module 4. Data Mining: Selection, Preprocessing and Transformation

- Master the techniques of statistical inference to understand and apply statistical methods in data mining
- Perform detailed exploratory analysis of data sets to identify relevant patterns, anomalies, and trends
- Develop skills for data preparation, including data cleaning, integration, and formatting for use in data mining
- Implement effective strategies for handling missing values in datasets, applying imputation or elimination methods according to context
- Identify and mitigate noise present in data, using filtering and smoothing techniques to improve the quality of the data set
- Address data preprocessing in Big Data environments

Module 5. Algorithm and Complexity in Artificial Intelligence

- Introduce algorithm design strategies, providing a solid understanding of fundamental approaches to problem solving
- Analyze the efficiency and complexity of algorithms, applying analysis techniques to evaluate performance in terms of time and space
- Study and apply sorting algorithms, understanding their performance and comparing their efficiency in different contexts
- Explore tree-based algorithms, understanding their structure and applications
- Investigate algorithms with Heaps, analyzing their implementation and usefulness in efficient data manipulation
- Analyze graph-based algorithms, exploring their application in the representation and solution of problems involving complex relationships
- Study Greedyalgorithms, understanding their logic and applications in solving optimization problems
- Investigate and apply the backtracking technique for systematic problem solving, analyzing its effectiveness in various scenarios

Module 6. Intelligent Systems

- Explore agent theory, understanding the fundamental concepts of its operation and its application in Artificial Intelligence and software engineering
- Study the representation of knowledge, including the analysis of ontologies and their application in the organization of structured information
- Analyze the concept of the semantic web and its impact on the organization and retrieval of information in digital environments
- Evaluate and compare different knowledge representations, integrating these to improve the efficiency and accuracy of intelligent systems

Module 7: Machine Learning and Data Mining

- Introduce the processes of knowledge discovery and the fundamental concepts of machine learning
- Study decision trees as supervised learning models, understanding their structure and applications
- Evaluate classifiers using specific techniques to measure their performance and accuracy in data classification
- Study neural networks, understanding their operation and architecture to solve complex machine learning problems
- Explore Bayesian methods and their application in machine learning, including Bayesian networks and Bayesian classifiers
- Analyze regression and continuous response models for predicting numerical values from data
- Study *clustering* techniques to identify patterns and structures in unlabeled data sets
- Explore text mining and natural language processing (NLP), understanding how machine learning techniques are applied to analyze and understand text

Module 8. Neural Networks, the Basis of Deep Learning

- Master the fundamentals of *Deep Learning*, understanding its essential role
- Explore the fundamental operations in neural networks and understand their application in model building
- Analyze the different layers used in neural networks and learn how to select them appropriately
- Understanding the effective linking of layers and operations to design complex and efficient neural network architectures
- Use trainers and optimizers to tune and improve the performance of neural networks
- Explore the connection between biological and artificial neurons for a deeper understanding of model design

Module 9. Deep Neural Networks Training

- Solve gradient-related problems in deep neural network training
- Explore and apply different optimizers to improve the efficiency and convergence of models
- Program the learning rate to dynamically adjust the convergence speed of the model
- Understand and address overfitting through specific strategies during training
- Apply practical guidelines to ensure efficient and effective training of deep neural networks
- Implement Transfer Learning as an advanced technique to improve model performance on specific tasks
- Explore and apply Data Augmentation techniques to enrich datasets and improve model generalization
- Develop practical applications using Transfer Learning to solve real-world problems

Module 10. Model Customization and Training with TensorFlow

- Master the fundamentals of TensorFlow and its integration with NumPy for efficient data management and calculations
- Customize models and training algorithms using the advanced capabilities of TensorFlow
- Explore the tfdata API to efficiently manage and manipulate datasets
- Implement the TFRecord format for storing and accessing large datasets in TensorFlow
- Use Keras preprocessing layers to facilitate the construction of custom models
- Explore the TensorFlow Datasets project to access predefined datasets and improve development efficiency
- Develop a Deep Learning application with TensorFlow, integrating the knowledge acquired in the module
- Apply in a practical way all the concepts learned in building and training custom models with TensorFlow in real-world situations

Module 11. Deep Computer Vision with Convolutional Neural Networks

- Understand the architecture of the visual cortex and its relevance in Deep Computer Vision
- Explore and apply convolutional layers to extract key features from images
- Implement clustering layers and their use in Deep Computer Vision models with Keras
- Analyze various Convolutional Neural Network (CNN) architectures and their applicability in different contexts
- Develop and implement a CNN ResNet using the Keras library to improve model efficiency and performance
- Use pre-trained Keras models to leverage transfer learning for specific tasks
- Apply classification and localization techniques in Deep Computer Vision environments
- Explore object detection and object tracking strategies using Convolutional Neural Networks

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

- Developing skills in text generation using Recurrent Neural Networks (RNN)
- Apply RNNs in opinion classification for sentiment analysis in texts
- Understand and apply attentional mechanisms in natural language processing models
- Analyze and use Transformers models in specific NLP tasks
- Explore the application of Transformers models in the context of image processing and computer vision
- Become familiar with the Hugging Face Transformers library for efficient implementation of advanced models
- Compare different Transformers libraries to evaluate their suitability for specific tasks
- Develop a practical application of NLP that integrates RNN and attention mechanisms to solve real-world problems

Module 13. Autoencoders, GANs, and Diffusion Models

- Develop efficient representations of data using Autoencoders, GANs and Diffusion Models
- Perform PCA using an incomplete linear autoencoder to optimize data representation
- Implement and understand the operation of stacked autoencoders

- Explore and apply convolutional autoencoders for efficient visual data representations
- Analyze and apply the effectiveness of sparse automatic encoders in data representation
- Generate fashion images from the MNIST dataset using Autoencoders
- Understand the concept of Generative Adversarial Networks (GANs) and Diffusion Models
- Implement and compare the performance of Diffusion Models and GANs in data generation

Module 14. Bio-Inspired Computing

- Introduce the fundamental concepts of bio-inspired computing
- Analyze space exploration-exploitation strategies in genetic algorithms
- Examine models of evolutionary computation in the context of optimization
- Continue detailed analysis of evolutionary computation models
- Apply evolutionary programming to specific learning problems
- Address the complexity of multi-objective problems in the framework of bio-inspired computing
- Explore the application of neural networks in the field of bio-inspired computing
- Delve into the implementation and usefulness of neural networks in bio-inspired computing

Module 15. Artificial Intelligence: Strategies and Applications

- Develop strategies for the implementation of artificial intelligence in financial services
- Identify and assess the risks associated with the use of Artificial Intelligence in the health care setting
- Assess the potential risks associated with the use of Artificial Intelligence in industry
- Apply Artificial Intelligence techniques in industry to improve productivity
- Design artificial intelligence solutions to optimize processes in public administration
- Evaluate the implementation of Artificial Intelligence technologies in the education sector
- Apply artificial intelligence techniques in forestry and agriculture to improve productivity
- Optimize Human Resources processes through the strategic use of Artificial Intelligence

Module 16: Artificial Intelligence Applications in Digital Marketing and E-Commerce

- Analyze how to implement content personalization and recommendations using Adobe Sensei in Digital Marketing and eCommerce strategies
- Automate strategic decision-making processes with Optimizely to optimize the performance of Digital Marketing campaigns
- Analyze sentiment and emotions in marketing content using Hub Spot to adapt strategies and improve effectiveness

- Identify content and distribution opportunities using Evergage to improve the effectiveness of Inbound Marketing strategies
- Automate workflows and lead tracking with Segment to improve operational efficiency and effectiveness of marketing strategies
- Personalize user experiences based on the buying cycle using Autopilot to improve customer retention and loyalty

Module 17. Campaign Optimization and AI Application

- Implement AI and personalized advertising with Emarsys to create highly personalized and targeted ads to specific audiences
- Apply advanced ad targeting and segmentation techniques with Eloqua to reach specific audiences at different stages of the customer lifecycle
- Optimize ad budgets using Artificial Intelligence to maximize ROI and campaign effectiveness
- Perform automated tracking and analysis of campaign results to make real-time adjustments and improve performance
- Implement automated and adaptive A/B testing to identify high-value audiences and optimize campaign creative content
- Automate technical SEO and keyword analysis tasks with Spyfu, using Artificial Intelligence to perform multi-channel attribution analysis

Module 18. Artificial Intelligence and User Experience in Digital Marketing

- Personalize user experience based on user behavior and preferences using Artificial Intelligence
- Optimize website navigation and usability using Artificial Intelligence, including predictive analytics of user behavior and process automation
- Implement personalized offers and product recommendations, automating tracking and retargeting, as well as customer service optimization
- Track and predict customer satisfaction using sentiment analysis with AI tools and tracking of key metrics
- Develop and train chatbots for customer service with Itercom, automating satisfaction surveys and questionnaires, as well as integrating real-time feedback
- Automating responses to frequent queries with Chatfuel, including competitive analysis and AI query/response generation

Module 19. Analyzing Digital Marketing Data with Artificial Intelligence

- Detect hidden patterns and trends in mMrketing data and perform brand sentiment analysis
- Predict campaign and conversion results, detect anomalies and optimize customer experience using predictive analytics
- Perform risk and opportunity analysis on marketing strategies, including predictive analytics on market trends and competitor assessment
- Use AI and social media analytics with Brandwatch to identify market niches, monitor emerging trends and perform sentiment analysis

Module 20. Artificial Intelligence to Automate e-Commerce Processes

- Integrate Artificial Intelligence in the conversion funnel to analyze sales data and performance at all stages of the buying process
- Implement chatbots and virtual assistants for 24/7 customer service, using Artificial Intelligence to generate automatic responses and collect feedback
- Detect and prevent fraud in e-Commerce transactions with Sift, using AI to detect anomalies and verify identities
- Perform Artificial Intelligence analysis to detect suspicious behavior and fraudulent patterns in real-time
- Promote ethics and accountability in the use of Artificial Intelligence in e-Commerce, ensuring transparency in the collection and use of data
- Explore future trends of Artificial Intelligence in Marketing and E-Commerce with REkko

03

Skills

This academic program will provide students with a comprehensive set of competencies, encompassing both the technical knowledge and strategic skills necessary to excel in the field of AI-driven Digital Marketing. They will develop skills in the selection and management of AI tools and platforms, as well as in the interpretation of complex data for informed decision making. In addition, the ability to design and implement effective and ethical Digital Marketing strategies that fully leverage the potential of AI to improve customer experience and achieve business goals will be fostered.

You will apply specific AI algorithms for content personalization, audience segmentation and predictive analysis of customer behavior"

General Skills

- Master data mining techniques, including complex data selection, preprocessing and transformation
- Design and develop intelligent systems capable of learning and adapting to changing environments
- Control machine learning tools and their application in data mining for decision making
- Employ Autoencoders, GANs and Diffusion Models to solve specific challenges in Artificial Intelligence
- Implement an encoder-decoder network for neural machine translation
- Apply the fundamental principles of neural networks in solving specific problems
- Use Artificial Intelligence techniques for the optimization of Digital Marketing campaigns, from audience segmentation to content personalization
- Apply advanced data analytics using Artificial Intelligence to better understand consumer behavior and optimize Digital Marketing strategies
- Develop skills in the use of machine learning and deep learning algorithms to analyze large volumes of data in the context of Digital Marketing
- Design Artificial Intelligence-based Digital Marketing strategies that enable companies to quickly adapt to market changes in digital environments

Specific Skills

- Delve into understanding and application of genetic algorithms
- Implement noise removal techniques using automatic encoders
- Effectively create training data sets for natural language processing (NLP) tasks
- Run grouping layers and their use in Deep Computer Vision models with Keras
- Use TensorFlow features and graphics to optimize the performance of custom models
- Optimize the development and application of chatbots and virtual assistants, understanding their operation and potential applications
- Build the first neural network, applying the concepts learned in practice
- Activate Multilayer Perceptron (MLP) using the Keras library
- Apply data scanning and preprocessing techniques, identifying and preparing data for effective use in machine learning models
- Implement effective strategies for handling missing values in datasets, applying imputation or elimination methods according to context
- Investigate languages and software for the creation of ontologies, using specific tools for the development of semantic models

- Develop data cleaning techniques to ensure the quality and accuracy of the information used in subsequent analyses
- Use Adobe Sensei to predict trends and buying behaviors in digital marketing and e-commerce environments
- Using Optimizely to adapt digital strategies to changes in the digital environment and improve marketing innovation
- Use Hub Spot to automatically generate SEO-optimized content and improve target audience engagement
- Use Segment to capture lead information, segment and qualify leads to optimize the conversion process
- Control Autopilot to deliver personalized content and automate user experience optimization
- Develop a product and service recommender using Artificial Intelligence to increase conversions and sales
- Leverage custom audience targeting, devices, platforms and customer lifecycle stages to optimize ad relevance

- Automate the creation and distribution of personalized ads with Cortex, generating dynamic creatives and optimizing creative design
- Use Adobe Target to apply AI and optimize marketing campaigns
- Implement AI in SEO and SEM with BrightEdge, for advanced keyword analysis, audience targeting and ad personalization
- Implement AI and personalization of the customer experience with Zendesk chat to deliver personalized product recommendations
- Apply AI and chatbots in customer service with Ada Support to detect dissatisfied customers, predict their satisfaction and personalize care
- Use Artificial Intelligence in Marketing data analysis with Google Analytics for advanced audience segmentation and predictive trend analysis
- Generate data-driven insights and recommendations with Data Robot, including predictive analytics and personalized recommendations
- Forecast sales and product demand with ThoughtSpot, optimizing ROI and analyzing compliance risk
- Analyze sentiment and emotions on social media with Clarabridge, identifying influencers, opinion leaders and monitoring brand reputation
- Use Shopify Flow to automate purchasing processes and inventory management, as well as to detect and prevent fraud
- Optimize pricing and recommend products in real time with Google Cloud AI Platform, analyzing competitive pricing and segmenting customers
- Make automated decisions with Artificial Intelligence with Watson Studio, ensuring transparency in the process and taking responsibility for the outcomes

You will master leading AI platforms in Marketing, such as Adobe Sensei, Optimizely, HubSpot and others, effectively integrating these tools into your digital strategies"

04

Course Management

The faculty is made up of experts in the field, who combine solid academic education and extensive professional experience in applying Artificial Intelligence in Digital Marketing. In fact, their in-depth knowledge and practical experience will allow graduates to learn about the latest trends, tools and techniques in this field. In addition, its pedagogical approach, focused on stimulating critical thinking, problem solving and collaboration, will foster a dynamic and stimulating learning environment, preparing students to face real-world challenges with confidence and skill.

The teachers of this Professional Master's Degree are recognized leaders in their respective fields, with outstanding careers in leading companies in the sector and important Digital Marketing agencies"

Management

Dr. Peralta Martín-Palomino, Arturo

- CEO and CTO at Prometeus 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
- Ph.D. in Psychology from the University of Castilla - La Mancha
- Ph.D. in Economics, Business and Finance from the Camilo José Cela University
- Ph.D. in Psychology from University of Castilla – La Mancha
- Professional Master's Degree in Executive MBA by the Isabel I University
- Professional Master's Degree in Sales and Marketing Management, Isabel I University
- Expert Master's Degree in Big Data by Hadoop Training
- Professional Master's Degree in Advanced Information Technologies from the University of Castilla - La Mancha
- Member of: SMILE Research Group

Ms. Martínez Cerrato, Yésica

- Education, Business and Marketing Specialist
- Responsible for Technical Training at Securitas Seguridad España
- Product Manager in Electronic Security at Securitas Seguridad España
- Business Intelligence Analyst at Ricopia Technologies
- Computer Technician and Head of OTEC Computer Classrooms at the University of Alcalá de Henares
- Collaborator in the ASALUMA Association
- Degree in Electronic Communications Engineering at the Polytechnic School, University of Alcalá de Henares, Madrid

Professors

Mr. Nájera Puente, Juan Felipe

- Data Analyst and Data Scientist
- Director of Studies and Research at the Council for Quality Assurance in Higher Education
- Production Programmer at Confiteca C.A
- Processes Consultant at Esefex Consulting
- Academic Planning Analyst at San Francisco de Quito University
- Professional Master's Degree in Big Data and Data Science from the International University of Valencia.Industrial Engineer from San Francisco de Quito University

Ms. Del Rey Sánchez, Cristina

- Talent Management Administrative Officer at Securitas Seguridad España, S.L
- Coordinator of Extracurricular Activities Centers
  Support classes and pedagogical interventions with Primary and Secondary Education students
- Postgraduate in Development, Delivery and Tutoring of e-Learning Training Actions
- Postgraduate in Early Childhood Care
- Degree in Pedagogy from the Complutense University of Madrid

05

Structure and Content

The syllabus of this Professional Master's Degree will provide participants with a comprehensive and practical understanding of the applications of Artificial Intelligence in the field of Digital Marketing. From content personalization and recommendations using leading tools, such as Adobe Sensei, to audience segmentation, predictive trend analysis and advertising campaign optimization, students will delve into fundamental topics to develop effective and adaptive strategies. In addition, with a results-oriented approach, participants will lead the digital transformation in Marketing, leveraging the potential of AI to drive business success.

Thanks to this 100% online Professional Master's Degree, you will delve into data analysis and audience segmentation, as well as content personalization and optimization of advertising campaigns"

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-based 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. Creation of 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 Evaluation of Results
2.7.1. Statistical Measures
2.7.2. Relationship Indices
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. 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. Merge Sort
- 5.3.6. Quick Sorting (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. Languages for Ontologies and Software for Ontology Creation
- 6.6.2. 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. 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. 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. 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. 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 Graphics 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 Graphics

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

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

10.7. The TFRecord Format
- 10.7.1. Using the TFRecord API for Data Serialization
- 10.7.2. TFRecord Files Upload with TensorFlow
- 10.7.3. Using TFRecord Files for Model Training

10.8. Keras Preprocessing Layers
- 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 Datasetsfor Data Loading
- 10.9.2. Data Preprocessing with TensorFlow Datasets
- 10.9.3. Using TTensorFlow 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. Use of 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. 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
- 11.10.1. Edge Detection
- 11.10.1. Rule-based Segmentation Methods

Module 12. Natural Language Processing (NLP) with Natural Recurrent Networks (NNN) 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. Transformers 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 TransformersBookstore
- 12.8.1. Using the Hugging Face's TransformersLibrary
- 12.8.2. Hugging Face´s Transformers Library App
- 12.8.3. Advantages of Hugging Face´s Transformers Library

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. Application of Filters
- 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 Applications
- 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 in Financial Services. Opportunities and Challenges
- 15.1.2. Case Uses
- 15.1.3. Potential Risks Related to the Use of Artificial Intelligence
- 15.1.4. Potential Future Developments / Uses of Artificial Intelligence

15.2. Implications of Artificial Intelligence in the Healthcare Service
- 15.2.1. Implications of Artificial Intelligence in the Healthcare Sector. Opportunities and Challenges
- 15.2.2. Case Uses

15.3. Risks Related to the Use of Artificial Intelligence in Health Services
- 15.3.1. Potential Risks Related to the Use of Artificial Intelligence
- 15.3.2. Potential Future Developments / Uses of Artificial Intelligence

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

15.5. Industry
- 15.5.1. Implications of Artificial Intelligence in Industry. Opportunities and Challenges
- 15.5.2. Case Uses

15.6. Potential Risks Related to the Use of Artificial Intelligence in the Industry
- 15.6.1. Case Uses
- 15.6.2. Potential Risks Related to the Use of Artificial Intelligence
- 15.6.3. Potential Future Developments / Uses of Artificial Intelligence

15.7. Public Administration
- 15.7.1. Implications of Artificial Intelligence in Public Administration. Opportunities and Challenges
- 15.7.2. Case Uses
- 15.7.3. Potential Risks Related to the Use of Artificial Intelligence
- 15.7.4. Potential Future Developments / Uses of Artificial Intelligence

15.8. Educational
- 15.8.1. Implications of Artificial Intelligence in Education. Opportunities and Challenges
- 15.8.2. Case Uses
- 15.8.3. Potential Risks Related to the Use of Artificial Intelligence
- 15.8.4. Potential Future Developments / Uses of Artificial Intelligence

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

15.10. Human Resources
- 15.10.1. Implications of Artificial Intelligence in Human Resources. Opportunities and Challenges
- 15.10.2. Case Uses
- 15.10.3. Potential Risks Related to the Use of Artificial Intelligence
- 15.10.4. Potential Future Developments / Uses of Artificial Intelligence

Module 16. Artificial Intelligence Applications in Digital Marketing and E-Commerce

16.1. Artificial Intelligence in Digital Marketing and E-Commerce
- 16.1.1. Content Personalization and Recommendations with Adobe Sensei
- 16.1.2. Audience Segmentation and Market Analysis
- 16.1.3. Predicting Trends and Buying Behavior

16.2. Digital Strategy with Optimizely
- 16.2.1. Incorporation of AI in Strategic Planning
- 16.2.2. Process Automation
- 16.2.3. Strategic Decisions

16.3. Continuous Adaptation to Changes in the Digital Environment
- 16.3.1. Strategy for the Management of Change
- 16.3.2. Adaptation of Marketing Strategies
- 16.3.3. Innovation

16.4. Content Marketing and Artificial Intelligence with Hub Spot
- 16.4.1. Content Personalization
- 16.4.2. Title and Description Optimization
- 16.4.3. Advanced Audience Segmentation
- 16.4.4. Sentiment Analysis
- 16.4.5. Content Marketing Automation

16.5. Automatic Content Generation
- 16.5.1. Content Optimization for SEO
- 16.5.2. Engagement
- 16.5.3. Analysis of Feelings and Emotions in the Content

16.6. AI in Inbound Marketing Strategies with Evergage
- 16.6.1. Growth Strategies based on Artificial Intelligence
- 16.6.2. Identifying Content and Distribution Opportunities
- 16.6.3. Use of Artificial Intelligence in the Identification of Business Opportunities

16.7. Automation of Workflows and Lead Tracking with Segment
- 16.7.1. Data Collection
- 16.7.2. Lead Segmentation and Lead Scoring
- 16.7.3. Multichannel Follow-up
- 16.7.4. Analysis and Optimization

16.8. Personalizing User Experiences Based on the Buying Cycle with Autopilot
- 16.8.1. Personalized Content
- 16.8.2. User Experience Automation and Optimization
- 16.8.3. Retargeting

16.9. Artificial Intelligence and Digital Entrepreneurship
- 16.9.1. Growth Strategies based on Artificial Intelligence
- 16.9.2. Advanced Data Analysis
- 16.9.3. Price Optimization
- 16.9.4. Sector-specific Applications

16.10. Artificial Intelligence Applications for Startups and Emerging Companies
- 16.10.1. Challenges and Opportunities
- 16.10.2. Sector-specific Applications
- 16.10.3. Integration of Artificial Intelligence into Existing Products

Module 17. Campaign Optimization and AI Application

17.1. Artificial Intelligence and Personalized Advertising with Emarsys
- 17.1.1. Accurate Audience Targeting Using Algorithms
- 17.1.2. Product and Service Recommender
- 17.1.3. Conversion Funnel Optimization

17.2. Advanced Ad Targeting and Segmentation with Eloqua
- 17.2.1. Segmentation by Custom Audience Segments
- 17.2.2. Targeting by Devices and Platforms
- 17.2.3. Segmentation by Customer Lifecycle Stages

17.3. Optimization of Advertising Budgets by means of Artificial Intelligence
- 17.3.1. Continuous Optimization based on Data
- 17.3.2. Use of Real-time Ad Performance Data
- 17.3.3. Segmentation and Targeting

17.4. Automated Creation and Distribution of Personalized Advertisements with Cortex
- 17.4.1. Generation of Dynamic creativities
- 17.4.2. Content Personalization
- 17.4.3. Optimization of Creative Design

17.5. Artificial Intelligence and Optimization of Marketing Campaigns with Adobe TArget
- 17.5.1. Multiplatform Distribution
- 17.5.2. Frequency Optimization
- 17.5.3. Automated Tracking and Analysis

17.6. Predictive Analytics for Campaign Optimization
- 17.6.1. Prediction of Market Trends
- 17.6.2. Estimating Campaign Performance
- 17.6.3. Budget Optimization

17.7. Automated and Adaptive A/B Testing
- 17.7.1. Automated A/B Testing
- 17.7.2. Identification of High Value Audiences
- 17.7.3. Optimization of Creative Content

17.8. Real-time Data-driven Optimization with Evergage
- 17.8.1. Real-time Tuning
- 17.8.2. Customer Life Cycle Forecasting
- 17.8.3. Detection of Behavioral Patterns

17.9. Artificial Intelligence in SEO and SEM with BrightEdge
- 17.9.1. Keyword Analysis using Artificial Intelligence
- 17.9.2. Advanced Audience Targeting with Artificial Intelligence Tools
- 17.9.3. Ad Personalization using Artificial Intelligence

17.10. Automating Technical SEO Tasks and Keyword Analysis with Spyfu
- 17.10.1. Multichannel Attribution Analysis
- 17.10.2. Campaign Automation using Artificial Intelligence
- 17.10.3. Automatic Optimization of the Web Site Structure thanks to Artificial Intelligence

Module 18. Artificial Intelligence and User Experience in Digital Marketing

18.1. Personalization of the User Experience based on Behavior and Referrals
- 18.1.1. Personalization of Content thanks to Artificial Intelligence
- 18.1.2. Virtual Assistants and Chatbots with Cognigy
- 18.1.3. Intelligent Recommendations

18.2. Optimization of Web Site Navigation and Usability using Artificial Intelligence
- 18.2.1. Optimization of the User Interface
- 18.2.2. Predictive Analysis of User Behavior
- 18.2.3. Automation of Repetitive Processes

18.3. Virtual Assistance and Automated Customer Support with Dialogflow
- 18.3.1. Artificial Intelligence Sentiment and Emotion Analysis
- 18.3.2. Problem Detection and Prevention
- 18.3.3. Automation of Customer Support with Artificial Intelligence

18.4. Artificial Intelligence and Personalization of the Customer Experience with Zendesk Chat
- 18.4.1. Personalized Product Recommender
- 18.4.2. Personalized Content and Artificial Intelligence
- 18.4.3. Personalized communication

18.5. Real-time Customer Profiling
- 18.5.1. Personalized Offers and Promotions
- 18.5.2. User Experience Optimization
- 18.5.3. Advanced Audience Segmentation

18.6. Personalized Offers and Product Recommendations
- 18.6.1. Tracking and Retargeting Automation
- 18.6.2. Personalized Feedback and Surveys
- 18.6.3. Customer Service Optimization

18.7. Customer Satisfaction Tracking and Forecasting
- 18.7.1. Sentiment Analysis with Artificial Intelligence Tools
- 18.7.2. Tracking of Key Customer Satisfaction Metrics
- 18.7.3. Feedback Analysis with Artificial Intelligence Tools

18.8. Artificial Intelligence and Chatbots in Customer Service with Ada Support
- 18.8.1. Detection of Dissatisfied Customers
- 18.8.2. Predicting Customer Satisfaction
- 18.8.3. Personalization of Customer Service with Artificial Intelligence

18.9. Development and Training of Chatbots for Customer Service with Itercom
- 18.9.1. Automation of Surveys and Satisfaction Questionnaires
- 18.9.2. Analysis of Customer Interaction with the Product/Service
- 18.9.3. Real-time *Feedback* Integration with Artificial Intelligence

18.10. Automation of Responses to Frequent Inquiries with Chatfuel
- 18.10.1. Competitive Analysis
- 18.10.2. Feedbacks and Responses
- 18.10.3. Generation of Queries/Responses with Artificial Intelligence Tools

Module 19. Analyzing Digital Marketing Data with Artificial Intelligence

19.1. Artificial Intelligence in Data Analysis for Marketing with Google Analytics
- 19.1.1. Advanced Audience Segmentation
- 19.1.2. Predictive Trend Analysis using Artificial Intelligence
- 19.1.3. Price Optimization using Artificial Intelligence Tools

19.2. Automated Processing and Analysis of Large Data Volumes with RapidMiner
- 19.2.1. Brand Sentiment Analysis
- 19.2.2. Marketing Campaign Optimization
- 19.2.3. Personalization of Content and Messages with Artificial Intelligence Tools

19.3. Detection of Hidden Patterns and Trends in Marketing Data
- 19.3.1. Detection of Behavioral Patterns
- 19.3.2. Trend Detection using Artificial Intelligence
- 19.3.3. Marketing Attribution Analysis

19.4. Data-driven Insights and Recommendations Generation with Data Robot
- 19.4.1. Predictive Analytics Thanks to Artificial Intelligence
- 19.4.2. Advanced Audience Segmentation
- 19.4.3. Personalized Recommendations

19.5. Artificial Intelligence in Predictive Analytics for Marketing with Sisense
- 19.5.1. Price and Offer Optimization
- 19.5.2. Artificial Intelligence Sentiment and Opinion Analysis
- 19.5.3. Automation of Reports and Analysis

19.6. Prediction of Campaign Results and Conversions
- 19.6.1. Anomaly Detection
- 19.6.2. Customer Experience Optimization
- 19.6.3. Impact Analysis and Attribution

19.7. Risk and Opportunity Analysis in Marketing Strategies
- 19.7.1. Predictive Analysis in Market Trends
- 19.7.2. Evaluation of Competence
- 19.7.3. Reputational Risk Analysis

19.8. Sales and Product Demand Forecasting with ThoughtSpot
- 19.8.1. Return on Investment (ROI) Optimization
- 19.8.2. Compliance Risk Analysis
- 19.8.3. Innovation Opportunities

19.9. Artificial Intelligence and Social Media Analytics with Brandwatch
- 19.9.1. Market Niches and their Analysis with Artificial Intelligence
- 19.9.2. Monitoring Emerging Trends

19.10. Sentiment and Emotion Analysis on Social Media with Clarabridge
- 19.10.1. Identification of Influencers and Opinion Leaders
- 19.10.2. Brand Reputation Monitoring and Crisis Detection

Module 20. Artificial Intelligence to Automate *e-Commerce* Processes

20.1. E-Commerce Automation with Algolia
- 20.1.1. Customer Service Automation
- 20.1.2. Price Optimization
- 20.1.3. Personalization of Product Recommendations

20.2. Automation of Purchasing and Inventory Management Processes with Shopify Flow
- 20.2.1. Inventory and Logistics Management
- 20.2.2. Fraud Detection and Fraud Prevention
- 20.2.3. Sentiment Analysis

20.3. Integration of Artificial Intelligence in the Conversion Funnel
- 20.3.1. Sales and Performance Data Analysis
- 20.3.2. Data Analysis at the Awareness Stage
- 20.3.3. Data Analysis at the Conversion Stage

20.4. Chatbots and Virtual Assistants for Customer Service
- 20.4.1. Artificial Intelligence and 24/7 Assistance
- 20.4.2. Feedbacks and Responses
- 20.4.3. Generation of Queries/Responses with Artificial Intelligence Tools

20.5. Real-time Price Optimization and Product Recommender thanks to Artificial Intelligence with the Google Cloud AI Platform
- 20.5.1. Competitive Price Analysis and Segmentation
- 20.5.2. Dynamic Price Optimization
- 20.5.3. Price Sensitivity Forecasting

20.6. Fraud Detection and Prevention in e-Commerce Transactions with Sift
- 20.6.1. Anomaly Detection with the Help of Artificial Intelligence
- 20.6.2. Identity Verification
- 20.6.3. Real-time Monitoring with Artificial Intelligence
- 20.6.4. Implementation of Automated Rules and Policies

20.7. Artificial Intelligence Analysis to Detect Suspicious Behavior
- 20.7.1. Analysis of Suspicious Patterns
- 20.7.2. Behavioral Modeling with Artificial Intelligence Tools
- 20.7.3. Real-time Fraud Detection

20.8. Ethics and Responsibility in the Use of Artificial Intelligence in E-Commerce
- 20.8.1. Transparency in the Collection and Use of Data Using Artificial Intelligence Tools with Watson
- 20.8.2. Data Security
- 20.8.3. Responsibility for Design and Development with Artificial Intelligence

20.9. Automated Decision Making with Artificial Intelligence with Watson Studio
- 20.9.1. Transparency in the Decision-Making Process
- 20.9.2. Accountability for Results
- 20.9.3. Social Impact

20.10. Future Trends in Artificial Intelligence in the Field of Marketing and E-Commerce with REkko
- 20.10.1. Marketing and Advertising Automation
- 20.10.2. Predictive and Prescriptive Analytics
- 20.10.3. Visual e-Commerce and Search
- 20.10.4. Virtual Shopping Assistants

You will address crucial aspects, such as change management in a constantly evolving digital environment, ethics in the use of Artificial Intelligence and future trends in Digital Marketing"

06

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world"

You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.

The student will learn to solve complex situations in real business environments through collaborative activities and real cases.

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

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

The case method has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the course, students will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

Relearning Methodology

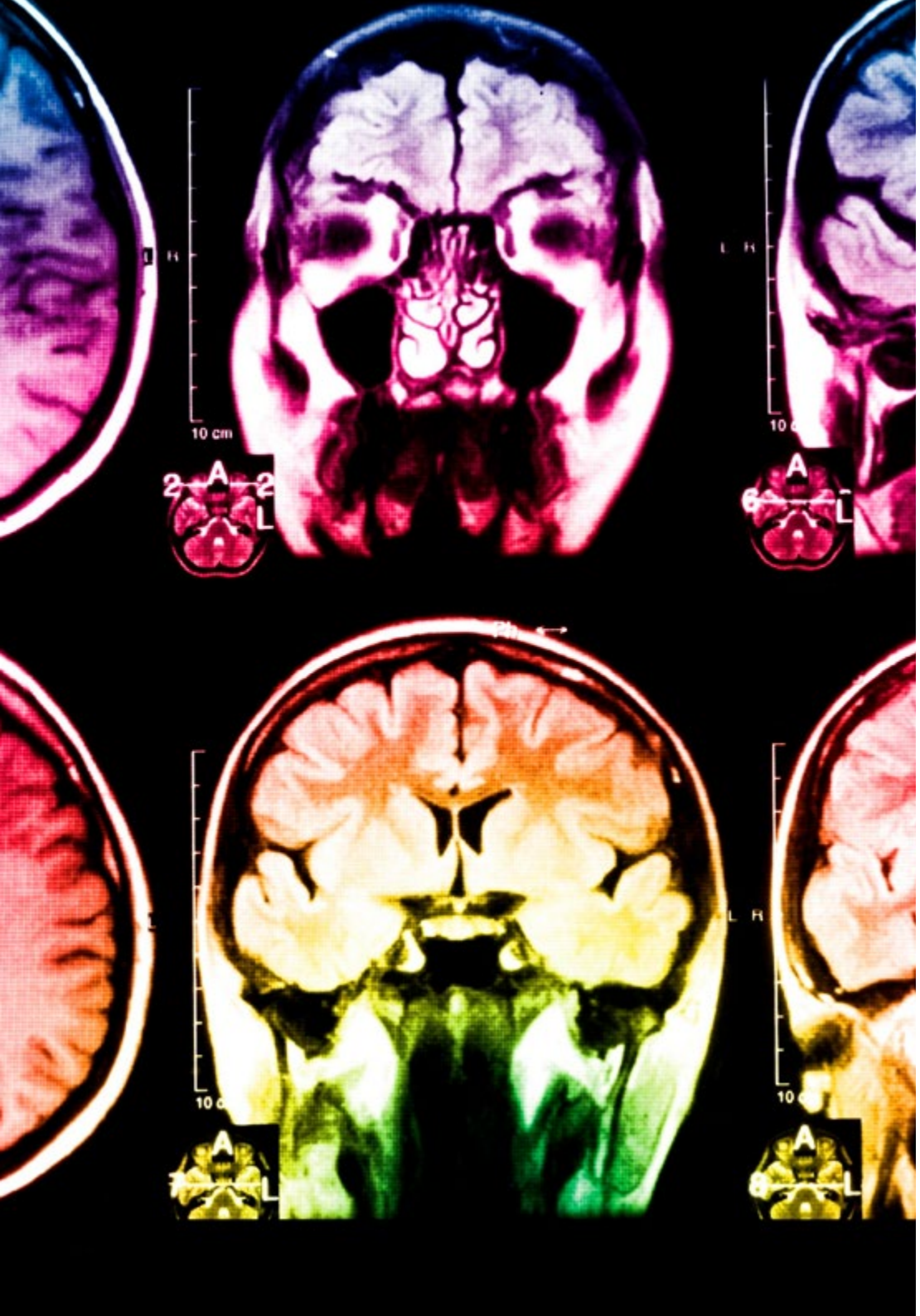
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

In 2019, we obtained the best learning results of all online universities in the world.

At TECH you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically. This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.

This program offers the best educational material, prepared with professionals in mind:

Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.

Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

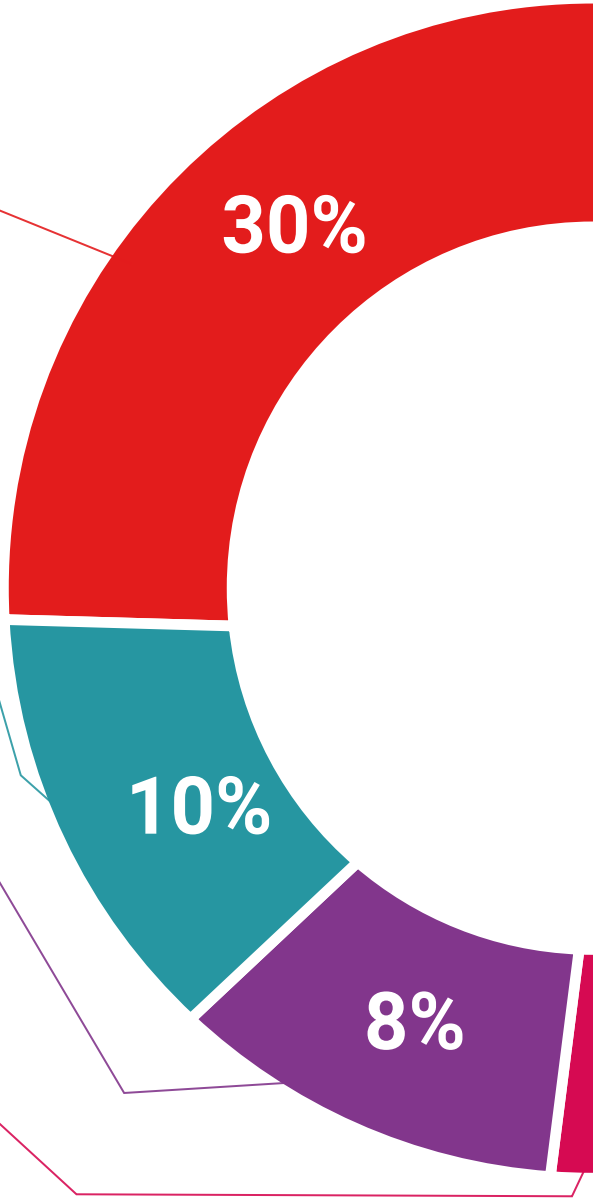
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

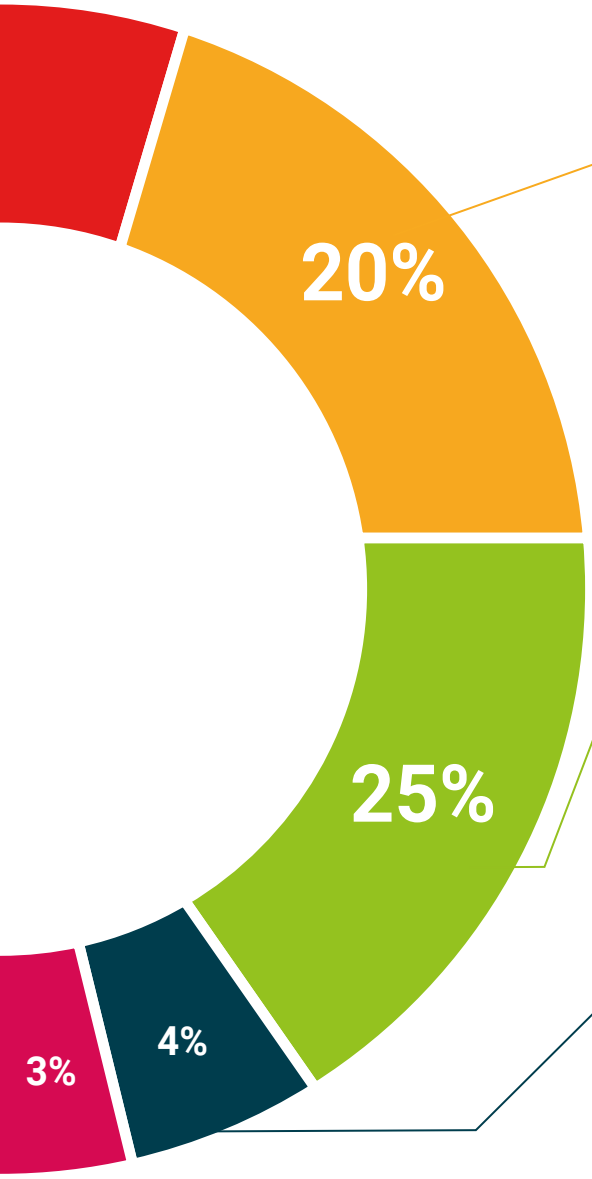
Practising Skills and Abilities

They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.

Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.

Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.

07

Certificate

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

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

This program will allow you to obtain your **Professional Master's Degree diploma in Artificial Intelligence in Digital Marketing** endorsed by **TECH Global University**, the world's largest online university.

TECH Global University is an official European University publicly recognized by the Government of Andorra (***official bulletin***). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

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

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

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 Digital Marketing

This is a program of 1,500 hours of duration equivalent to 60 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
Chancellor

Unique TECH Code: AFWORD23S techtitute.com/certificates

Professional Master's Degree in Artificial Intelligence in Digital Marketing

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
	Total 60

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Fundamentals of Artificial Intelligence	6	CO
1º	Data Types and Data Life Cycle	6	CO
1º	Data in Artificial Intelligence	6	CO
1º	Data Mining: Selection, Preprocessing and Transformation	6	CO
1º	Algorithm and Complexity in Artificial Intelligence	6	CO
1º	Intelligent Systems	6	CO
1º	Machine Learning and Data Mining	6	CO
1º	Neural Networks, the Basis of Deep Learning	6	CO
1º	Deep Neural Networks Training	6	CO
1º	Model Customization and Training with TensorFlow	6	CO
1º	Deep Computer Vision with Convolutional Neural Networks	6	CO
1º	Natural Language Processing (NLP) with Natural Recurrent	6	CO
1º	Networks (NNN) and Attention	6	CO
	Autoencoders, GANS, and Diffusion Models		
1º	Bio-Inspired Computing	6	CO
1º	Artificial Intelligence: Strategies and Applications	6	CO
1º	Artificial Intelligence Applications in Digital Marketing and E-Commerce	6	CO
1º	Campaign Optimization and AI Application	6	CO
1º	Artificial Intelligence and User Experience in Digital Marketing	6	CO
1º	Analyzing Digital Marketing Data with Artificial Intelligence	6	CO
1º	Artificial Intelligence to Automate e-Commerce Processes	6	CO

Dr. Pedro Navarro Illana
Chancellor

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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 Digital Marketing

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Professional Master's Degree

Artificial Intelligence in Digital Marketing

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