Hybrid Professional Master's Degree

Artificial Intelligence in Design

tech global university

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Artificial Intelligence in Design

Modality: **Hybrid (Online + Internship)**
Duration: **12 months**
Certificate: **TECH Global University**
Credits: **60 + 4 ECTS**
Website: **www.techtitute.com/us/artificial-intelligence/hybrid-professional-master-degree/hybrid-professional-master-degree-artificial-intelligence-design**

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01

Introduction

Artificial Intelligence is helping experts to improve both their design process and the quality of the products or services created. For example, algorithms are used to analyze large volumes of data to identify aesthetic trends. In this way, designers improve the usability, accessibility and efficiency of their pieces. However, to handle these tools effectively and enjoy all their advantages, professionals need to develop a series of skills. In this context, TECH presents a complete university program that will provide them with the necessary skills to master instruments such as Machine Learning Algorithmics.

You will incorporate in your daily practice the most innovative techniques of Artificial Intelligence to personalize the user experience and improve their level of satisfaction"

In a highly competitive business environment, companies are challenged to design highly innovative products or services that capture the interest of consumers. In this sense, Artificial Intelligence offers a variety of applications in the field of design, both in terms of efficiency and effectiveness of goods. Its tools can be used to analyze user behavior and preferences in order to customize designs based on the individual needs of each consumer. In this way, companies optimize customer satisfaction and design effectiveness.

Faced with this reality, TECH creates a pioneering Hybrid Professional Master's Degree in Artificial Intelligence in Design. Its main objective is to provide designers with the necessary skills to handle emerging technologies such as Machine Learning, Neural Networks or Deep Computer Vision, among others. To achieve this, the academic itinerary will delve into issues ranging from languages for the creation of ontologies to Data Mining or Deep Neural Network Training. In relation to this, the syllabus will include a disruptive module on future trends in Artificial Intelligence, urging students to carry out highly innovative solutions. It should be noted that students will have access to a library full of multimedia resources (including interactive summaries, case studies or explanatory videos) to enjoy a fully dynamic learning experience.

In addition, this university degree includes a practical internship in a well-known company. During 3 weeks, graduates will be able to apply everything they have learned to a real work scenario, where they will join a multidisciplinary team to offer the most innovative design solutions. In this way they will enjoy a much more direct learning to raise their professional career to the highest level.

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

- Development of more than 100 case studies presented by Artificial Intelligence in Design professionals
- Its graphic, schematic and practical contents provide essential information on those disciplines that are indispensable for professional practice
- A disruptive module on Artificial Intelligence trends
- Presentation of state-of-the-art tools for the development of semantic models
- All of this will be complemented by 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
- Furthermore, you will be able to carry out a internship in one of the best companies

You will master Bio-Inspired Computing to optimize designs through algorithms inspired by natural processes such as insect swarming behavior"

You will master Machine Learning techniques to analyze consumer behavior and preferences, personalizing user experiences"

Take an intensive 3-week stay in a prestigious center and acquire all the knowledge to grow professionally.

The emphasis on real case studies that you will be able to study will help you enormously in the contextualization of the whole program.

In this proposal of Hybrid Professional Master's Degree, of professionalizing character and blended learning modality, the program is aimed at updating design professionals who wish to experience a quality leap in their career through the implementation of Artificial Intelligence in their procedures. The contents are based on the latest scientific evidence, and oriented in a didactic way to integrate theoretical knowledge in nursing practice, and the theoretical-practical elements will facilitate the assimilation of knowledge.

Thanks to its multimedia content elaborated with the latest educational technology, they will allow the design professional a situated and contextual learning, that is to say, a simulated environment that will provide an immersive learning programmed to specialize 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 throughout the program. For this purpose, students will be assisted by an innovative interactive video system created by renowned and experienced experts.

02

Why Study this Hybrid Professional Master's Degree?

Artificial Intelligence is transforming the way experts design digital products and services. Thanks to its tools, companies improve their relationships with customers and achieve customer loyalty over a long period of time. Given its importance, TECH has created this revolutionary program. This is characterized by combining the latest trends in areas such as Bio-inspired Computing or Deep Neural Network Training with a practical stay in a prestigious entity. Therefore, graduates will obtain the skills required to excel in the field of design through the implementation of the most sophisticated technological tools.

The current importance of Artificial Intelligence in Design makes this Hybrid Professional Master's Degree a safe bet, with a market in constant growth and full of opportunities"

1. Updating from the latest technology available

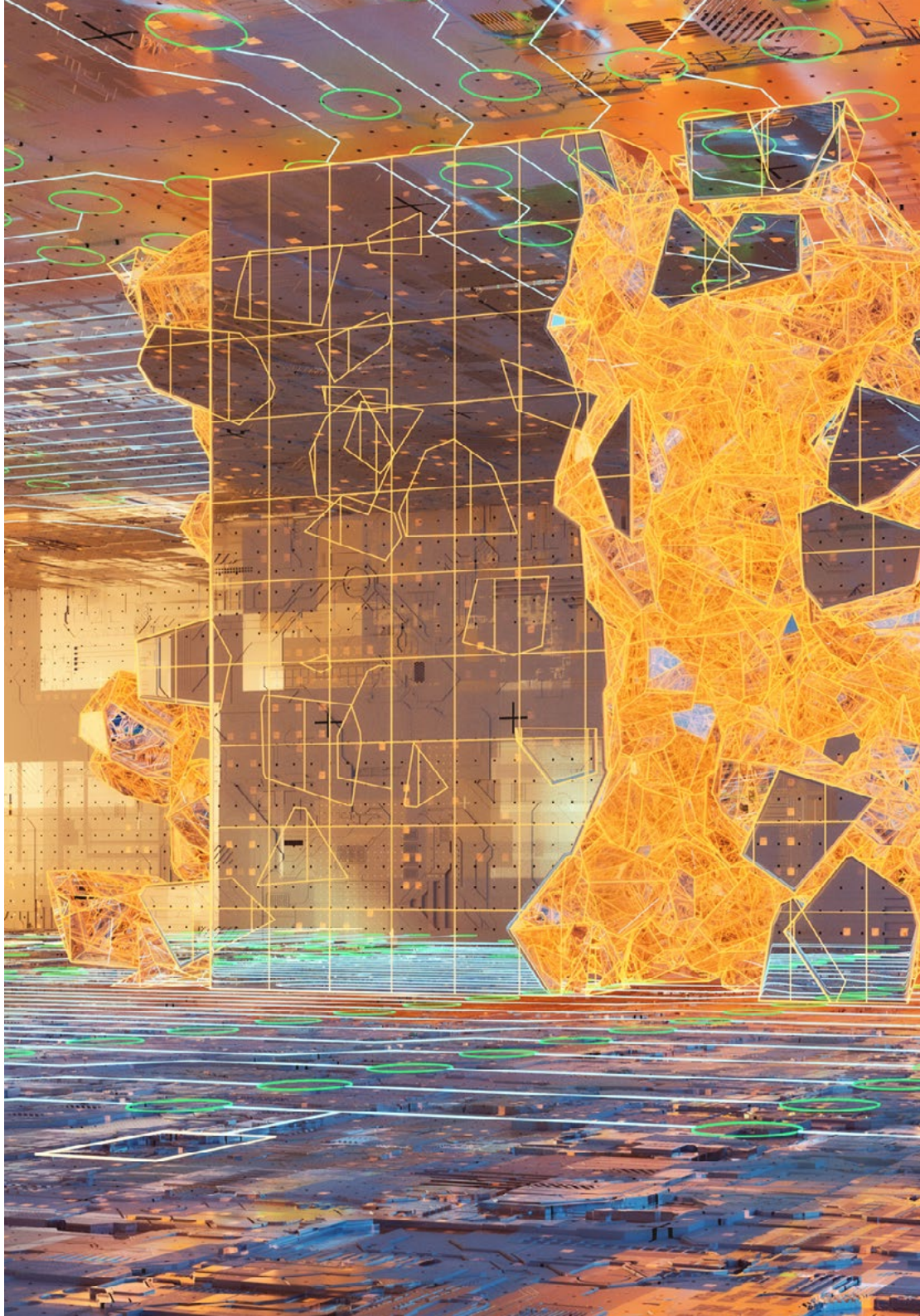
Artificial Intelligence technologies are having a significant impact on design. For example, these tools have the ability to automate repetitive and tedious tasks in the design process, allowing designers to focus on more creative and strategic aspects of their work. Through this Hybrid Professional Master's Degree, students will enter a reference company equipped with the latest technology in the field of Artificial Intelligence in Design.

2. Gaining in-depth knowledge from the experience of top specialists

Throughout their practical stay, graduates will be supported by a large team of professionals who will transmit the latest trends in emerging fields such as Deep Computer Vision or Intelligent Systems. In addition, they will be supported by a tutor, who will ensure that students develop their activities comfortably and enhance their skills for the proper management of Artificial Intelligence.

3. Entering first-class professional environments

TECH's priority is to provide academic itineraries characterized by their high level. For this reason, it makes a rigorous selection process to choose the institutions where students will develop their Internship Program. As a result, graduates will enjoy a rewarding learning experience in first-class institutions.



4. Combining the best theory with state-of-the-art practice

Aware of the importance of offering a comprehensive education, TECH goes far beyond the theoretical level, so common in other syllabuses. To this end, it combines this approach with practice, to ensure that graduates get closer to the reality of their work. In this sense, the academic itinerary includes a Internship Program in a prestigious company, so that students can develop their full potential and professional development.

5. Expanding the boundaries of knowledge

TECH offers graduates the opportunity to carry out this Internship Program not only in centers of national importance, but also internationally. In this way, the student will be able to expand its borders and catch up with the best professionals, who work in digital companies of reference.

You will have full practical immersion at the center of your choice"

03

Objectives

Through this university program, designers will gain a holistic view of the applications of Artificial Intelligence in the field of design. In this way, graduates will obtain advanced skills to effectively handle tools such as Natural Language Programming, Data Mining or Bio-inspired Computing. Thanks to this, they will develop highly creative proposals to innovate in the labor market.

You will have all the support of TECH, the largest online academic institution in the world with the latest educational technology at your disposal"

General Objective

- Thanks to this Hybrid Professional Master's Degree in Artificial Intelligence in Design, graduates will acquire the necessary competences to work with Artificial Intelligence techniques (such as Computer Vision, Neural Networks and Machine Learning Algorithms, among others). At the same time, designers will handle advanced platforms such as TensorFlow for the effective implementation of Artificial Intelligence models in design. In tune with this, specialists will incorporate emotional components in their projects to effectively connect with the audience and capture their interest

You will achieve your professional goals with this unique degree, through effective, progressive and immediately applicable to your practice"

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 the structuring and processing of data for AI systems

Module 2. Data Types and 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
- Study the structure and characteristics of datasets, understanding their importance in the preparation and use of data for Artificial Intelligence models
- Analyze supervised and unsupervised models, including methods and classification
- 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, Pre-Processing 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

- 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
- Study semantic reasoners, knowledge-based systems and expert systems, understanding their functionality and applications in intelligent decision making

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 in Deep Learning
- 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
- Understand 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
- Tune hyperparameters for Fine Tuning of neural networks, optimizing their performance on specific tasks

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

- 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
- Implement semantic segmentation techniques to understand and classify objects in images in a detailed manner

Module 12. Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) 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
- Explore social adaptation algorithms as a key approach in 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

Module 15. Artificial Intelligence: Strategies and Applications

- Develop strategies for the implementation of artificial intelligence in financial services
- Analyze the implications of artificial intelligence in the delivery of healthcare services
- Identify and assess the risks associated with the use of AI in the healthcare field
- Assess the potential risks associated with the use of AI 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 AI technologies in the education sector
- Apply artificial intelligence techniques in forestry and agriculture to improve productivity

Module 16. Practical Applications of Artificial Intelligence in Design

- Apply collaborative tools, leveraging AI to improve communication and efficiency in design teams
- Incorporate emotional aspects into designs through techniques that effectively connect with the audience, exploring how AI can influence the emotional perception of Design
- Master tools and frameworks specific to the application of AI in Design, such as GANs (Generative Adversarial Networks) and other relevant libraries
- Employ AI to generate images, illustrations and other visual elements automatically

Module 17. Design-User Interaction and AI

- Develop skills in Adaptive Design, considering user behavior and applying advanced AI tools.
- Critically analyze the challenges and opportunities when implementing personalized designs in industry using AI
- Use predictive AI algorithms to anticipate user interactions, enabling proactive and efficient design responses
- Develop AI-based recommender systems that suggest relevant content, products, or actions to users

Module 18. Innovation in Design and AI Processes

- Implement mass customization strategies in production using Artificial Intelligence, adapting products to individual needs
- Apply AI techniques to minimize waste in the design process, contributing to more sustainable practices
- Develop practical skills to apply AI techniques to improve industrial and design processes
- Encourage creativity and exploration during design processes, using AI as a tool to generate innovative solutions

Module 19. Applied Design Technologies and AI

- Improve comprehensive understanding and practical skills to leverage advanced technologies and Artificial Intelligence in various facets of Design
- Apply microchip architecture optimization techniques using AI to improve both performance and efficiency
- Properly utilize algorithms for automatic generation of multimedia content, enriching visual communication in editorial projects
- Implement the knowledge and skills acquired during this program to real projects involving technologies and AI in Design

Module 20. Ethics and Environment in Design and AI

- Understand the ethical principles related to Design and Artificial Intelligence, cultivating an ethical awareness in decision making
- Focus on the ethical integration of technologies, such as emotion recognition, ensuring immersive experiences that respect the user's privacy and dignity
- Promote social and environmental responsibility in video game design and in the industry in general, considering ethical aspects in representation and gameplay
- Generate sustainable practices in design processes, ranging from waste reduction to the integration of responsible technologies, contributing to the preservation of the environment

Enroll now and advance in your field of work with a comprehensive program that will allow you to put into practice everything you have learned"

04

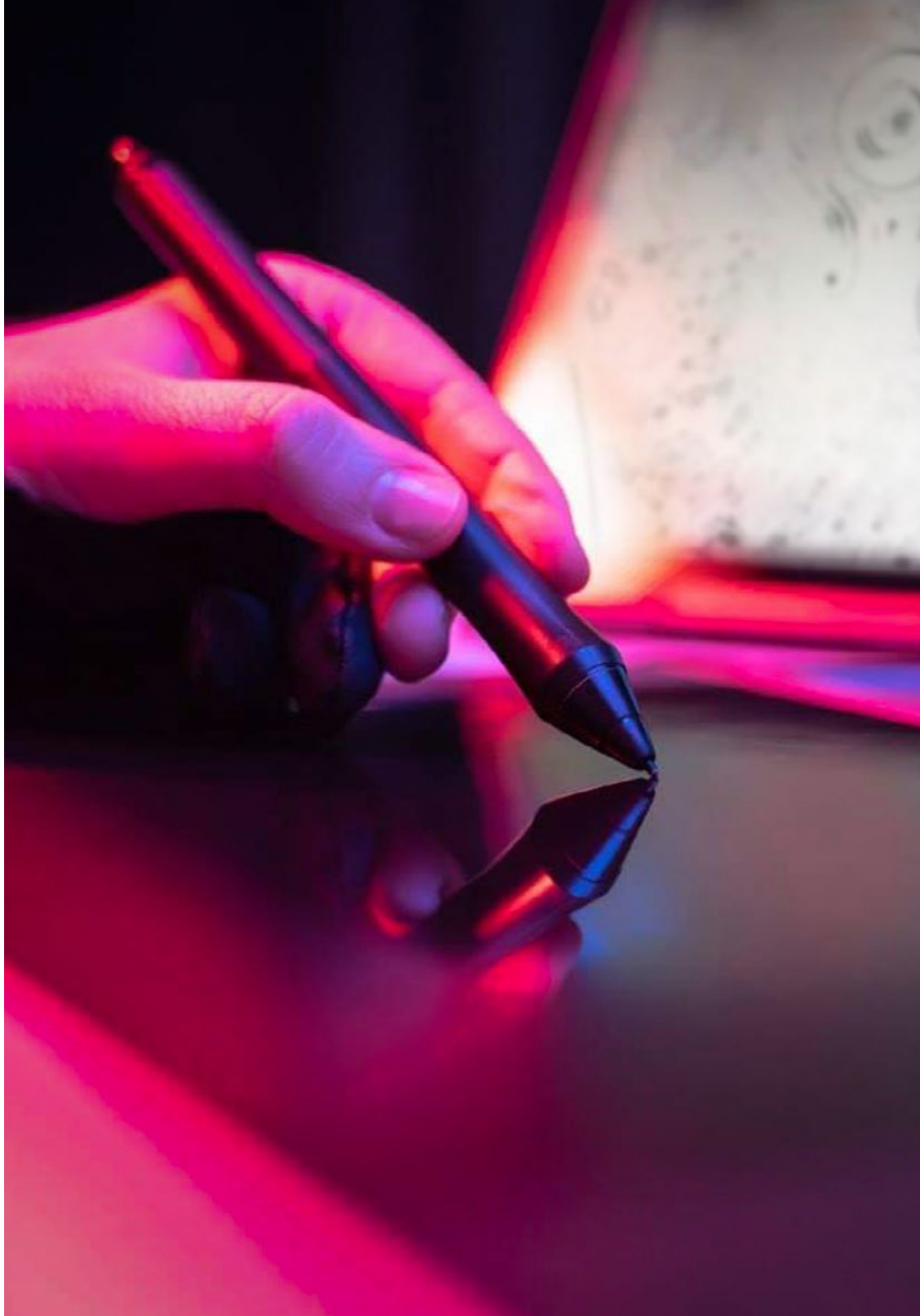
Skills

Through this university program, designers will be equipped with the most innovative Artificial Intelligence techniques to solve a variety of design problems, including the automatic generation of visual elements. In turn, graduates will handle tools such as Tensorflow with the aim of automatically generating designs and personalizing the user experience.

You will develop customized Artificial Intelligence models to solve design problems, such as image classification and user sentiment analysis"

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 AI tools, platforms and techniques, from data analysis to the application of neural networks and predictive modeling
- Conceive and execute projects that employ generative techniques, understanding their application in industrial and artistic environments
- Use predictive Artificial Intelligence algorithms to anticipate user interactions, enabling proactive and efficient design responses
- Apply Artificial Intelligence techniques to minimize waste in the design process, contributing to more sustainable practices



Specific Skills

- Apply AI techniques and strategies to improve efficiency in the retail sector
- 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
- Master reuse of pre-workout layers to optimize and accelerate the training process
- 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
- Implement Artificial Intelligence tools in specific design projects, including automatic content generation, optimization and pattern recognition
- Conceive and execute projects that employ generative techniques, understanding their application in industrial and artistic environments
- Use predictive Artificial Intelligence algorithms to anticipate user interactions, enabling proactive and efficient responses in Design
- Develop practical skills to apply AI techniques to improve industrial and design processes
- Apply optimization techniques of microchip architecture using Artificial Intelligence to improve performance and efficiency
- Use algorithms for automatic generation of multimedia content, enriching presentation and visual communication in editorial projects

You will have the best multimedia resources with which you will be able to enrich your learning and put what you have studied into practice in a much easier way"

05

Course Management

In line with its philosophy of providing the most complete and updated of the academic panorama, TECH brings together in this Hybrid Professional Master's Degree authentic experts in Artificial Intelligence in Design. These specialists have extensive professional experience, where they have developed innovative solutions for renowned companies. Thanks to this, they have developed a myriad of didactic contents for students to enjoy high quality learning. In addition, the teaching staff will be available throughout the course to provide personalized advice to students and help them to enhance their skills.

The teaching team has designed hours of additional content for you to expand each section of the syllabus in a personalized way"

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
- PhD. in Psychology from the University of Castilla La Mancha
- PhD in Economics, Business and Finance from the Camilo José Cela University
- PhD in Psychology from University of Castilla La Mancha
- Máster in Executive MBA por la Universidad Isabel I
- Master's Degree in Sales and Marketing Management, Isabel I University
- Expert Master's Degree in Big Data by Hadoop Training
- Master's Degree in Advanced Information Technologies from the University of Castilla La Mancha
- Member of: SMILE Research Group

Mr. Maldonado Pardo, Chema

- Specialist in Graphic Design
- Graphic Designer at DocPath Document Solutions S.L.
- Founding Partner and Head of the Design and Advertising Department at D.C.M. Difusión Integral de Ideas, C.B.
- Head of the Design and Digital Printing Department at Ofipaper, La Mancha S.L.
- Graphic Designer in Ático, Graphic Studio
- Graphic Designer and Craftsman Printer in Lozano Artes Gráficas
- Layout and Graphic Designer in Gráficas Lozano
- ETSI Telecommunications by the Polytechnic University of Madrid
- ETS Computer Systems ETSI by the University of Castilla-La Mancha

Professors

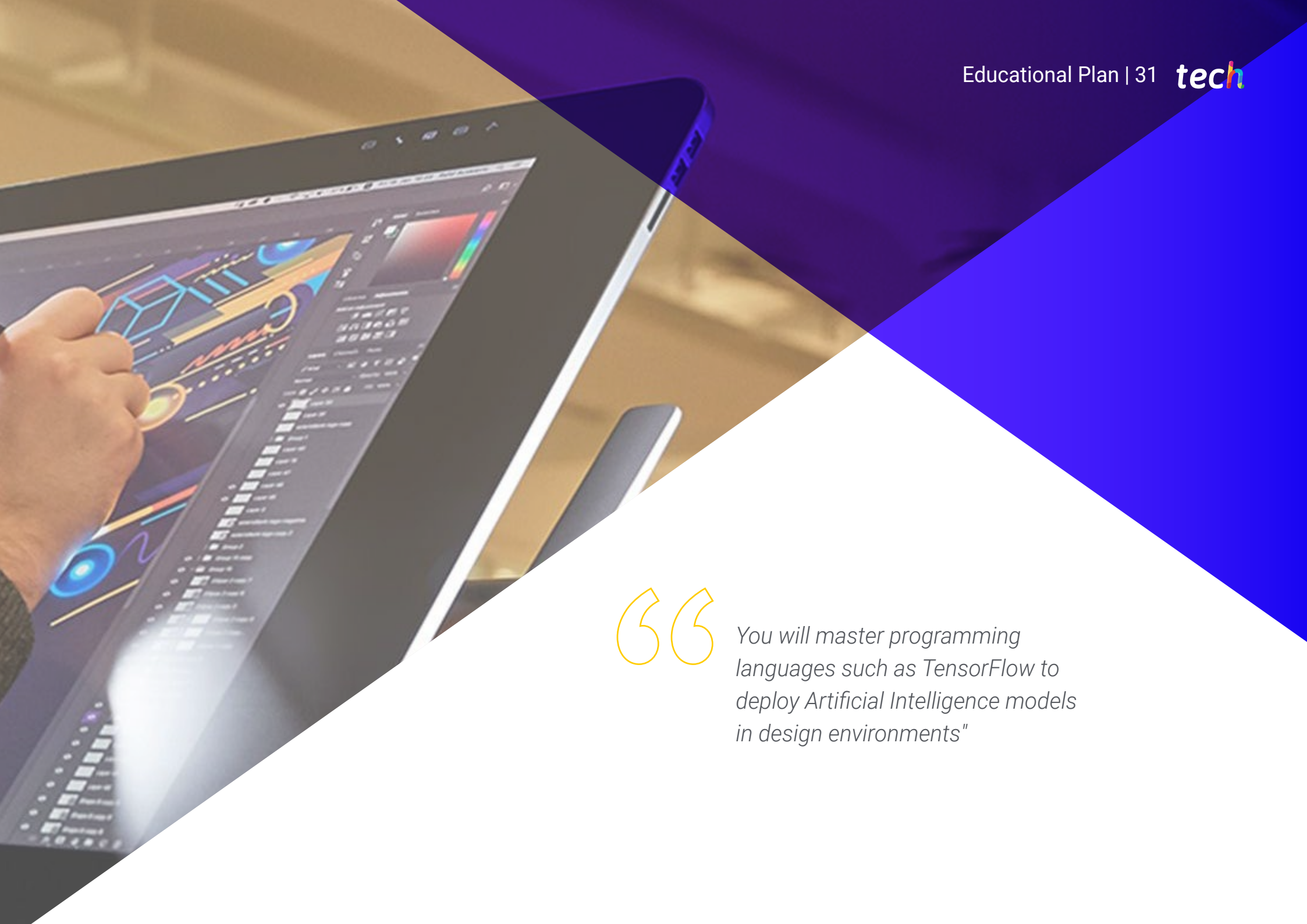
Ms. Parreño Rodríguez, Adelaida

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

06

Educational Plan

This syllabus is made up of 20 specialized modules, which will equip students with the skills required to handle Artificial Intelligence tools and use them in their design processes. To this end, the syllabus will delve into essential issues such as Data Mining, Machine Learning, Neural Networks or Model Personalization and Training with TensorFlow. In this way, graduates will implement these technological tools in their projects for tasks such as the personalization of the user experience.



You will master programming languages such as TensorFlow to deploy Artificial Intelligence models in design environments"

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 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 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/Safety

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 Mixing (Merge_Sort)
- 5.3.6. Quick_Sort

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

5.5. Algorithms Using Heaps
- 5.5.1. Heaps
- 5.5.2. The Heapsort Algorithm
- 5.5.3. Priority Queues

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

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

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

5.9. Greedy Algorithms on Graphs
- 5.9.1. The Minimum Covering Tree
- 5.9.2. Prim's Algorithm
- 5.9.3. Kruskal's Algorithm
- 5.9.4. Complexity Analysis

5.10. Backtracking
- 5.10.1. Backtracking
- 5.10.2. Alternative Techniques

Module 6. Intelligent Systems

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

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

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

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

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

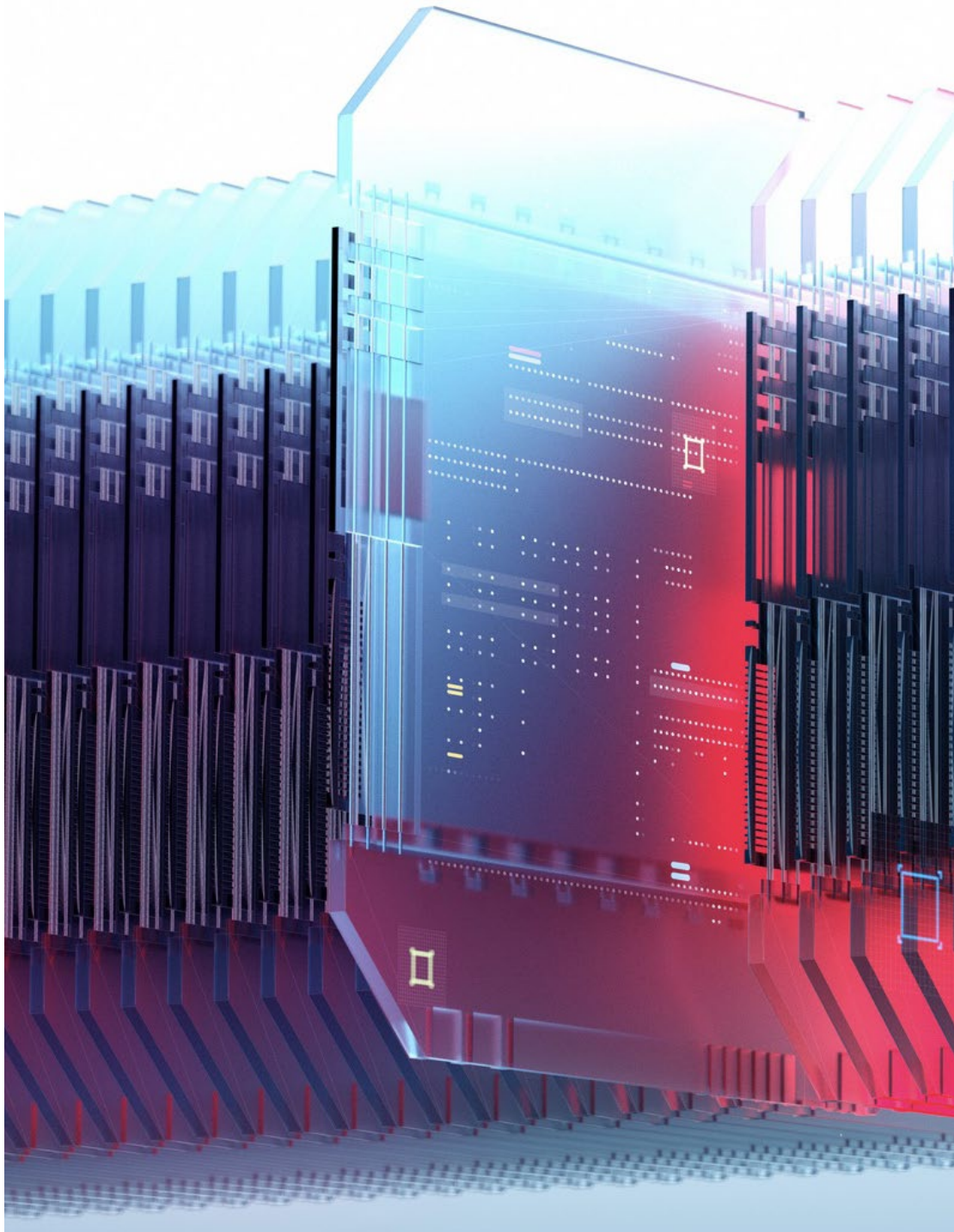
6.6. Ontology Languages and Ontology Creation Software
- 6.6.1. Triple RDF, Turtle and N
- 6.6.2. RDF Schema
- 6.6.3. OWL
- 6.6.4. SPARQL
- 6.6.5. Introduction to Ontology Creation Tools
- 6.6.6. Installing and Using Protégé

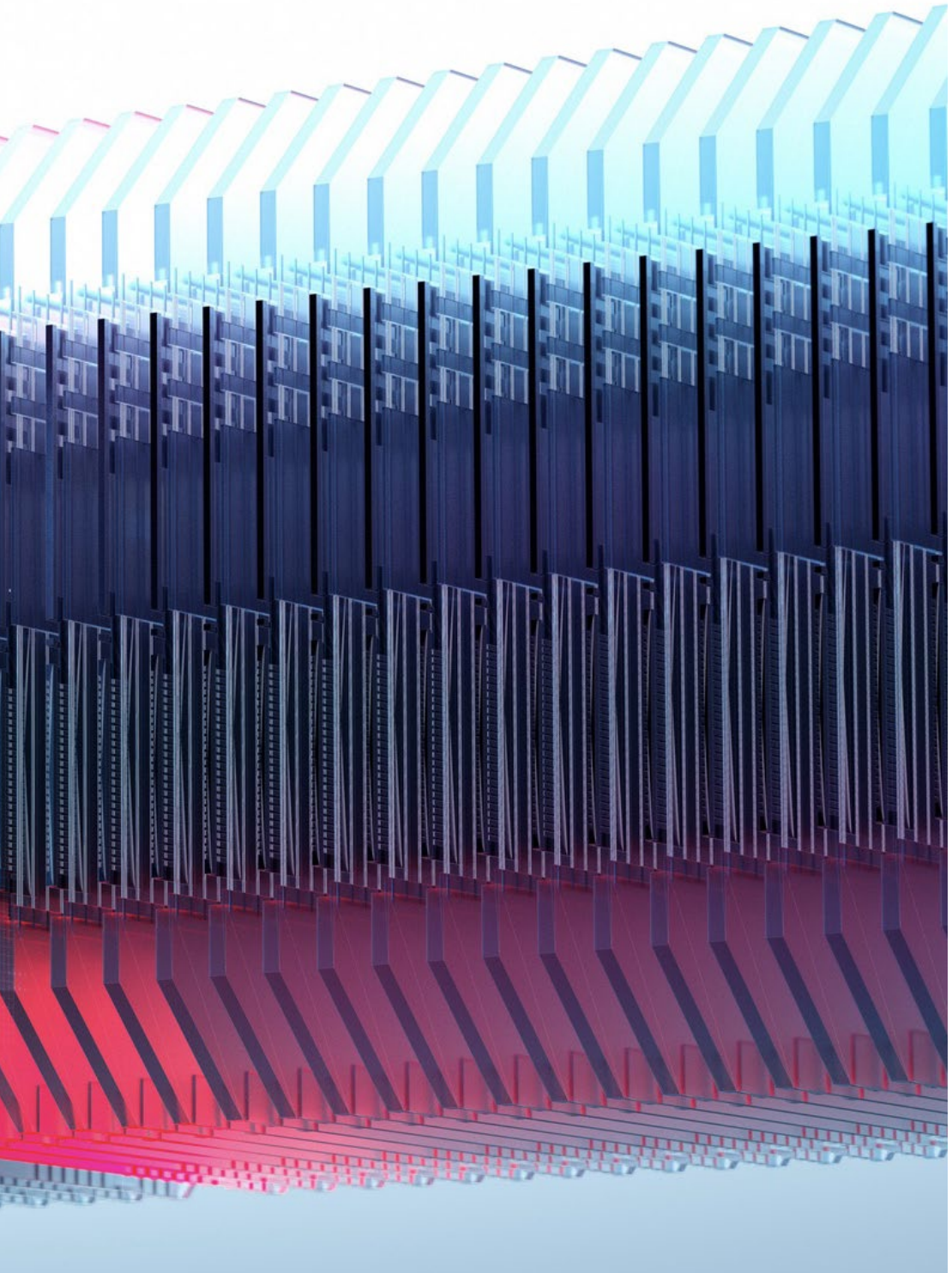
6.7. Semantic Web
- 6.7.1. Current and Future Status of the Semantic Web
- 6.7.2. Semantic Web Applications

6.8. Other Knowledge Representation Models
- 6.8.1. Vocabulary
- 6.8.2. Global Vision
- 6.8.3. Taxonomy
- 6.8.4. Thesauri
- 6.8.5. Folksonomy
- 6.8.6. Comparison
- 6.8.7. Mind Maps

6.9. Knowledge Representation Assessment and Integration
- 6.9.1. Zero-Order Logic
- 6.9.2. First-Order Logic
- 6.9.3. Descriptive Logic
- 6.9.4. Relationship between Different Types of Logic
- 6.9.5. Prolog: Programming Based on First-Order Logic

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





Module 7. Machine Learning and Data Mining

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

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

7.3. Decision Trees
- 7.3.1. ID Algorithm
- 7.3.2. Algorithm C
- 7.3.3. Overtraining and Pruning
- 7.3.4. Result Analysis

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 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. Optimization of Graphs with TensorFlow Operations

10.5. Loading and Preprocessing Data with TensorFlow
- 10.5.1. Loading of Datasets with TensorFlow
- 10.5.2. Preprocessing Data with TensorFlow
- 10.5.3. Using TensorFlow Tools for Data Manipulation

10.6. The tfdata API
- 10.6.1. Using the tfdata API for Data Processing
- 10.6.2. Construction of Data Streams with tfdata
- 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 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 Datasets for Data Loading
- 10.9.2. Preprocessing Data with TensorFlow Datasets
- 10.9.3. Using TensorFlow Datasets for Model Training

10.10. Building a Deep Learning App with TensorFlow
- 10.10.1. Practical 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. 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 Preprocessing
- 12.7.3. Training a Transformers Model for Vision

12.8. Hugging Face's Transformers Bookstore
- 12.8.1. Using the Hugging Face's Transformers Library
- 12.8.2. Application of the Hugging Face Transformers Library
- 12.8.3. Advantages of the Hugging Face 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 Uses
- 15.1.3. Potential Risks Related to the Use of AI
- 15.1.4. Potential Future Developments/Uses of AI

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

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

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

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

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

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

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

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

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

Module 16. Practical Applications of Artificial Intelligence in Design

16.1. Automatic Image Generation in Graphic Design with Wall-e, Adobe Firefly and Stable Diffusion
- 16.1.1. Fundamental Concepts of Image Generation
- 16.1.2. Tools and Frameworks for Automatic Graphic Generation
- 16.1.3. Social and Cultural Impact of Generative Design
- 16.1.4. Current Trends in the Field and Future Developments and Applications.

16.2. Dynamic Personalization of User Interfaces Using AI
- 16.2.1. UI/UX Personalization Principles
- 16.2.2. Recommendation Algorithms in UI Customization
- 16.2.3. User Experience and Continuous Feedback
- 16.2.4. Practical Implementation in Real Applications

16.3. Generative Design: Applications in Industry and Art
- 16.3.1. Fundamentals of Generative Design
- 16.3.2. Generative Design in Industry
- 16.3.3. Generative Design in Contemporary Art
- 16.3.4. Challenges and Future Advances in Generative Design

16.4. Automatic Creation of Editorial Layouts with Algorithms
- 16.4.1. Principles of Automatic Editorial Layout
- 16.4.2. Content Distribution Algorithms
- 16.4.3. Optimization of Spaces and Proportions in Editorial Design
- 16.4.4. Automation of the Review and Adjustment Process

16.5. Procedural Generation of Content in Videogames with PCG
- 16.5.1. Introduction to Procedural Generation in Videogames
- 16.5.2. Algorithms for the Automatic Creation of Levels and Environments
- 16.5.3. Procedural Narrative and Branching in Videogames
- 16.5.4. Impact of Procedural Generation on the Player's Experience

16.6. Pattern Recognition in Logos with Machine Learning Using Cogniac
- 16.6.1. Fundamentals of Pattern Recognition in Graphic Design
- 16.6.2. Implementation of Machine Learning Models for Logo Identification
- 16.6.3. Practical Applications in Graphic Design
- 16.6.4. Legal and Ethical Considerations in the Recognition of Logos

16.7. Optimization of Colors and Compositions with AI
- 16.7.1. Color Psychology and Visual Composition
- 16.7.2. Color Optimization Algorithms in Graphic Design with Adobe Color Wheel and Coolors
- 16.7.3. Automatic Composition of Visual Elements Using Framer, Canva, and RunwayML
- 16.7.4. Evaluating the Impact of Automatic Optimization on User Perception

16.8. Predictive Analysis of Visual Trends in Design
- 16.8.1. Data Collection and Current Trends
- 16.8.2. Machine Learning Models for Trend Prediction
- 16.8.3. Implementation of Proactive Design Strategies
- 16.8.4. Principles in the Use of Data and Predictions in Design

16.9. AI-assisted Collaboration in Design Teams
- 16.9.1. Human-AI Collaboration in Design Projects
- 16.9.2. Platforms and Tools for AI-assisted Collaboration (Adobe Creative Cloud and Sketch2React)
- 16.9.3. Best Practices in AI-assisted Technology Integration
- 16.9.4. Future Perspectives on Human-AI Collaboration in Design

16.10. Strategies for the Successful Incorporation of AI in Design
- 16.10.1. Identification of AI-solvable Design Needs
- 16.10.2. Evaluation of Available Platforms and Tools
- 16.10.3. Effective Integration in Design Projects
- 16.10.4. Continuous Optimization and Adaptability

Module 17. Design-User Interaction and AI

17.1. Contextual Suggestions for Behavior-Based Design
- 17.1.1. Understanding User Behavior in Design
- 17.1.2. AI-based Contextual Suggestion Systems
- 17.1.3. Strategies to Ensure Transparency and User Consent
- 17.1.4. Trends and Possible Improvements in Behavior-based Personalization

17.2. Predictive Analysis of User Interactions
- 17.2.1. Importance of Predictive Analytics in User-Design Interactions
- 17.2.2. Machine Learning Models for Predicting User Behavior
- 17.2.3. Integration of Predictive Analytics in User Interface Design
- 17.2.4. Challenges and Dilemmas in Predictive Analytics

17.3. Adaptive Design to Different Devices with AI
- 17.3.1. Principles of Device Adaptive Design
- 17.3.2. Content Adaptation Algorithms
- 17.3.3. Interface Optimization for Mobile and Desktop Experiences
- 17.3.4. Future Developments in Adaptive Design with Emerging Technologies

17.4. Automatic Generation of Characters and Enemies in Video Games
- 17.4.1. The Need for Automatic Generation in the Development of Video Games
- 17.4.2. Algorithms for Character and Enemy Generation
- 17.4.3. Customization and Adaptability in Automatically Generated Characters
- 17.4.4. Development Experiences: Challenges and Lessons Learned

17.5. AI Improvement in Game Characters
- 17.5.1. Importance of Artificial Intelligence in Video Game Characters
- 17.5.2. Algorithms to Improve the Behavior of Characters
- 17.5.3. Continuous Adaptation and Learning of AI in Games
- 17.5.4. Technical and Creative Challenges in Character AI Improvement

17.6. Custom Design in Industry: Challenges and Opportunities
- 17.6.1. Transformation of Industrial Design with Personalization
- 17.6.2. Enabling Technologies for Customized Design
- 17.6.3. Challenges in Implementing Customized Design at Scale
- 17.6.4. Opportunities for Innovation and Competitive Differentiation

17.7. Design for Sustainability Through AI
- 17.7.1. Life Cycle Analysis and Traceability with Artificial Intelligence
- 17.7.2. Optimization of Recyclable Materials
- 17.7.3. Improvement of Sustainable Processes
- 17.7.4. Development of Practical Strategies and Projects

17.8. Integration of Virtual Assistants in Design Interfaces with Adobe Sensei, Figma and AutoCAD
- 17.8.1. Role of Virtual Assistants in Interactive Design
- 17.8.2. Development of Virtual Assistants Specialized in Design
- 17.8.3. Natural Interaction with Virtual Assistants in Design Projects
- 17.8.4. Implementation Challenges and Continuous Improvement

17.9. Continuous User Experience Analysis for Improvement
- 17.9.1. Continuous Improvement Cycle in Interaction Design
- 17.9.2. Tools and Metrics for Continuous Analysis
- 17.9.3. Iteration and Adaptation in User Experience
- 17.9.4. Ensuring Privacy and Transparency in the Handling of Sensitive Data

17.10. Application of AI Techniques to Improve Usability
- 17.10.1. Intersection of AI and Usability
- 17.10.2. Sentiment and User Experience (UX) Analysis
- 17.10.3. Dynamic Interface Personalization
- 17.10.4. Workflow and Navigation Optimization

Module 18. Innovation in Design and AI Processes

18.1. Optimization of Manufacturing Processes with AI Simulations
- 18.1.1. Introduction to Manufacturing Process Optimization
- 18.1.2. AI Simulations for Production Optimization
- 18.1.3. Technical and Operational Challenges in the Implementation of AI Simulations
- 18.1.4. Future Perspectives: Advances in Process Optimization with AI

18.2. Virtual Prototyping: Challenges and Benefits
- 18.2.1. Importance of Virtual Prototyping in Design
- 18.2.2. Tools and Technologies for Virtual Prototyping
- 18.2.3. Challenges in Virtual Prototyping and Strategies for Overcoming Them
- 18.2.4. Impact on Design Innovation and Agility

18.3. Generative Design: Applications in Industry and Artistic Creation
- 18.3.1. Architecture and Urban Planning
- 18.3.2. Fashion and Textile Design
- 18.3.3. Design of Materials and Textures
- 18.3.4. Automation in Graphic Design

18.4. Materials and Performance Analysis Using Artificial Intelligence
- 18.4.1. Importance of Materials and Performance Analysis in Design
- 18.4.2. Artificial Intelligence Algorithms for Material Analysis
- 18.4.3. Impact on Design Efficiency and Sustainability
- 18.4.4. Implementation Challenges and Future Applications

18.5. Mass Customization in Industrial Production
- 18.5.1. Transformation of Production Through Mass Customization
- 18.5.2. Enabling Technologies for Mass Customization
- 18.5.3. Logistical and Scale Challenges of Mass Customization
- 18.5.4. Economic Impact and Innovation Opportunities

18.6. Artificial Intelligence Fotor Assisted Design Tools Fotor and Snappa)
- 18.6.1. Generation-Assisted Design Gan (Generative Adversarial Networks)
- 18.6.2. Collective Generation of Ideas
- 18.6.3. Context-aware Generation
- 18.6.4. Exploration of Non-linear Creative Dimensions

18.7. Collaborative Human-robot Design in Innovative Projects
- 18.7.1. Integration of Robots in Innovative Design Projects
- 18.7.2. Tools and Platforms for Human-robot Collaboration (ROS, OpenAI Gym and Azure Robotics)
- 18.7.3. Challenges in Integrating Robots in Creative Projects
- 18.7.4. Future Perspectives in Collaborative Design with Emerging Technologies

18.8. Predictive Maintenance of Products: AI Approach
- 18.8.1. Importance of Predictive Maintenance in Product Prolongation
- 18.8.2. Machine Learning Models for Predictive Maintenance
- 18.8.3. Practical Implementation in Various Industries
- 18.8.4. Evaluation of the Accuracy and Effectiveness of these Models in Industrial Environments

18.9. Automatic Generation of Typefaces and Visual Styles
- 18.9.1. Fundamentals of Automatic Generation in Typeface Design
- 18.9.2. Practical Applications in Graphic Design and Visual Communication
- 18.9.3. AI-assisted Collaborative Design in the Creation of Typefaces
- 18.9.4. Exploration of Automatic Styles and Trends

18.10. IoT Integration for Real-time Product Monitoring
- 18.10.1. Transformation with the Integration of IoT in Product Design
- 18.10.2. Sensors and IoT Devices for Real Time Monitoring
- 18.10.3. Data Analysis and IoT-based Decision Making
- 18.10.4. Implementation Challenges and Future Applications of IoT in Design

Module 19. Applied Design Technologies and AI

19.1. Integration of Virtual Assistants in Design Interfaces with Dialogflow, Microsoft Bot Framework and Rasa
- 19.1.1. Role of Virtual Assistants in Interactive Design
- 19.1.2. Development of Virtual Assistants Specialized in Design
- 19.1.3. Natural Interaction with Virtual Assistants in Design Projects
- 19.1.4. Implementation Challenges and Continuous Improvement

19.2. Automatic Detection and Correction of Visual Errors with AI
- 19.2.1. Importance of Automatic Visual Error Detection and Correction
- 19.2.2. Algorithms and Models for Visual Error Detection
- 19.2.3. Automatic Correction Tools in Visual Design
- 19.2.4. Challenges in Automatic Detection and Correction and Strategies for Overcoming Them

19.3. AI Tools for Usability Evaluation of Interface Designs (EyeQuant, Lookback and Mouseflow)
- 19.3.1. Analysis of Interaction Data with Machine Learning Models
- 19.3.2. Automated Report Generation and Recommendations
- 19.3.3. Virtual User Simulations for Usability Testing Using Bootpress, Botium and Rasa
- 19.3.4. Conversational Interface for User Feedback

19.4. Optimization of Editorial Workflows with Algorithms Using Chat GPT, Bing, WriteSonic and Jasper
- 19.4.1. Importance of Optimizing Editorial Workflows
- 19.4.2. Algorithms for Editorial Automation and Optimization
- 19.4.3. Tools and Technologies for Editorial Optimization
- 19.4.4. Challenges in Implementation and Continuous Improvement in Editorial Workflows

19.5. Realistic Simulations in Video Game Design with TextureLab and Leonardo
- 19.5.1. Importance of Realistic Simulations in the Videogame Industry
- 19.5.2. Modeling and Simulation of Realistic Elements in Video Games
- 19.5.3. Technologies and Tools for Realistic Simulations in Video Games
- 19.5.4. Technical and Creative Challenges in Realistic Video Game Simulations

19.6. Automatic Generation of Multimedia Content in Editorial Design
- 19.6.1. Transformation with Automatic Generation of Multimedia Content
- 19.6.2. Algorithms and Models for the Automatic Generation of Multimedia Content
- 19.6.3. Practical Applications in Publishing Projects
- 19.6.4. Challenges and Future Trends in the Automatic Generation of Multimedia Content

19.7. Adaptive and Predictive Design Based on User Data
- 19.7.1. Importance of Adaptive and Predictive Design in User Experience
- 19.7.2. Collection and Analysis of User Data for Adaptive Design
- 19.7.3. Algorithms for Adaptive and Predictive Design
- 19.7.4. Integration of Adaptive Design in Platforms and Applications

19.8. Integration of Algorithms in Usability Improvement
- 19.8.1. Segmentation and Behavioral Patterns
- 19.8.2. Detection of Usability Problems
- 19.8.3. Adaptability to Changes in User Preferences
- 19.8.4. Automated a/b Testing and Analysis of Results

19.9. Continuous Analysis of User Experience for Iterative Improvements
- 19.9.1. Importance of Continuous Feedback in Product and Service Evolution
- 19.9.2. Tools and Metrics for Continuous Analysis
- 19.9.3. Case Studies Demonstrating Substantial Improvements Achieved Through this Approach
- 19.9.4. Handling of Sensitive Data

19.10. AI-assisted Collaboration in Editorial Teams
- 19.10.1. Transforming Collaboration in AI-assisted Editorial Teams
- 19.10.2. Tools and Platforms for AI-assisted Collaboration (Grammarly, Yoast SEO and Quillionz)
- 19.10.3. Development of Virtual Assistants Specialized in Editing
- 19.10.4. Implementation Challenges and Future Applications of AI-assisted Collaboration

Module 20. Ethics and Environment in Design and AI

20.1. Environmental Impact in Industrial Design: Ethical Approach
- 20.1.1. Environmental Awareness in Industrial Design
- 20.1.2. Life Cycle Assessment and Sustainable Design
- 20.1.3. Ethical Challenges in Design Decisions with Environmental Impact
- 20.1.4. Sustainable Innovations and Future Trends

20.2. Improving Visual Accessibility in Responsive Graphic Design
- 20.2.1. Visual Accessibility as an Ethical Priority in Graphic Design
- 20.2.2. Tools and Practices for the Improvement of Visual Accessibility (Google LightHouse and Microsoft Accessibility Insights)
- 20.2.3. Ethical Challenges in Implementing Visual Accessibility
- 20.2.4. Professional Responsibility and Future Improvements in Visual Accessibility

20.3. Waste Reduction in the Design Process: Sustainable Challenges
- 20.3.1. Importance of Waste Reduction in Design
- 20.3.2. Strategies for Waste Reduction at Different Stages of Design
- 20.3.3. Ethical Challenges in Implementing Waste Reduction Practices
- 20.3.4. Corporate Commitments and Sustainable Certifications

20.4. Sentiment Analysis in Editorial Content Creation: Ethical Considerations
- 20.4.1. Sentiment Analysis and Ethics in Editorial Content
- 20.4.2. Algorithms for Sentiment Analysis and Ethical Decisions
- 20.4.3. Impact on Public Opinion
- 20.4.4. Challenges in Sentiment Analysis and Future Implications

20.5. Integration of Emotion Recognition for Immersive Experiences
- 20.5.1. Ethics in the Integration of Emotion Recognition in Immersive Experiences
- 20.5.2. Emotion Recognition Technologies
- 20.5.3. Ethical Challenges in Creating Emotionally Aware Immersive Experiences
- 20.5.4. Future Perspectives and Ethics in the Development of Immersive Experiences

20.6. Ethics in Video Game Design: Implications and Decisions
- 20.6.1. Ethics and Responsibility in Videogame Design
- 20.6.2. Inclusion and Diversity in Video Games: Ethical Decisions
- 20.6.3. Microtransactions and Ethical Monetization in Videogames
- 20.6.4. Ethical Challenges in the Development of Narratives and Characters in Videogames

20.7. Responsible Design: Ethical and Environmental Considerations in the Industry
- 20.7.1. Ethical Approach to Responsible Design
- 20.7.2. Tools and Methods for Responsible Design
- 20.7.3. Ethical and Environmental Challenges in the Design Industry
- 20.7.4. Corporate Commitments and Responsible Design Certifications

20.8. Ethics in the Integration of AI in User Interfaces
- 20.8.1. Exploration of How Artificial Intelligence in User Interfaces Raises Ethical Challenges
- 20.8.2. Transparency and Explainability in AI Systems in User Interfaces
- 20.8.3. Ethical Challenges in the Collection and Use of User Interface Data
- 20.8.4. Future Perspectives on AI Ethics at User Interfaces

20.9. Sustainability in Design Process Innovation
- 20.9.1. Recognition of the Importance of Sustainability in Design Process Innovation
- 20.9.2. Development of Sustainable Processes and Ethical Decision-Making
- 20.9.3. Ethical Challenges in the Adoption of Innovative Technologies
- 20.9.4. Business Commitments and Sustainability Certifications in Design Processes

20.10. Ethical Aspects in the Application of Design Technologies
- 20.10.1. Ethical Decisions in the Selection and Application of Design Technologies
- 20.10.2. Ethics in the Design of User Experiences with Advanced Technologies
- 20.10.3. Intersections of Ethics and Technologies in Design
- 20.10.4. Emerging Trends and the Role of Ethics in the Future Direction of Design with Advanced Technologies

07

Clinical Internship

Once the online theoretical stage has been passed, the academic itinerary includes a period of internship program in a renowned company. During their on-site stay, students will have the support of a tutor, who will help them both in the preparation and in the development of the internship. In this way, graduates are guaranteed an enriching learning experience.

You will do your internship in an institution of the highest renown in the sector"

The Internship Program phase of this Hybrid Professional Master's Degree in Artificial Intelligence in Design consists of a practical stay in a renowned institution in Barcelona, lasting 3 weeks, from Monday to Friday with 8 consecutive hours of Internship Program with an assistant specialist. This experience will allow graduates to be part of a team of professionals and to participate in the activities they are carrying out. Students will also develop the necessary skills to overcome the challenges that arise in the implementation of Artificial Intelligence in Design.

Under an eminently practical approach, the activities of this specialization are aimed at developing and perfecting the necessary skills to merge new technologies with the creation of creative products. In this way, students will efficiently handle the most sophisticated tools of Artificial Intelligence and use them to create unique designs.

This is an ideal opportunity for students who wish to excel in the field of Design. During their Internship Program, graduates will have access to the latest techniques in subjects such as Data Mining, Intelligent Systems, Natural Language Processing or Bio-inspired Computing. Therefore, designers will remain at the technological forefront and will be up to date with the latest trends to provide high quality services.

The practical part will be carried out with the active participation of the student performing the activities and procedures of each area of competence (learning to learn and learning to do), with the accompaniment and guidance of teachers and other training partners that facilitate teamwork and multidisciplinary integration as transversal competencies for the praxis of Artificial Intelligence in Design (learning to be and learning to relate).

The procedures described below will be the basis of the practical part of the program, and their implementation will be subject to the center's own availability and workload, the proposed activities being the following:

Module	Practical Activity
Data Life Cycle	Classify data according to its type, content and sensitivity for its proper management
	Establish storage methods to store data in an accessible form
	Process data to transform, clean and prepare it for use in different applications
	Conduct periodic audits and monitor data usage to ensure compliance with privacy policies
Training with TensorFlow	Perform preprocessing operations on the data to prepare it for model training
	Modify the model architecture to better fit the data and the problem at hand
	Optimize model hyperparameters, such as learning rate or batch size
	Apply regularization techniques in order to avoid model overfitting
Artificial Vision	Locate the presence of specific objects within an image
	Assign a class label to each pixel in an image to identify different semantic regions
	Create entirely new images that are realistic and consistent with the input data using adversarial generators
	Improve the resolution and visual quality of low-resolution images using Deep Learning techniques

Module	Practical Activity
Data Mining	Perform descriptive analysis to summarize and visualize data
	Use modeling techniques such as decision trees to identify interesting patterns and understand relationships between variables
	Adjust the parameters of the models and select the most important features to optimize their performance
	Monitor the performance of the implemented models and make adjustments as needed to ensure their accuracy over time
Artificial Intelligence to Design-User	Employ Artificial Intelligence techniques to analyze user behavior on digital platforms
	Use data collected from user interaction with digital products and services to continually optimize interface design
	Design chatbots and virtual assistants that interact naturally with consumers
	Implement algorithms to recommend specific design elements (such as colors, fonts or visual styles)

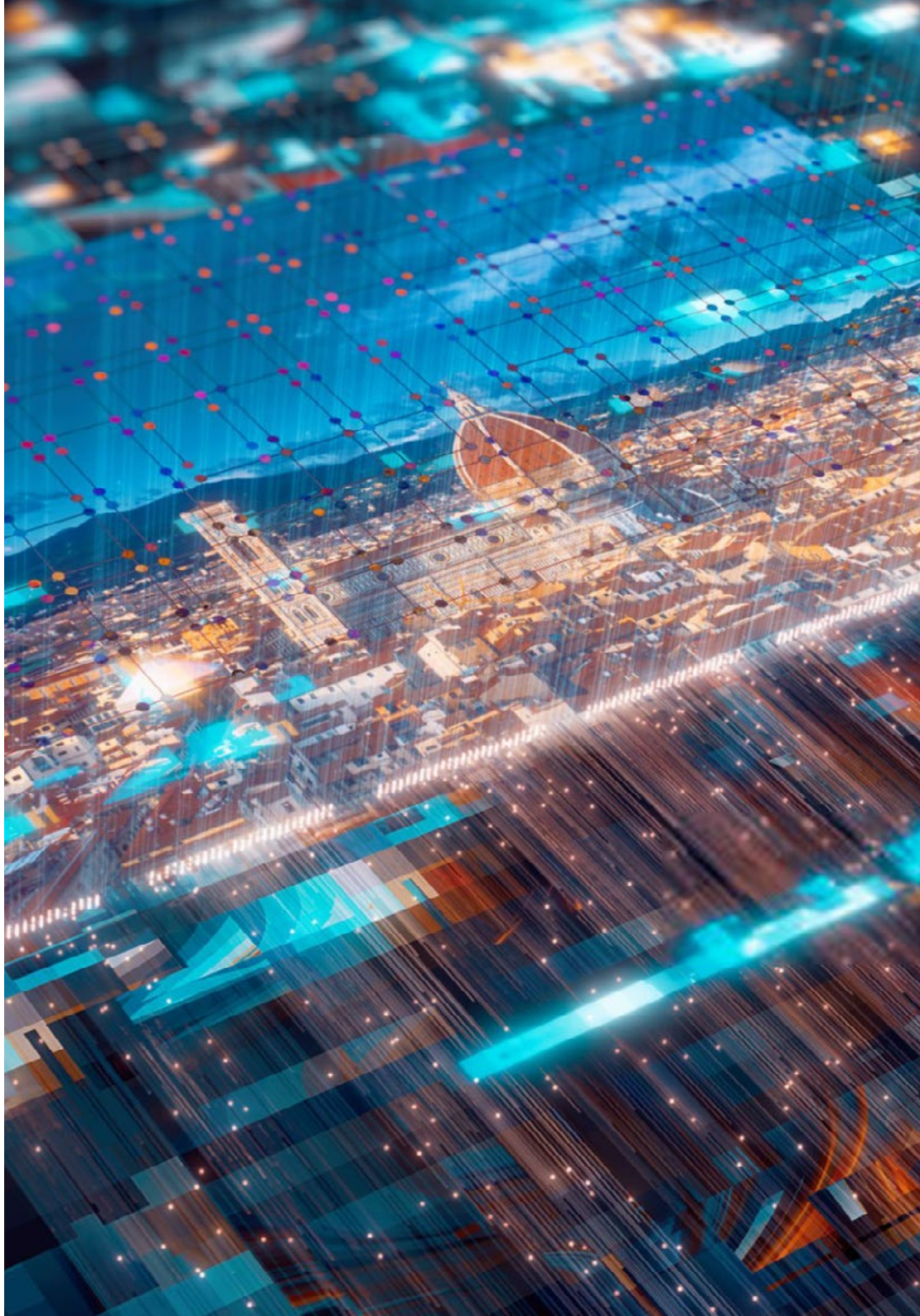
You will handle cutting-edge AI techniques to continuously optimize product design using real-time user data"

Civil Liability Insurance

This institution's main concern is to guarantee the safety of the trainees and other collaborating agents involved in the internship process at the company. Among the measures dedicated to achieve this is the response to any incident that may occur during the entire teaching-learning process.

To this end, this entity commits to purchasing a civil liability insurance policy to cover any eventuality that may arise during the course of the internship at the center.

This liability policy for interns will have broad coverage and will be taken out prior to the start of the Internship Program period. That way professionals will not have to worry in case of having to face an unexpected situation and will be covered until the end of the internship program at the center.



General Conditions of the Internship Program

The general terms and conditions of the internship agreement for the program are as follows:

1. TUTOR: During the Hybrid Professional Master's Degree, students will be assigned with two tutors who will accompany them throughout the process, answering any doubts and questions that may arise. On the one hand, there will be a professional tutor belonging to the internship center who will have the purpose of guiding and supporting the student at all times. On the other hand, they will also be assigned with an academic tutor whose mission will be to coordinate and help the students during the whole process, solving doubts and facilitating everything they may need. In this way, the student will be accompanied and will be able to discuss any doubts that may arise, both clinical and academic.

2. DURATION: The internship program will have a duration of three continuous weeks, in 8-hour days, 5 days a week. The days of attendance and the schedule will be the responsibility of the center and the professional will be informed well in advance so that they can make the appropriate arrangements.

3. ABSENCE: If the students does not show up on the start date of the Hybrid Professional Master's Degree, they will lose the right to it, without the possibility of reimbursement or change of dates. Absence for more than two days from the internship, without justification or a medical reason, will result in the professional's withdrawal from the internship, therefore, automatic termination of the internship. Any problems that may arise during the course of the internship must be urgently reported to the academic tutor.

4. CERTIFICATION: Professionals who pass the Hybrid Professional Master's Degree will receive a certificate accrediting their stay at the center.

5. EMPLOYMENT RELATIONSHIP: the Hybrid Professional Master's Degree shall not constitute an employment relationship of any kind.

6. PRIOR EDUCATION: Some centers may require a certificate of prior education for the Hybrid Professional Master's Degree. In these cases, it will be necessary to submit it to the TECH internship department so that the assignment of the chosen center can be confirmed.

7. DOES NOT INCLUDE: The Hybrid Professional Master's Degree will not include any element not described in the present conditions. Therefore, it does not include accommodation, transportation to the city where the internship takes place, visas or any other items not listed.

However, students may consult with their academic tutor for any questions or recommendations in this regard. The academic tutor will provide the student with all the necessary information to facilitate the procedures in any case.

08

Where Can I Do the Internship?

The itinerary of this Hybrid Professional Master's Degree includes a practical internship in a prestigious institution, where students will put into practice everything they have learned about Artificial Intelligence in Design. In order to bring this program closer to more professionals, TECH offers students the possibility of carrying it out in different institutions of international importance.

You will complete your theoretical education with the best practical internship in the market. You will achieve success in your daily practice"

The student will be able to complete the practical part of this Hybrid Professional Master's Degree at the following centers:

Ogilvy Barcelona

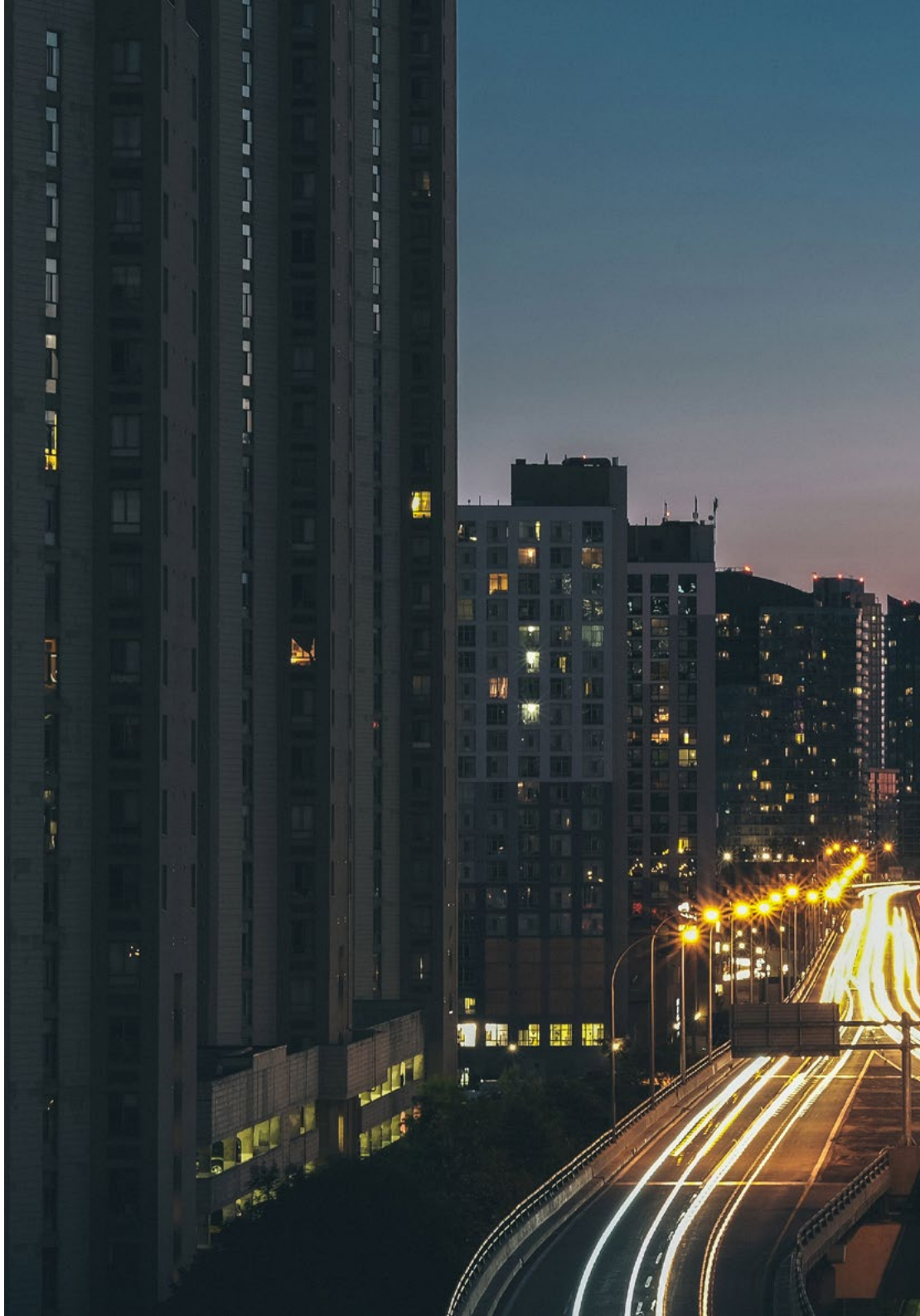
Country
Spain

City
Barcelona

Address: Calle Bolivia 68-70, 08018, Barcelona

Ogilvy is a pioneer in Pervasive Advertising, Marketing and Corporate Communications.

Related internship programs:
- Artificial Intelligence in Design
- Personal Brand Construction



Boost your career path with holistic teaching, allowing you to advance both theoretically and practically"

09

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

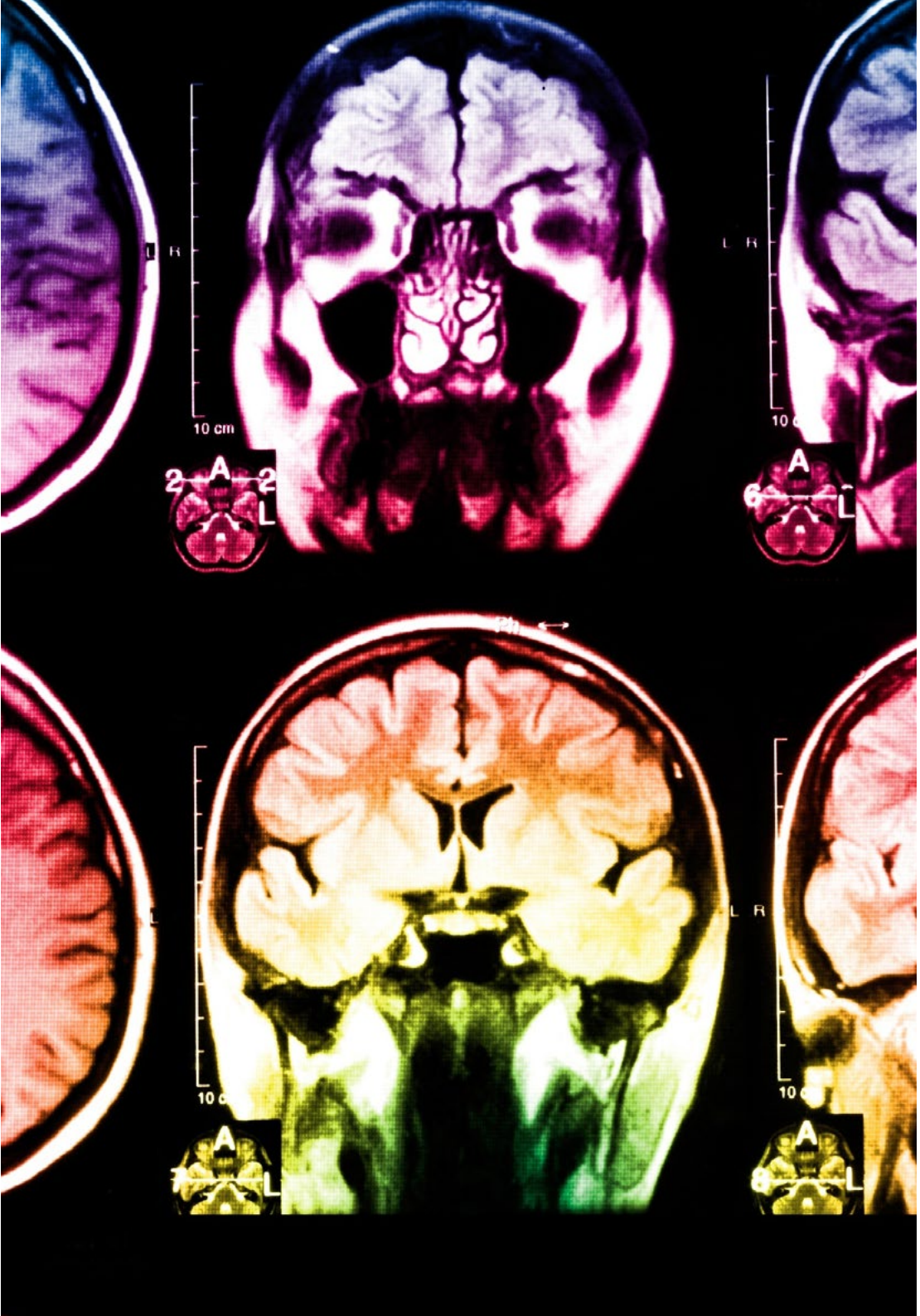
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

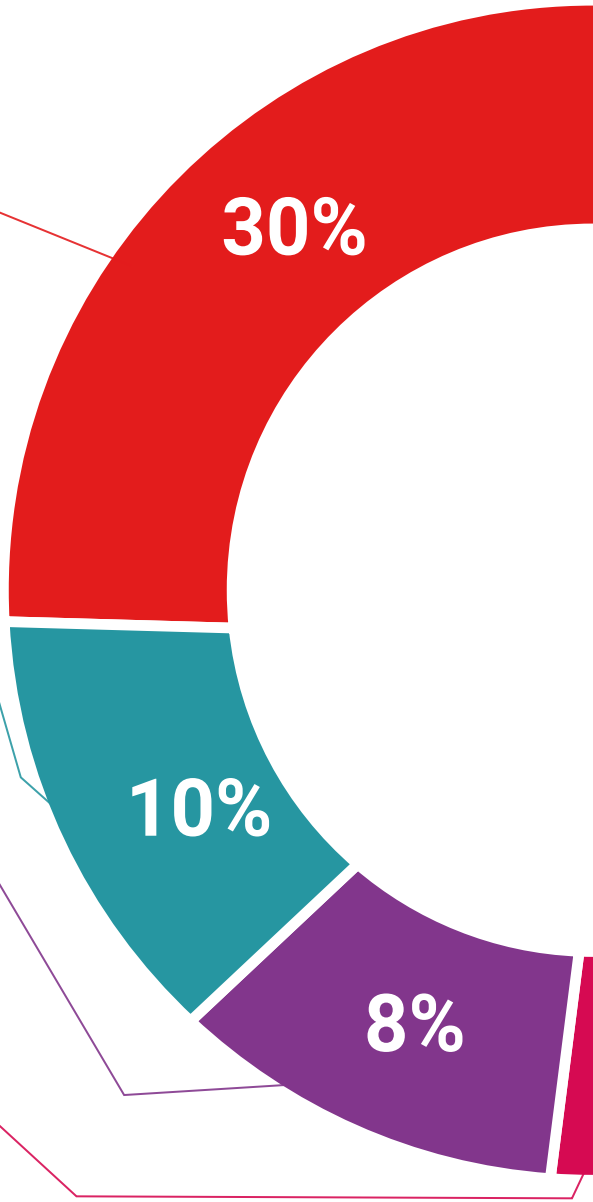
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

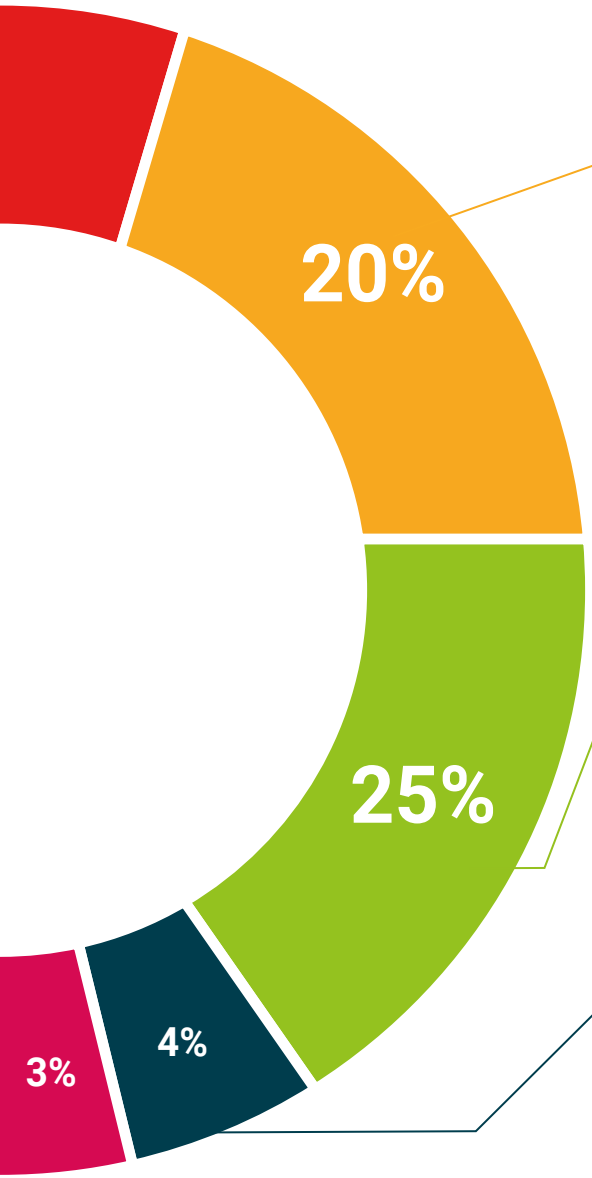
Practising Skills and Abilities

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.

10

Certificate

The Hybrid Professional Master's Degree in Artificial Intelligence in Design guarantees students, in addition to the most rigorous and up-to-date education, access to a Hybrid 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 **Hybrid Professional Master's Degree in Artificial Intelligence in Design** 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.

Title: **Hybrid Professional Master's Degree in Artificial Intelligence in Design**

Modality: **Hybrid (Online + Internship)**

Duration: **12 months**

Accreditation: **64 ECTS**


tech global university

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

Hybrid Professional Master's Degree in Artificial Intelligence in Design

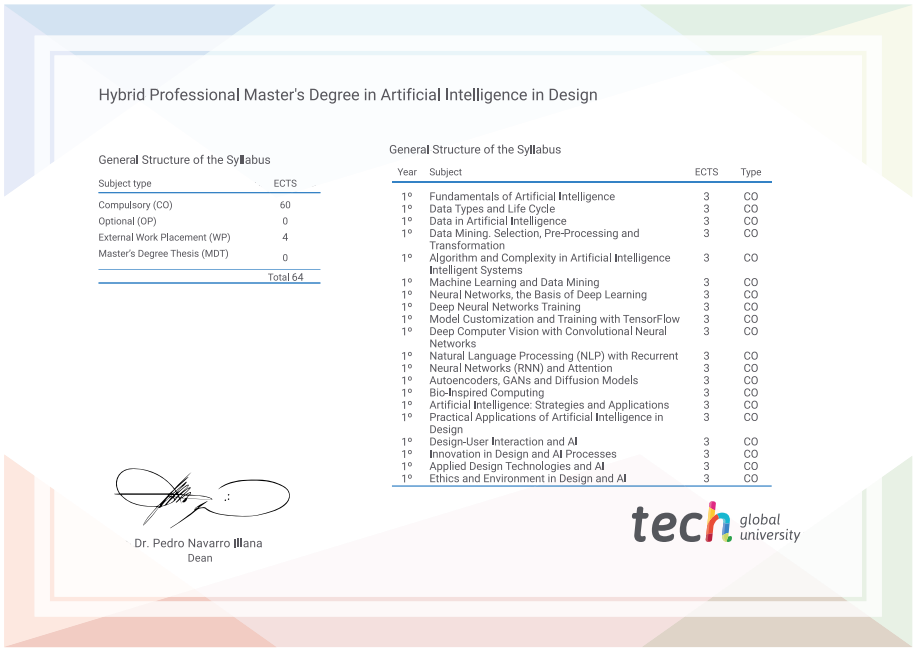
This is a private qualification of 1,920 hours of duration equivalent to 64 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

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: AFWORD23S techtitute.com/certificates


Hybrid Professional Master's Degree in Artificial Intelligence in Design

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	4
Master's Degree Thesis (MDT)	0
	Total 64

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Fundamentals of Artificial Intelligence	3	CO
1º	Data Types and Life Cycle	3	CO
1º	Data in Artificial Intelligence	3	CO
1º	Data Mining. Selection, Pre-Processing and Transformation	3	CO
1º	Algorithm and Complexity in Artificial Intelligence	3	CO
1º	Intelligent Systems		
1º	Machine Learning and Data Mining	3	CO
1º	Neural Networks, the Basis of Deep Learning	3	CO
1º	Deep Neural Networks Training	3	CO
1º	Model Customization and Training with TensorFlow	3	CO
1º	Deep Computer Vision with Convolutional Neural Networks	3	CO
1º	Natural Language Processing (NLP) with Recurrent	3	CO
1º	Neural Networks (RNN) and Attention	3	CO
1º	Autoencoders, GANs and Diffusion Models	3	CO
1º	Bio-Inspired Computing	3	CO
1º	Artificial Intelligence: Strategies and Applications	3	CO
1º	Practical Applications of Artificial Intelligence in Design	3	CO
1º	Design-User Interaction and AI	3	CO
1º	Innovation in Design and AI Processes	3	CO
1º	Applied Design Technologies and AI	3	CO
1º	Ethics and Environment in Design and AI	3	CO

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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.

Hybrid Professional Master's Degree

Artificial Intelligence in Design

Modality: **Hybrid (Online + Internship)**
Duration: **12 months**
Certificate: **TECH Global University**
Credits: **60 + 4 ECTS**

Hybrid Professional Master's Degree
Artificial Intelligence in Design

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