Professional Master's Degree

Artificial Intelligence in Design

tech global university

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Professional Master's Degree
Artificial Intelligence in Design

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

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

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01

Introduction to the Program

The fusion between Artificial Intelligence and Design has generated a true revolution in the way we conceive and make products. AI becomes a catalyst for creativity, providing advanced automatic generation tools, streamlining the creative process and allowing designers to explore a wide range of possibilities in a significantly reduced timeframe. Not only that, but it also refines the user experience by painstakingly analyzing data and patterns to shape more instinctive and tailored interfaces. AI also plays an essential role in improving Design, simplifying tests and simulations. For this reason, TECH has conceived this innovative program, inspired by the cutting-edge approach of *Relearning*.

The application of Artificial Intelligence in the field of Design will allow you to access a more innovative, user-centered creative process"

The synergy between Artificial Intelligence and Design has generated a true revolution in the conception and development of projects in this field. A key point to take into account is the substantial improvement of the creative process: AI algorithms explore vast data sets to discover patterns and trends, providing invaluable insights that drive decision making in the field of Design.

In this context, TECH presents this Professional Master's Degree in Artificial Intelligence in Design, which seamlessly merges new technologies with the creation of creative products, providing designers with a unique and comprehensive perspective. In addition to imparting technical knowledge, this program will address ethics and sustainability, ensuring that graduates are prepared to face contemporary challenges in a constantly evolving field.

Similarly, the breadth of topics to be covered reflects the diversity of applications of AI in different disciplines, from automated content generation to strategies to reduce waste in the Design process. In fact, the emphasis on ethics and environmental impact is designed to train conscious and competent professionals. Finally, it will cover data analysis for decision making in Design, the implementation of AI systems to personalize products and experiences, as well as the exploration of advanced visualization techniques and creative content generation.

In this way, TECH has designed a rigorous academic program, supported by the innovative Relearning method. This educational approach consists of reiterating key concepts to ensure a deep understanding of the content. Accessibility is also key, since it is enough to have an electronic device connected to the Internet to access the material at any time and in any place, freeing the students from the limitations of physically attending or adjusting to fixed schedules. In addition, students will have access to an exclusive series of 10 complementary Masterclasses, designed by an internationally renowned expert in Artificial Intelligence and Machine Learning.

This **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:

- The development of case studies presented by experts in Artificial Intelligence in Design
- The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- Practical exercises where the self-assessment process can be carried out to improve learning
- Special emphasis on innovative methodologies in Artificial Intelligence in Design
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection

You will have the opportunity to take part in exclusive Masterclasses delivered by a renowned international expert in Artificial Intelligence and Machine Learning"

You will explore the complex intersection between ethics, the environment and new technologies in depth through this unique Professional Master's Degree, taught entirely online"

From visual creation automation, to predictive trend analysis and AI-powered collaboration, you'll be immersed in a dynamic field.

Take advantage of TECH's vast library of multimedia resources and explore the fusion of virtual assistants and user emotion analysis.

Its teaching staff includes professionals from the field of Artificial Intelligence in Design, who bring their work experience to this program, as well as renowned specialists from leading companies and prestigious universities.

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

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

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Why Study at TECH?

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

Study at the world's largest online university and guarantee your professional success. The future starts at TECH"

The world's best online university, according to FORBES

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

The best top international faculty

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

The world's largest online university

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

The most complete syllabuses on the university scene

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

A unique learning method

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

The official online university of the NBA

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

Leaders in employability

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

Google Premier Partner

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

The top-rated university by its students

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

03

Syllabus

What makes this Professional Master's Degree in Artificial Intelligence in Design exceptional is its revolutionary and comprehensive approach to the intersection between Design and Artificial Intelligence. The incorporation of specific modules such as “Computational Design and AI” and “Design-User Interaction and AI” will enable designers to address contemporary challenges, from the automatic creation of multimedia content to contextual adaptation in user interactions. In addition, the innovative fusion of technical skills, such as microchip structure optimization, with ethical and ecological considerations, such as waste minimization, makes this program a comprehensive proposition.

Immerse yourself in a training that integrates creativity with a deep focus on ethics and sustainability, applying Artificial Intelligence in the field of Design"

Module 1. Fundamentals of Artificial Intelligence

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

1.2. Artificial Intelligence in Games
- 1.2.1. Game Theory
- 1.2.2. Minimax and Alpha-Beta Pruning
- 1.2.3. Simulation: Monte Carlo

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

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

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

1.6. Semantic Web
- 1.6.1. Specifications: RDF, RDFS and OWL
- 1.6.2. Inference/ Reasoning
- 1.6.3. *Linked Data*

1.7. Expert Systems and DSS
- 1.7.1. Expert Systems
- 1.7.2. Decision Support Systems

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

1.9. AI Implementation Strategy

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

Module 2. Data Types and Life Cycle

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

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

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

2.4. Initial Stages of the Cycle
- 2.4.1. Definition of Goals
- 2.4.2. Determination of Resource Requirements
- 2.4.3. Gantt Chart
- 2.4.4. Data Structure

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

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

2.7. Data Analysis, Interpretation and Evaluation of Results
- 2.7.1. Statistical Measures
- 2.7.2. Relationship Indexes
- 2.7.3. Data Mining

2.8. Datawarehouse
- 2.8.1. Elements that Comprise It
- 2.8.2. Design
- 2.8.3. Aspects to Consider

2.9. Data Availability
- 2.9.1. Access
- 2.9.2. Uses
- 2.9.3. Security

2.10. Regulatory Framework
- 2.10.1. Data Protection Law
- 2.10.2. Good Practices
- 2.10.3. Other Regulatory Aspects

Module 3. Data in Artificial Intelligence

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

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

3.3. From Data to Information
- 3.3.1. Data Analysis
- 3.3.2. Types of Analysis
- 3.3.3. Extraction of Information from a Dataset

3.4. Extraction of Information Through Visualization
- 3.4.1. Visualization as an Analysis Tool
- 3.4.2. Visualization Methods
- 3.4.3. Visualization of a Data Set

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

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

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

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

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

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

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

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

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

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

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

4.5. Noise in the Data
- 4.5.1. Noise Classes and Attributes
- 4.5.2. Noise Filtering
- 4.5.3. The Effect of Noise

4.6. The Curse of Dimensionality
- 4.6.1. *Oversampling*
- 4.6.2. *Undersampling*
- 4.6.3. Multidimensional Data Reduction

4.7. From Continuous to Discrete Attributes
  4.7.1. Continuous Data vs. Discreet Data
  4.7.2. Discretization Process
4.8. The Data
  4.8.1. Data Selection
  4.8.2. Prospects and Selection Criteria
  4.8.3. Selection Methods
4.9. Instance Selection
  4.9.1. Methods for Instance Selection
  4.9.2. Prototype Selection
  4.9.3. Advanced Methods for Instance Selection
4.10. Data Pre-Processing in Big Data Environments

Module 5. Algorithm and Complexity in Artificial Intelligence

5.1. Introduction to Algorithm Design Strategies
  5.1.1. Recursion
  5.1.2. Divide and Conquer
  5.1.3. Other Strategies
5.2. Efficiency and Analysis of Algorithms
  5.2.1. Efficiency Measures
  5.2.2. Measuring the Size of the Input
  5.2.3. Measuring Execution Time
  5.2.4. Worst, Best and Average Case
  5.2.5. Asymptotic Notation
  5.2.6. Criteria for Mathematical Analysis of Non-Recursive Algorithms
  5.2.7. Mathematical Analysis of Recursive Algorithms
  5.2.8. Empirical Analysis of Algorithms
5.3. Sorting Algorithms
  5.3.1. Concept of Sorting
  5.3.2. Bubble Sorting
  5.3.3. Sorting by Selection
  5.3.4. Sorting by Insertion
  5.3.5. Sorting by Merge (Merge_Sort)
  5.3.6. Sorting Quickly (Quick_Sort)
5.4. Algorithms with Trees
  5.4.1. Tree Concept
  5.4.2. Binary Trees
  5.4.3. Tree Paths
  5.4.4. Representing Expressions
  5.4.5. Ordered Binary Trees
  5.4.6. Balanced Binary Trees
5.5. Algorithms Using Heaps
  5.5.1. Heaps
  5.5.2. The Heapsort Algorithm
  5.5.3. Priority Queues
5.6. Graph Algorithms
  5.6.1. Representation
  5.6.2. Traversal in Width
  5.6.3. Depth Travel
  5.6.4. Topological Sorting
5.7. Greedy Algorithms
  5.7.1. Greedy Strategy
  5.7.2. Elements of the Greedy Strategy
  5.7.3. Currency Exchange
  5.7.4. Traveler's Problem
  5.7.5. Backpack Problem
5.8. Minimal Path Finding
  5.8.1. The Minimum Path Problem
  5.8.2. Negative Arcs and Cycles
  5.8.3. Dijkstra's Algorithm
5.9. Greedy Algorithms on Graphs
  5.9.1. The Minimum Covering Tree
  5.9.2. Prim's Algorithm
  5.9.3. Kruskal's Algorithm
  5.9.4. Complexity Analysis
5.10. *Backtracking*
  5.10.1. Backtracking
  5.10.2. Alternative Techniques

Module 6. Intelligent Systems

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

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

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

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

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

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

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

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

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

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

Module 7. Machine Learning and Data Mining

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

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

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

7.4. Evaluation of Classifiers
- 7.4.1. Confusion Matrices
- 7.4.2. Numerical Evaluation Matrices
- 7.4.3. Kappa Statistic
- 7.4.4. ROC Curves

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

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

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

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

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

7.10 Text Mining and Natural Language Processing (NLP)
- 7.10.1. Basic Concepts
- 7.10.2. Corpus Creation
- 7.10.3. Descriptive Analysis
- 7.10.4. Introduction to Feelings Analysis

Module 8. Neural Networks, the Basis of Deep Learning

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

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

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

8.4. Layer Bonding and Operations
- 8.4.1. Architecture Design
- 8.4.2. Connection between Layers
- 8.4.3. Forward Propagation

8.5. Construction of the First Neural Network
- 8.5.1. Network Design
- 8.5.2. Establish the Weights
- 8.5.3. Network Training

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

8.7. Application of the Principles of Neural Networks
- 8.7.1. Activation Functions
- 8.7.2. Backward Propagation
- 8.7.3. Parameter Adjustment

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

8.9. Implementation of MLP (Multilayer Perceptron) with Keras
- 8.9.1. Definition of the Network Structure
- 8.9.2. Model Compilation
- 8.9.3. Model Training

8.10. Fine Tuning Hyperparameters of Neural Networks
- 8.10.1. Selection of the Activation Function
- 8.10.2. Set the Learning Rate

8.10. 3. Adjustment of Weights

Module 9. Deep Neural Networks Training

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

9.2. Reuse of Pre-Trained Layers
- 9.2.1. Transfer Learning Training
- 9.2.2. Feature Extraction
- 9.2.3. Deep Learning

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

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

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

9.6. Practical Guidelines
- 9.6.1. Model Design
- 9.6.2. Selection of Metrics and Evaluation Parameters
- 9.6.3. Hypothesis Testing

9.7. *Transfer Learning*
- 9.7.1. Transfer Learning Training
- 9.7.2. Feature Extraction
- 9.7.3. Deep Learning

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

9.9. Practical Application of Transfer Learning
- 9.9.1. Transfer Learning Training
- 9.9.2. Feature Extraction
- 9.9.3. Deep Learning

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

Module 10. Model Customization and Training with TensorFlow

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

10.2. TensorFlow and NumPy
- 10.2.1. NumPy Computing Environment for TensorFlow
- 10.2.2. Using NumPy Arrays with TensorFlow
- 10.2.3. NumPy Operations for TensorFlow Graphs

10.3. Model Customization and Training Algorithms
- 10.3.1. Building Custom Models with TensorFlow
- 10.3.2. Management of Training Parameters
- 10.3.3. Use of Optimization Techniques for Training

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

10.5. Loading and Preprocessing Data with TensorFlow
- 10.5.1. Loading Data Sets with TensorFlow
- 10.5.2. Pre-Processing Data with TensorFlow
- 10.5.3. Using TensorFlow Tools for Data Manipulation

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

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

10.8. Keras Pre-Processing Layers
- 10.8.1. Using the Keras Pre-Processing API
- 10.8.2. Pre-Processing Pipelined Construction with Keras
- 10.8.3. Using the Keras Pre-Processing API for Model Training

10.9. The TensorFlow Datasets Project
- 10.9.1. Using TensorFlow Datasets for Data Loading
- 10.9.2. Data Pre-Processing 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 Application with TensorFlow
- 10.10.3. Model Training with TensorFlow
- 10.10.4. Using the Application for the Prediction of Results

Module 11. Deep Computer Vision with Convolutional Neural Networks

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

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

11.3. Grouping Layers and Implementation of Grouping Layers with Keras
- 11.3.1. Pooling and Striding
- 11.3.2. *Flattening*
- 11.3.3. Types of Pooling

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

11.5. Implementing a CNN ResNet Using Keras
- 11.5.1. Weight Initialization
- 11.5.2. Input Layer Definition
- 11.5.3. Output Definition

11.6. Use of Pre-Trained Keras Models
- 11.6.1. Characteristics of Pre-Trained Models
- 11.6.2. Uses of Pre-Trained Models
- 11.6.3. Advantages of Pre-Trained Models

11.7. Pre-Trained Models for Transfer Learning
- 11.7.1. Learning by Transfer
- 11.7.2. Transfer Learning Process
- 11.7.3. Advantages of Transfer Learning

11.8. Deep Computer Vision Classification and Localization
- 11.8.1. Image Classification
- 11.8.2. Localization of Objects in Images
- 11.8.3. Object Detection

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

11.10. Semantic Segmentation
- 11.10.1. Deep Learning for Semantic Segmentation
- 11.10.1. Edge Detection
- 11.10.1. Rule-Based Segmentation Methods

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

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

12.2. Training Data Set Creation
- 12.2.1. Preparation of the Data for Training an RNN
- 12.2.2. Storage of the Training Dataset
- 12.2.3. Data Cleaning and Transformation
- 12.2.4. Sentiment Analysis

12.3. Classification of Opinions with RNN
- 12.3.1. Detection of Themes in Comments
- 12.3.2. Sentiment Analysis with Deep Learning Algorithms

12.4. Encoder-Decoder Network for Neural Machine Translation
- 12.4.1. Training an RNN for Machine Translation
- 12.4.2. Use of an Encoder-Decoder Network for Machine Translation
- 12.4.3. Improving the Accuracy of Machine Translation with RNNs

12.5. Attention Mechanisms
- 12.5.1. Application of Care Mechanisms in RNN
- 12.5.2. Use of Care Mechanisms to Improve the Accuracy of the Models
- 12.5.3. Advantages of Attention Mechanisms in Neural Networks

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

12.7. Transformers for Vision
- 12.7.1. Use of Transformers Models for Vision
- 12.7.2. Image Data Pre-Processing
- 12.7.3. Training a Transformers Model for Vision

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

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

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

Module 13. Autoencoders, GANs and Diffusion Models

13.1. Representation of Efficient Data
- 13.1.1. Dimensionality Reduction
- 13.1.2. Deep Learning
- 13.1.3. Compact Representations

13.2. PCA Realization with an Incomplete Linear Automatic Encoder
- 13.2.1. Training Process
- 13.2.2. Implementation in Python
- 13.2.3. Use of Test Data

13.3. Stacked Automatic Encoders
- 13.3.1. Deep Neural Networks
- 13.3.2. Construction of Coding Architectures
- 13.3.3. Use of Regularization

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

13.5. Noise Suppression of Automatic Encoders
- 13.5.1. Filter Application
- 13.5.2. Design of Coding Models
- 13.5.3. Use of Regularization Techniques

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

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

13.8. Generation of Fashion MNIST Images
- 13.8.1. Pattern Recognition
- 13.8.2. Image Generation
- 13.8.3. Deep Neural Networks Training

13.9. Generative Adversarial Networks and Diffusion Models
- 13.9.1. Content Generation from Images
- 13.9.2. Modeling of Data Distributions
- 13.9.3. Use of Adversarial Networks

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

Module 14. Bio-Inspired Computing

14.1. Introduction to Bio-Inspired Computing
- 14.1.1. Introduction to Bio-Inspired Computing

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

14.3. Genetic Algorithms
- 14.3.1. General Structure
- 14.3.2. Implementations of the Major Operators

14.4. Space Exploration-Exploitation Strategies for Genetic Algorithms
- 14.4.1. CHC Algorithm
- 14.4.2. Multimodal Problems

14.5. Evolutionary Computing Models (I)
- 14.5.1. Evolutionary Strategies
- 14.5.2. Evolutionary Programming
- 14.5.3. Algorithms Based on Differential Evolution

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

14.7. Evolutionary Programming Applied to Learning Problems
- 14.7.1. Rules-Based Learning
- 14.7.2. Evolutionary Methods in Instance Selection Problems

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

14.9. Neural Networks (I)
- 14.9.1. Introduction to Neural Networks
- 14.9.2. Practical Example with Neural Networks

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

Module 15. Artificial Intelligence: Strategies and Applications

15.1. Financial Services
- 15.1.1. The Implications of Artificial Intelligence (AI) in Financial Services. Opportunities and Challenges
- 15.1.2. Case Studies
- 15.1.3. Potential Risks Related to the Use of AI
- 15.1.4. Potential Future Developments/Uses of AI

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

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

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

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

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

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

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

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

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

Module 16. 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. 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 GPT Chat, Bing, WriteSonic and Jasper Algorithms
- 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

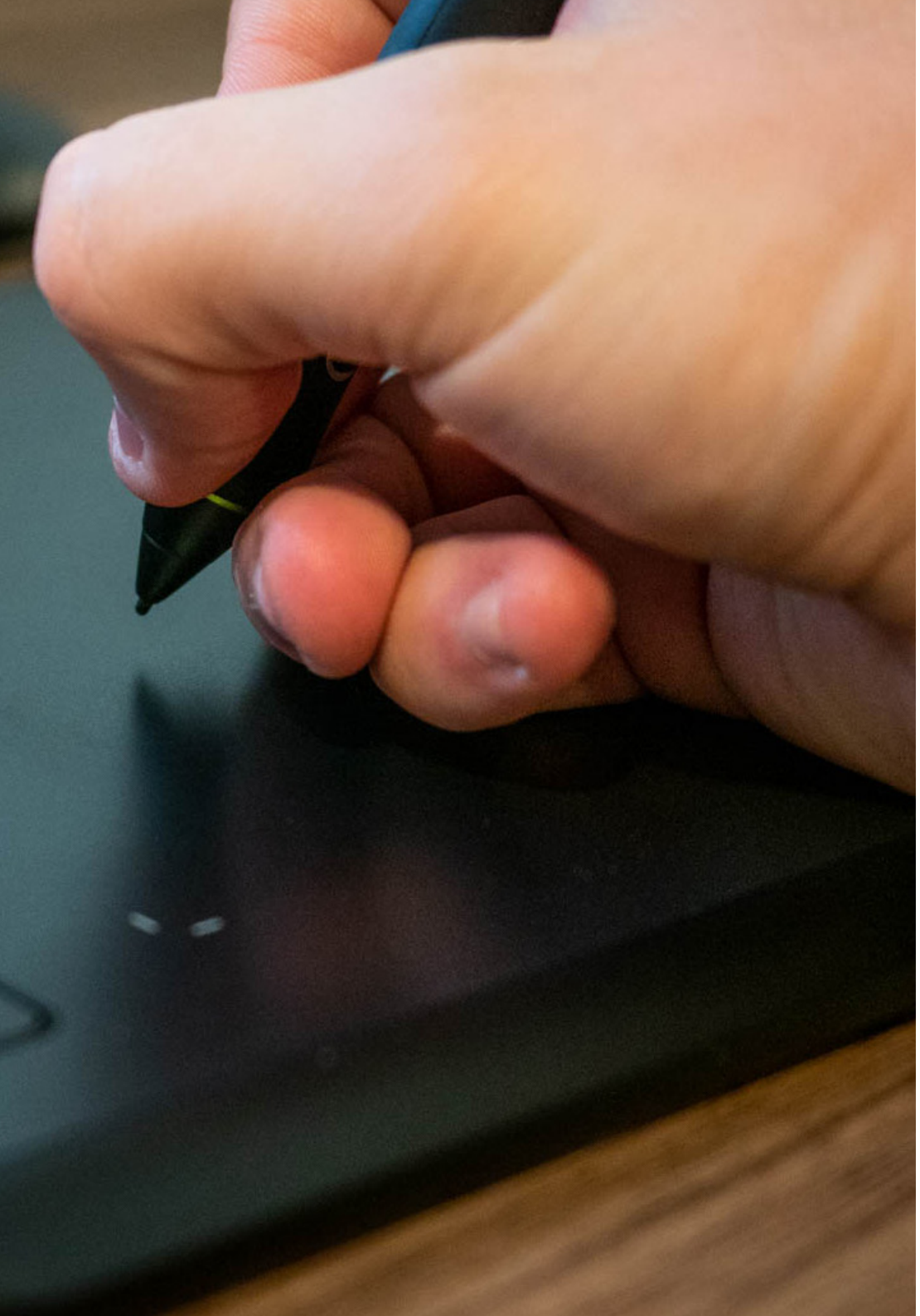
20.2. Improving Visual Accessibility in Responsive Graphic Design
- 20.2.1. Visual Accessibility as an Ethical Priority in Graphic Design
- 20.2.2. Tools and Practices for Improving Visual Accessibility (Google LightHouse and Microsoft Accessibility Insights)
- 20.2.3. Ethical Challenges in Implementing 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

04

Teaching Objectives

The main purpose of this Professional Master's Degree is to provide designers with a thorough and complete understanding of the intersection between Artificial Intelligence and the field of Design. This will involve not only strengthening their technical and creative skills, but also conceiving and applying AI algorithms in innovative processes. In addition, a critical and ethical vision in the use of AI in creative projects will be promoted, preparing professionals to face ethical dilemmas and emerging social challenges. Topics ranging from the personalization of user experiences to the generation of visual content will also be addressed.

You will lead in a context where collaboration between human inventiveness and cutting-edge technology is fundamental to the development of today's Design”

General Objectives

- Understand the theoretical foundations of Artificial Intelligence
- Study the different types of data and understand the data lifecycle
- Evaluate the crucial role of data in the development and implementation of AI solutions
- Delve into algorithms and complexity to solve specific problems
- Explore the theoretical basis of neural networks for Deep Learning development
- Analyze bio-inspired computing and its relevance in the development of intelligent systems
- Analyze current strategies of Artificial Intelligence in various fields, identifying opportunities and challenges
- Develop skills to implement Artificial Intelligence tools in design projects, covering automatic content generation, design optimization and pattern recognition
- Apply collaborative tools, leveraging Artificial Intelligence to improve communication and efficiency in design teams
- Incorporate emotional aspects into designs through techniques that effectively connect with the audience
- Understand the symbiosis between interactive design and Artificial Intelligence to optimize user experience
- Develop skills in adaptive design, considering user behavior and applying advanced Artificial Intelligence tools
- Critically analyze the challenges and opportunities when implementing custom designs in industry using AI Artificial Intelligence
- Understand the transformative role of Artificial Intelligence in the innovation of design and manufacturing processes

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
- Explore the concept of the semantic web and its influence on the organization and understanding of information in digital environments

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
- Analyze the regulatory aspects related to data management, complying with privacy and security regulations, as well as best practices

Module 3. Data in Artificial Intelligence

- Master the fundamentals of data science, covering tools, types and sources for information analysis
- Explore the process of transforming data into information using data mining and visualization techniques
- Study the structure and characteristics of datasets, understanding their importance in the preparation and use of data for Artificial Intelligence models
- 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 pre-processing 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 Greedy algorithms, understanding their logic and applications in solving optimization problems
- Investigate and apply the backtracking technique for systematic problem solving, analyzing its effectiveness in various scenarios

Module 6. Intelligent Systems

- Explore agent theory, understanding the fundamental concepts of its operation and its application in Artificial Intelligence and software engineering
- Study the representation of knowledge, including the analysis of ontologies and their application in the organization of structured information
- Analyze the concept of the semantic web and its impact on the organization and retrieval of information in digital environments

- Evaluate and compare different knowledge representations, integrating these to improve the efficiency and accuracy of intelligent systems
- 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
- Explore the connection between biological and artificial neurons for a deeper understanding of model design
- 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
- Understand and apply regularization techniques to improve generalization and avoid overfitting in deep neural networks

Module 10. Model Customization and Training with TensorFlow

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

Module 11. Deep Computer Vision with Convolutional Neural Networks

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

- Develop 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
- Delve into the implementation and usefulness of neural networks in bio-inspired computing

Module 15. Artificial Intelligence: Strategies and Applications

- Develop strategies for the implementation of artificial intelligence in financial services
- 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
- Optimize human resources processes through the strategic use of artificial intelligence

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
- Implementing AI techniques to analyze design-related data, such as navigation behavior and user feedback

Module 17. Design-User Interaction and AI

- Understand the symbiosis between Interactive Design and AI to optimize the user experience
- 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

- Understand the transformative role of AI in design and manufacturing process innovation
- 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
- Understand the strategic integration of emerging technologies and AI in the Design domain
- 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 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
- Analyze how AI technologies can affect society, considering strategies to mitigate their possible negative impacts

05

Career Opportunities

This TECH program represents a unique opportunity for design professionals seeking to update their skills and master artificial intelligence tools applied to creative environments. Through advanced knowledge, graduates will be able to optimize processes, generate innovative content, and enhance user-technology interaction. With a practical and cutting-edge approach, this master's degree enables the development of key skills in generative design, data analysis, and interface automation. In addition, it offers an ethical and sustainable perspective on AI in design, driving creativity and innovation within the industry.

Integrate Artificial Intelligence to optimize resources and minimize environmental impact in every project"

Graduate Profile

The graduate of this TECH Professional Master's Degree will be a professional equipped to integrate Artificial Intelligence tools into design, enhancing automated content generation, interface optimization, and the personalization of visual experiences. They will have the skills to design, implement, and evaluate AI-based solutions that boost creativity and efficiency across various sectors. Additionally, they will be prepared to address ethical challenges and ensure the sustainable use of these technologies. This professional will also be capable of leading innovation projects, applying data analysis techniques in design, and exploring new forms of user-technology interaction.

Stand out with excellence in any area of design by integrating AI tools to optimize processes and deliver high-impact creative experiences.

- **Interface and UX Optimization:** Application of predictive algorithms to enhance user experience on digital platforms
- **Sustainable Project Development:** Implementation of AI strategies to minimize waste and promote responsible practices within the design industry
- **Data Management in Creative Projects:** Use of data mining and machine learning for strategic decision-making in Design
- **Ethics and Safety in Artificial Intelligence:** Application of regulations and standards to ensure the responsible use of AI in creative environments

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

1. **AI-Generated Content Designer:** Responsible for integrating neural networks and AI algorithms to create personalized images, videos, and graphic elements.
2. **UX/UI Optimization Specialist with AI:** In charge of applying predictive models to improve interaction and accessibility on digital platforms.
3. **AI Design Consultant:** Professional who advises and leads AI integration projects in creative and industrial sectors.
4. **Generative Design Expert for Industry and Art:** Specialist in creating structures and patterns based on generative design algorithms.
5. **AI Project Coordinator in Design:** Leader in the implementation of AI solutions in design agencies, architecture firms, and visual production studios.
6. **Researcher in Creative Innovation and Emerging Technologies:** Professional focused on exploring trends in machine learning, generative design, and the automation of creative processes.
7. **Natural Language Processing Specialist for Content Creation:** Applies AI techniques to develop automated texts, narratives, and editorial structures.
8. **Ethics and Sustainability Supervisor in AI-Assisted Design:** Professional responsible for regulating the ethical use of artificial intelligence in creative environments and minimizing its environmental impact.

06

Study Methodology

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

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

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

The student: the priority of all TECH programs

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

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

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

The most comprehensive study plans at the international level

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

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

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

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

Case Studies and Case Method

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

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

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

Relearning Methodology

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

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

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

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

A 100% online Virtual Campus with the best teaching resources

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

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

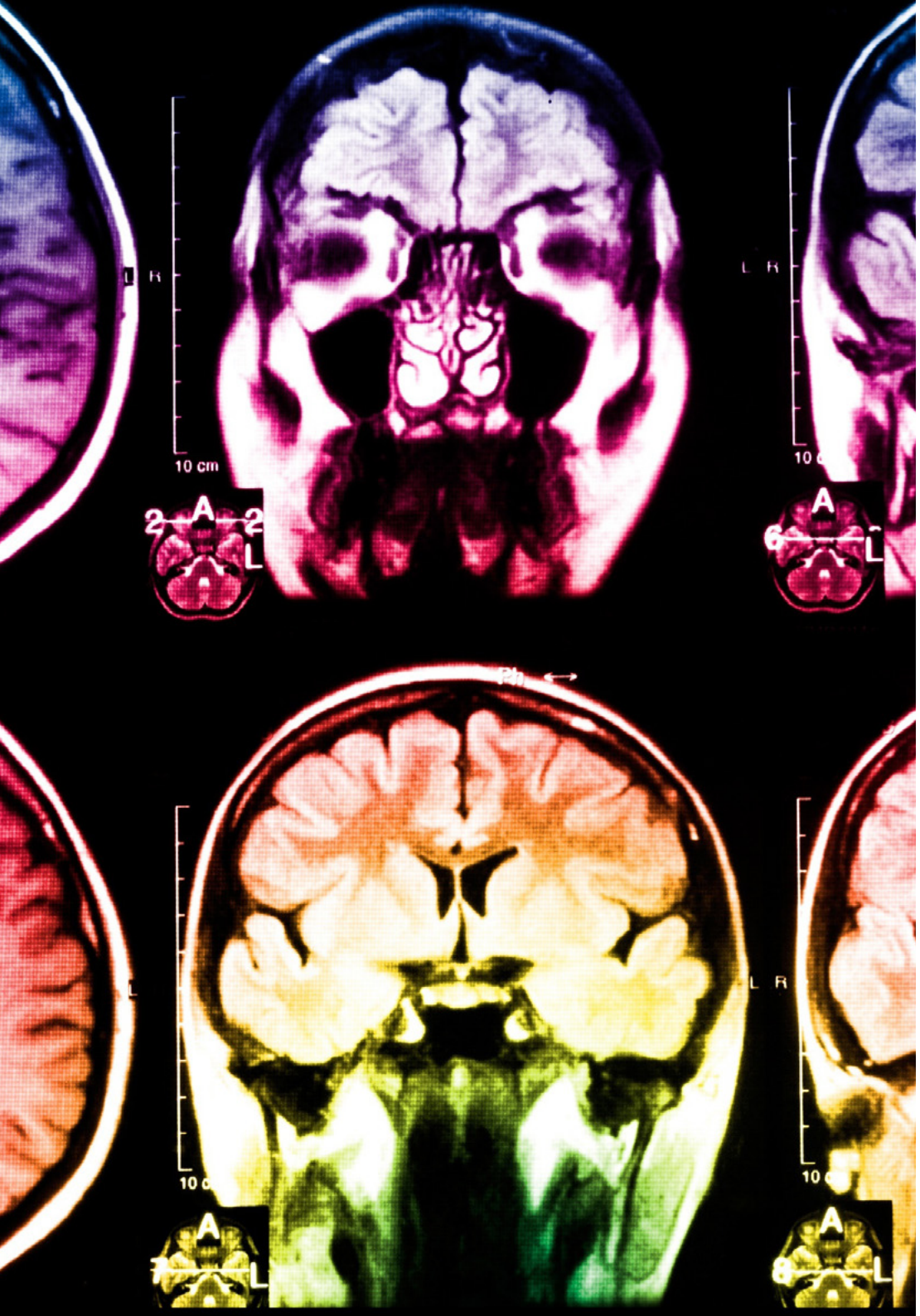
In order to facilitate tutor-student contact as much as possible, you will have a wide range of communication possibilities, both in real time and delayed (internal messaging, telephone answering service, email contact with the technical secretary, chat and videoconferences).

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

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

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

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



The university methodology top-rated by its students

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

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

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

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

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

Study Material

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

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

Practicing Skills and Abilities

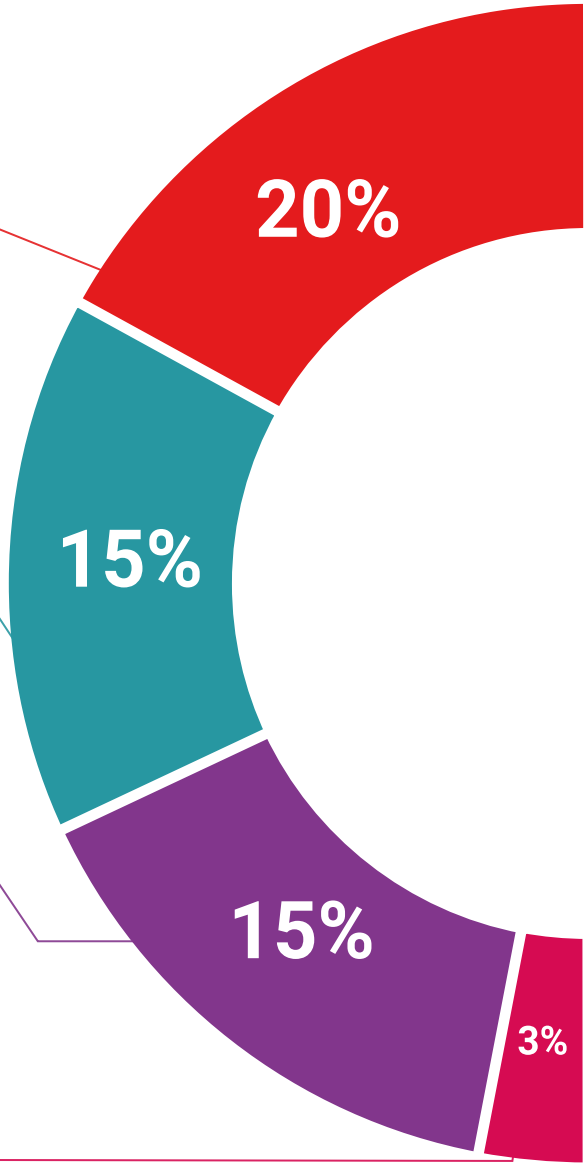
You will carry out activities to develop specific competencies and skills in each thematic field. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop within the framework of the globalization we live in.

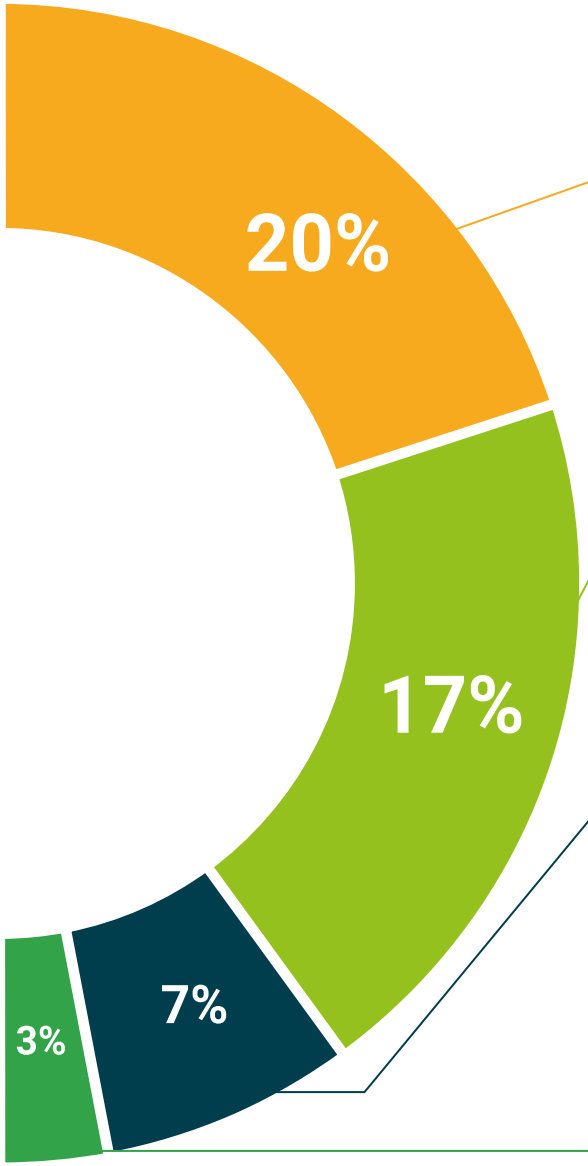
Interactive Summaries

We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge. This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

Additional Reading

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





Case Studies

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

Testing & Retesting

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

Classes

There is scientific evidence suggesting that observing third-party experts can be useful.
Learning from an expert strengthens knowledge and memory, and generates confidence for future difficult decisions.

Quick Action Guides

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

07

Teaching Staff

The faculty of this prestigious university program in Artificial Intelligence applied to Design are renowned pioneers in their field, leading the intersection of creativity and technology. They are regarded as top-level specialists, combining deep theoretical knowledge with extensive practical experience. Thanks to their ongoing commitment to innovation, they not only share cutting-edge knowledge and advanced tools but also inspire graduates to explore new frontiers in AI-driven design. Their bold pedagogical approach is marked by a clear vision and the ability to navigate the complexity of a constantly evolving field. This ensures that students are well-prepared to meet the future challenges of the discipline.

Implement AI tools that enable fluid, dynamic feedback. Enhance user interaction through virtual assistants"

International Guest Director

Flaviane Peccin is a leading **data scientist** with more than a decade of international experience applying **predictive modeling** and **machine learning** in various industries. Throughout her career, she has led innovative projects in the field of **Artificial Intelligence**, **data analytics** and **data-driven business decision making**, consolidating herself as an influential figure in the **digital transformation** of large corporations.

In this regard, she has held roles of great importance at **Visa**, as **Director** of **Artificial Intelligence** and **Machine Learning**, where she has been responsible for defining and executing the company's global **data science** strategy, with a particular focus on ***Machine Learning*** as a service. In addition, her leadership has ranged from collaboration with **commercial and scientific stakeholders**, to the implementation of **advanced algorithms** and **scalable technology solutions**, which have driven efficiency and accuracy in decision making. As such, her experience in integrating emerging trends in **Artificial Intelligence** and **Gen AI** has positioned her at the forefront of her field.

She has also worked as **Director** of **Data Science** in this same organization, leading a team of experts that has provided **analytical consulting** to clients in Latin America, developing **predictive models** that have optimized the **cardholder** lifecycle and significantly improved the management of **credit and debit portfolios**. Her career has also included key positions at **Souza Cruz**, **HSBC**, **GVT** and **Telefónica**, where she has contributed to the development of innovative solutions for **risk** management, **analytical models** and **fraud control**.

Therefore, with extensive experience in **Latin American** and **US** markets, Flaviane Peccin has been instrumental in the adaptation of products and services, using **advanced statistical techniques** and **deep data analysis**.

Ms. Peccin, Flaviane

- Director of Artificial Intelligence and Machine Learning at Visa, Miami, United States
- Director of Data Science at Visa
- Customer Analytics Manager at Visa
- Coordinator/Data Science Specialist at Souza Cruz
- Quantitative Modeling Analyst at HSBC
- Credit and Collections Analyst at GVT
- Statistical Analyst at Telefónica
- Master's Degree in Numerical Methods in Engineering from the Federal University of Paraná
- Bachelor's Degree in Statistics from the Federal University of Paraná

Thanks to TECH, you will be able to learn with the best professionals in the world"

Management

Dr. Peralta Martín-Palomino, Arturo

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

Mr. Maldonado Pardo, Chema

- 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

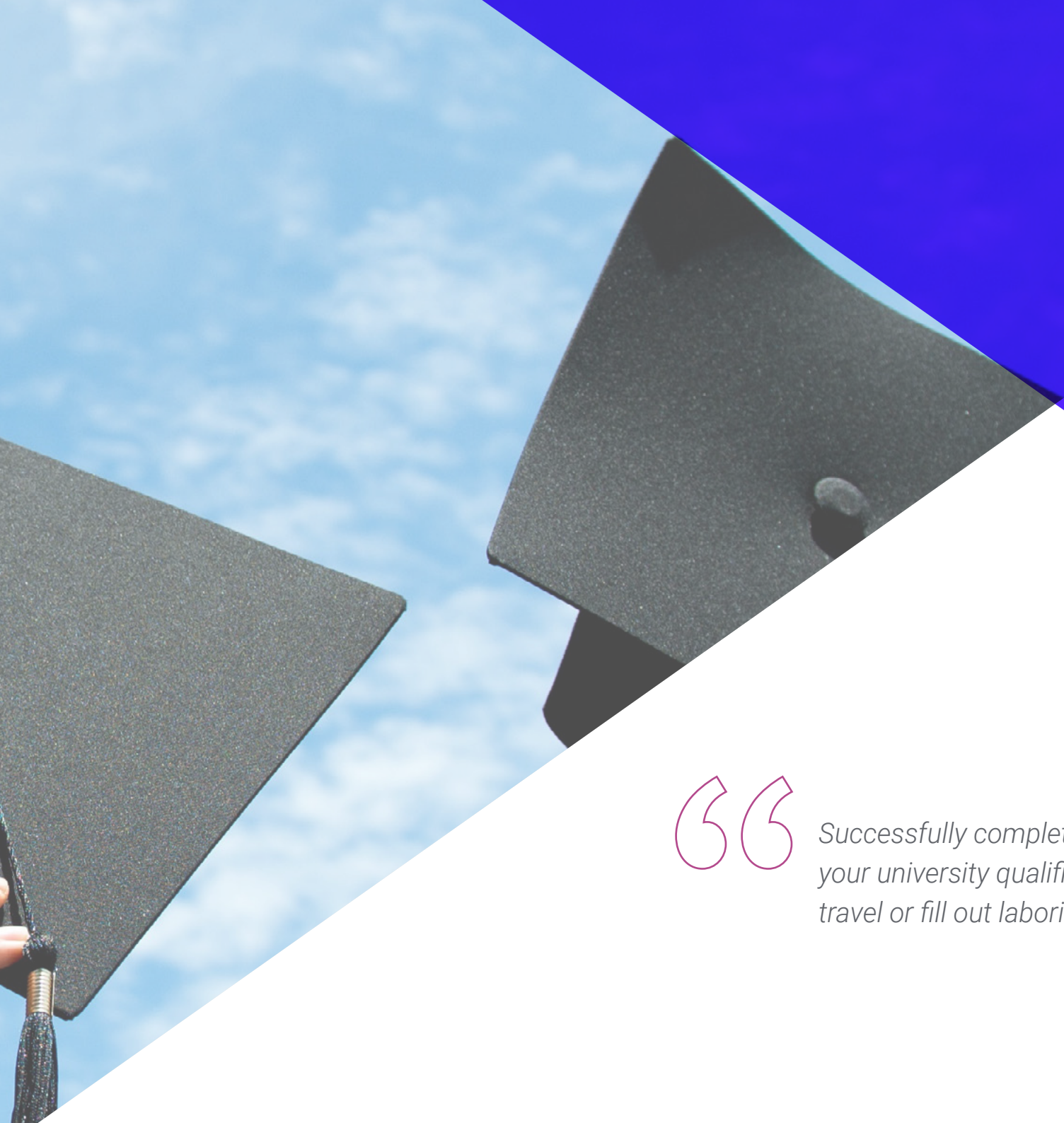
Ms. Parreño Rodríguez, Adelaida

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

08

Certificate

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



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

This private qualification will allow you to obtain a diploma for the **Professional Master's Degree in Artificial Intelligence in 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: **Professional Master's Degree in Artificial Intelligence in Design**

Modality: **online**

Duration: **12 months**

Accreditation: **90 ECTS**

tech global university

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

Professional Master's Degree in Artificial Intelligence in Design

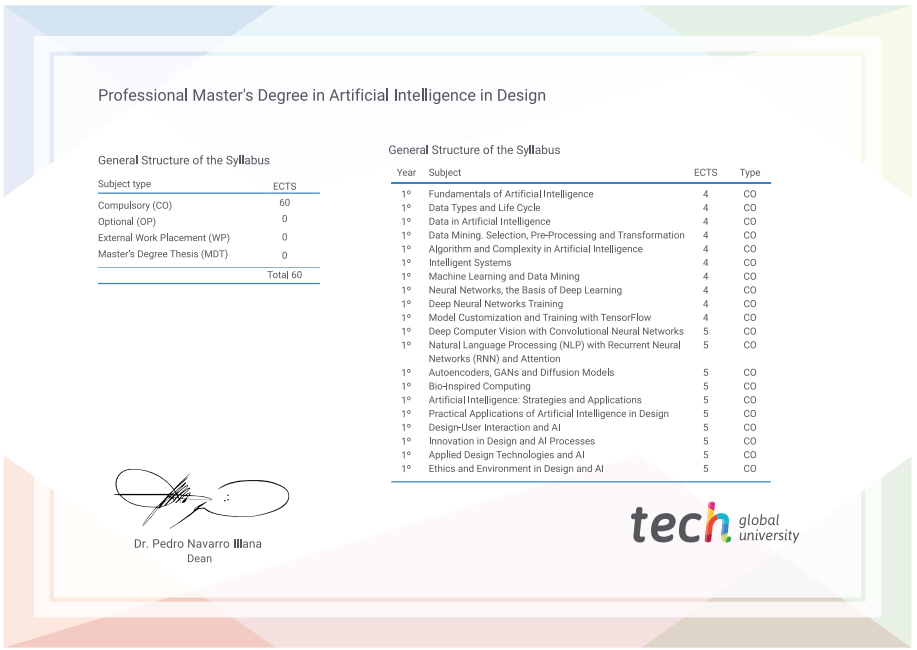
This is a private qualification of 1,800 hours of duration equivalent to 60 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

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

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

Dr. Pedro Navarro Illana
Dean

Unique TECH Code: AFWORD23S techtitute.com/certificates



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)	0
Master's Degree Thesis (MDT)	0
	Total 60

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Fundamentals of Artificial Intelligence	4	CO
1º	Data Types and Life Cycle	4	CO
1º	Data in Artificial Intelligence	4	CO
1º	Data Mining. Selection, Pre-Processing and Transformation	4	CO
1º	Algorithm and Complexity in Artificial Intelligence	4	CO
1º	Intelligent Systems	4	CO
1º	Machine Learning and Data Mining	4	CO
1º	Neural Networks, the Basis of Deep Learning	4	CO
1º	Deep Neural Networks Training	4	CO
1º	Model Customization and Training with TensorFlow	4	CO
1º	Deep Computer Vision with Convolutional Neural Networks	5	CO
1º	Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) and Attention	5	CO
1º	Autoencoders, GANs and Diffusion Models	5	CO
1º	Bio-Inspired Computing	5	CO
1º	Artificial Intelligence: Strategies and Applications	5	CO
1º	Practical Applications of Artificial Intelligence in Design	5	CO
1º	Design-User Interaction and AI	5	CO
1º	Innovation in Design and AI Processes	5	CO
1º	Applied Design Technologies and AI	5	CO
1º	Ethics and Environment in Design and AI	5	CO

Dr. Pedro Navarro Illana
Dean

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

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