Hybrid Professional Master's Degree
Artificial Intelligence in Design

tech global university

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Hybrid Professional Master's Degree

Artificial Intelligence in Design

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

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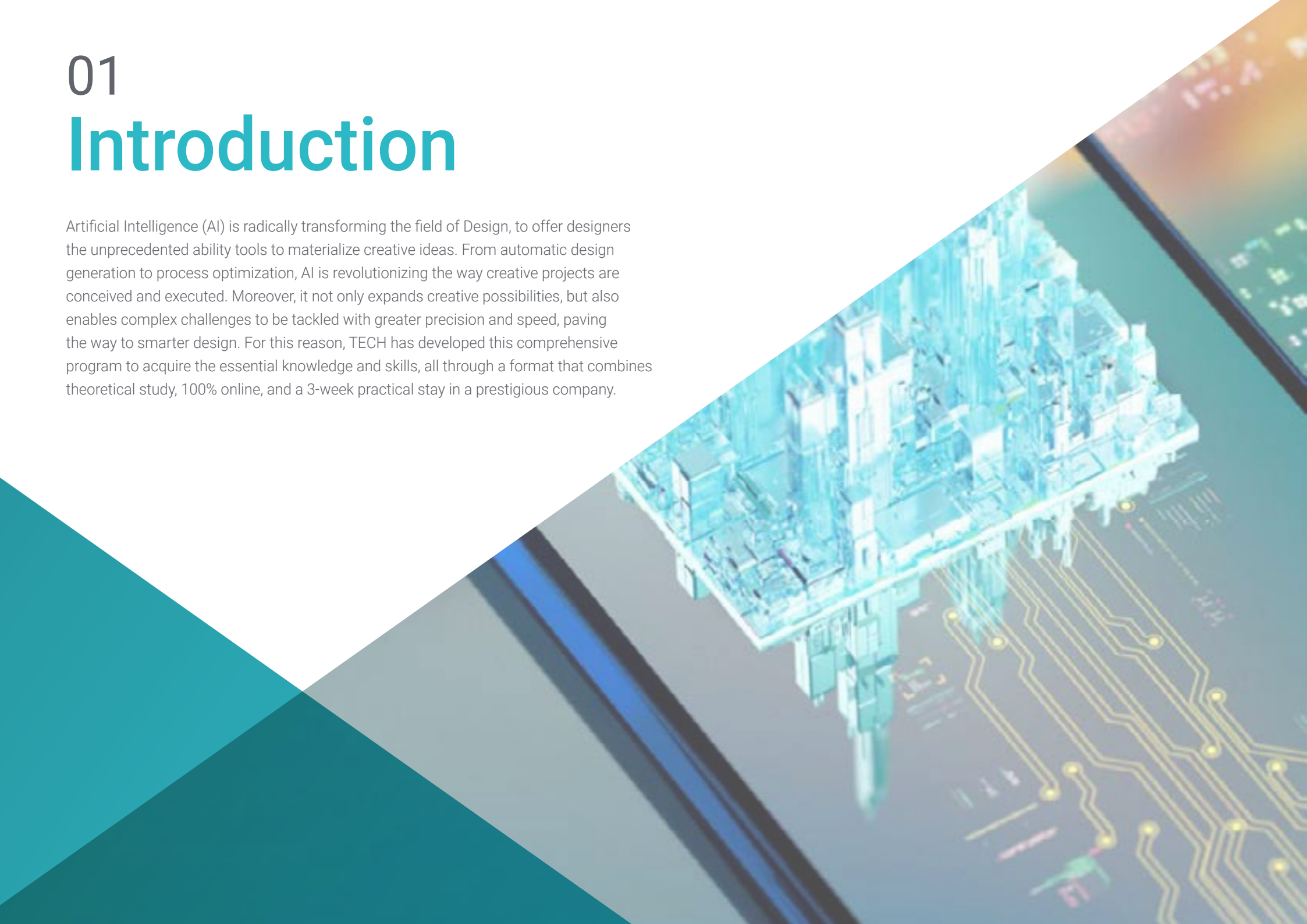
01

Introduction

Artificial Intelligence (AI) is radically transforming the field of Design, to offer designers the unprecedented ability tools to materialize creative ideas. From automatic design generation to process optimization, AI is revolutionizing the way creative projects are conceived and executed. Moreover, it not only expands creative possibilities, but also enables complex challenges to be tackled with greater precision and speed, paving the way to smarter design. For this reason, TECH has developed this comprehensive program to acquire the essential knowledge and skills, all through a format that combines theoretical study, 100% online, and a 3-week practical stay in a prestigious company.



Thanks to this Hybrid Professional Master's Degree, you will integrate intelligent algorithms into your Design work, accessing deeper data analysis, automating repetitive tasks, and generating innovative solutions"

Artificial Intelligence (AI) offers designers a wide range of tools and capabilities to boost their creativity and efficiency. From automatic design generation to process optimization, AI provides the opportunity to explore new frontiers and innovative solutions. It also facilitates customization and rapid adaptation to changing market needs, allowing designers to focus on creative expression and the creation of meaningful experiences for users.

This is how this Hybrid Professional Master's Degree was created, in which designers will apply collaborative tools powered by AI, improving communication and efficiency in design teams. In addition, they will analyze how to incorporate emotional aspects in designs using techniques that effectively connect with the audience, and how AI can influence the emotional perception of Design.

Likewise, the interaction between Design and user through AI will be deepened, developing skills in adaptive design and critically analyzing the challenges and opportunities when implementing personalized designs. Predictive algorithms will also be used to anticipate user interactions and develop AI-based recommender systems, enabling the creation of more personalized and efficient user experiences.

Finally, innovation in design processes through Artificial Intelligence will be addressed, from mass customization of products to the application of techniques to minimize waste and foster creativity in design. Likewise, professionals will acquire practical skills to use AI as a tool to generate innovative and sustainable solutions.

Therefore, this Hybrid Professional Master's Degree will include an internship in a prestigious international company. During 3 weeks, the professionals will join a multidisciplinary work team to carry out tasks related to creative and design projects. It should be noted that, during this stage, they will be accompanied by a specialized tutor, who will reinforce the mastery of the contents by means of the use of the most avant-garde tools in this area.

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

- Development of more than 100 case studies presented by design professionals specialized in the use of Artificial Intelligence and university professors with extensive experience in the field
- Its graphic, schematic and practical contents provide essential information on those disciplines that are indispensable for professional practice
- All of this will be complemented by theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection
- Furthermore, you will be able to carry out an internship in one of the best companies

You will integrate Artificial Intelligence into your designs, leveraging tangible benefits to drive innovation and excellence in your profession. What are you waiting for to enroll?"

You will carry out an intensive practical internship, lasting 3 weeks, in a prestigious institution, so that you acquire the knowledge and skills essential to grow personally and professionally"

In this Hybrid Professional Master's Degree proposal, of a professionalizing character and blended learning modality, the program is aimed at updating Design professionals who develop their activity using Artificial Intelligence tools, which require a high level of qualification. The contents are based on the latest scientific evidence, and oriented in a didactic way to integrate the theoretical knowledge in the practice of Artificial Intelligence in Design, and the theoretical-practical elements will facilitate the updating of knowledge and will allow decision making in patient management.

Thanks to its multimedia content elaborated with the latest educational technology, they will allow the design professional a situated and contextual learning, that is, a simulated environment that will provide an immersive learning programmed to specialize in real situations. This program is designed around Problem-Based Learning, whereby the physician must try to solve the different professional practice situations that arise during the course. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

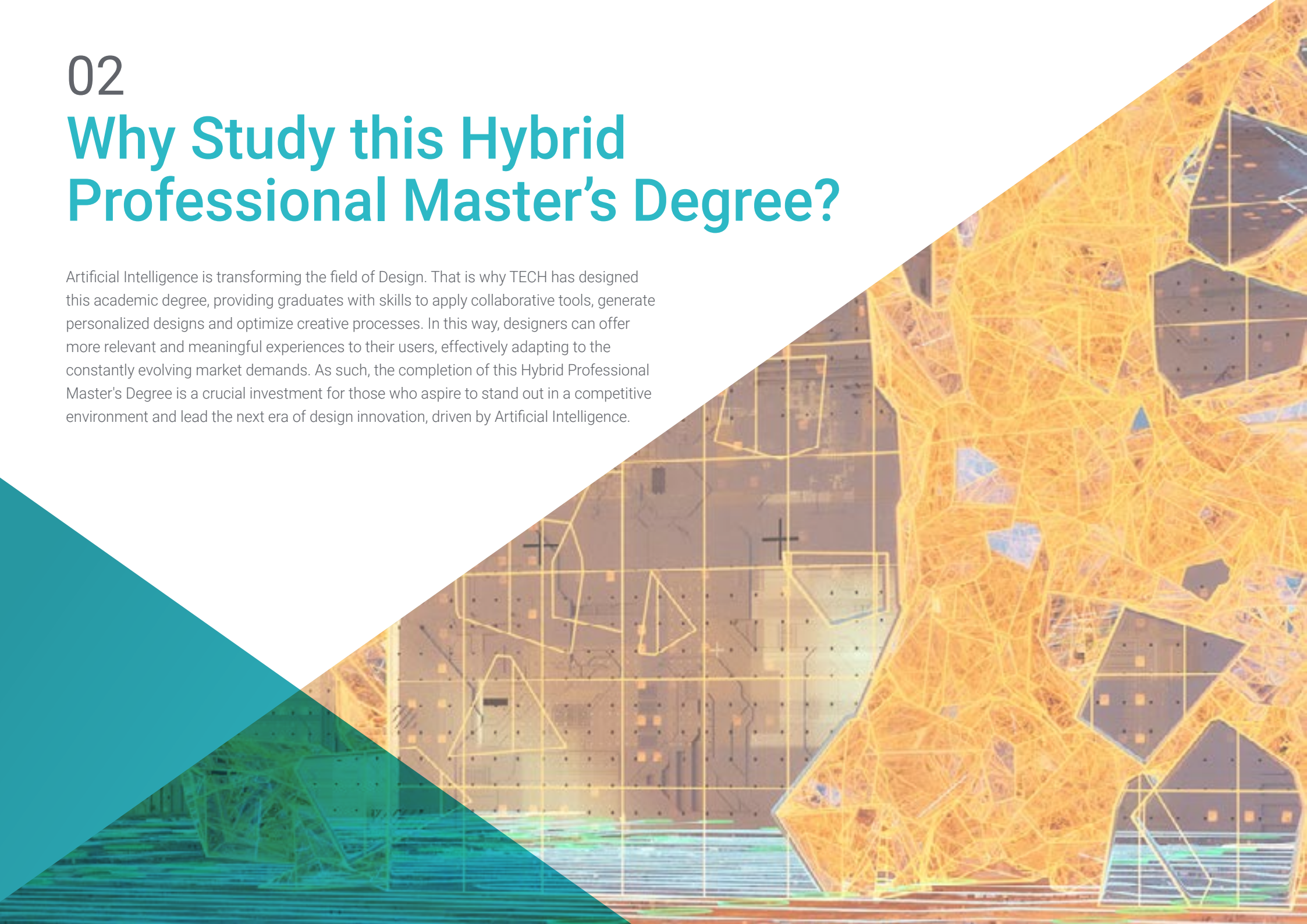
You will master specific tools, such as Generative Adversarial Networks (GANs), essential to automate the generation of visual elements and optimize creative processes.

Through this university program, you will be prepared to face the challenges and take advantage of the opportunities offered by AI in the field of Design, always maintaining an ethical and responsible approach.

02

Why Study this Hybrid Professional Master's Degree?

Artificial Intelligence is transforming the field of Design. That is why TECH has designed this academic degree, providing graduates with skills to apply collaborative tools, generate personalized designs and optimize creative processes. In this way, designers can offer more relevant and meaningful experiences to their users, effectively adapting to the constantly evolving market demands. As such, the completion of this Hybrid Professional Master's Degree is a crucial investment for those who aspire to stand out in a competitive environment and lead the next era of design innovation, driven by Artificial Intelligence.



You will address ethical and environmental issues, preparing you to lead with responsibility and contribute to a sustainable future in the Design industry"

1. Updating from the latest technology available

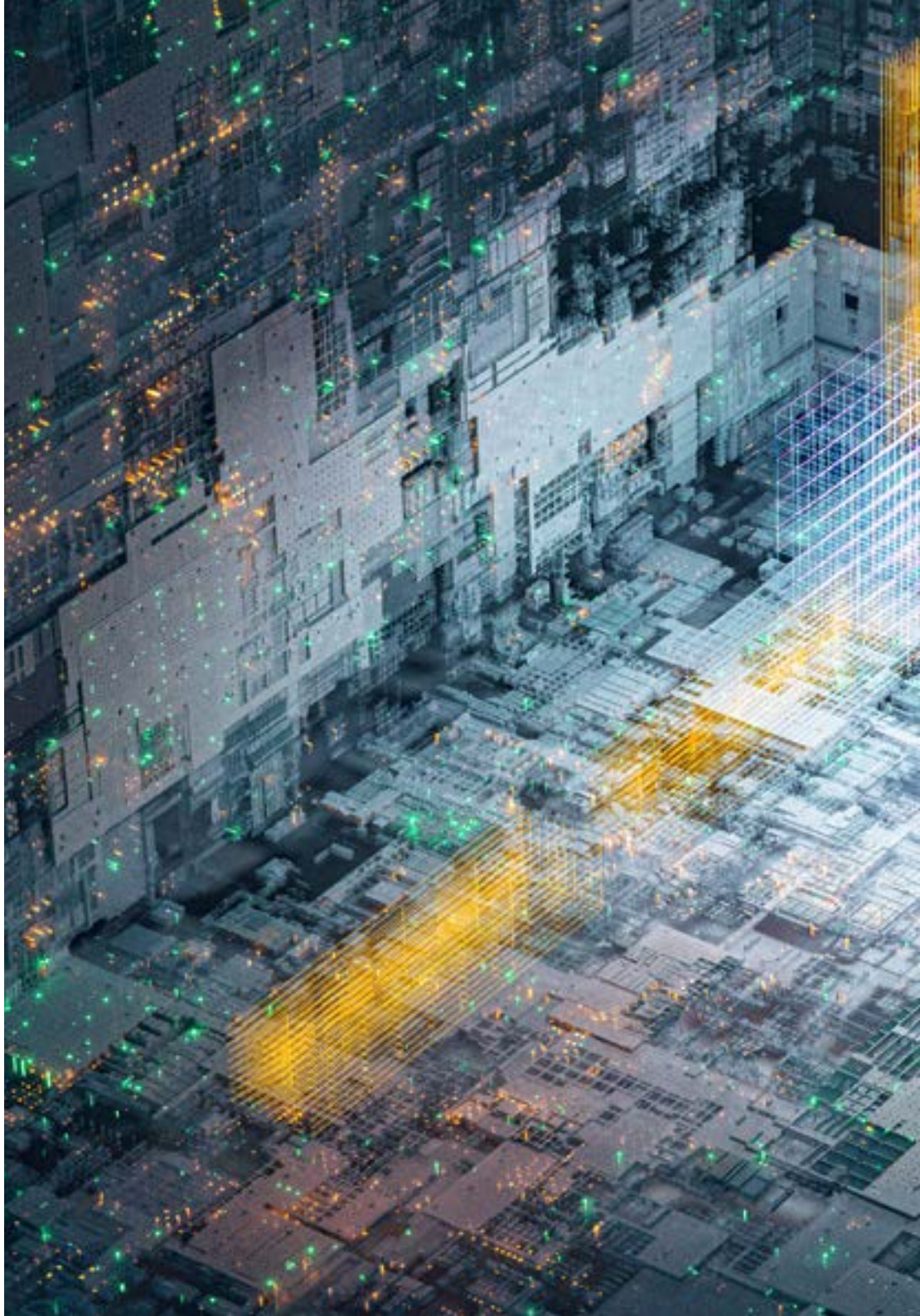
Artificial Intelligence technologies are having a significant impact on Design. For example, these tools have the ability to automate repetitive and tedious tasks, allowing designers to focus on more creative and strategic aspects of their work. Through this Hybrid Professional Master's Degree, students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

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

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

3. Entering first-class professional environments

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



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

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

5. Expanding the boundaries of knowledge

TECH offers graduates the opportunity to carry out their internships, not only in centers of national importance, but also internationally. In this way, students will be able to expand their frontiers and catch up with the best professionals, who work in leading companies.

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

03

Objectives

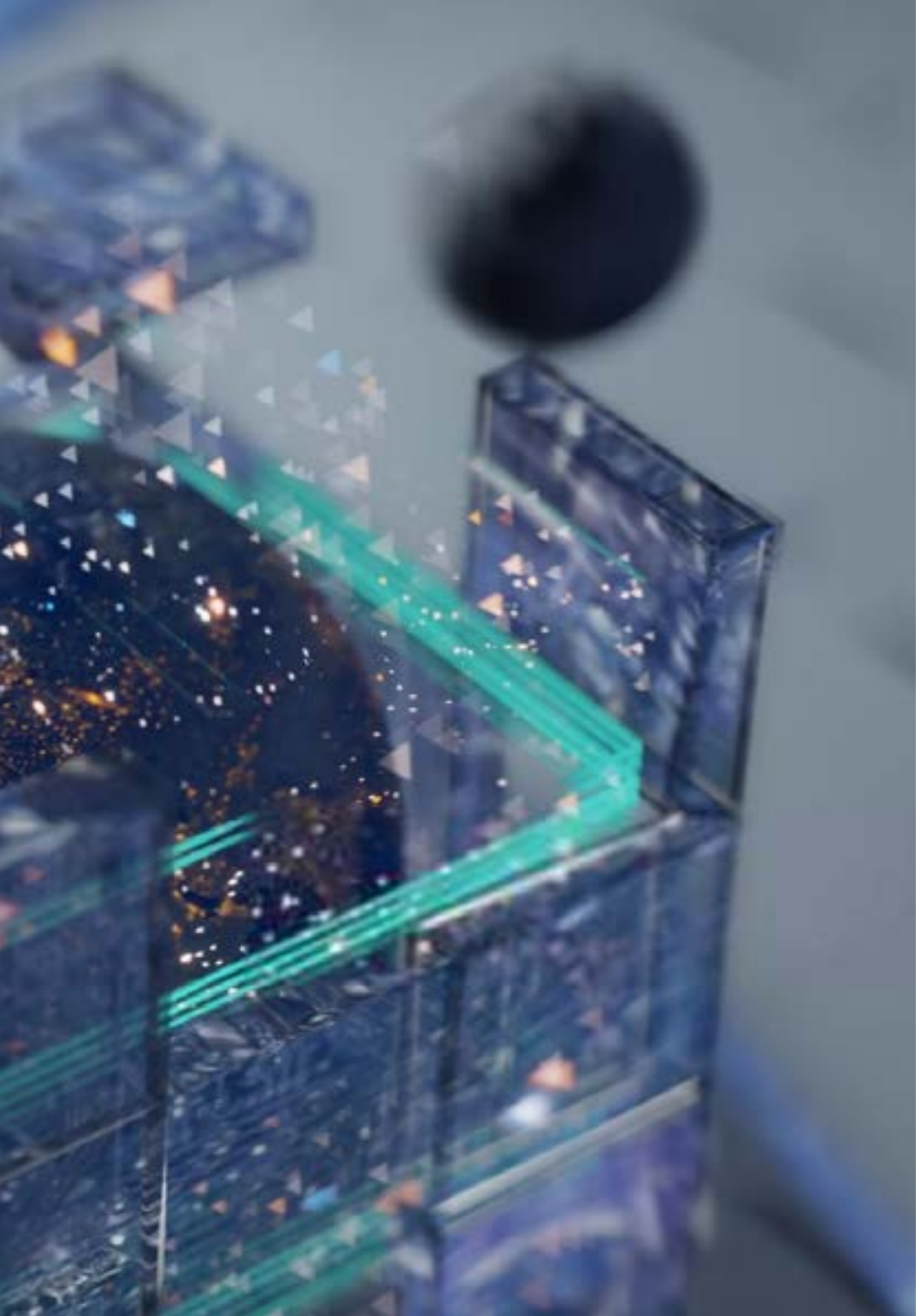
The university program will equip designers with the skills and knowledge necessary to take full advantage of AI in their professional practice. Therefore, the main objective will be to specialize professionals to effectively apply collaborative tools and AI frameworks in their projects, improving communication, efficiency and creativity in design teams. In addition, it will analyze how AI can influence the emotional perception of Design, allowing graduates to incorporate emotional aspects effectively in their creations.

Through a combination of theory and practice, this program will enable you to lead innovation in the field of Design, adapting effectively to technological and ethical changes"

General Objective

- The objective of the Hybrid Professional Master's Degree in Artificial Intelligence in Design will be to provide professionals with a deep and practical understanding of how AI is transforming this discipline. Therefore, designers will acquire the necessary skills to effectively integrate AI into their creative process, taking advantage of collaborative tools and specific frameworks to improve communication and efficiency in design teams. In addition, they will analyze how AI can influence the emotional perception of Design, allowing them to create more meaningful and personalized experiences for their users

The objective of this Hybrid Professional Master's Degree will be to prepare you to face the challenges and take advantage of the opportunities presented by the integration of AI in the field of Design"



Specific Objectives

Module 1. Fundamentals of Artificial Intelligence

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

Module 2. Data Types and Data Life Cycle

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

Module 3. Data in Artificial Intelligence

- Master the fundamentals of data science, covering tools, types and sources for information analysis
- Study the structure and characteristics of datasets, understanding their importance in the preparation and use of data for Artificial Intelligence models
- Analyze supervised and unsupervised models, including methods and classification
- Use specific tools and best practices in data handling and processing, ensuring efficiency and quality in the implementation of Artificial Intelligence

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

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

Module 5. Algorithm and Complexity in Artificial Intelligence

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

- Study the representation of knowledge, including the analysis of ontologies and their application in the organization of structured information
- Analyze the concept of the semantic web and its impact on the organization and retrieval of information in digital environments
- Evaluate and compare different knowledge representations, integrating these to improve the efficiency and accuracy of intelligent systems
- Study semantic reasoners, knowledge-based systems and expert systems, understanding their functionality and applications in intelligent decision making

Module 7. Machine Learning and Data Mining

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

Module 8. Neural Networks, the Basis of Deep Learning

- Master the fundamentals of Deep Learning, understanding its essential role in Deep Learning
- Explore the fundamental operations in neural networks and understand their application in model building
- Analyze the different layers used in neural networks and learn how to select them appropriately
- Understand the effective linking of layers and operations to design complex and efficient neural network architectures
- Use trainers and optimizers to tune and improve the performance of neural networks
- Tune hyperparameters for Fine Tuning of neural networks, optimizing their performance on specific tasks

Module 9. Deep Neural Networks Training

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

Module 10. Model Customization and Training with TensorFlow

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

Module 11. Deep Computer Vision with Convolutional Neural Networks

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

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

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

Module 13. Autoencoders, GANs and Diffusion Models

- Develop efficient representations of data using Autoencoders, GANs and Diffusion Models
- Perform PCA using an incomplete linear autoencoder to optimize data representation
- Implement and understand the operation of stacked autoencoders
- Explore and apply convolutional autoencoders for efficient visual data representations
- Analyze and apply the effectiveness of sparse automatic encoders in data representation
- Generate fashion images from the MNIST dataset using Autoencoders
- Understand the concept of Generative Adversarial Networks (GANs) and Diffusion Models
- Implement and compare the performance of Diffusion Models and GANs in data generation

Module 14. Bio-Inspired Computing

- Introduce the fundamental concepts of bio-inspired computing
- Explore social adaptation algorithms as a key approach in bio-inspired computing
- Analyze space exploration-exploitation strategies in genetic algorithms
- Examine models of evolutionary computation in the context of optimization
- Continue detailed analysis of evolutionary computation models
- Apply evolutionary programming to specific learning problems
- Address the complexity of multi-objective problems in the framework of bio-inspired computing
- Explore the application of neural networks in the field of bio-inspired computing

Module 15. Artificial Intelligence: Strategies and Applications

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

Module 16. Practical Applications of Artificial Intelligence in Design

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

Module 17. Design-User Interaction and AI

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

Module 18. Innovation in Design and AI Processes

- Implement mass customization strategies in production using Artificial Intelligence, tailoring 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
- Apply microchip architecture optimization techniques using AI to improve both performance and efficiency
- Properly use algorithms for the automatic generation of multimedia content, enriching visual communication in editorial projects
- Implement the knowledge and skills acquired during this program to real projects involving technologies and AI in Design

Module 20. Ethics and Environment in Design and AI

- Understand the ethical principles related to Design and Artificial Intelligence, cultivating an ethical awareness in decision making
- Focus on the ethical integration of technologies, such as emotion recognition, ensuring immersive experiences that respect the user's privacy and dignity
- Promote social and environmental responsibility in video game design and in the industry in genera, 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

04

Skills

Through this program, designers will develop advanced skills in the application of collaborative tools and specific Artificial Intelligence frameworks, improving communication and efficiency in design teams. In addition, they will be able to incorporate emotional aspects in their creations, taking advantage of innovative techniques that connect more deeply with the audience. With a focus on the automatic generation of visual content and the personalization of user experiences, professionals will become experts in using predictive algorithms and recommendation systems, based on AI, to create innovative and user-centered solutions.

This Hybrid Professional Master's Degree will equip you to successfully lead in an environment where AI plays an increasingly central role in the creative process and user experience"

General Skills

- Master data mining techniques, including complex data selection, preprocessing and transformation
- Design and develop intelligent systems capable of learning and adapting to changing environments
- Control machine learning tools and their application in data mining for decision making
- Employ Autoencoders, GANs and Diffusion Models to solve specific challenges in Artificial Intelligence
- Implement an encoder-decoder network for neural machine translation
- Apply the fundamental principles of neural networks in solving specific problems
- Acquire practical skills in the use of IA tools, platforms, and techniques, addressing everything from data analysis to the application of neural networks and predictive modeling
- Conceive and execute projects using generative techniques, understanding their application in industrial and artistic environments
- Use predictive AI algorithms to anticipate user interactions, enabling proactive and efficient design responses
- Apply Artificial Intelligence techniques to minimize waste in the design process, contributing to more sustainable practices

Specific Skills

- Apply AI techniques and strategies to improve efficiency in the retail sector
- Delve into understanding and application of genetic algorithms
- Implement noise removal techniques using automatic encoders
- Effectively create training data sets for natural language processing (NLP) tasks
- Run grouping layers and their use in Deep Computer Vision models with Keras
- Use TensorFlow features and graphics to optimize the performance of custom models
- Optimize the development and application of chatbots and virtual assistants, understanding their operation and potential applications
- Master reuse of pre-workout layers to optimize and accelerate the training process
- Build the first neural network, applying the concepts learned in practice
- Activate Multilayer Perceptron (MLP) using the Keras library
- Apply data scanning and preprocessing techniques, identifying and preparing data for effective use in machine learning models
- Implement effective strategies for handling missing values in datasets, applying imputation or elimination methods according to context
- Investigate languages and software for the creation of ontologies, using specific tools for the development of semantic models
- Develop data cleaning techniques to ensure the quality and accuracy of the information used in subsequent analyses
- Implement Artificial Intelligence tools in design projects, including automatic content generation, optimization and pattern recognition
- Conceive and execute projects using generative techniques, understanding their application in industrial and artistic environments
- Use predictive AI algorithms to anticipate user interactions, enabling proactive and efficient design responses
- Develop practical skills to apply AI techniques to improve industrial and design processes
- Apply microchip architecture optimization techniques using Artificial Intelligence to improve performance and efficiency
- Properly use algorithms for the automatic generation of multimedia content, enriching visual communication in editorial projects

You will acquire key skills to effectively navigate the modern world of AI-driven Design, all thanks to an extensive library of multimedia resources"

05

Course Management

The teachers of this Hybrid Professional Master's Degree are highly qualified and experienced experts in the intersection between Artificial Intelligence and Design. In fact, their diverse and deep experience allows them to offer a comprehensive perspective on how Artificial Intelligence is transforming the field of Design.
In addition to possessing a strong academic background, these mentors are committed to developing practical skills in graduates, providing guidance and fostering a collaborative learning environment.

The faculty of this Hybrid Professional Master's Degree will inspire you to explore new frontiers and lead the next generation of AI-driven Design"

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 Universidade Federal do Paraná
- Bachelor's Degree in Statistics from Universidade Federal do 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 Shephers GmbH
- Consultant and Strategic Business Advisor at Alliance Medical
- Director of Design and Development at DocPath
- PhD. in Psychology from the University of Castilla La Mancha
- PhD in Economics, Business and Finance from the Camilo José Cela University
- PhD in Psychology from University of Castilla La Mancha
- Máster in Executive MBA por la Universidad Isabel I
- Master's Degree in Sales and Marketing Management, Isabel I University
- Expert Master's Degree in Big Data by Hadoop Training
- Master's Degree in Advanced Information Technologies from the University of Castilla La Mancha
- Member of the: 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 Artisan Printer at Lozano Artes Gráficas
- Layout and Graphic Designer in Gráficas Lozano
- ETSI Telecommunications from the Polytechnic University of Madrid
- ETS Computer Systems ETSI from 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

06

Educational Plan

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

You will master programming languages, such as TensorFlow, to deploy Artificial Intelligence models in Design environments. With all the quality guarantees that characterize TECH!"

Module 1. Fundamentals of Artificial Intelligence

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

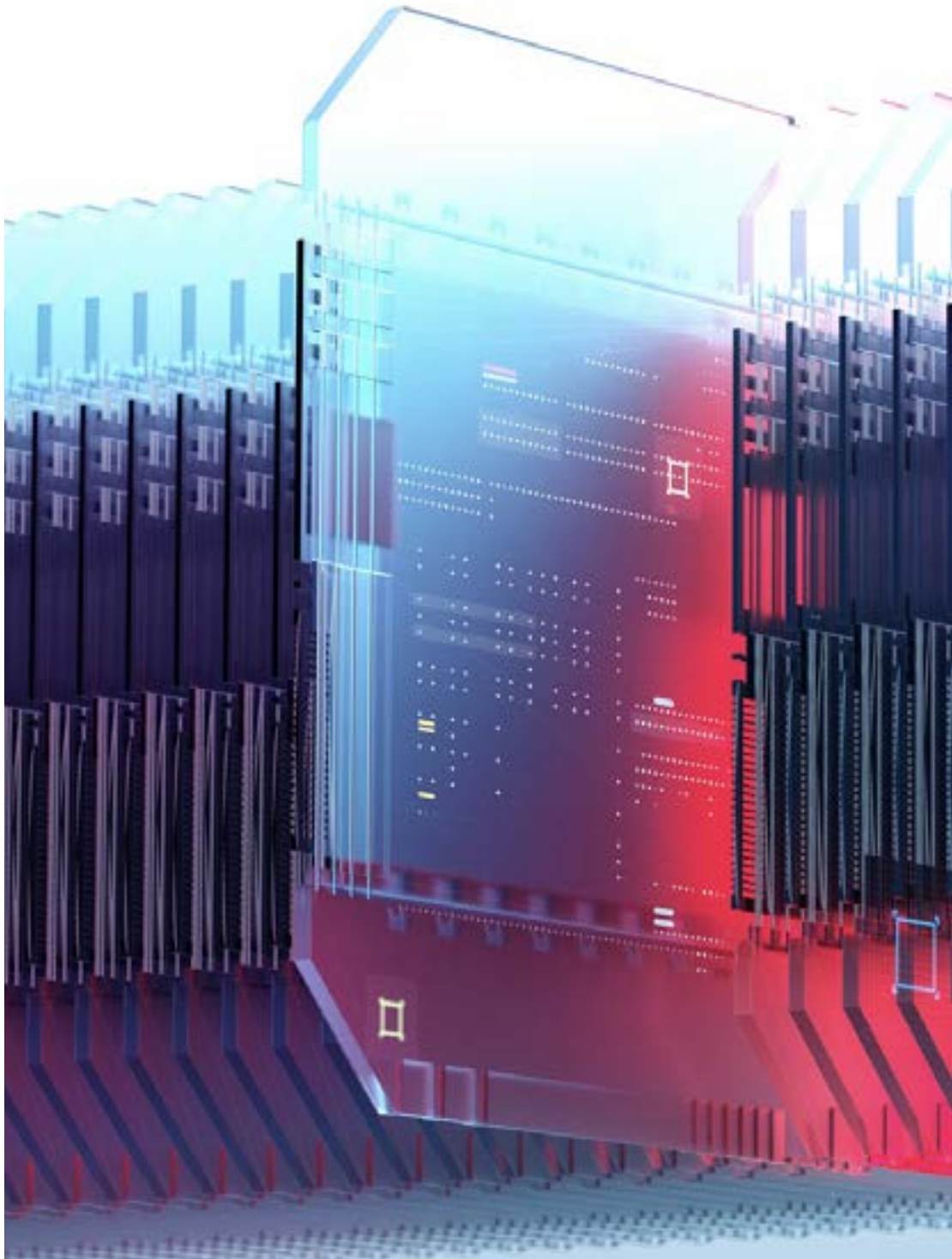
1.2. Artificial Intelligence in Games
- 1.2.1. Game Theory
- 1.2.2. Minimax and Alpha-Beta Pruning
- 1.2.3. Simulation: Monte Carlo

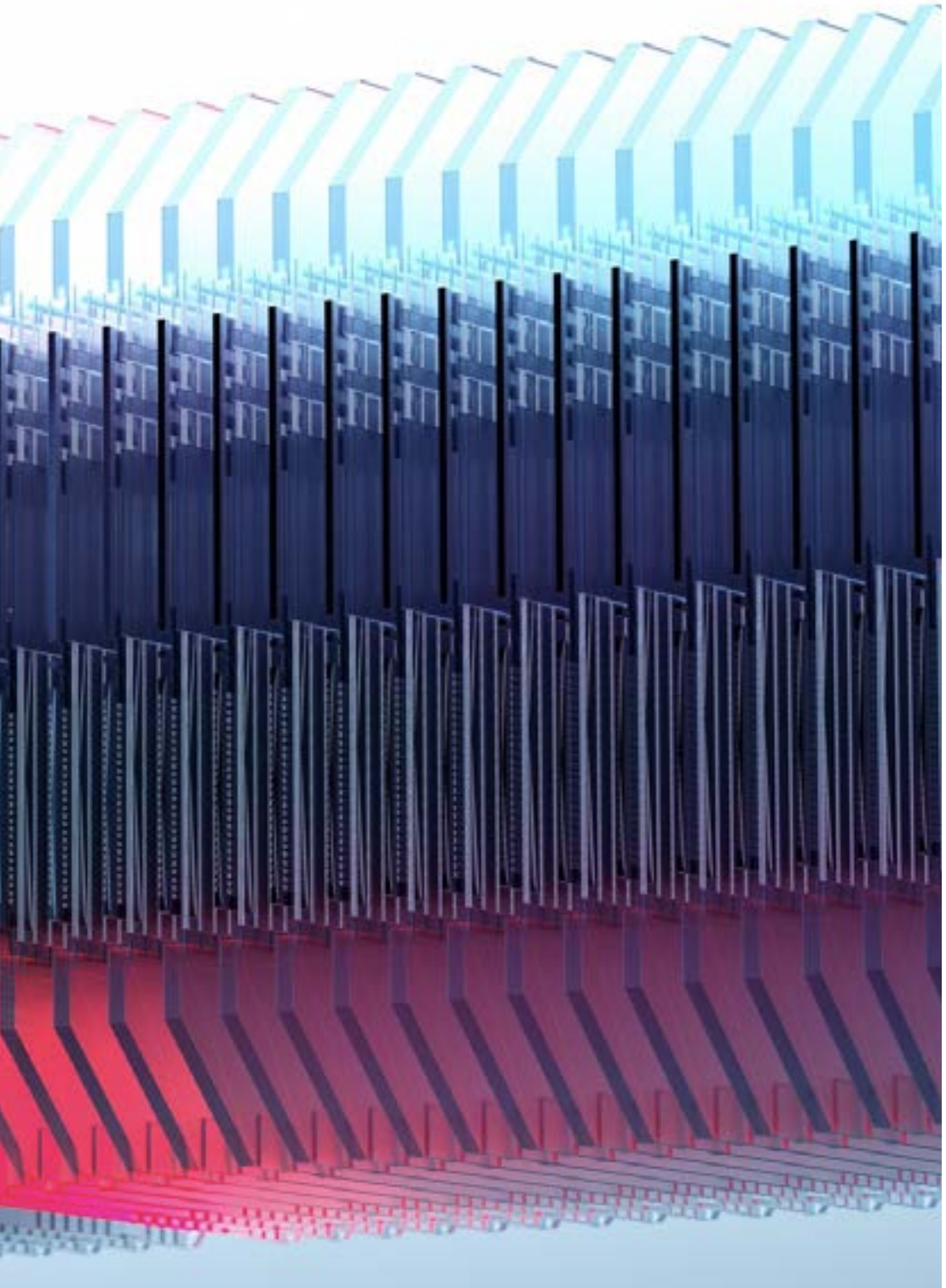
1.3. Neural Networks
- 1.3.1. Biological Fundamentals
- 1.3.2. Computational Model
- 1.3.3. Supervised and Unsupervised Neural Networks
- 1.3.4. Simple Perceptron
- 1.3.5. Multilayer Perceptron.

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

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

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





1.7. Expert systems and DSS
  1.7.1. Expert Systems
  1.7.2. Decision Support Systems
1.8. Chatbots and Virtual Assistants
  1.8.1. Types of Assistants: Voice and Text-Based Assistants.
  1.8.2. Fundamental Parts for the Development of an Assistant: Intents, Entities and Dialog Flow
  1.8.3. Integrations: Web, Slack, WhatsApp, Facebook
  1.8.4. Assistant Development Tools: Dialog Flow, Watson Assistant
1.9. AI Implementation Strategy
1.10. Future of Artificial Intelligence
  1.10.1. Understand How to Detect Emotions Using Algorithms
  1.10.2. Creating a Personalities: Language, Expressions and Content
  1.10.3. Trends of Artificial Intelligence
  1.10.4. Reflections

Module 2. Data Types and Data Life Cycle

2.1. Statistics
  2.1.1. Statistics: Descriptive Statistics, Statistical Inferences
  2.1.2. Population, Sample, Individual
  2.1.3. Variables: Definition, Measurement Scales
2.2. Types of Data Statistics
  2.2.1. According to Type
    2.2.1.1. Quantitative: Continuous Data and Discrete Data
    2.2.1.2. Qualitative: Binomial Data, Nominal Data and Ordinal Data
  2.2.2. According to their Shape
    2.2.2.1. Numeric
    2.2.2.2. Text:
    2.2.2.3. Logical
  2.2.3. According to its Source
    2.2.3.1. Primary
    2.2.3.2. Secondary

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

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

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

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

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

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

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

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

Module 3. Data in Artificial Intelligence

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4.7. From Continuous to Discrete Attributes
- 4.7.1. Continuous Data Vs. Discreet Data
- 4.7.2. Discretization Process

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

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

4.10. Data Pre-Processing in Big Data Environments

Module 5. Algorithm and Complexity in Artificial Intelligence

5.1. Introduction to Algorithm Design Strategies
- 5.1.1. Recursion
- 5.1.2. Divide and Conquer
- 5.1.3. Other Strategies

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

5.3. Sorting Algorithms
- 5.3.1. Concept of Sorting
- 5.3.2. Bubble Sorting
- 5.3.3. Sorting by Selection
- 5.3.4. Sorting by Insertion
- 5.3.5. Merge Sort
- 5.3.6. Quick Sorting (Quick_Sort)

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

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

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

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

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

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

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

Module 6. Intelligent Systems

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

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

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

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

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

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

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

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

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

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

Module 7. Machine Learning and Data Mining

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

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

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

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

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

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

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

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

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

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

Module 8. Neural Networks, the Basis of Deep Learning

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

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

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

8.4. Union of Layers and Operations
- 8.4.1. Architecture Design
- 8.4.2. Connection between layers
- 8.4.3. Forward propagation

8.5. Construction of the first neural network
- 8.5.1. Network Design
- 8.5.2. Establish the Weights
- 8.5.3. Network Training

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

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

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

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

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

Module 9. Deep Neural Networks Training

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

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

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

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

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

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

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

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

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

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

Module 10. Model Customization and Training with TensorFlow

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

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

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

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

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

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

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

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

10.9. The TensorFlow Datasets Project
- 10.9.1. Using TensorFlow Datasets for Data Loading
- 10.9.2. Preprocessing Data with TensorFlow Datasets
- 10.9.3. Using TensorFlow Datasets for Model Training

10.10. Building a Deep Learning App with TensorFlow
- 10.10.1. Practical Application
- 10.10.2. Building a Deep Learning App with TensorFlow
- 10.10.3. Model Training with TensorFlow
- 10.10.4. Use of the Application for the Prediction of Results

Module 11. Deep Computer Vision with Convolutional Neural Networks

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

11.2. Convolutional Layers
- 11.2. 1 Reuse of Weights in Convolution
- 11.2.2. Convolution D
- 11.2.3. Activation Functions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Module 13. Autoencoders, GANs and Diffusion Models

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

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

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

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

13.5. Automatic Encoder Denoising
- 13.5.1. Filter Application
- 13.5.2. Design of Coding Models
- 13.5.3. Use of Regularization Techniques

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

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

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

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

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

Module 14. Bio-Inspired Computing

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

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

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

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

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

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

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

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

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

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

Module 15. Artificial Intelligence: Strategies and Applications

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

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

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

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

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

15.6. Potential risks related to the use of AI in industry
- 15.6.1. Case Uses
- 15.6.2. Potential Risks Related to the Use of AI
- 15.6.3. Potential Future Developments/uses of AI

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

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

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

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

Module 16. Practical Applications of Artificial Intelligence in Design

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

16.2. Dynamic Personalization of User Interfaces using AI
- 16.2.1. UI/UX Personalization Principles
- 16.2.2. Recommendation Algorithms in Interface Personalization
- 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 Revision and Adjustment Process

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

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

16.7. Color and Composition Optimization 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's 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 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 Behavioral-Based Design Suggestions
- 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 Behavioral 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 User Behavior Prediction
- 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 Character and Enemy Generation in Video Game Development
- 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 for Improving Character Behavior
- 17.5.3. Continuous Adaptation and Learning of AI in Games
- 17.5.4. Technical and Creative Challenges in Character AI Enhancement

17.6. Custom Design in the Industry: Challenges and Opportunities
- 17.6.1. Transformation of Industrial Design with Customization
- 17.6.2. Enabling Technologies for Customized Design
- 17.6.3. Challenges in Implementing Customized Design to 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 Handling Sensitive Data

17.10. Application of AI Techniques for Usability Enhancement
- 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 Implementing AI Simulations
- 18.1.4. Future Perspectives: Advances in Process Optimization with AI

18.2. Virtual Prototypes Creation: 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: Applicability 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-Assisted Design Tools. (Fotor and Snappa)
- 18.6.1. Gan-Generation Aided Design (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. Human-Robot Collaborative 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 Extending Product Lifetime
- 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 Typographies and Visual Styles
- 18.9.1. Fundamentals of Automatic Typeface 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 to Monitor Products in Real-Time
- 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 Analytics 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 and AutoCAD
- 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 with Bootpress, Botium and Rasa
- 19.3.4. Conversational Interface for User Feedback

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

19.5. Realistic Simulations in Video Game Design with TextureLab and Leonardo
- 19.5.1. Importance of Realistic Simulations in the Video Game Industry
- 19.5.2. Modeling and Simulation of Realistic Elements in Videogames
- 19.5.3. Technologies and Tools for Realistic Simulations in Videogames
- 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 Multimedia Content Generation
- 19.6.2. Algorithms and Models for Automatic Multimedia Content Generation
- 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 for Improving Usability
- 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 by This Approach
- 19.9.4. Handling of Sensitive Data

19.10. AI-Assisted Collaboration in Editorial Teams
- 19.10.1. Transformation of AI-Assisted Collaboration in 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 Edition
- 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 Graphic Design with Responsibility
- 20.2.1. Visual Accessibility as an Ethical Priority in Graphic Design
- 20.2.2. Tools and Practices for Visual Accessibility Improvement (Google LightHouse and Microsoft Accessibility Insights)
- 20.2.3. Ethical Challenges in Visual Accessibility Implementation
- 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 into 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 Video Game 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 Certifications for Responsible Design

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 in User Interfaces

20.9. Sustainability in Design Process Innovation
- 20.9.1. Recognition of the Importance of Sustainability in AI in User Interfaces
- 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

This program will enable you to develop Artificial Intelligence models using Computer Vision techniques, to address specific problems in Design"

07

Clinical Internship

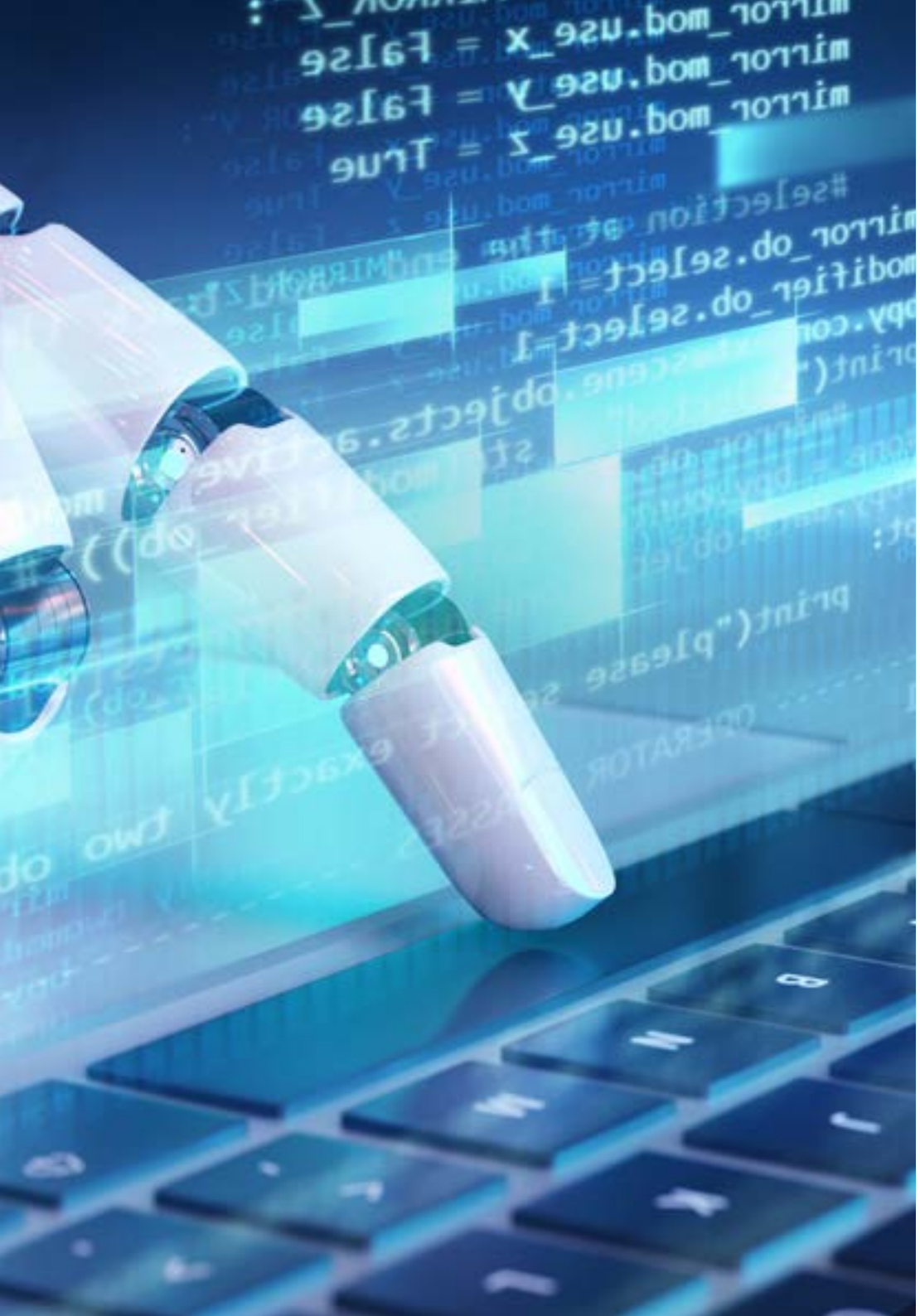
After passing the online theoretical stage, the academic itinerary includes a period of practical training in a prestigious company. During their on-site stay, graduates will be supported by a tutor, who will guide them both in the preparation and development of the internship. In this way, professionals will have the guarantees to obtain an enriching learning experience.

You will carry out your internship in an institution of maximum renown in the Design sector and the use of Artificial Intelligence tools. Enroll now!"

The Internship Program phase of this Hybrid Professional Master's Degree in Artificial Intelligence in Design consists of a 3-week internship in a recognized entity, from Monday to Friday, with 8 consecutive hours of practical training with an assistant specialist. This experience will allow graduates to be part of a team of professionals and to participate in the activities they are carrying out. Likewise, students will develop the necessary skills to overcome the challenges that arise in the implementation of Artificial Intelligence in Design.

In this training proposal, of a completely practical nature, the activities are aimed at developing and perfecting the competencies necessary for the application of Artificial Intelligence in the field of Design, which requires a high level of qualification, and which is oriented towards specific training for the exercise of the activity, in an environment of patient safety and high professional performance.

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



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

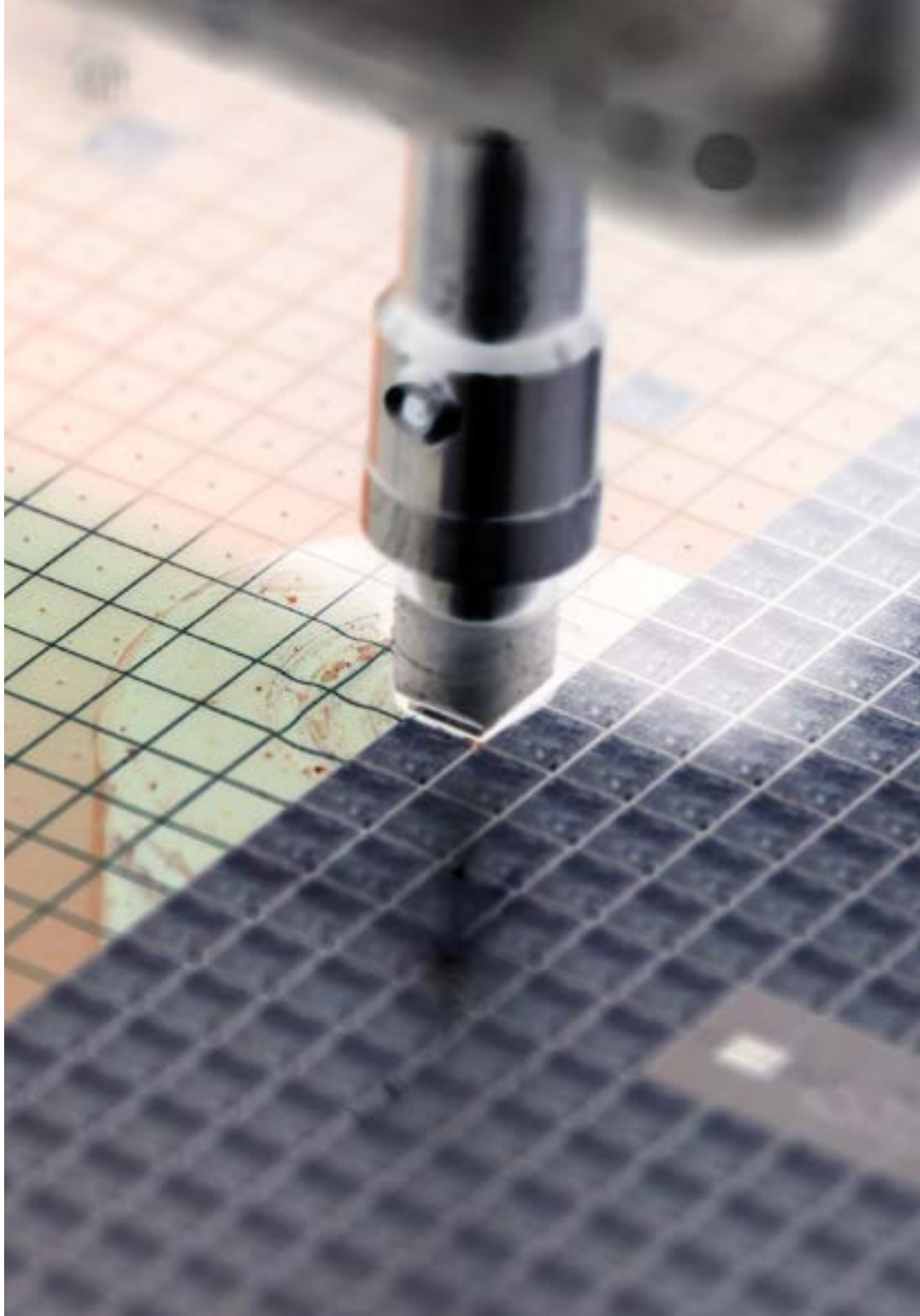
Module	Practical Activity
AI Design Projects	Apply AI algorithms to generate preliminary designs
	Integrate AI systems into the design process to automate repetitive tasks
	Utilize AI tools to improve efficiency and quality of design projects
	Explore the use of neural networks for the creation of generative artwork
	Investigate and apply computer vision algorithms in graphic design and data visualization projects
Design and Creation of Products with AI	Use AI techniques to optimize manufacturing processes
	Customize products by applying AI to user preferences
	Develop AI algorithms for automatic creation of graphic products
	Implement AI systems for mass customization of products
	Use machine learning techniques to improve production efficiency
Data Analysis and Communication with AI	Analyze large volumes of data to identify patterns and trends in Design
	Implement AI systems to perform predictive analytics in the Design domain
	Employ machine learning algorithms to identify patterns in user behavior
	Develop Artificial Intelligence models for generating design recommendations
	Use Natural Language Processing techniques to improve communication with users
Developing AI Solutions	Collaborate with AI experts to develop innovative, user-centric solutions
	Explore new ways of approaching creative problems through the application of AI
	Participate in interdisciplinary projects combining Design with AI
	Contribute to the research and development of new techniques and applications of AI in Design
	Share knowledge and experiences on the integration of AI in design with the professional community

Civil Liability Insurance

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

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

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



General Conditions of the Internship Program

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

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

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

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

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

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

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

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

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

08

Where Can I Do the Internship?

This Hybrid Professional Master's Degree foresees in its itinerary the realization of a practical training in a prestigious entity, where students will take to the practical level everything they have learned about Artificial Intelligence in Design. In addition, in order to bring this degree to more professionals, TECH will offer students the opportunity to carry it out in different international institutions.

You will complement your theoretical training, 100% online, with the best practical stay in the market. You will achieve success in your usual practice in an agile and simple way!"

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

Design

Ogilvy Barcelona

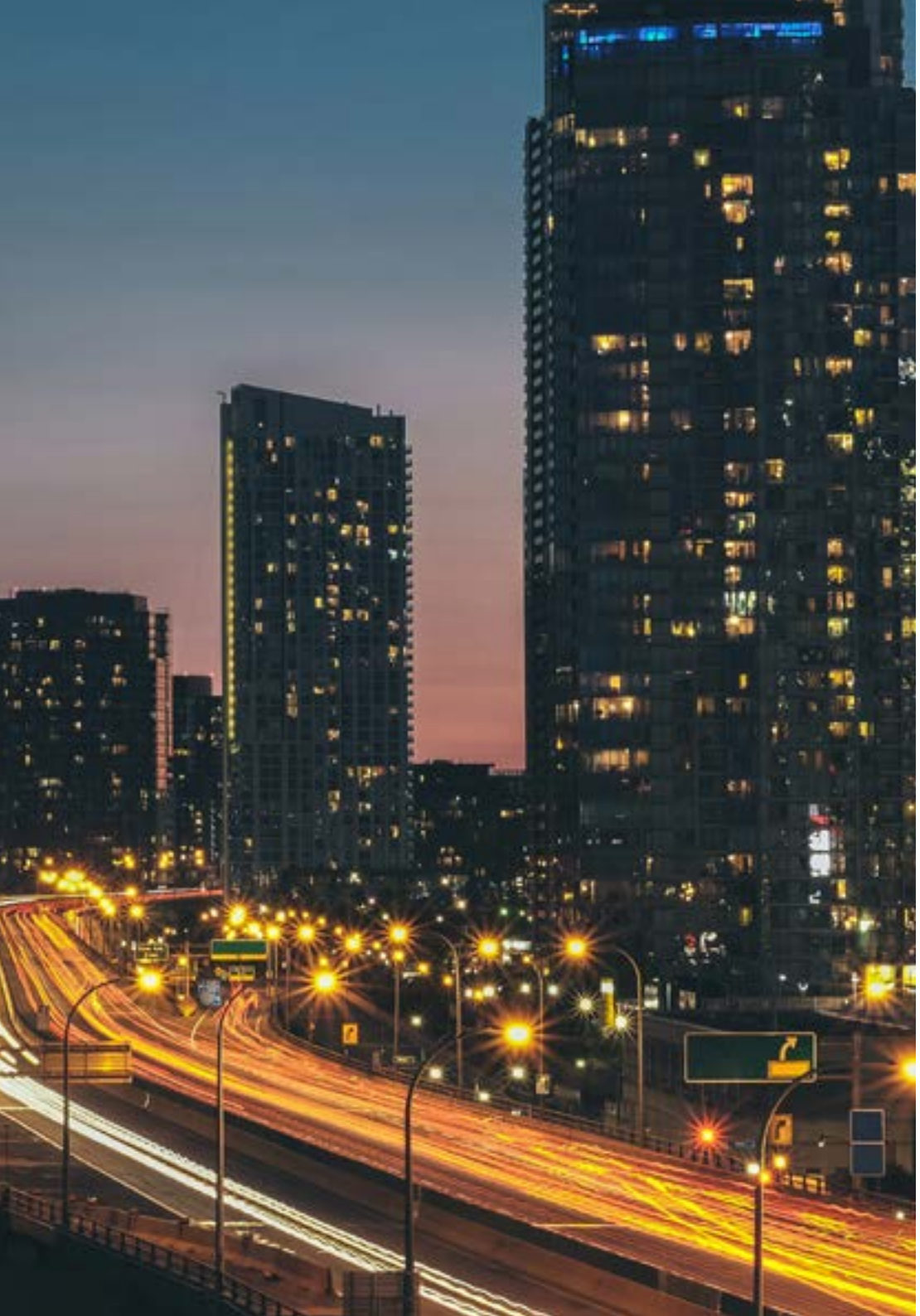
Country
Spain

City
Barcelona

Address: Calle Bolivia 68-70, 08018, Barcelona

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

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



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

09

Methodology

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

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

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

Case Study to contextualize all content

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

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

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

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

A learning method that is different and innovative

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

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

The case method is the most widely used learning system in the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

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

Relearning Methodology

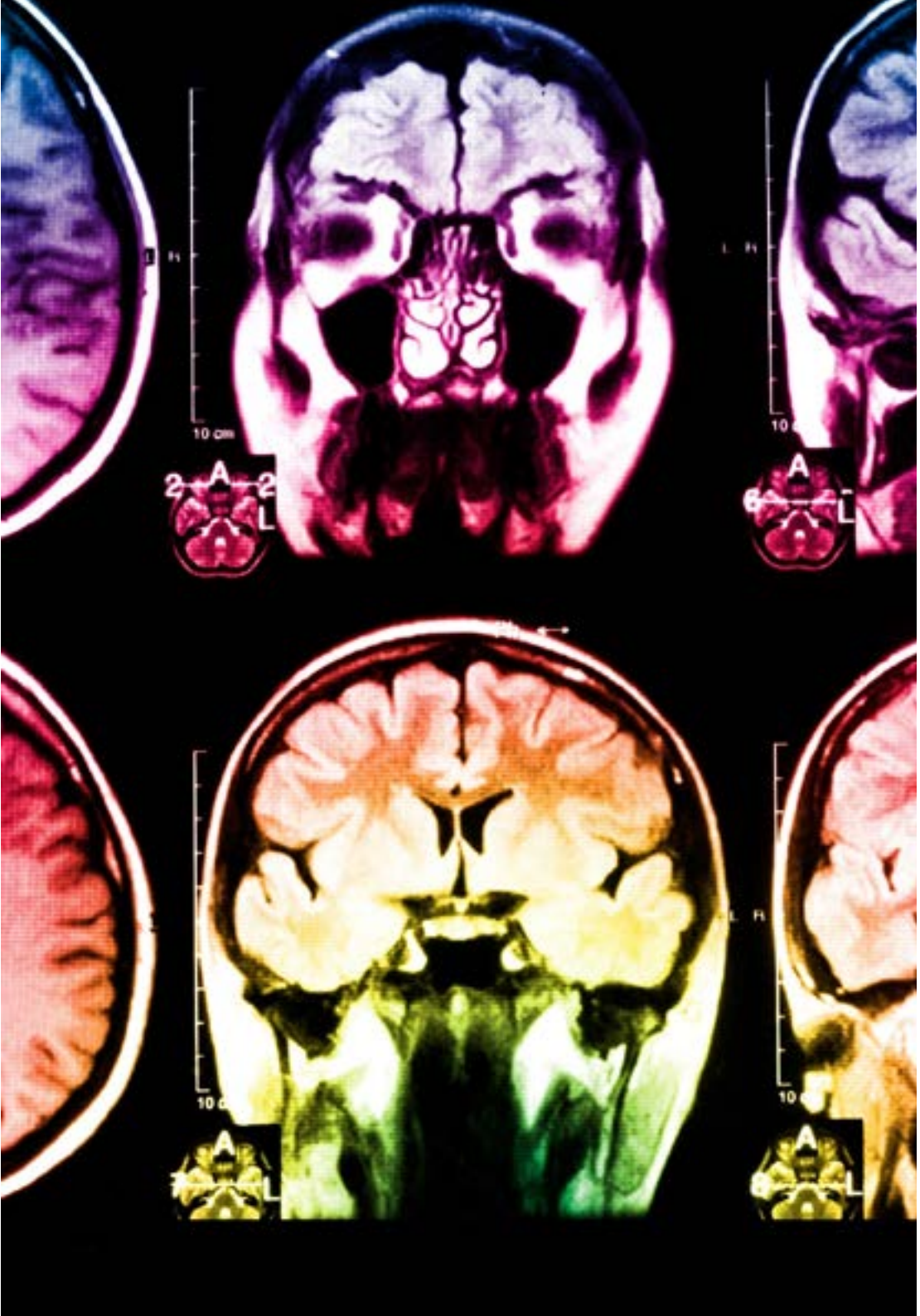
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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

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

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

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



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

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

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

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

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

Study Material

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

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

Classes

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

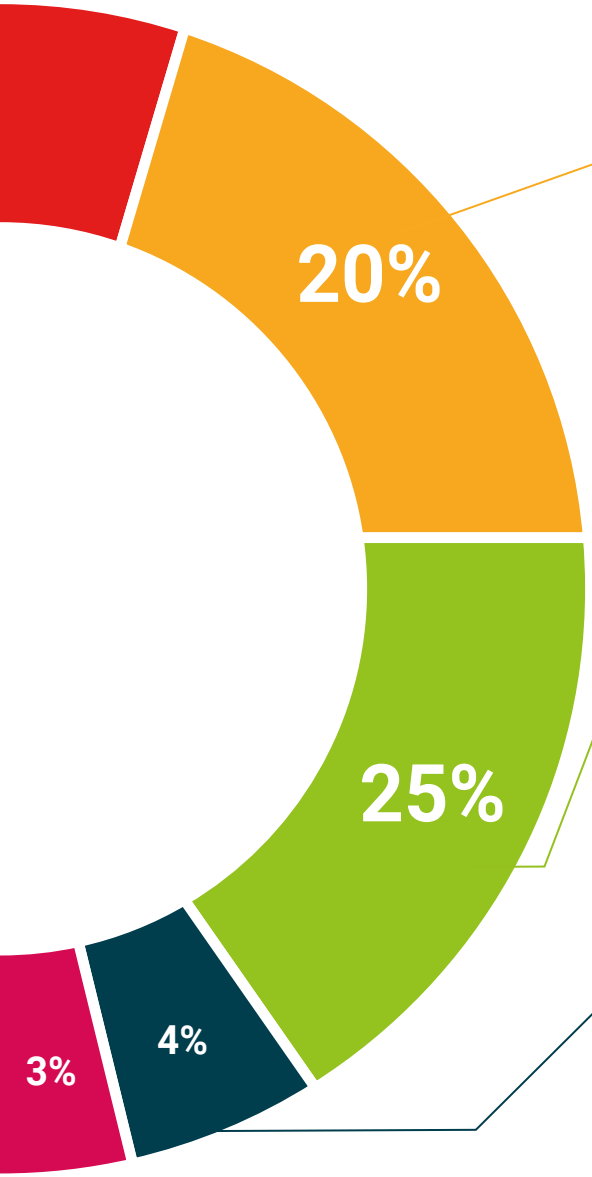
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

Practising Skills and Abilities

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

Additional Reading

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



Case Studies

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

Interactive Summaries

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

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

Testing & Retesting

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

10

Certificate

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

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

This private qualification will allow you to obtain a **Hybrid Professional Master's Degree diploma in Artificial Intelligence in Design** endorsed by **TECH Global University**, the world's largest online university.

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

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

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

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

Duration: **12 months**

Accreditation: **60 + 4 ECTS**


tech global university

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

Hybrid Professional Master's Degree in Artificial Intelligence in Design

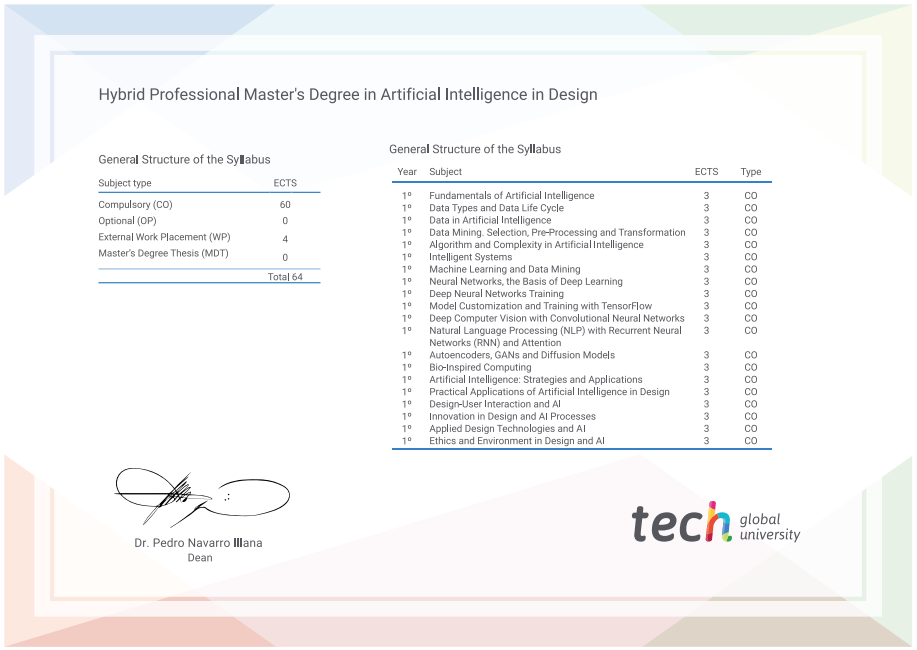
This is a private qualification of 1,920 hours of duration equivalent to 64 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

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

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

Dr. Pedro Navarro Illana
Dean

Unique TECH Code: AFWORD23S techtitute.com/certificates


Hybrid Professional Master's Degree in Artificial Intelligence in Design

General Structure of the Syllabus

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

General Structure of the Syllabus

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

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

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Hybrid Professional Master's Degree

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Hybrid Professional Master's Degree
Artificial Intelligence in Design

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