Hybrid Master's Degree
Artificial Intelligence in Education

tech global university

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Hybrid Master's Degree

Artificial Intelligence in Education

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

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01

Introduction to the Program

The integration of Artificial Intelligence in education has opened up new possibilities for improving teaching processes. Intelligent systems allow unprecedented personalization of learning, adapting content and pedagogical methods to the needs of each student. In addition, they also facilitate continuous assessment, providing real-time feedback that optimizes academic performance. However, despite its great benefits, the implementation of this technology poses significant technical challenges. Therefore, specialists need to develop advanced skills to integrate Artificial Intelligence optimally in the classroom. With this in mind, TECH is launching an innovative university program focused on Artificial Intelligence in Education.

Through this Hybrid Master's Degree, you will implement Artificial Intelligence in educational contexts to personalize learning processes"

Artificial Intelligence plays a crucial role in the transformation of global Education, with a significant impact on the personalization of learning and administrative management. According to a new report by the World Health Organization, the lack of access to quality education affects more than 260 million children and young people worldwide, limiting their opportunities for development. In this sense, the integration of technologies such as machine learning has the potential to reduce this gap, offering innovative solutions to improve accessibility and equity in the education system.

In this context, TECH presents a cutting-edge Hybrid Master's Degree in Artificial Intelligence in Education. The academic itinerary, prepared by references in this sector, will delve into subjects ranging from the optimization of educational processes through predictive analysis or the use of state-of-the-art software such as TensorFlow to the training of deep neural networks. In this way, students will develop practical skills in the implementation of Artificial Intelligence solutions to personalize learning, automate assessment and improve educational management.

On the other hand, the Hybrid Master's Degree is characterized by providing students with multimedia content developed with the latest educational technology. In this sense, in the Virtual Campus students will have access to a library full of resources among which interactive summaries, specialized readings or case studies stand out. In this way, they will enjoy immersive learning that will prepare them to solve complex situations during their professional practice.

This **Hybrid Master's Degree in Artificial Intelligence in Education** contains the most complete and updated educational program in the market. Its most notable features are:

- Development of more than 100 case studies presented by professionals in the application of Artificial Intelligence in Education.
- 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 a internship in one of the best companies

You will apply regulations on privacy, ethics and digital inclusion in the use of Educational Intelligence in academic environments"

You will carry out a practical stay in a reference institution, where you will integrate Artificial Intelligence solutions to boost its innovation capacity"

In this Master's proposal, of a professionalizing nature and blended learning modality, the program is aimed at updating professionals in Artificial Intelligence in Education. The contents are based on the latest scientific evidence, and oriented in a didactic way to integrate theoretical knowledge into daily teaching practice.

Thanks to its multimedia content elaborated with the latest educational technology, it will allow the Artificial Intelligence in Education professional a situated and contextual learning, that is to say, a simulated environment that will provide an immersive learning programmed to train in real situations. The design of this program is based on Problem-Based Learning, by means of which the student must try to solve the different professional practice situations that arise during the program. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

Specialized readings will allow you to further extend the rigorous information provided in this academic option.

You will delve into the latest trends in business management, being able to design effective strategies to make decisions in complex and unstable contexts.

02

Why Study at TECH?

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

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

The world's best online university, according to FORBES

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

The best top international faculty

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

The world's largest online university

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

The most complete syllabuses on the university scene

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

A unique learning method

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

The official online university of the NBA

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

Leaders in employability

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

Google Premier Partner

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

The top-rated university by its students

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

03

Syllabus

The didactic contents that are part of this Hybrid Master's Degree have been developed by leading experts in the use of Artificial Intelligence in the educational field. Therefore, the syllabus will delve into issues ranging from data analysis or teaching practice with generative systems to the legal and ethical foundations of the use of technological tools in education.

You will use intelligent systems for the automation of evaluations, providing constructive feedback and improving the measurement of academic performance"

Module 1. Fundamentals of Artificial Intelligence

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

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

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

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

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

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

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

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

1.9. AI Implementation Strategy

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

Module 2. Data Types and Life Cycle

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

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

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

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

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

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

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

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

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

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

Module 3. Data in Artificial Intelligence

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4.10. Data Pre-Processing in Big Data Environments

Module 5. Algorithm and Complexity in Artificial Intelligence

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

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

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

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

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

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

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

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

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

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

Module 6. Intelligent Systems

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

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

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

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

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

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

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

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

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

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

Module 7. Machine Learning and Data Mining

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

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

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

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

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

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

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

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

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

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

Module 8. Neural Networks, the Basis of Deep Learning

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

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

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

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

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

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

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

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

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

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

Module 9. Deep Neural Networks Training

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

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

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

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

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

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

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

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

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

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

Module 10. Model Customization and Training with TensorFlow

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

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

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

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

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

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

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

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

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

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

Module 11. Deep Computer Vision with Convolutional Neural Networks

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Module 13. Autoencoders, GANs and Diffusion Models

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

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

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

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

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

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

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

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

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

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

Module 14. Bio-Inspired Computing

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

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

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

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

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

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

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

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

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

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

Module 15. Artificial Intelligence: Strategies and Applications

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

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

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

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

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

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

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

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

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

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

Module 16. Data Analysis and Application of AI Techniques for Educational Personalization

16.1. Identification, Extraction and Preparation of Educational Data
- 16.1.1. Applying H2O.ai in the Collection and Selection of Relevant Data in Educational Settings
- 16.1.2. Data Cleaning and Normalization Techniques for Educational Analyses
- 16.1.3. Importance of Data Integrity and Quality in Educational Research

16.2. Analysis and Evaluation of Educational Data with AI for Continuous Improvement in the Classroom
- 16.2.1. Implementation of TensorFlow in the Interpretation of Educational Trends and Patterns Using Machine Learning Techniques
- 16.2.2. Evaluating the Impact of Pedagogical Strategies Using Data Analytics
- 16.2.3. Application of Trinka in the Integration of AI-Based Feedback for the Optimization of the Teaching Process

16.3. Definition of Academic Performance Indicators from Educational Data
- 16.3.1. Establishment of Key Metrics for Evaluating Student Achievement
- 16.3.2. Comparative Analysis of Indicators to Identify Areas for Improvement

16.3.3. Correlation Between Academic Indicators and External Factors Using AI
16.4. AI Tools for Educational Decision Making and Monitoring
16.4.1. Decision Support Systems Based on tome.ai for Educational Administrators
16.4.2. Use of Trello for Educational Resource Planning and Allocation
16.4.3. Optimization of Educational Processes through Predictive Analytics with Orange Data Mining
16.5. AI Technologies and Algorithms for Predictive Analysis of Academic Achievement Data
16.5.1. Fundamentals of Predictive Modeling in Education
16.5.2. Use of Classification and Regression Algorithms to Predict Trends in Education
16.5.3. Case Studies of Successful Predictions in Educational Environments
16.6. Application of Data Analytics with AI for the Prevention and Solution of Educational Problems
16.6.1. Early Identification of Academic Risks through Predictive Analytics
16.6.2. Data-Driven Intervention Strategies to Address Educational Challenges
16.6.3. Evaluating the Impact of DataRobot AI-Based Solutions in Education
16.7. Personalized Diagnosis of Learning Difficulties from Data Analytics with AI
16.7.1. AI Techniques for the Identification of Learning Styles and Learning Difficulties with IBM Watson Education
16.7.2. Integration of Data Analysis into Individualized Educational Support Plans
16.7.3. Case Studies of Diagnoses Improved by the Use of AI
16.8. Data Analysis and Application of AI for Identification of Special Educational Needs
16.8.1. AI Approaches to Special Educational Needs Screening with Gooroo
16.8.2. Personalization of Teaching Strategies Based on Data Analysis
16.8.3. Evaluation of the Impact of AI on Educational Inclusion
16.9. Personalization of Learning with AI from Academic Performance Data Analytics
16.9.1. Creating Adaptive Learning Pathways using Smart Sparrow
16.9.2. Implementation of Recommender Systems for Educational Resources
16.9.3. Real-Time Individual Progress Measurement and Adjustment via Squirrel AI Learning
16.10. Security and Privacy in the Processing of Educational Data
16.10.1. Ethical and Legal Principles in the Management of Educational Data
16.10.2. Data Protection and Privacy Techniques for Educational Systems with Google Cloud Security
16.10.3. Case Studies on Security Breaches and Their Impact on Education

Module 17. Development of Artificial Intelligence Projects in the Classroom

17.1. Planning and Design of AI Projects in Education with Algor Education
17.1.1. First Steps to Plan the Project
17.1.2. Knowledge Bases
17.1.3. Design of AI Projects in Education
17.2. Tools for the Development of Educational Projects with AI
17.2.1. Tools for Developing Educational Projects: TensorFlow Playground
17.2.2. Tools for Educational Projects in History
17.2.3. Tools for Educational Projects in Mathematics; Wolfram Alpha
17.2.4. Tools for Educational Projects in English: Grammarly
17.3. Strategies for Implementing AI Projects in the Classroom
17.3.1. When to Implement an AI Project
17.3.2. Why Implement an AI Project
17.3.3. Strategies to Be Implemented
17.4. Integration of AI Projects in Specific Subjects
17.4.1. Mathematics and AI: Thinkster Math
17.4.2. History and AI
17.4.3. Languages and AI: Deep L
17.4.4. Other Subjects: Watson Studio
17.5. Project 1: Developing Educational Projects Using Machine Learning with Khan Academy
17.5.1. First Steps
17.5.2. Requirements
17.5.3. Tools to Be Used
17.5.4. Project Definition

17.6. Project 2: Integration of AI in the Development of Educational Games
- 17.6.1. First Steps
- 17.6.2. Requirements
- 17.6.3. Tools to Be Used
- 17.6.4. Project Definition

17.7. Project 3: Development of Educational Chatbots for Student Assistance
- 17.7.1. First Steps
- 17.7.2. Requirements
- 17.7.3. Tools to Be Used
- 17.7.4. Project Definition

17.8. Project 4: Integrating Intelligent Agents into Educational Platforms with Knewton
- 17.8.1. First Steps
- 17.8.2. Requirements
- 17.8.3. Tools to Be Used
- 17.8.4. Project Definition

17.9. Evaluating and Measuring the Impact of AI Projects in Education with Qualtrics
- 17.9.1. Benefits of Working with AI in the Classroom
- 17.9.2. Actual Data
- 17.9.3. AI in the Classroom
- 17.9.4. AI Statistics in Education

17.10. Analysis and Continuous Improvement of AI in Education with Edmodo Insights
- 17.10.1. Current Projects
- 17.10.2. Commissioning
- 17.10.3. What the Future Holds
- 17.10.4. Transforming the Classroom 360

Module 18. Teaching Practice with Generative Artificial Intelligence

18.1. Generative AI Technologies for Use in Education
- 18.1.1. Current Market: Artbreeder, Runway ML and DeepDream Generator
- 18.1.2. Technologies in Use
- 18.1.3. What Is to Come
- 18.1.4. The Future of the Classroom

18.2. Application of Generative AI Tools in Educational Planning
- 18.2.1. Planning Tools: Altitude Learning
- 18.2.2. Tools and Their Application
- 18.2.3. Education and AI
- 18.2.4. Evolution

18.3. Creating Teaching Materials with Generative AI Using Story Ai, Pix2PIx and NeouralTalk2
- 18.3.1. AI and Its Uses in the Classroom
- 18.3.2. Tools to Create Teaching Material
- 18.3.3. How to Work with the Tools
- 18.3.4. Commands

18.4. Development of Evaluation Tests Using Generative AI with Quizgecko
- 18.4.1. AI and Its Uses in the Development of Evaluation Tests
- 18.4.2. Tools for the Development of Evaluation Tests
- 18.4.3. How to Work with the Tools
- 18.4.4. Commands

18.5. Enhanced Feedback and Communication with Generative AI
- 18.5.1. AI in Communication
- 18.5.2. Application of Tools in the Development of Communication in the Classroom
- 18.5.3. Advantages and Disadvantages

18.6. Correction of Activities and Evaluative Tests Using Generative AI with Grandscope AI
- 18.6.1. AI and Its Uses in the Correction of Evaluative Activities and Tests
- 18.6.2. Tools for the Correction of Evaluative Activities and Tests
- 18.6.3. How to Work with the Tools
- 18.6.4. Commands

18.7. Generation of Teacher Quality Assessment Surveys through Generative AI
- 18.7.1. AI and Its Uses in the Generation of Teaching Quality Assessment Surveys Using AI
- 18.7.2. Tools for the Generation of AI-based Teacher Quality Surveys
- 18.7.3. How to Work with the Tools
- 18.7.4. Commands

18.8. Integration of Generative AI Tools in Pedagogical Strategies
- 18.8.1. Applications of AI in Pedagogical Strategies
- 18.8.2. Correct Uses
- 18.8.3. Advantages and Disadvantages
- 18.8.4. Generative AI Tools in Pedagogical Strategies: Gans

18.9. Use of Generative AI for Universal Design for Learning
- 18.9.1. Generative AI, Why Now?
- 18.9.2. AI in Learning
- 18.9.3. Advantages and Disadvantages
- 18.9.4. Applications of AI in Learning

18.10. Evaluating the Effectiveness of Generative AI in Education
- 18.10.1. Effectiveness Data
- 18.10.2. Projects
- 18.10.3. Design Purposes
- 18.10.4. Evaluating the Effectiveness of AI in Education

Module 19. Innovations and Emerging Trends in AI for Education

19.1. Emerging AI Tools and Technologies in Education
- 19.1.1. Obsolete AI Tools
- 19.1.2. Current Tools: ClassDojo and Seesaw
- 19.1.3. Future Tools

19.2. Augmented and Virtual Reality in Education
- 19.2.1. Augmented Reality Tools
- 19.2.2. Virtual Reality Tools
- 19.2.3. Application of Tools and Their Uses
- 19.2.4. Advantages and Disadvantages

19.3. Conversational AI for Educational Support and Interactive Learning with Wysdom AI and SnatchBot
- 19.3.1. Conversational AI, Why Now?
- 19.3.2. AI in Learning
- 19.3.3. Advantages and Disadvantages
- 19.3.4. Applications of AI in Learning

19.4. Application of AI for Improving Knowledge Retention
- 19.4.1. AI as a Support Tool
- 19.4.2. Guidelines to Follow
- 19.4.3. AI Performance in Knowledge Retention
- 19.4.4. AI and Support Tools

19.5. Facial and Emotional Recognition Technologies for Tracking Learner Engagement and Well-Being
- 19.5.1. Facial and Emotional Recognition Technologies on the Market Today
- 19.5.2. Uses
- 19.5.3. Applications
- 19.5.4. Margin of Error
- 19.5.5. Advantages and Disadvantages

19.6. Blockchain and AI in Education to Transform Educational Administration and Certification
- 19.6.1. What Is Blockchain?
- 19.6.2. Blockchain and Its Applications
- 19.6.3. Blockchain as a Transformative Element
- 19.6.4. Educational Administration and Blockchain

19.7. Emerging AI Tools to Enhance the Learning Experience with Squirrel AI Learning
- 19.7.1. Current Projects
- 19.7.2. Commissioning
- 19.7.3. What the Future Holds
- 19.7.4. Transforming the Classroom 360

19.8. Strategies for Developing Pilots with Emerging AI
- 19.8.1. Advantages and Disadvantages
- 19.8.2. Strategies to Be Developed
- 19.8.3. Key Points
- 19.8.4. Pilot Projects

19.9. Analysis of Successful AI Innovation Cases
- 19.9.1. Innovative Projects
- 19.9.2. Application of AI and Its Benefits
- 19.9.3. AI in the Classroom, Successful Cases

19.10. Future of AI in Education
- 19.10.1. AI History in Education
- 19.10.2. Where Is AI Going in the Classroom?
- 19.10.3. Future Projects

Module 20. Ethics and Legislation of Artificial Intelligence in Education

20.1. Identification and Ethical Treatment of Sensitive Data in the Educational Context
- 20.1.1. Principles and Practices for the Ethical Handling of Sensitive Data in Education
- 20.1.2. Challenges in Protecting the Privacy and Confidentiality of Student Data
- 20.1.3. Strategies for Ensuring Transparency and Informed Consent in Data Collection

20.2. Social and Cultural Impact of AI in Education
- 20.2.1. Analysis of the Effect of AI on Social and Cultural Dynamics in Educational Environments
- 20.2.2. Exploring How Microsoft AI for Accessibility Can Perpetuate or Mitigate Social Biases and Inequalities
- 20.2.3. Assessing the Social Responsibility of Developers and Educators in the implementation of AI

20.3. AI Legislation and Data Policy in Educational Settings
- 20.3.1. Review of Current Data and Privacy Laws and Regulations Applicable to AI in Education
- 20.3.2. Impact of Data Policies on Educational Practice and Technological Innovation
- 20.3.3. Developing Institutional Policies for the Ethical Use of AI in Education with AI Ethics Lab

20.4. Assessing the Ethical Impact of AI
- 20.4.1. Methods for Assessing the Ethical Implications of AI Applications in Education
- 20.4.2. Challenges in Measuring the Social and Ethical Impact of AI
- 20.4.3. Creating Ethical Frameworks to Guide the Development and Use of AI in Education

20.5. Challenges and Opportunities of AI in Education
- 20.5.1. Identification of Major Ethical and Legal Challenges in the Use of AI in Education
- 20.5.2. Exploring Opportunities to Improve Teaching and Learning through Squirrel AI Learning
- 20.5.3. Balancing Technological Innovation and Ethical Considerations in Education

20.6. Ethical Application of AI Solutions in the Educational Environment
- 20.6.1. Principles for Ethical Design and Deployment of AI Solutions in Education
- 20.6.2. Case Studies on Ethical Applications of AI in Different Educational Contexts
- 20.6.3. Strategies for Involving All Stakeholders in Ethical AI Decision-Making

20.7. AI, Cultural Diversity and Gender Equity
- 20.7.1. Analysis of the Impact of AI on the Promotion of Cultural Diversity and Gender Equity in Education
- 20.7.2. Strategies for Developing Inclusive and Diversity-Sensitive AI Systems with Teachable Machine by Google
- 20.7.3. Assessment of how AI can Influence the Representation and Treatment of Different Cultural and Gender Groups

20.8. Ethical Considerations for the Use of AI Tools in Education
- 20.8.1. Ethical Guidelines for the Development and Use of AI Tools in the Classroom
- 20.8.2. Discussion on the Balance between Automation and Human Intervention in Education
- 20.8.3. Analysis of Cases Where the Use of AI in Education Has Raised Significant Ethical Issues

20.9. Impact of AI on Educational Accessibility
- 20.9.1. Exploration of How AI Can Enhance or Limit Accessibility in Education
- 20.9.2. Analysis of AI Solutions Designed to Increase Inclusion and Access to Education for All with Google Read Along
- 20.9.3. Ethical Challenges in Implementing AI Technologies to Improve Accessibility

20.10. Global Case Studies in AI and Education
- 20.10.1. Analysis of International Case Studies on the Use of AI in Education
- 20.10.2. Comparison of Ethical and Legal Approaches in Different Educational Cultural Contexts
- 20.10.3. Lessons Learned and Best Practices from Global Cases in AI and Education

04

Teaching Objectives

The design of the program of this Hybrid Master's Degree in Artificial Intelligence in Education will allow professionals to acquire the necessary skills to update their knowledge in the education sector, delving intpo the key aspects of the integration of intelligent systems in teaching and learning processes. The knowledge developed throughout the curriculum will boost your growth from a global perspective, giving you full training to apply intelligent solutions in educational environments.

You will implement Artificial Intelligence solutions that adapt content, pace and learning styles to individual needs in the classroom"

General Objective

- The overall objective of this Hybrid Master's Degree in Artificial Intelligence in Education at TECH is to train professionals in the practical application of intelligent systems in educational environments. Through a stay in a reference institution, students will work with experts in educational innovation, improving their skills in personalization of learning, data analysis and optimization of pedagogical processes.

You will design chatbots that facilitate interaction between teachers and students, providing automated responses"

Specific Objectives

Module 1. Fundamentals of Artificial Intelligence

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

Module 2. Data Types and Life Cycle

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

Module 3. Data in Artificial Intelligence

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

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

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

Module 5. Algorithm and Complexity in Artificial Intelligence

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

Module 6. Intelligent Systems

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

Module 7: Machine Learning and Data Mining

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

Module 8. Neural Networks, the Basis of Deep Learning

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

Module 9. Deep Neural Networks Training

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

Module 10. Model Customization and Training with TensorFlow

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

Module 11. Deep Computer Vision with Convolutional Neural Networks

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

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

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

Module 13. Autoencoders, GANs and Diffusion Models

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

Module 14. Bio-Inspired Computing

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

Module 15. Artificial Intelligence: Strategies and Applications

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

Module 16. Data Analysis and Application of AI Techniques for Educational Personalization

- Apply AI in the analysis and evaluation of educational data to drive continuous improvement in educational settings
- Define academic performance indicators based on educational data to measure and improve student performance
- Implement AI technologies and algorithms to perform predictive analytics on academic performance data
- Perform personalized diagnostics of learning difficulties through data analysis with AI, identifying particular educational needs and designing targeted interventions
- Address security and privacy in the processing of educational data when applying AI tools, ensuring regulatory and ethical compliance

Module 17. Development of Artificial Intelligence Projects in the Classroom

- Plan and design educational projects that effectively integrate AI in educational environments, mastering specific tools for its development
- Design effective strategies to implement AI projects in learning environments, integrating them in specific subjects to enrich and improve the educational process
- Develop educational projects applying machine learning to improve the learning experience, integrating AI in the design of educational games in playful learning
- Create educational chatbots to assist students in their learning processes and resolution of doubts, including intelligent agents in educational platforms to improve interaction and teaching
- Perform continuous analysis of AI in Education projects to identify areas for improvement and optimization

Module 18. Teaching Practice with Generative Artificial Intelligence

- Master generative AI technologies for their application and effective use in educational environments, planning effective educational activities
- Create didactic materials using generative AI to improve the quality and variety of learning resources, as well as to measure student progress in innovative ways
- Use generative AI to correct activities and evaluative tests, streamlining and optimizing this process
- Integrate generative AI tools in pedagogical strategies to improve the effectiveness of the educational process and design inclusive learning environments, under the universal design approach
- Evaluate the effectiveness of generative AI in education, analyzing its impact on teaching and learning processes

Module 19. Innovations and Emerging Trends in AI for Education

- Master emerging AI tools and technologies applied to education for their effective use in learning environments
- Integrate Augmented and Virtual Reality in Education to enrich and enhance the learning experience
- Apply conversational AI to facilitate educational support and foster interactive learning among students
- Implement facial and emotional recognition technologies to monitor student engagement and well-being in the classroom
- Explore the integration of Blockchain and AI in Education to transform educational administration and validate certifications

Module 20. Ethics and Legislation of Artificial Intelligence in Education

- Identify and apply ethical practices in the handling of sensitive data within the educational context, prioritizing responsibility and respect.
- Analyze the social and cultural impact of AI in Education, assessing its influence on educational communities
- Understand legislation and policies related to the use of data in educational settings involving AI
- Define the intersection between AI, cultural diversity, and gender equity in the educational context
- Evaluate the impact of AI on educational accessibility, ensuring equity in access to knowledge

05

Internship

Once the online theoretical period is over, the university program includes a period of practical training in a reference entity. At the same time, students will have at their disposal the support of a tutor who will accompany them throughout the process, both in the preparation and the development of the internship. This will ensure that students enjoy an immersive experience that will raise their employment horizons to a higher level.

You will carry out an Internship Program in a prestigious institution related to Artificial Intelligence in Education"

The Internship Program of this Artificial Intelligence in Education program consists of a practical internship in a reference company, lasting 3 weeks, from Monday to Friday with 8 consecutive hours of practical training with an assistant specialist. This internship will allow participants to apply the knowledge acquired in a real environment, facing concrete challenges in the integration of Artificial Intelligence in Education.

In this completely practical training proposal, the activities are aimed at developing and perfecting the necessary skills for teaching practice through the use of state-of-the-art technological tools.

It is, without a doubt, an opportunity to learn by working in the educational environment of the future, where the personalization of learning and the analysis of data in real time are the central axis of pedagogical innovation. This is a new way of understanding and integrating educational processes, and makes partner institutions the ideal setting for this unique experience in the improvement of professional skills in Artificial Intelligence applied to education in the 21st century.

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

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

Module	Practical Activity
Application of Artificial Intelligence in the Classroom	Create platforms or applications based on Artificial Intelligence that adapt educational content according to the needs, preferences and learning pace of each student
	Implement intelligent tutoring systems that offer personalized resources and activities to help students overcome their learning difficulties
	Develop automated assessment systems that use machine learning to correct assignments, tests, and projects, providing immediate and detailed feedback
	Implement a virtual assistant to guide users in navigating educational platforms
Generative Artificial Intelligence-Assisted Instruction	Create personalized activities, such as quizzes or educational games, that are tailored to each individual's progress and areas of difficulty
	Generate a weekly lesson plan based on students' performance and learning preferences, adjusting the content according to the assessment of their prior knowledge
	Design tests that adjust the difficulty of the questions based on the student's previous answers, providing a more accurate assessment of their skills
	Generate practical examples or simulations of real-world situations that help students better understand the concepts learned in class
Educational Data Processing	Collect and analyze data on learner performance, such as grades, study time and participation, to identify learning patterns
	Create interactive materials, such as quizzes or practical exercises, that automatically adjust to learners' previous answers and present new challenges as they progress
	Implement an AI-based virtual tutor that can answer questions, offer personalized advice, and help students overcome difficulties in real-time
	Analyze users' academic performance and interactions with the learning platform to detect potential risks of underachievement or dropout, enabling early interventions

Civil Liability Insurance

The university's main concern is to guarantee the safety of the interns, other collaborating professionals involved in the internship process at the center. 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, the university commits to purchasing a civil liability insurance policy to cover any eventuality that may arise during the stay at the internship center.

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

General Conditions of the Internship Program

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

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

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

3. ABSENCE: If the students does not show up on the start date of the Hybrid 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 Master's Degree will receive a certificate accrediting their stay at the center.

5. EMPLOYMENT RELATIONSHIP: the Hybrid 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 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 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.

06

Internship Centers

This Hybrid Master's Degree program includes in its itinerary a practical stay in a prestigious center where students will put into practice everything they have learned about Artificial Intelligence in Education. In this sense, and to bring this program closer to more professionals, TECH offers students the opportunity to take it in different centers around the country. In this way, this institution strengthens its commitment to quality and affordable education for all.

You will do an internship in a reference company in the use of Artificial Intelligence in Education"

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

Educational

Instituto Rambla Barcelona

Country
Spain

City
Barcelona

Address: Rambla de Catalunya, 16, 08007 Barcelona

Rambla Instituto offers a wide variety of high quality of high quality training programs in a variety in a variety of areas of study

Related internship programs:
- Digital Education, E-Learning and Social Media

Educational

Instituto Rambla Madrid

Country
Spain

City
Madrid

Address: C/ Gran Vía, 59, 10A, 28013 Madrid

Rambla Instituto offers a wide variety of high quality of high quality training programs in a variety in a variety of areas of study

Related internship programs:
- Digital Education, E-Learning and Social Media

Educational

Instituto Rambla Valencia

Country
Spain

City
Valencia

Address: Carrer de Jorge Juan, 17, 46004 València, Valencia

Rambla Instituto offers a wide variety of high quality of high quality training programs in a variety in a variety of areas of study

Related internship programs:
- Digital Education, E-Learning and Social Media

07

Career Opportunities

This comprehensive university TECH program represents a unique opportunity for education professionals looking to update their skills and master Artificial Intelligence tools applied to teaching. Thanks to this cutting-edge knowledge, graduates of this program will be able to transform learning processes and expand their opportunities in an increasingly digitized sector.

Do you want to work as a Director of Educational Innovation with Artificial Intelligence? Achieve it through this university program in only 12 months"

Graduate Profile

Graduates of this university program will be professionals trained to integrate Artificial Intelligence technologies in educational environments, improving teaching, learning and academic management processes. They will have the skills to design, implement and evaluate intelligent systems that optimize the personalization of learning, the automation of evaluation and pedagogical decision-making based on data. In addition, they will be prepared to address ethical challenges and ensure safety in the use of Artificial Intelligence in Education.

You will be able to manage large volumes of educational data using Artificial Intelligence, thus optimizing pedagogical decision making.

- **Technological Adaptation in Educational Environments:** Ability to integrate advanced technologies in teaching, improving the personalization and effectiveness of learning through the use of AI-based tools
- **Learning Optimization with Artificial Intelligence:** Ability to apply critical thinking and use Artificial Intelligence in the identification of educational patterns, optimizing teaching strategies and improving student outcomes
- **Ethical Commitment and Data Protection in Education:** Ensure responsible implementation of educational technologies, respecting ethical principles and privacy regulations to protect student and teacher data
- **Interdisciplinary Collaboration in Educational Innovation:** Encourage fluid communication and joint work with teachers, pedagogues and technology developers, promoting the effective integration of Artificial Intelligence in the educational environment

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

1. **Specialist in Artificial Intelligence Integration in Education:** Design and implement Artificial Intelligence solutions in educational environments to improve learning personalization, assessment and optimization of pedagogical resources.
   Responsibilities: Adapt and manage Artificial Intelligence systems in educational centers, ensuring their correct application to improve the quality of teaching and learning.
2. **Coordinator of Ethics and Security in the use of educational Artificial Intelligence:** Responsible for ensuring compliance with regulations on privacy and ethics in the use of Artificial Intelligence in educational institutions, minimizing risks and ensuring equity in access to technology.
   Responsibilities: Develop internal regulations and best practice guidelines for the ethical and responsible implementation of Artificial Intelligence in teaching and assessment processes.
3. **Expert in Educational Data Analysis with Artificial Intelligence:** Manage and analyze large volumes of educational data using Artificial Intelligence to improve pedagogical decision-making and optimize the learning experience.
   Responsibilities: Develop predictive models and intelligent systems-based strategies to improve student achievement and design more effective educational interventions.
4. **Developer of Artificial Intelligence Solutions for Education:** Responsible for designing and adapting machine learning tools to personalize instruction, automate assessment, and improve interaction in virtual learning platforms.
   Responsibilities: Collaborate with technology teams to develop innovative solutions based on Artificial Intelligence to facilitate adaptive learning and automation of educational tasks.
5. **Consultant in Digital Transformation and Education with Artificial Intelligence:** Dedicated to advising educational institutions on the implementation of Artificial Intelligence

solutions, ensuring that the technologies applied respond to the pedagogical and strategic needs of each institution.
Responsibilities: Evaluate the feasibility of Artificial Intelligence projects in the education sector and provide recommendations on their effective integration into teaching and management processes.

6. **Specialist in Learning Personalization with Artificial Intelligence:** Responsible for designing personalized learning plans using Artificial Intelligence algorithms, adapting contents and methodologies to the specific needs of each student.
Responsibilities: Monitor the evolution of personalized learning, evaluating the effectiveness of algorithms and adjusting strategies according to student performance.
7. **Supervisor of Educational Innovation with Artificial Intelligence:** Leads projects that seek to integrate Artificial Intelligence in Education, optimizing teaching, evaluation and institutional management processes.
Responsibilities: Coordinate work teams in the implementation of Artificial Intelligence in educational environments, ensuring the fulfillment of strategic objectives and the improvement of educational quality.

You will design personalized learning plans through algorithms, adapting content and methodologies to the specific needs of each individual"

08

Study Methodology

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

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

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

The student: the priority of all TECH programs

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

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

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

The most comprehensive study plans at the international level

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

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

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

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

Case Studies and Case Method

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

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

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

Relearning Methodology

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

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

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

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

A 100% online Virtual Campus with the best teaching resources

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

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

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

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

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

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

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

The university methodology top-rated by its students

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

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

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

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

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

Study Material

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

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

Practicing Skills and Abilities

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

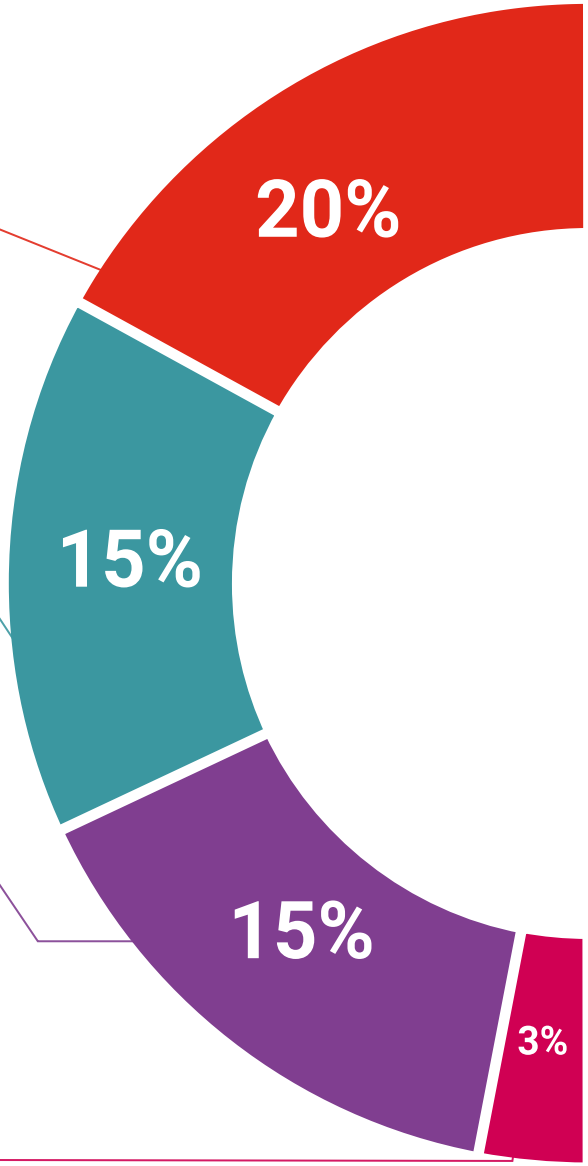
Interactive Summaries

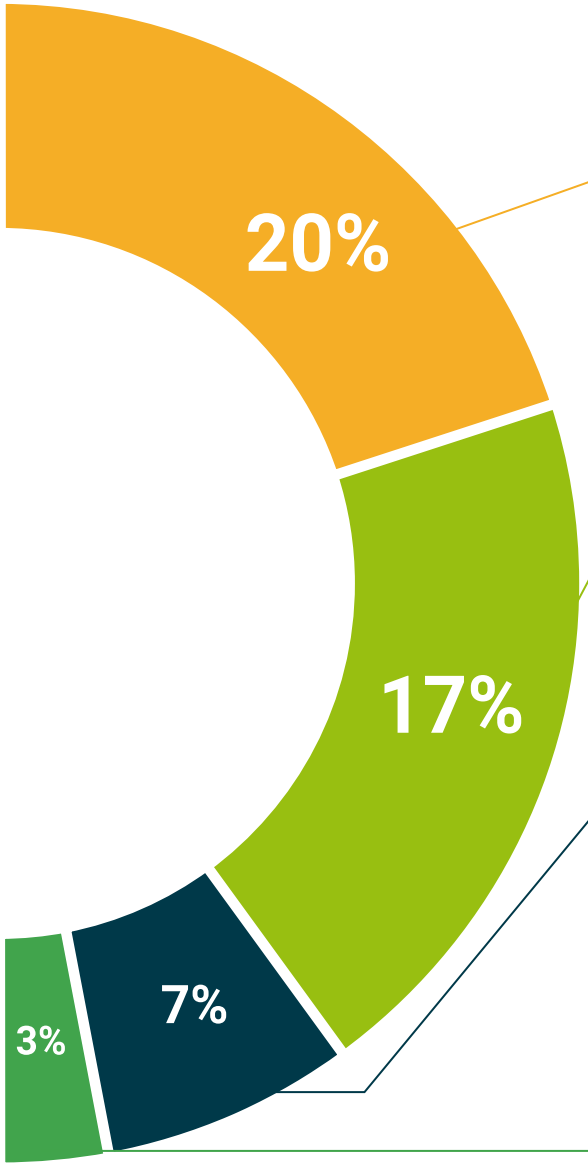
We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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

Additional Reading

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





Case Studies

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

Testing & Retesting

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

Classes

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

Learning from an expert strengthens knowledge and memory, and generates confidence for future difficult decisions.

Quick Action Guides

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

09

Teaching Staff

TECH's main premise is to offer the most complete and updated university programs in the academic panorama, which is why it rigorously selects its teaching staff. Thanks to this effort, this Hybrid Master's Degree has the collaboration of renowned specialists in the implementation of Artificial Intelligence in the field of Education. In this way, they have created various teaching materials that stand out for their excellent quality and for adapting to the demands of the current labor market. As a result, graduates will enjoy an immersive experience that will significantly increase their employment horizons.

You will be supported by a faculty of distinguished professionals in the application of Artificial Intelligence in Education"

Management

Dr. Peralta Martín-Palomino, Arturo

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

Mr. Nájera Puente, Juan Felipe

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

Professors

Ms. Martínez Cerrato, Yésica

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

10

Certificate

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

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

This private qualification will allow you to obtain a diploma for the **Hybrid Master's Degree in Artificial Intelligence in Education** 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.

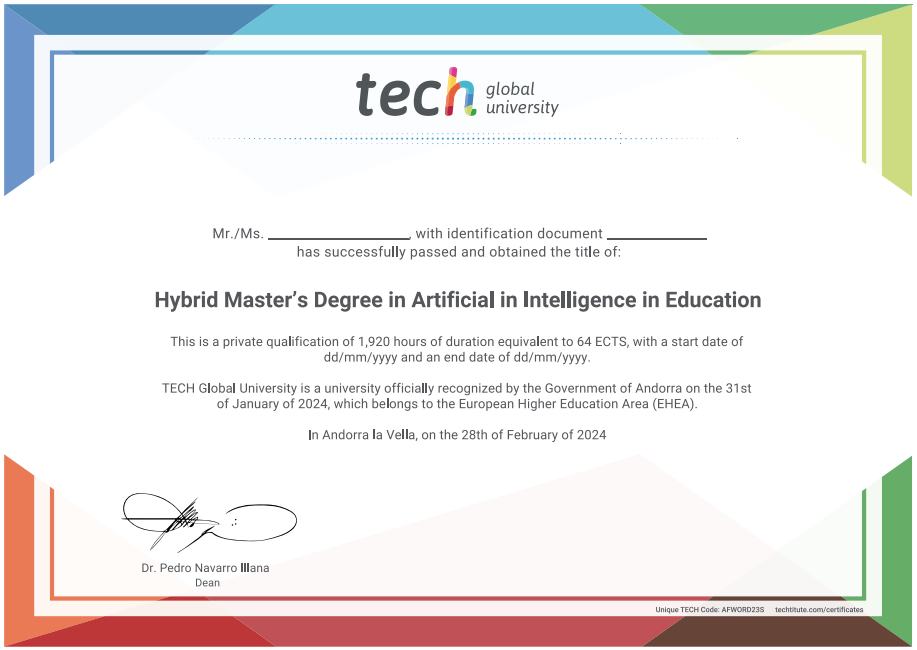
This **TECH Global University private qualification**, is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Hybrid Master's Degree in Artificial in Intelligence in Education**

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

Duration: **12 months.**

Credits: **60 + 4 ECTS**


tech global university

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

Hybrid Master's Degree in Artificial in Intelligence in Education

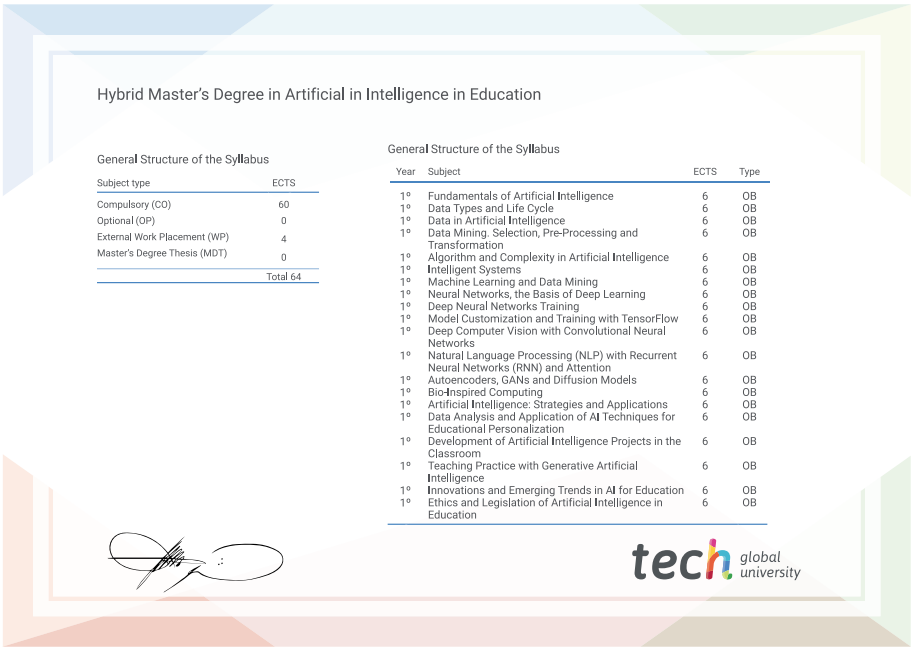
This is a private qualification of 1,920 hours of duration equivalent to 64 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

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 Master's Degree in Artificial in Intelligence in Education

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	6	OB
1º	Data Types and Life Cycle	6	OB
1º	Data in Artificial Intelligence	6	OB
1º	Data Mining. Selection, Pre-Processing and Transformation	6	OB
1º	Algorithm and Complexity in Artificial Intelligence	6	OB
1º	Intelligent Systems	6	OB
1º	Machine Learning and Data Mining	6	OB
1º	Neural Networks, the Basis of Deep Learning	6	OB
1º	Deep Neural Networks Training	6	OB
1º	Model Customization and Training with TensorFlow	6	OB
1º	Deep Computer Vision with Convolutional Neural Networks	6	OB
1º	Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) and Attention	6	OB
1º	Autoencoders, GANs and Diffusion Models	6	OB
1º	Bio-Inspired Computing	6	OB
1º	Artificial Intelligence: Strategies and Applications	6	OB
1º	Data Analysis and Application of AI Techniques for Educational Personalization	6	OB
1º	Development of Artificial Intelligence Projects in the Classroom	6	OB
1º	Teaching Practice with Generative Artificial Intelligence	6	OB
1º	Innovations and Emerging Trends in AI for Education	6	OB
1º	Ethics and Legislation of Artificial Intelligence in Education	6	OB

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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 Master's Degree

Artificial Intelligence in Education

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

Duration: **12 months.**

Certificate: **TECH Global University**

Credits: **60 + 4 ECTS**

Hybrid Master's Degree
Artificial Intelligence in Education

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