Professional Master's Degree

Artificial Intelligence in Clinical Practice

tech global university

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Professional Master's Degree
Artificial Intelligence in Clinical Practice

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

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

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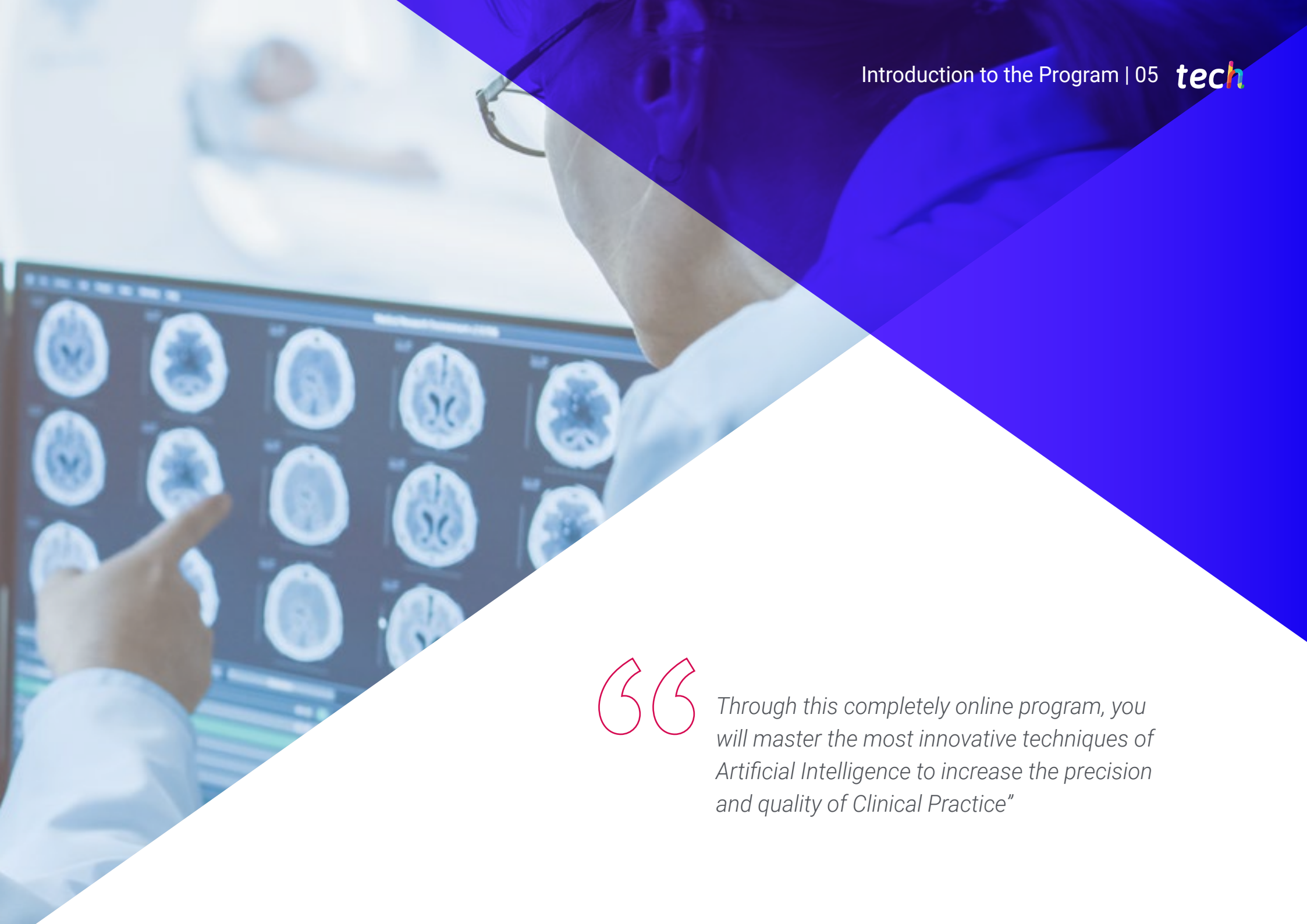
01

Introduction to the Program

Artificial Intelligence is playing an increasingly important role in both clinical research and medical care. Among the reasons for this is that these systems help in the identification of pathologies by analyzing medical images (such as X-rays or CT scans). In this way, specialists can detect anomalies with greater precision and speed. In turn, this means earlier diagnosis and even detection of diseases in their early stages. In this context, TECH has developed a university degree that will delve into the integration of intelligent systems in clinical The Practice. Moreover, it is based on a 100% online methodology so that students can balance their studies with the rest of their daily activities.



Through this completely online program, you will master the most innovative techniques of Artificial Intelligence to increase the precision and quality of Clinical Practice"

Big data significantly improves medical care and research in the healthcare field. These advanced systems give experts the opportunity to personalize treatments and have immediate access to relevant information such as medical history to optimize results. In addition, these tools contribute to continuous monitoring of patients outside the healthcare environment, which is especially beneficial for users suffering from chronic diseases. However, in order to enjoy these benefits, professionals need to develop advanced skills to successfully integrate sophisticated machine learning techniques into their daily practice.

For this reason, TECH has designed a program in Artificial Intelligence in Clinical Practice. The syllabus will cover aspects such as data mining in both health and biomedical records, while focusing on algorithm training methods and predictive analytics. The teaching content will also delve into the interactions that occur in biological networks for the identification of patterns when faced with complex diseases. In addition, the syllabus will pay careful attention to the ethical and legal factors of the use of intelligent systems in the medical context. In this way, graduates will master the main technologies of Artificial Intelligence to optimize the quality of life of patients.

It should be noted that, to reinforce all this content, TECH relies on its revolutionary Relearning methodology. This system is based on the reiteration of key concepts, to consolidate optimal understanding. The only requirement for specialists is to have an electronic device (such as a mobile phone, computer or tablet) connected to the Internet, in order to access the Virtual Campus and view the contents at any time. In addition, on the Virtual Campus they will enjoy a wide range of multimedia content such as in-depth videos, specialized readings and interactive summaries.

This **Professional Master's Degree in Artificial Intelligence in Clinical Practice** contains the most complete and up-to-date educational program on the market. Its most notable features are:

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

You will master specialized software such as TensorFlow Datasets to perform efficient preprocessing of health data"

You will implement Machine Learning models to optimize the early detection of complex diseases such as cancer"

You will guarantee security, privacy and ethics in the application of intelligent systems in the health field.

With the Relearning system you will integrate concepts in a natural and progressive way, without the need to memorize.

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

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

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

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Why Study at TECH?

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

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

The world's best online university, according to FORBES

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

The best top international faculty

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

The world's largest online university

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

The most complete syllabuses on the university scene

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

A unique learning method

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

The official online university of the NBA

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

Leaders in employability

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

Google Premier Partner

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

The top-rated university by its students

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

03

Syllabus

The current syllabus will delve into aspects ranging from the interpretation of medical data to the development of predictive algorithms and the implementation of solutions based on Artificial Intelligence in different healthcare environments. Likewise, the syllabus will delve into the most advanced machine learning techniques to optimize informed strategic decision making.

The teaching materials will also cover the use of state-of-the-art software such as TensorFlow, which will enable graduates to apply machine learning models in the early detection of diseases, the personalization of treatments and the optimization of clinical processes.

You will master the most cutting-edge Big Data techniques to extract valuable information for the real-time monitoring of Chronic Diseases"

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 Films
- 1.1.3. Importance of Artificial Intelligence
- 1.1.4. Technologies that Enable and Support Artificial Intelligence

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

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

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

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

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

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

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

1.9. AI Implementation Strategy

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

Module 2. Data Types and Life Cycle

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

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

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

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

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

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

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

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

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

2.10. Regulatory Aspects
- 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 Preprocessing

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, Preprocessing and Transformation

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

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

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

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

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

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

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

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

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

4.10. Data Pre-Processing in Big Data Environments

Module 5. Algorithm and Complexity in Artificial Intelligence

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

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

5.3. Sorting Algorithms
- 5.3.1. Concept of Sorting
- 5.3.2. Bubble Sorting
- 5.3.3. Sorting by Selection
- 5.3.4. Sorting by Insertion
- 5.3.5. Merge Sort
- 5.3.6. Quick 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. Greedy Strategy Elements
- 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 Preprocessing
- 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. C Algorithm
- 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. Cloak
- 8.3.3. Output Layer

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

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

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

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

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

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

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

Module 9. Deep Neural Networks Training

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

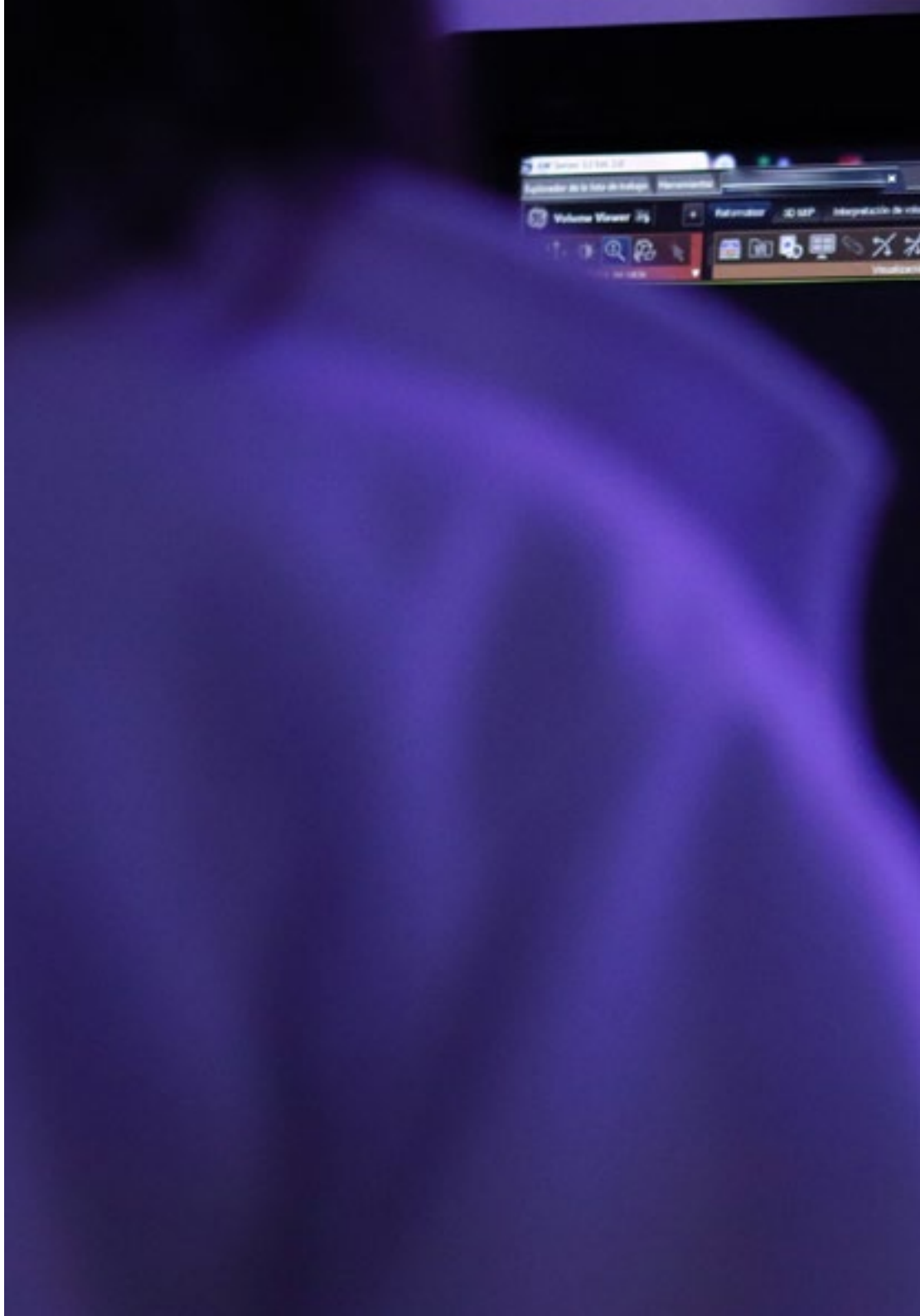
9.2. Reuse of Pre-Trained Layers
- 9.2.1. Learning Transfer Training
- 9.2.2. Feature Extraction
- 9.2.3. Deep Learning

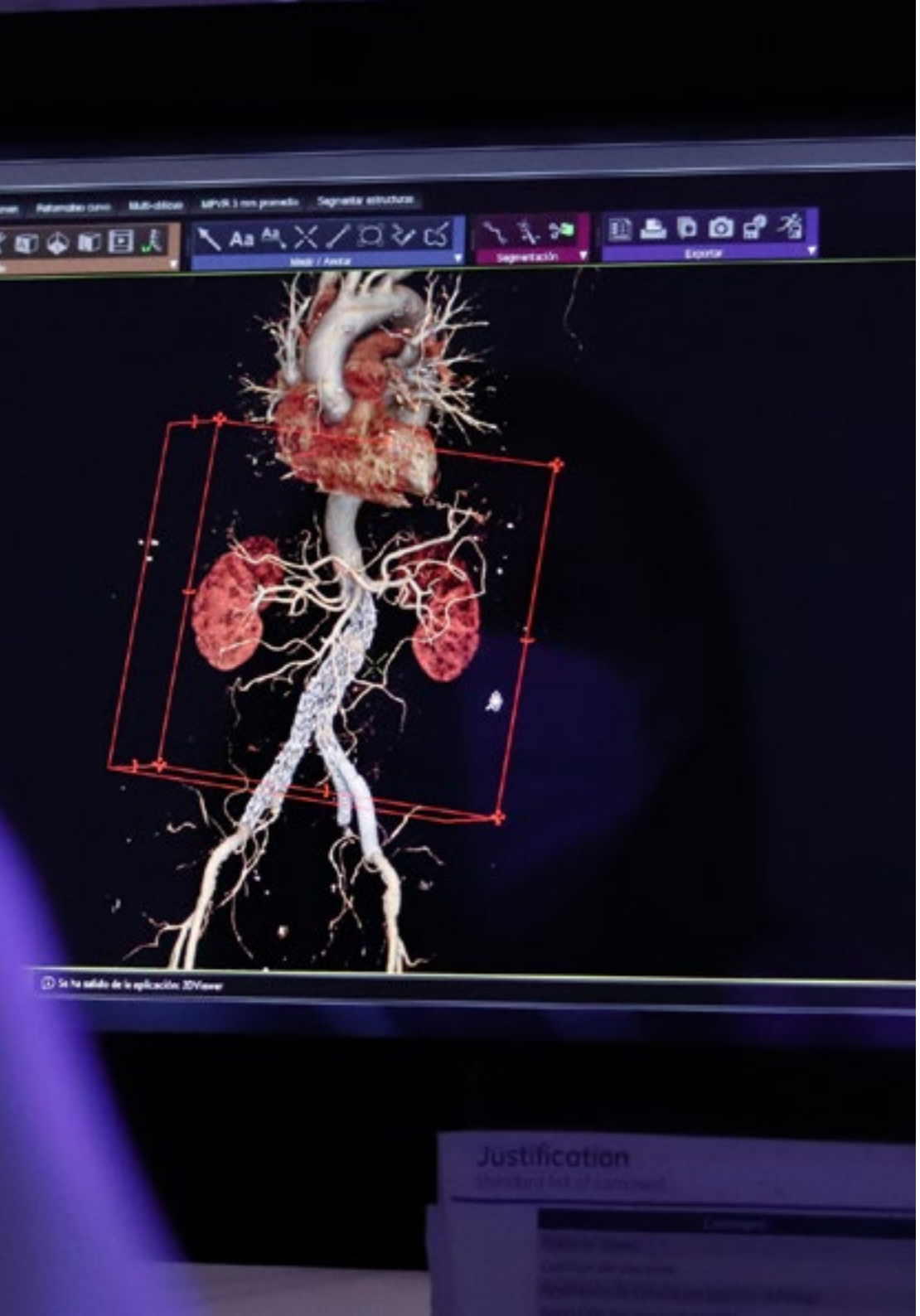
9.3. Optimizers
- 9.3.1. Stochastic Gradient Descent Optimizers
- 9.3.2. Adam and RMSprop Optimizers
- 9.3.3. Moment Optimizers

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

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

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





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

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

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

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

Module 10. Model Customization and Training with TensorFlow

10.1. TensorFlow
- 10.1.1. Using the TensorFlow Library
- 10.1.2. Model Education with TensorFlow
- 10.1.3. Operations with Graphs in TensorFlow

10.2. TensorFlow and NumPy
- 10.2.1. NumPy Computational 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 Functions and Graphs
- 10.4.1. Functions with TensorFlow
- 10.4.2. Use of Graphs for Model Training
- 10.4.3. Optimization of graphs with TensorFlow Operations

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

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

10.7. The TFRecord Format
- 10.7.1. Using the TFRecord API for Data Serialization
- 10.7.2. Loading TFRecord files with TensorFlow
- 10.7.3. Using TFRecord Files for Training Models

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

10.9. The TensorFlow Datasets Project
- 10.9.1. Using TensorFlow Datasets for data loading
- 10.9.2. Data preprocessing with TensorFlow Datasets
- 10.9.3. Using TensorFlow Datasets for Model Training

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

Module 11. Deep Computer Vision with Convolutional Neural Networks

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Module 13. Autoencoders, GANs and Diffusion Models

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

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

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

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

13.5. Noise Suppression of Autoencoders
- 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 Distribution Algorithms (EDA)
- 14.6.2. Genetic Programming

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

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

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

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

Module 15. Artificial Intelligence: Strategies and Applications

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

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

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

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

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

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

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

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

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

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

Module 16. Diagnosis in Clinical Practice using Artificial Intelligence

16.1. Technologies and Tools for AI-assisted Diagnostics
- 16.1.1. Development of Software for AI-assisted Diagnosis in Different Medical Specialties using ChatGPT
- 16.1.2. Use of Advanced Algorithms for Rapid and Accurate Analysis of Clinical Symptoms and Signs
- 16.1.3. Integration of AI into Diagnostic Devices to Improve Efficiency
- 16.1.4. AI Tools to Assist in the Interpretation of Laboratory Test Results using IBM Watson Health

16.2. Integration of Multimodal Clinical Data for Diagnosis
- 16.2.1. AI Systems to Combine Imaging, Laboratory and Clinical Record Data using AutoML
- 16.2.2. Tools for Correlating Multimodality Data into More Accurate Diagnoses using Enlitic Curie
- 16.2.3. Use of AI to Analyze Complex Patterns from Different Types of Clinical Data using Flatiron Health's OncologyCloud
- 16.2.4. Integration of Genomic and Molecular Data in AI-assisted Diagnosis

16.3. Creation and Analysis of Health Datasets with AI using Google Cloud Healthcare API
- 16.3.1. Development of Clinical Databases for AI Model Training
- 16.3.2. Use of AI for the Analysis and Extraction of Insights from Large Health Datasets
- 16.3.3. AI Tools for Clinical Data Cleaning and Preparation
- 16.3.4. AI Systems for Identifying Trends and Patterns in Health Data

16.4. Visualization and Management of Health Data with AI
- 16.4.1. AI Tools for Interactive and Understandable Visualization of Health Data
- 16.4.2. AI Systems for Efficient Management of Large Volumes of Clinical Data
- 16.4.3. Use of AI-based Dashboards for the Monitoring of Health Indicators
- 16.4.4. AI Technologies for Health Data Management and Security

16.5. Pattern Recognition and Machine Learning in Clinical Diagnostics
- 16.5.1. Application of Machine Learning Techniques for Pattern Recognition in Clinical Data
- 16.5.2. Use of AI in the Early Identification of Diseases through Pattern Analysis using PathAI
- 16.5.3. Development of Predictive Models for More Accurate Diagnoses
- 16.5.4. Implementation of Machine Learning Algorithms in the Interpretation of Health Data

16.6. Interpretation of Medical Images with AI using Aidoc
- 16.6.1. AI Systems for Detection and Classification of Medical Image Anomalies
- 16.6.2. Use of Deep Learning in the Interpretation of X-rays, MRI and CT Scans
- 16.6.3. AI Tools to Improve Accuracy and Speed in Diagnostic Imaging
- 16.6.4. Implementation of AI for Image-based Clinical Decision Support

16.7. Natural Language Processing on Medical Records for Clinical Diagnosis using ChatGPT and Amazon Comprehend Medical
- 16.7.1. Use of NLP for the Extraction of Relevant Information from Medical Records
- 16.7.2. AI Systems for Analyzing Physician Notes and Patient Reports
- 16.7.3. AI Tools for Summarizing and Classifying Medical Record Information
- 16.7.4. Application of NLP in the Identification of Symptoms and Diagnosis from Clinical Texts

16.8. Validation and Evaluation of AI-assisted Diagnostic Models
- 16.8.1. Methods for Validation and Testing of AI Models in Real Clinical Settings
- 16.8.2. Performance and Accuracy Evaluation of AI-Assisted Diagnostic Tools
- 16.8.3. Use of AI to Ensure Reliability and Ethics in Clinical Diagnosis
- 16.8.4. Implementation of Continuous Assessment Protocols for AI Systems in Healthcare

16.9. AI in the Diagnosis of Rare Diseases using Face2Gene
- 16.9.1. Development of AI Systems Specialized in Rare Diseases Identification
- 16.9.2. Use of AI for Analyzing Atypical Patterns and Complex Symptomatology
- 16.9.3. AI Tools for Early and Accurate Diagnosis of Rare Diseases
- 16.9.4. Implementation of Global Databases with AI to Improve Diagnosis of Rare Diseases

16.10. Success Stories and Challenges in AI Diagnostics Implementation
- 16.10.1. Analysis of Case Studies where AI has Significantly Improved Clinical Diagnosis
- 16.10.2. Assessment of Challenges in AI adoption in Clinical Settings
- 16.10.3. Discussion on Ethical and Practical Barriers in the Implementation of AI for Diagnosis
- 16.10.4. Examination of Strategies for Overcoming Obstacles to the Integration of AI in Medical Diagnostics

Module 17. Treatment and Management of Patients with Artificial Intelligence

17.1. AI-assisted Treatment Systems
- 17.1.1. Development of AI Systems to Assist in Decision-Making Therapeutics
- 17.1.2. Use of AI for the Personalization of Treatments Based on Individual Profiles
- 17.1.3. Implementation of AI Tools in the Administration of Dosage and Medication Scheduling
- 17.1.4. Integration of AI in Real-Time Monitoring and Adjustment of Treatments

17.2. Definition of Indicators for Monitoring Patient Health Status
- 17.2.1. Establishment of Key Parameters using AI for Patient Health Monitoring
- 17.2.2. Use of AI to Identify Predictive Indicators of Health and Disease
- 17.2.3. Development of Early Warning Systems Based on Health Indicators
- 17.2.4. Implementation of AI for Continuous Assessment of Patient Health Status

17.3. Tools for the Monitoring and Control of Health Indicators
- 17.3.1. Development of AI-enabled Mobile and Wearable Applications for Health Monitoring
- 17.3.2. Implementation of AI Systems for the Real-Time Analysis of Health Data
- 17.3.3. Use of AI-based Dashboards for Visualization and Monitoring of Health Indicators
- 17.3.4. Integration of IoT Devices in the Continuous Monitoring of Health Indicators with AI

17.4. AI in the Planning and Execution of Medical Procedures with Intuitive Da Vinci Surgical System
- 17.4.1. Use of AI Systems to Optimize the Planning of Surgeries and Medical Procedures
- 17.4.2. Implementation of AI in the Simulation and Practice of Surgical Procedures
- 17.4.3. Using AI to Improve Accuracy and Efficacy in the Execution of Medical Procedures
- 17.4.4. Application of AI in Surgical Resource Coordination and Management

17.5. Machine Learning Algorithms for the Establishment of Therapeutic Treatments
- 17.5.1. Use of Machine Learning to Develop Personalized Treatment Protocols
- 17.5.2. Implementation of Predictive Algorithms for the Selection of Effective Therapies
- 17.5.3. Development of AI Systems for Real-time Tailoring of Treatments
- 17.5.4. Application of AI in the Analysis of the Effectiveness of Different Therapeutic Options

17.6. Adaptability and Continuous Updating of Therapeutic Protocols Using AI with BM Watson for Oncology
- 17.6.1. Implementation of AI Systems for Dynamic Review and Updating of Treatments
- 17.6.2. Use of AI in Adaptation of Therapeutic Protocols to New Findings and Data
- 17.6.3. Development of AI Tools for Continuous Personalization of Treatments
- 17.6.4. Integration of AI in Adaptive Response to Evolving Patient Conditions

17.7. Optimization of Healthcare Services with AI Technology
- 17.7.1. Use of AI to Improve the Efficiency and Quality of Health Care Services
- 17.7.2. Implementation of AI Systems for Healthcare Resource Management
- 17.7.3. Development of AI Tools for Workflow Optimization in Hospitals
- 17.7.4. Application of AI in the Reduction of Waiting Times and Improvement of Patient Care

17.8. Application of AI in the Response to Health Emergencies
- 17.8.1. Implementation of AI Systems for Rapid and Efficient Healthcare Crisis Management with BlueDot
- 17.8.2. Use of AI in Optimizing the Distribution of Resources in Emergencies
- 17.8.3. Development of AI Tools for Disease Outbreak Prediction and Response
- 17.8.4. Integration of AI in Warning and Communication Systems during Health Emergencies

17.9. Interdisciplinary Collaboration in AI-assisted Treatments
- 17.9.1. Promotion of Collaboration between Different Medical Specialties through AI Systems
- 17.9.2. Use of AI to Integrate Knowledge and Techniques from Different Disciplines in Treatment
- 17.9.3. Development of AI Platforms to Facilitate Interdisciplinary Communication and Coordination
- 17.9.4. Implementation of AI in the Creation of Multidisciplinary Treatment Teams

17.10. Successful Experiences of AI in the Treatment of Diseases
- 17.10.1. Analysis of Successful Cases in the Use of AI for Effective Treatment of Diseases
- 17.10.2. Evaluation of the Impact of AI in Improving Treatment Outcomes
- 17.10.3. Documentation of Innovative Experiences in the Use of AI in Different Medical Areas
- 17.10.4. Discussion on the Advances and Challenges in the Implementation of AI in Medical Treatments

Module 18. Personalized Healthcare through Artificial Intelligence

18.1. AI Applications in Genomics for Personalized Medicine with DeepGenomics
- 18.1.1. Development of AI Algorithms for the Analysis of Genetic Sequences and their Relationship with Diseases
- 18.1.2. Use of AI in the Identification of Genetic Markers for Personalized Treatments
- 18.1.3. Implementation of AI for the Rapid and Accurate Interpretation of Genomic Data
- 18.1.4. AI Tools in Correlating Genotypes with Drug Responses

18.2. AI in Pharmacogenomics and Drug Design using AtomWise
- 18.2.1. Development of AI Models to Predict Drug Efficacy and Safety
- 18.2.2. Use of AI in the Identification of Therapeutic Targets and Drug Design
- 18.2.3. Application of AI in the Analysis of Gene-drug Interactions for Treatment Customization
- 18.2.4. Implementation of AI Algorithms to Accelerate New Drug Discovery

18.3. Personalized Monitoring with Smart Devices and AI
- 18.3.1. Development of Wearables with AI for Continuous Monitoring of Health Indicators
- 18.3.2. Use of AI in the Interpretation of Data Collected by Smart Devices with FitBit
- 18.3.3. Implementation of AI-based Early Warning Systems for Health Conditions
- 18.3.4. AI Tools for the Personalization of Lifestyle and Health Recommendations

18.4. Clinical Decision Support Systems with AI
- 18.4.1. AI Implementation to Assist Physicians in Clinical Decision Making with Oracle Cerner
- 18.4.2. Development of AI Systems that Provide Recommendations Based on Clinical Data
- 18.4.3. Use of AI in the Assessment of Risks and Benefits of Different Therapeutic Options
- 18.4.4. AI Tools for Real-time Health Data Integration and Analysis

18.5. Trends in Health Personalization with AI
- 18.5.1. Analyzing the Latest AI Trends for Customizing Healthcare
- 18.5.2. Use of AI in the Development of Preventive and Predictive Approaches in Health
- 18.5.3. Implementing AI in Adapting Health Plans to Individual Needs
- 18.5.4. Exploring New AI Technologies in the Field of Personalized Health

18.6. Advances in AI-assisted Surgical Robotics with Intuitive Da Vinci Surgical System
- 18.6.1. Development of Surgical Robots with AI for Precise and Minimally Invasive Procedures
- 18.6.2. Use of AI to Improve Accuracy and Safety in Robotic-Assisted Surgeries with OncoraMedical
- 18.6.3. Implementation of AI Systems for Surgical Planning and Simulation of Operations
- 18.6.4. Advances in the Integration of Tactile and Visual Feedback in Surgical Robotics with AI

18.7. Development of Predictive Models for Personalized Clinical Practice
- 18.7.1. Using AI to Create Predictive Disease Models Based on Individual Data
- 18.7.2. Implementation of AI in Predicting Treatment Responses
- 18.7.3. Development of AI Tools for Anticipating Health Risks
- 18.7.4. Applying Predictive Models in the Planning of Preventive Interventions

18.8. AI in Personalized Pain Management and Treatment with Kaia Health
- 18.8.1. Development of AI Systems for Personalized Pain Assessment and Management
- 18.8.2. Use of AI in Identifying Pain Patterns and Responses to Treatments
- 18.8.3. Implementation of AI Tools in the Personalization of Pain Therapies
- 18.8.4. Application of AI in Monitoring and Adjusting Pain Treatment Plans

18.9. Patient Autonomy and Active Participation in Personalization
- 18.9.1. Promoting Patient Autonomy through AI Tools for Managing Patient Health with Ada Health
- 18.9.2. Development of AI Systems that Empower Patients in Decision Making
- 18.9.3. Using AI to Provide Personalized Information and Education to Patients
- 18.9.4. AI Tools that Facilitate Active Patient Participation in Treatment

18.10. Integration of AI in Electronic Medical Records with Oracle Cerner
- 18.10.1. AI Implementation for Efficient Analysis and Management of Electronic Medical Records
- 18.10.2. Development of AI Tools for Extracting Clinical Insights from Electronic Records
- 18.10.3. Using AI to Improve Accuracy and Accessibility of Data in Medical Records
- 18.10.4. Application of AI for the Correlation of Clinical History Data with Treatment Plans

Module 19. Analysis of Big Data in the Healthcare Sector with Artificial Intelligence

19.1. Fundamentals of Big Data in Healthcare
- 19.1.1. The Explosion of Data in the Field of Healthcare
- 19.1.2. Concept of Big Data and Main Tools
- 19.1.3. Applications of Big Data in Healthcare

19.2. Text Processing and Analysis in Health Data with KNIME and Python
- 19.2.1. Concepts of Natural Language Processing
- 19.2.2. Embedding Techniques
- 19.2.3. Application of Natural Language Processing in Healthcare

19.3. Advanced Methods for Data Retrieval in Healthcare with KNIME and Python
- 19.3.1. Exploration of Innovative Techniques for Efficient Data Retrieval in Healthcare
- 19.3.2. Development of Advanced Strategies for Extracting and Organizing Information in Healthcare Settings
- 19.3.3. Implementation of Adaptive and Personalized Data Retrieval Methods for Diverse Clinical Contexts

19.4. Quality Assessment in Health Data Analysis with KNIME and Phyton
- 19.4.1. Development of Indicators for Rigorous Assessment of Data Quality in Healthcare Settings
- 19.4.2. Implementation of Tools and Protocols for Quality Assurance of Data Used in Clinical Analysis
- 19.4.3. Continuous Assessment of the Accuracy and Reliability of Results in Health Data Analysis Projects

19.5. Data Mining and Machine Learning in Healthcare with KNIME and Phyton
- 19.5.1. Main Methodologies for Data Mining
- 19.5.2. Health Data Integration
- 19.5.3. Detection of Patterns and Anomalies in Health Data

19.6. Innovative Areas of Big Data and AI in Healthcare
- 19.6.1. Exploring New Frontiers in the Application of Big Data and AI to Transform the Healthcare Sector
- 19.6.2. Identifying Innovative Opportunities for the Integration of Big Data and AI Technologies in Medical Practices
- 19.6.3. Development of Cutting-edge Approaches to Maximize the Potential of Big Data and AI in Healthcare

19.7. Medical Data Collection and Preprocessing with KNIME and Phyton
- 19.7.1. Development of Efficient Methodologies for Medical Data Collection in Clinical and Research Settings
- 19.7.2. Implementation of Advanced Preprocessing Techniques to Optimize Medical Data Quality and Utility
- 19.7.3. Design of Collection and Preprocessing Strategies that Guarantee the Confidentiality and Privacy of Medical Information

19.8. Data Visualization and Health Communication with Tools such as PowerBI and Python
- 19.8.1. Design of Innovative Visualization Tools in Healthcare
- 19.8.2. Creative Communication Strategies in Healthcare
- 19.8.3. Integration of Interactive Technologies in Healthcare

19.9. Data Security and Governance in the Healthcare Sector
- 19.9.1. Development of Comprehensive Data Security Strategies to Protect Confidentiality and Privacy in the Health Sector
- 19.9.2. Implementation of Effective Governance Frameworks to Ensure Responsible and Ethical Data Management in Medical Settings
- 19.9.3. Design of Policies and Procedures to Ensure the Integrity and Availability of Medical Data, Addressing Healthcare Sector-Specific Challenges

19.10. Practical Applications of Big Data in Healthcare
- 19.10.1. Development of Specialized Solutions for Managing and Analyzing Large Data Sets in Healthcare Environments
- 19.10.2. Use of Practical Tools Based on Big Data to Support Clinical Decision Making
- 19.10.3. Application of Innovative Big Data Approaches to Address Specific Challenges within the Healthcare Sector

Module 20. Ethics and Regulation in Medical Artificial Intelligence

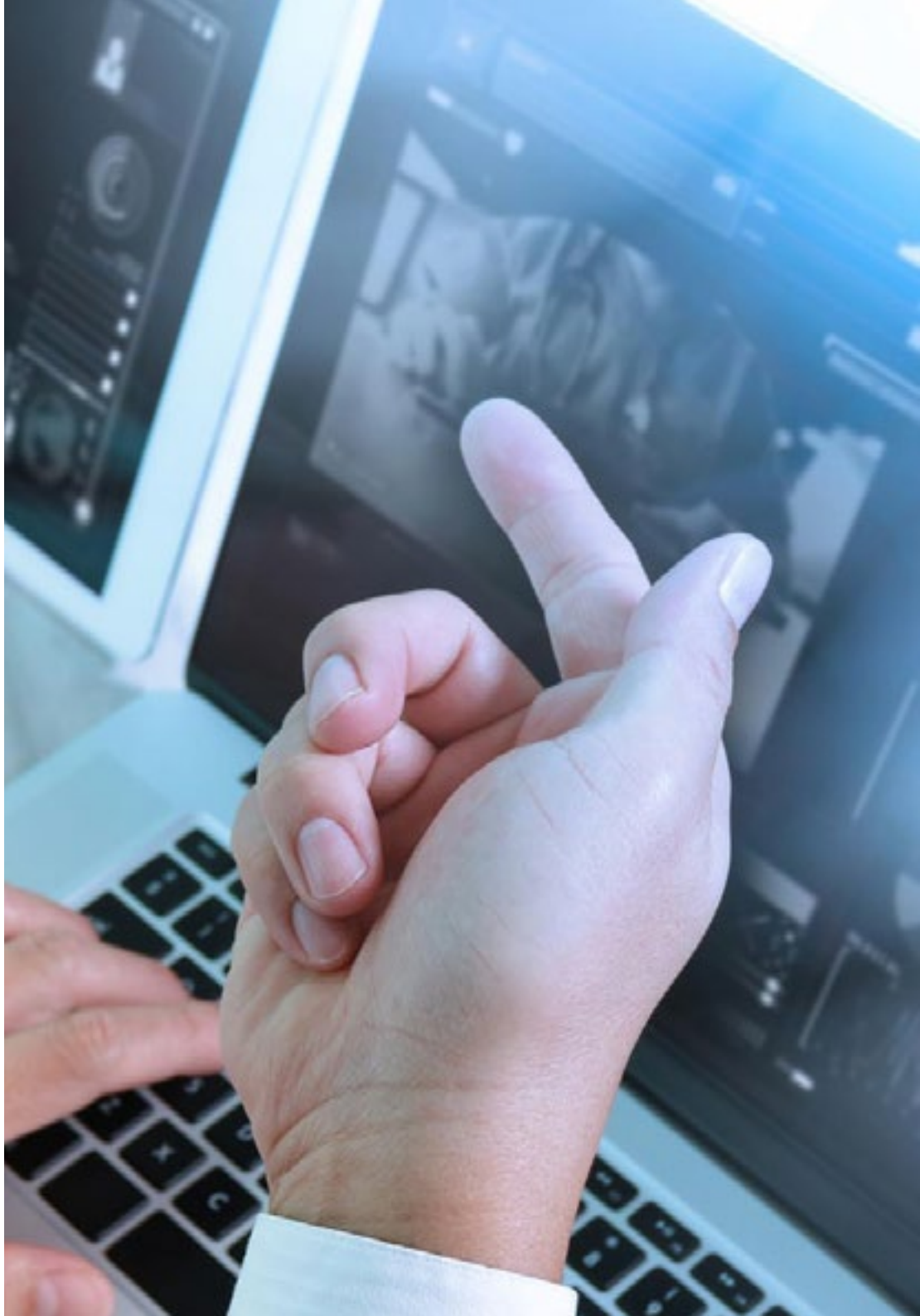
20.1. Ethical Principles in the Use of AI in Medicine
- 20.1.1. Analysis and Adoption of Ethical Principles in the Development and Use of Medical AI Systems
- 20.1.2. Integrating Ethical Values into AI-Assisted Decision-Making in Medical Settings
- 20.1.3. Establishing Ethical Guidelines to Ensure the Responsible Use of Artificial Intelligence in Medicine

20.2. Data Privacy and Consent in Medical Contexts
- 20.2.1. Developing Privacy Policies to Protect Sensitive Data in Medical AI Applications
- 20.2.2. Guarantee of Informed Consent in the Collection and Use of Personal Data in the Medical Field
- 20.2.3. Implementing Security Measures to Safeguard Patient Privacy in Medical AI Environments

20.3. Ethics in Research and Development of Medical AI Systems
- 20.3.1. Ethical Evaluation of Research Protocols in the Development of AI Systems for Health
- 20.3.2. Ensuring Transparency and Ethical Rigor in the Development and Validation of Medical AI Systems
- 20.3.3. Ethical Considerations in the Publication and Sharing of Medical AI Results

20.4. Social Impact and Accountability in Health AI
- 20.4.1. Analysis of the Social Impact of AI on Health Service Delivery
- 20.4.2. Development of Strategies to Mitigate Risks and Ethical Responsibility in Medical AI Applications
- 20.4.3. Continuous Social Impact Assessment and Adaptation of AI Systems to Positively Contribute to Public Health

20.5. Sustainable Development of AI in the Healthcare Sector
- 20.5.1. Integration of Sustainable Practices in the Development and Maintenance of AI Systems in Healthcare
- 20.5.2. Environmental and Economic Impact Assessment of AI Technologies in Healthcare
- 20.5.3. Development of Sustainable Business Models to Ensure Continuity and Improvement of AI Solutions in the Health Sector



20.6. Data Governance and International Regulatory Frameworks in Medical AI
- 20.6.1. Development of Governance Frameworks for Ethical and Efficient Data Management in Medical AI Applications
- 20.6.2. Adaptation to International Regulations to Ensure Ethical and Legal Compliance
- 20.6.3. Active Participation in International Initiatives to Establish Ethical Standards in the Development of Medical AI Systems

20.7. Economic Aspects of AI in the Healthcare Sector
- 20.7.1. Analysis of Economic Implications and Cost-Benefits in the Implementation of AI Systems in Healthcare
- 20.7.2. Development of Business Models and Financing to Facilitate the Adoption of AI Technologies in the Healthcare Sector
- 20.7.3. Assessment of Economic Efficiency and Equity in Access to AI-Driven Health Services

20.8. Human-Centered Design of Medical AI Systems
- 20.8.1. Integration of Human-Centered Design Principles to Improve Usability and Acceptance of Medical AI Systems
- 20.8.2. Participation of Health Professionals and Patients in the Design Process to Ensure the Relevance and Effectiveness of the Solutions
- 20.8.3. Continuous User Experience Assessment and Feedback to Optimize Interaction with AI Systems in Medical Environments

20.9. Fairness and Transparency in Medical Machine Learning
- 20.9.1. Development of Medical Machine Learning Models that Promote Equity and Transparency
- 20.9.2. Implementation of Practices to Mitigate Biases and Ensure Equity in the Application of AI Algorithms in the Field of Health
- 20.9.3. Continuous Assessment of Equity and Transparency in the Development and Deployment of Machine Learning Solutions in Medicine

20.10. Safety and Policy in the Implementation of AI in Medicine
- 20.10.1. Development Security Policies to Protect Data Integrity and Confidentiality in Medical AI Applications
- 20.10.2. Implementation of Safety Measures in the Deployment of AI Systems to Prevent Risks and Ensure Patient Safety
- 20.10.3. Continuous Evaluation of Safety Policies to Adapt to Technological Advances and New Challenges in the Implementation of AI in Medicine

You will use algorithms during different imaging tests such as computerized tomography to optimize diagnostic accuracy and reduce the margin of error in the interpretation of results"

04

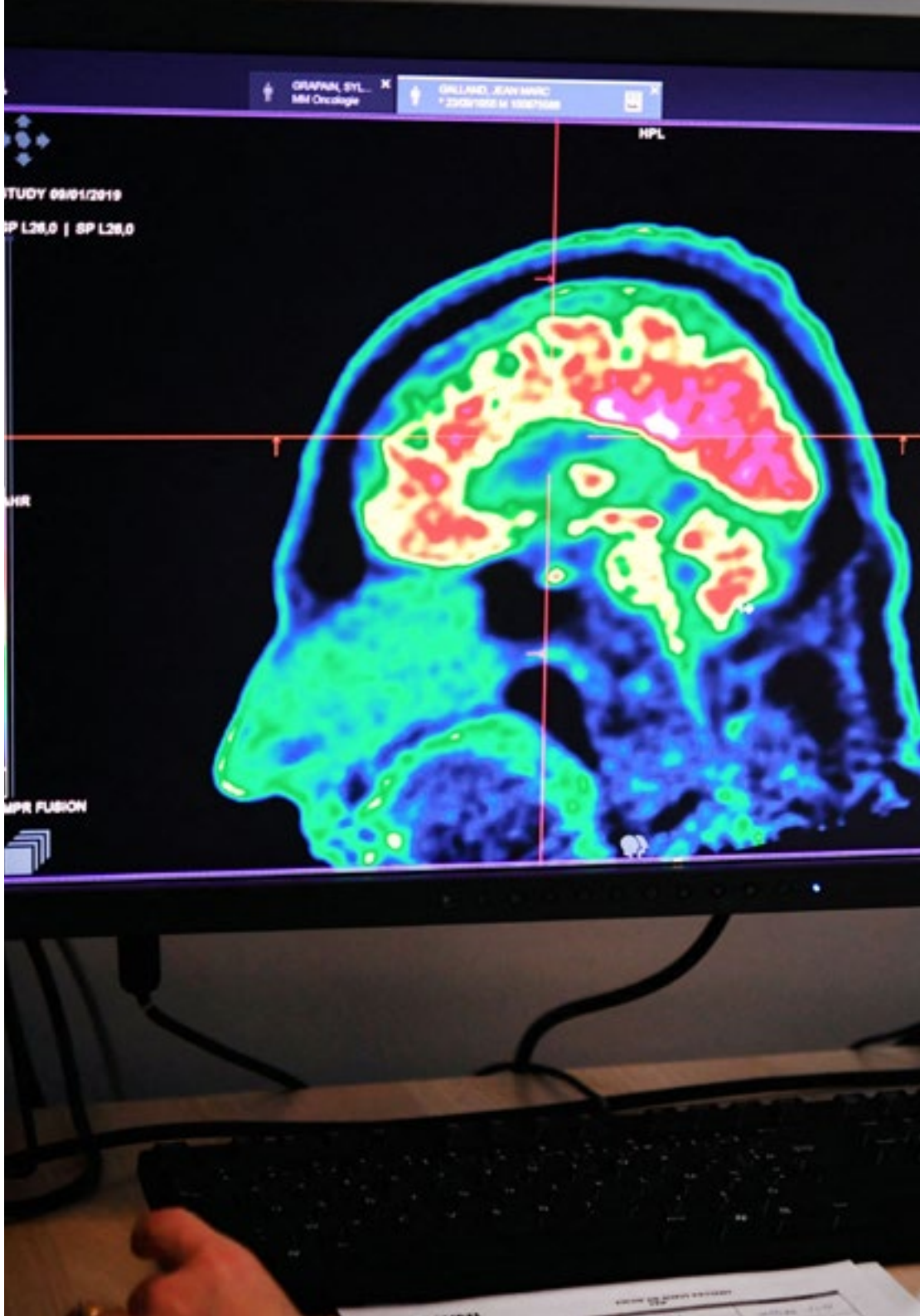
Teaching Objectives

Graduates will have an in-depth understanding of the implementation of Artificial Intelligence in Clinical Practice. In this way, professionals will master the most innovative big data and machine learning techniques to optimize data-driven strategic decision making. At the same time, specialists will be able to develop predictive models to personalize therapeutic plans and improve the overall well-being of patients in the long term.

You will apply intelligent systems to automate routine administrative tasks in the healthcare sector and improve operational flows"

General Objectives

- Understand the theoretical foundations of Artificial Intelligence
- Study the different types of data and understand the data lifecycle
- Evaluate the crucial role of data in the development and implementation of AI solutions
- Delve into algorithms and complexity to solve specific problems
- Explore the theoretical basis of neural networks for Deep Learning development
- Analyze bio-inspired computing and its relevance in the development of intelligent systems
- Analyze current strategies of Artificial Intelligence in various fields, identifying opportunities and challenges
- Acquire a solid understanding of model validation and simulations in the biomedical domain, exploring the use of synthetic datasets and practical applications of AI in health research
- Understand and apply genomic sequencing technologies, AI data analysis and use of AI in biomedical imaging
- Acquire expertise in key areas such as personalization of therapies, precision medicine, AI-assisted diagnostics, and clinical trial management
- Obtain a solid understanding of Big Data concepts in the clinical setting and become familiar with essential tools for its analysis
- Delve into ethical dilemmas, review legal considerations, explore the socioeconomic impact and future of AI in healthcare



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, Preprocessing and Transformation

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

Module 5. Algorithm and Complexity in Artificial Intelligence

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

Module 6. Intelligent Systems

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

- 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 TensorFlowand 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

Module 11. Deep Computer Vision with Convolutional Neural Networks

- Explore and apply convolutional layers to extract key features from images
- Analyze various Convolutional Neural Network 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
- 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
- Understand and apply attentional mechanisms in natural language processing models
- Explore the application of Transformers models in the context of image processing and computer vision
- 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
- 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

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

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. Diagnosis in Clinical Practice using Artificial Intelligence

- Critically analyze the benefits and limitations of AI in healthcare
- Identify potential pitfalls, providing an informed assessment of its application in clinical settings
- Recognize the importance of collaboration across disciplines to develop effective AI solutions
- Develop competencies to apply AI tools in the clinical context, focusing on aspects such as assisted diagnosis, analysis of medical images and interpretation of results
- Identify possible errors in the application of AI in healthcare, providing an informed view of its use in clinical settings

Module 17. Treatment and Management of Patients with Artificial Intelligence

- Interpret results for ethical datasets creation and strategic application in health emergencies
- Acquire advanced skills in the presentation, visualization, and management of AI data in healthcare
- Gain a comprehensive perspective of emerging trends and technological innovations in AI applied to healthcare
- Develop AI algorithms for specific applications such as health monitoring, facilitating the effective implementation of solutions in medical practice
- Design and implement individualized medical treatments by analyzing patients' clinical and genomic data with AI

Module 18. Personalized Healthcare through Artificial Intelligence

- Delve into emerging trends in AI applied to personalized health and its future impact
- Define AI applications for customizing medical treatments, ranging from genomic analysis to pain management
- Differentiate specific AI algorithms for the development of applications related to drug design or surgical robotics
- Delimit emerging trends in AI applied to personalized health and its future impact
- Promote innovation by developing strategies to improve health care

Module 19. Analysis of Big Data in the Healthcare Sector with Artificial Intelligence

- Acquire a solid understanding of medical data collection, filtering, and preprocessing
- Develop a clinical approach based on data quality and integrity in the context of privacy regulations
- Apply the acquired knowledge in use cases and practical applications, enabling to understand and solve industry-specific challenges, from text analytics to data visualization and medical information security
- Define Big Data techniques specific to the healthcare sector, including the application of machine learning algorithms for analytics
- Employ Big Data procedures to track and monitor the spread of infectious diseases in real time for effective response to epidemics

Module 20. Ethics and Regulation in Medical Artificial Intelligence

- Understand the fundamental ethical principles and legal regulations applicable to the implementation of AI in medicine
- Master the principles of data governance
- Understand international and local regulatory frameworks
- Ensure regulatory compliance in the use of AI data and tools in the healthcare sector
- Develop skills to design human-centered AI systems, promoting equity and transparency in machine learning

05

Career Opportunities

This TECH university program represents a unique opportunity for healthcare professionals seeking to specialize in the use of Artificial Intelligence in Clinical Practice. Through this innovative approach, graduates will acquire advanced skills to apply AI techniques in the optimization of biomedical processes, clinical data management and the development of predictive models, thereby expanding their job opportunities in highly specialized contexts.

Do you want to learn how to become a Director of Innovation in Digital Health? This university degree will give you the keys to achieve this in just a few months"

Graduate Profile

Graduates of this TECH program will be specialists highly skilled in integrating AI technologies in the clinical and biomedical fields, optimizing research, diagnosis and the personalization of treatments. They will have the necessary skills to design, implement and evaluate intelligent models that facilitate the analysis of massive data, the detection of patterns in medical images and the simulation of biological processes. In addition, they will have a solid background in data ethics and security, guaranteeing the responsible application of these technologies in healthcare settings. These professionals will be prepared to lead innovation projects in clinical research and collaborate in multidisciplinary teams at the frontier of biomedical knowledge.

You will provide holistic advice to healthcare institutions on the implementation of Artificial Intelligence tools.

- **Integration of Artificial Intelligence in Clinical Research:** Ability to apply AI techniques in the analysis of biomedical data, improving the accuracy of disease diagnosis and prediction
- **Optimization of Biomedical Processes:** Ability to design intelligent models that streamline the management of clinical trials and the development of personalized treatments
- **Security and Ethics in the Use of Artificial Intelligence:** Commitment to data protection and the responsible application of Artificial Intelligence in the clinical field
- **Interdisciplinary Collaboration:** Aptitude to work in multidisciplinary teams, facilitating the integration of AI in biomedical research and healthcare

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

1. **Specialist in Technological Innovation in Healthcare:** Responsible for integrating and administering Artificial Intelligence solutions in hospital environments to improve clinical efficiency and the patient experience.
2. **Clinical Data Manager with Artificial Intelligence:** Responsible for managing large volumes of healthcare data using Artificial Intelligence, guaranteeing its analysis, interpretation and security to optimize medical care.
3. **Specialist in Telemedicine with Artificial Intelligence:** Professional in charge of remote patient monitoring, using AI tools for continuous health status assessment and preventive intervention.
4. **Consultant in Healthcare Artificial Intelligence Projects:** Responsible for the implementation of Artificial Intelligence in hospitals and health centers, collaborating with multidisciplinary teams to adapt technological solutions to clinical needs.
5. **Internal Trainer in Artificial Intelligence Technologies:** Responsible for giving specialized workshops and courses on the use of AI tools in hospital environments, promoting the technological updating of health personnel.
6. **Coordinator of Personalized Care with Artificial Intelligence:** Designer and manager of individualized care plans, applying AI algorithms to adapt treatments to the specific needs of each patient.
7. **Clinical Innovation Project Supervisor:** Focuses on the incorporation of Artificial Intelligence in healthcare practice, optimizing workflows and improving the efficiency of healthcare resources.
8. **Specialist in Safety and Ethics in Healthcare AI:** Responsible for evaluating the ethical and regulatory impact of the use of AI in healthcare, guaranteeing compliance with regulations and the protection of clinical data.

06

Study Methodology

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

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

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

The student: the priority of all TECH programs

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

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

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

The most comprehensive study plans at the international level

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

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

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

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

Case Studies and Case Method

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

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

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

Relearning Methodology

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

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

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

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

A 100% online Virtual Campus with the best teaching resources

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

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

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

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

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

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

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

The university methodology top-rated by its students

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

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

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

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

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

Study Material

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

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

Practicing Skills and Abilities

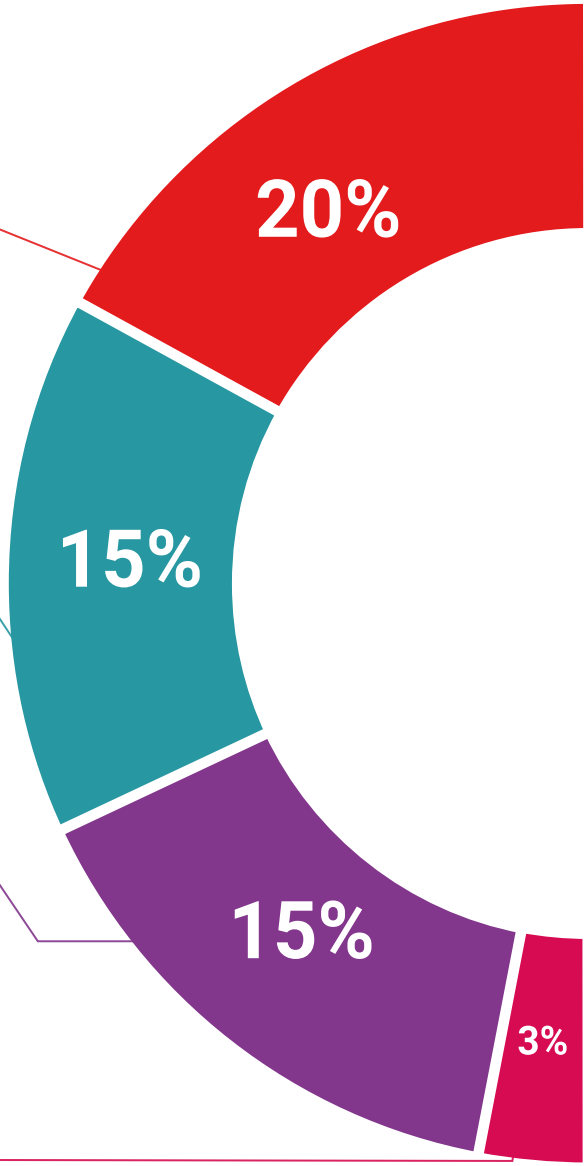
You will carry out activities to develop specific competencies and skills in each thematic field. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop within the framework of the globalization we live in.

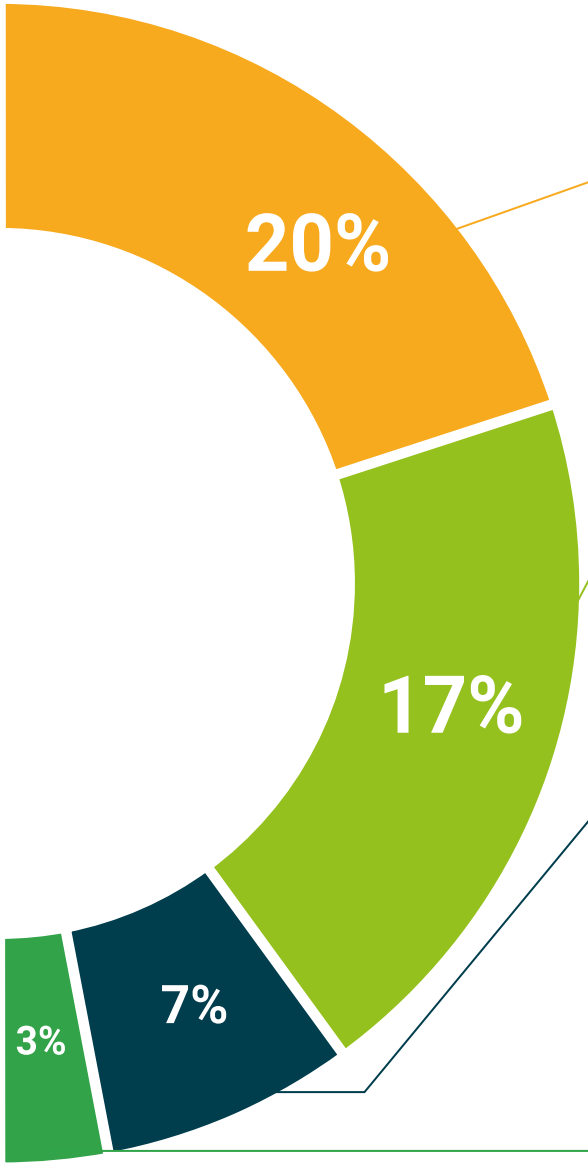
Interactive Summaries

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

Additional Reading

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





Case Studies

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

Testing & Retesting

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

Classes

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

Quick Action Guides

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

07

Teaching Staff

With the aim of providing university programs of high quality and academic excellence, TECH has brought together in this program professionals with extensive experience in Artificial Intelligence applied to Clinical Practice. In this sense, they have designed various teaching materials characterized by their high quality and by their adaptation to the needs of the current labor market. As a result, graduates have the guarantees they demand to specialize and advance successfully in their professional development.

An experienced teaching group specialized in the use of Artificial Intelligence in Clinical Practice will guide you throughout the university program"

Management

Dr. Peralta Martín-Palomino, Arturo

- CEO and CTO at Prometeus Global Solutions
- CTO at Korporate Technologies
- CTO at AI Shephers GmbH
- Consultant and Strategic Business Advisor at Alliance Medical
- Director of Design and Development at DocPath
- PhD in Computer Engineering from the University of Castilla-La Mancha
- PhD in Economics, Business and Finance from the Camilo José Cela University
- PhD in Psychology from University of Castilla La Mancha
- Master's Degree in Executive MBA from the Isabel I University
- Master's Degree in Sales and Marketing Management, Isabel I University
- Master's Degree in Expert 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. Martín-Palomino Sahagún, Fernando

- Chief Technology Officer and R+D+i Director at AURA Diagnostics (medTech)
- Business Development at SARLIN
- Chief Operating Officer at Alliance Diagnostics
- Chief Innovation Officer at Alliance Medical
- Chief Information Officer at Alliance Medical
- Field Engineer & Project Management in Digital Radiology at Kodak
- MBA from Polytechnic University of Madrid
- Executive Master's Degree in Marketing and Sales at ESADE
- Telecommunications Engineer from the University Alfonso X El Sabio

Professors

Dr. Carrasco González, Ramón Alberto

- Business Intelligence Manager (Marketing) at Granada Savings Bank and Mare Nostrum Bank
- Head of Information Systems (Data Warehousing and Business Intelligence) at Caja General de Ahorros de Granada and Banco Mare Nostrum.
- Computer Science and Artificial Intelligence Specialist and Researcher
- PhD in Artificial Intelligence from the University of Granada
- Higher Engineering Degree in Computer Science from the University of Granada

Mr. Popescu Radu, Daniel Vasile

- Independent Specialist in Pharmacology, Nutrition and Dietetics
- Freelance Producer of Teaching and Scientific Contents
- Nutritionist and Community Dietitian
- Community Pharmacist
- Researcher
- Master's Degree in Nutrition and Health at the Open University of Cataluña
- Master's Degree in Psychopharmacology from the University of Valencia
- Pharmacist from the Complutense University of Madrid
- Nutritionist-Dietician from the European University Miguel de Cervantes

08

Certificate

The Professional Master's Degree in Artificial Intelligence in Clinical Practice guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate 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**Professional Master's Degree in Artificial Intelligence in Clinical Practice** endorsed by **TECH Global University**, the world's largest online university.

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

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

Title: **Professional Master's Degree in Artificial Intelligence in Clinical Practice**

Modality: **online**

Duration: **12 months.**

Accreditation: **90 ECTS**

tech global university

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

Professional Master's Degree in Artificial Intelligence in Clinical Practice

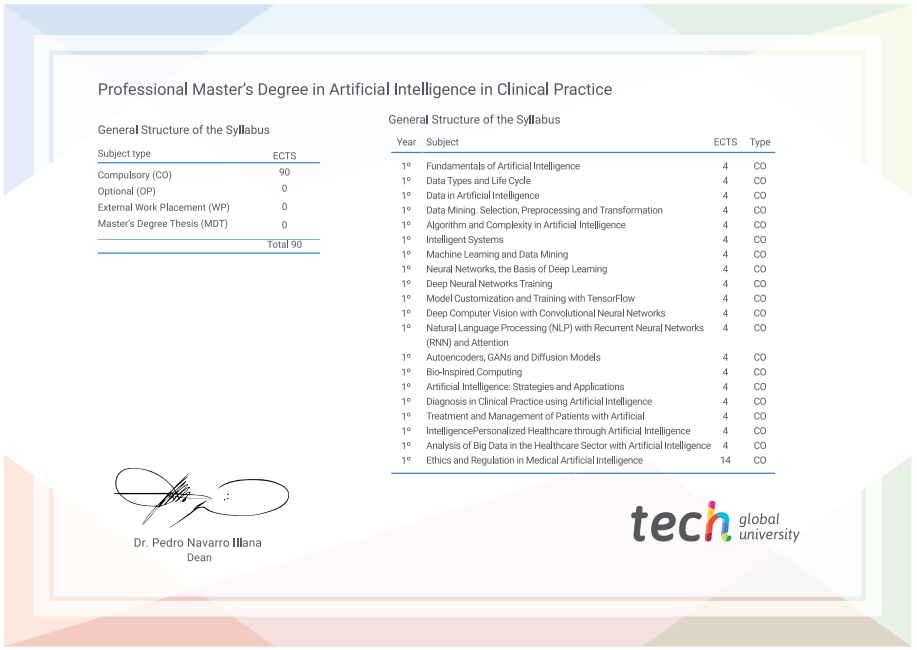
This is a private qualification of 2,700 hours of duration equivalent to 90 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

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

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

Dr. Pedro Navarro Illana
Dean

Unique TECH Code: AFWORD23S techtitute.com/certificates



Professional Master's Degree in Artificial Intelligence in Clinical Practice

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	90
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
	Total 90

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Fundamentals of Artificial Intelligence	4	CO
1º	Data Types and Life Cycle	4	CO
1º	Data in Artificial Intelligence	4	CO
1º	Data Mining. Selection, Preprocessing and Transformation	4	CO
1º	Algorithm and Complexity in Artificial Intelligence	4	CO
1º	Intelligent Systems	4	CO
1º	Machine Learning and Data Mining	4	CO
1º	Neural Networks, the Basis of Deep Learning	4	CO
1º	Deep Neural Networks Training	4	CO
1º	Model Customization and Training with TensorFlow	4	CO
1º	Deep Computer Vision with Convolutional Neural Networks	4	CO
1º	Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) and Attention	4	CO
1º	Autoencoders, GANs and Diffusion Models	4	CO
1º	Bio-Inspired Computing	4	CO
1º	Artificial Intelligence: Strategies and Applications	4	CO
1º	Diagnosis in Clinical Practice using Artificial Intelligence	4	CO
1º	Treatment and Management of Patients with Artificial	4	CO
1º	IntelligencePersonalized Healthcare through Artificial Intelligence	4	CO
1º	Analysis of Big Data in the Healthcare Sector with Artificial Intelligence	4	CO
1º	Ethics and Regulation in Medical Artificial Intelligence	14	CO

Dr. Pedro Navarro Illana
Dean

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

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