Postgraduate Diploma

Image Analysis with Artificial Intelligence for Medical Diagnosis

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Postgraduate Diploma
Image Analysis with Artificial Intelligence for Medical Diagnosis

» Modality: **online**
» Duration: **6 months**
» Certificate: **TECH Global University**
» Accreditation: **18 ECTS**
» Schedule: **at your own pace**
» Exams: **online**

Website: **www.techtitute.com/us/artificial-intelligence/postgraduate-diploma/postgraduate-diploma-image-analysis-artificial-intelligence-medical-diagnosis**

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01
Introduction

Diagnostic imaging has revolutionized medicine in recent years, allowing detailed visualization of internal structures of the human body. However, the increasing volume of data generated by advanced technologies such as MRI or Ultrasonography presents significant challenges in terms of analysis time and diagnostic accuracy. Given this, Artificial Intelligence emerges as a promising tool to address such limitations. Therefore, it is essential for specialists to acquire advanced skills to analyze images using this tool to improve diagnostic accuracy, reduce interpretation time and make informed clinical decisions. In this scenario, TECH launches an innovative online university program focused on Image Analysis with Artificial Intelligence for Medical Diagnosis.

Thanks to this revolutionary 100% online program, you will design personalized treatments through the support of Diagnostic Imaging"

A recent report published by the World Health Organization shows that the implementation of Artificial Intelligence algorithms in medical practice can improve diagnostic accuracy by 20%, also reducing interpretation time by 30%. This improvement in accuracy is due to Machine Learning's ability to analyze large volumes of medical imaging data, identify subtle patterns that might go unnoticed by the human eye, and provide second opinions based on robust evidence. Therefore, physicians need to handle this tool to provide a faster response to patients' needs and therefore improve the quality of care.

In this context, TECH launches a pioneering program in Image Analysis with Artificial Intelligence for Medical Diagnosis. Designed by references in this field, the academic itinerary will delve into subjects ranging from the use of software platforms to analyze images or segmentation algorithms to processing techniques to improve automatic interpretation. At the same time, the syllabus will delve into how Deep Learning algorithms can be used to detect submicroscopic patterns. In this way, graduates will develop advanced clinical skills to use Artificial Intelligence for early identification of a wide range of pathologies, including neurodegenerative conditions.

In addition, the university program is taught in a 100% online mode, allowing physicians to plan their own study schedules to experience a fully efficient update. In addition, specialists will enjoy a wide variety of multimedia resources designed to promote dynamic and natural teaching. To access the Virtual Campus, all professionals will need is a device with Internet access (including their own cell phone). They will also be supported at all times by an experienced teaching staff, who will resolve all the doubts that may arise during their academic itinerary.

This **Postgraduate Diploma in Image Analysis with Artificial Intelligence for Medical Diagnosis** contains the most complete and up-to-date program on the market. The most important features include:

- Development of practical cases presented by experts in Artificial Intelligence
- The graphic, schematic and eminently practical contents with which it is conceived gather scientific and practical information on those disciplines that are indispensable for professional practice
- Practical exercises where self-assessment can be used to improve learning
- Its special emphasis on innovative methodologies
- 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

The program will include clinical cases to bring the development of the program as close as possible to the reality of medical care"

"*You will delve into how Artificial Intelligence serves to personalize treatments based on genetic and imaging profiles*"

Do you want to develop models to assess risks and predict the progression of Oncological Diseases? Achieve it through this program in just 3 months.

With TECH's Relearning system you will update your knowledge at your own pace, without depending on external teaching constraints.

The program's teaching staff includes professionals from the field who contribute their work experience to this educational program, as well as renowned specialists from leading societies 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 immersive education programmed to learn in real situations.

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

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Objectives

Through this Postgraduate Diploma, doctors will acquire advanced skills to handle Artificial Intelligence tools and algorithms applied to the Analysis of Medical Images, such as MRI or CT scans. Therefore, graduates will use Artificial Intelligence to increase the accuracy and speed of diagnosis of various pathologies, optimizing detection processes and improving clinical decision making. In addition, specialists will acquire advanced skills to use specialized software in the preprocessing of Medical Images, such as TensorFlow.

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You will use Artificial Intelligence to identify early on a wide range of diseases, which will allow you to improve clinical decision making"

General Objectives

- Understand the theoretical foundations of Artificial Intelligence
- Study the different types of data and understand the data life cycle
- 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
- Explore bio-inspired computing and its relevance in the development of intelligent systems
- Develop skills to use and apply advanced Artificial Intelligence tools in the interpretation and analysis of medical images, improving diagnostic accuracy
- Implement Artificial Intelligence solutions that allow the automation of processes and the personalization of diagnostics
- Apply Data Mining and Predictive Analytics techniques to make evidence-based clinical decisions
- Acquire research skills that allow experts to contribute to the advancement of Artificial Intelligence in medical imaging

Specific Objectives

Module 1. Artificial Intelligence Innovations in Diagnostic Imaging

- Master tools such as IBM Watson Imaging and NVIDIA Clara to automatically interpret clinical tests
- Gain competencies to perform clinical experiments and results analysis using Artificial Intelligence, with an approach based on improving diagnostic accuracy

Module 2. Advanced Applications of Artificial Intelligence in Medical Imaging Studies and Analysis

- Execute observational studies in imaging using Artificial Intelligence, validating and calibrating the models efficiently
- Integrate medical imaging data with other biomedical sources, using tools such as Enlitic Curie to conduct multidisciplinary research

Module 3. Personalization and Automation in Medical Diagnostics using Artificial Intelligence

- Acquire skills to personalize diagnoses using Artificial Intelligence, correlating imaging findings with genomic and other biomarker data
- Master automation in medical image acquisition and processing, applying advanced Artificial Intelligence technologies

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Course Management

TECH's philosophy is based on offering the most complete and updated programs in the academic panorama, which is why it carries out an exhaustive process to form its teaching staff. For the delivery of this Postgraduate Diploma, the services of recognized experts in Image Analysis with Artificial Intelligence for Medical Diagnosis have been enlisted. These professionals have created a myriad of didactic contents that stand out both for their excellent quality and for meeting the requirements of the current labor market. Therefore, graduates will have access to an immersive experience that will allow them to optimize their daily clinical practice.

You will enjoy the personalized advice of the teaching team, made up of experts in Image Analysis with Artificial Intelligence for Medical Diagnosis"

Management

Dr. Peralta Martín-Palomino, Arturo

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

Professors

Mr. Popescu Radu, Daniel Vasile

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

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Structure and Content

This university program has been developed by authentic references in Image Analysis with Artificial Intelligence for Medical Diagnosis. The study plan will delve into the management of emerging tools such as Deep Learning or Convolutional Neural Networks in the field of Radiology. In addition, the syllabus will delve into how the Fabric Genomics platform can analyze large volumes of genomic data to identify genetic variants associated with various pathologies. In this way, specialists will detect biomarkers that allow predicting the appearance or progression of diseases, facilitating the implementation of preventive and personalized treatments.

You will implement Artificial Intelligence systems in the clinical environment, optimizing the workflow significantly"

Module 1. Artificial Intelligence Innovations in Diagnostic Imaging

1.1. Artificial Intelligence Technologies and Tools in Diagnostic Imaging with IBM Watson Imaging Clinical Review

    1.1.1. Leading Software Platforms for Medical Image Analysis

    1.1.2. Radiology-Specific Deep Learning Tools

    1.1.3. Innovations in Hardware to Accelerate Image Processing

    1.1.4. Integration of Artificial Intelligence Systems in Existing Hospital Infrastructures

1.2. Statistical Methods and Algorithms for Medical Image Interpretation with DeepMind AI for Breast Cancer Analysis

    1.2.1. Image Segmentation Algorithms

    1.2.2. Classification and Detection Techniques in Medical Images

    1.2.3. Use of Convolutional Neural Networks in Radiology

    1.2.4. Noise Reduction and Image Quality Improvement Methods

1.3. Design of Experiments and Analysis of Results in Diagnostic Imaging with Google Cloud Healthcare API

    1.3.1. Design of Validation Protocols for Artificial Intelligence Algorithms

    1.3.2. Statistical Methods for Comparing the Performance of Artificial Intelligence and Radiologists

    1.3.3. Setting Up Multicenter Studies for Artificial Intelligence Testing

    1.3.4. Interpretation and Presentation of Performance Test Results

1.4. Detection of Subtle Patterns in Low-Resolution Images

    1.4.1. Artificial Intelligence for Early Diagnosis of Neurodegenerative Diseases

    1.4.2. Artificial Intelligence Applications in Interventional Cardiology

    1.4.3. Use of Artificial Intelligence for the Optimization of Imaging Protocols

1.5. Biomedical Image Analysis and Processing

    1.5.1. Pre-Processing Techniques to Improve Automatic Interpretation

    1.5.2. Texture and Pattern Analysis in Histological Images

    1.5.3. Extraction of Clinical Features from Ultrasound Images

    1.5.4. Methods for Longitudinal Analysis of Images in Clinical Studies

1.6. Advanced Data Visualization in Diagnostic Imaging with OsiriX MD
  1.6.1. Development of Graphical Interfaces for 3D Image Exploration
  1.6.2. Tools for Visualization of Temporal Changes in Medical Images
  1.6.3. Augmented Reality Techniques for the Teaching of Anatomy
  1.6.4. Real-Time Visualization Systems for Surgical Procedures
1.7. Natural Language Processing in Medical Image Documentation and Reporting with Nuance PowerScribe 360
  1.7.1. Automatic Generation of Radiological Reports
  1.7.2. Extraction of Relevant Information from Electronic Medical Records
  1.7.3. Semantic Analysis for the Correlation of Imaging and Clinical Findings
  1.7.4. Image Search and Retrieval Tools Based on Textual Descriptions
1.8. Integration and Processing of Heterogeneous Data in Medical Imaging
  1.8.1. Fusion of Imaging Modalities for Complete Diagnostics
  1.8.2. Integration of Laboratory and Genetic Data in the Image Analysis
  1.8.3. Systems for Handling Large Volumes of Imaging Data
  1.8.4. Strategies for Normalization of Datasets from Multiple Sources
1.9. Applications of Neural Networks in Medical Image Interpretation with Zebra Medical Vision
  1.9.1. Use of Generative Networks for the Creation of Synthetic Medical Images
  1.9.2. Neural Networks for Automatic Tumor Classification
  1.9.3. Deep Learning for the Analysis of Time Series in Functional Imaging
  1.9.4. Fitting of Pre-Trained Models on Specific Medical Image Datasets
1.10. Predictive Modeling and its Impact on Diagnostic Imaging with IBM Watson Oncology
  1.10.1. Predictive Models for Risk Assessment in Oncology Patients
  1.10.2. Predictive Tools for Chronic Disease Follow-Up
  1.10.3. Survival Analysis Using Medical Imaging Data
  1.10.4. Prediction of Disease Progression using Machine Learning Techniques

Module 2. Advanced Applications of Artificial Intelligence in Medical Imaging Studies and Analysis

2.1. Design and Execution of Observational Studies using Artificial Intelligence in Medical Imaging with Flatiron Health
  2.1.1. Criteria for the Selection of Populations in Artificial Intelligence Observational Studies
  2.1.2. Methods for Controlling Confounding Variables in Imaging Studies
  2.1.3. Strategies for Long-Term Follow-Up in Observational Studies
  2.1.4. Analysis of Results and Validation of Artificial Intelligence Models in Real Clinical Settings
2.2. Validation and Calibration of AI Models in Image Interpretation with Arterys Cardio AI
  2.2.1. Cross-Validation Techniques Applied to Diagnostic Imaging Models
  2.2.2. Methods for Probability Calibration in AI Predictions
  2.2.3. Performance Standards and Accuracy Metrics for AI Evaluation
  2.2.4. Implementation of Robustness Testing in Different Populations and Conditions
2.3. Methods of Integrating Imaging Data with other Biomedical Sources
  2.3.1. Data Fusion Techniques to Improve Image Interpretation
  2.3.2. Joint Analysis of Images and Genomic Data for Accurate Diagnoses
  2.3.3. Integration of Clinical and Laboratory Information in Artificial Intelligence Systems
  2.3.4. Development of User Interfaces for Integrated Visualization of Multidisciplinary Data
2.4. Use of Medical Imaging Data in Multidisciplinary Research with Enlitic Curie
  2.4.1. Interdisciplinary Collaboration for Advanced Image Analysis
  2.4.2. Application of Artificial Intelligence Techniques from other Fields in Diagnostic Imaging
  2.4.3. Challenges and Solutions in the Management of Large and Heterogeneous Data
  2.4.4. Case Studies of Successful Multidisciplinary Applications
2.5. Specific Deep Learning Algorithms for Medical Imaging with Aidoc
  2.5.1. Development of Image-Specific Neural Network Architectures
  2.5.2. Optimization of Hyperparameters for Medical Imaging Models
  2.5.3. Transfer of Learning and its Applicability in Radiology

Module 3. Personalization and Automation in Medical Diagnostics using Artificial Intelligence

"

A first class academic proposal that will propel your professional career as a Physician to the highest level. Enroll now!"

Methodology

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

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the New England Journal of Medicine have considered it to be one of the most effective.
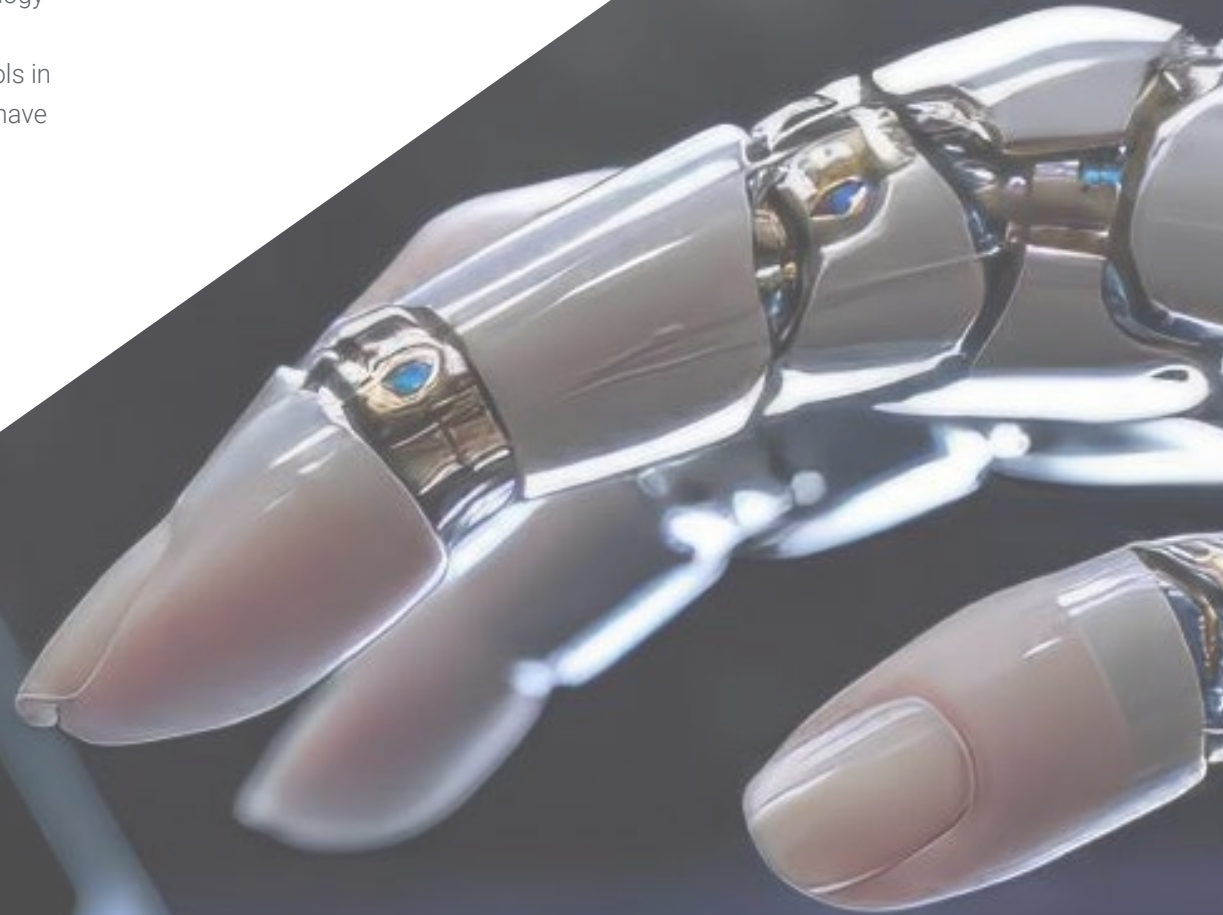
Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

Case Study to contextualize all content

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

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

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

A learning method that is different and innovative

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

"

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

The case method has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

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

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

Relearning Methodology

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

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

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

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

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

01 learning from evidence

02 relearning from evidence

03 testing

04 learning from an expert

05 neurocognitive context dependent learning

06 Von-Restorff effect

07 case based learning through storytelling

08 competencies testing (retesting)

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

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

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

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

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

Study Material

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

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

Classes

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

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

Practising Skills and Abilities

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

Additional Reading

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

30%

10%

8%

20%

25%

4%

3%
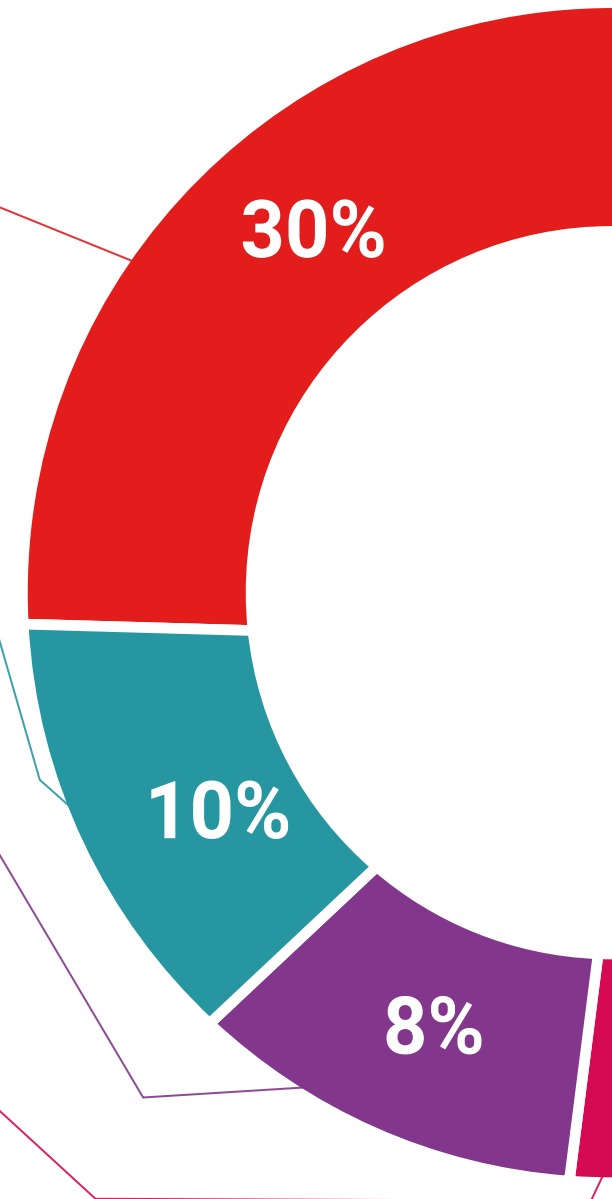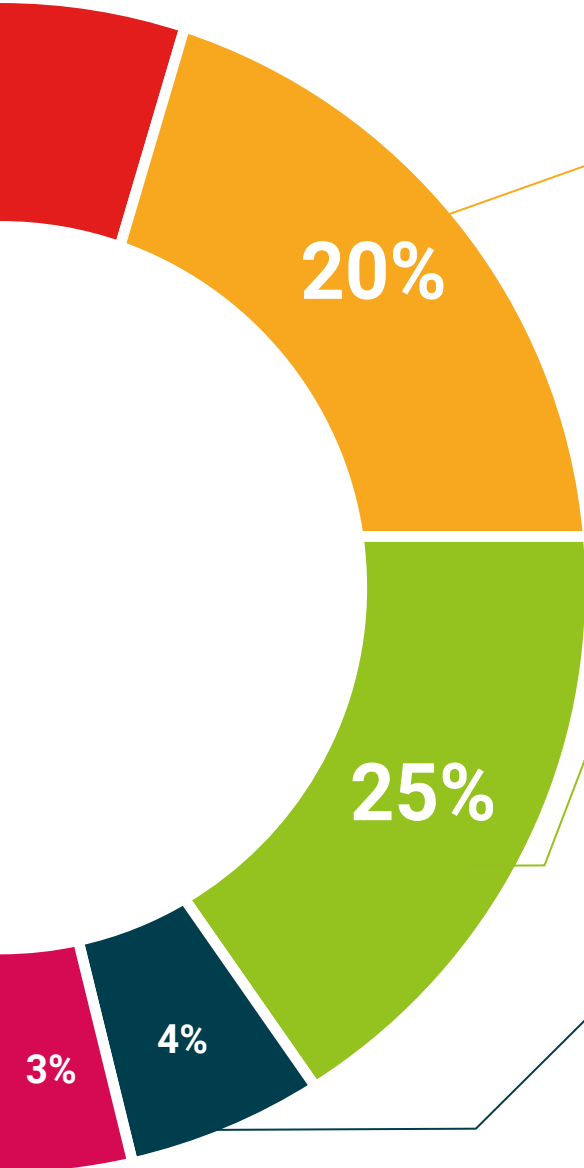
Case Studies

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

Interactive Summaries

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

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

Testing & Retesting

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

06
Certificate

This Postgraduate Diploma in Image Analysis with Artificial Intelligence for Medical Diagnosis guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma 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 **Postgraduate Diploma in Image Analysis with Artificial Intelligence for Medical Diagnosis** 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.
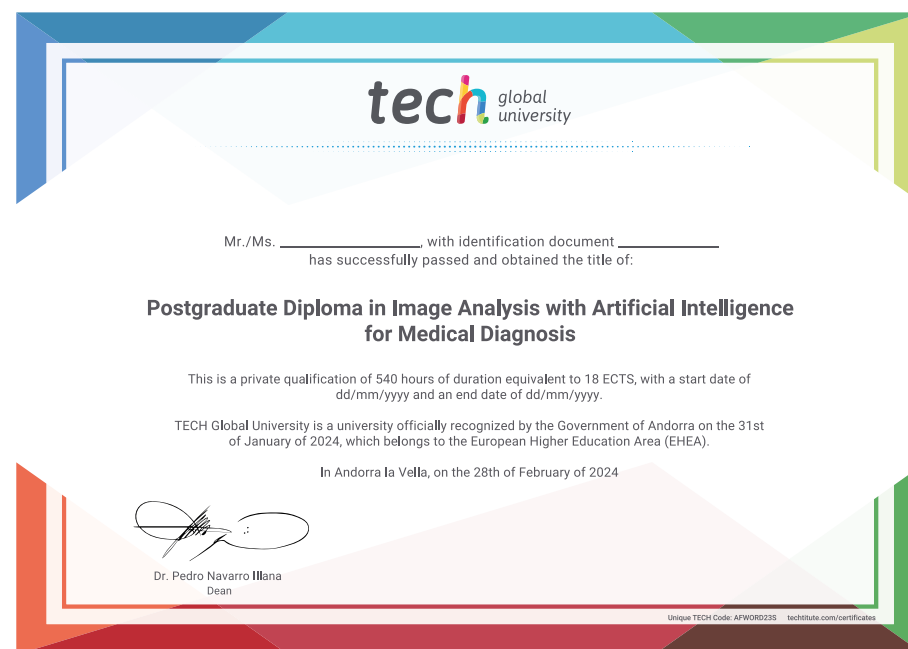
This **TECH Global University** private qualification, is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Image Analysis with Artificial Intelligence for Medical Diagnosis**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**

tech global university

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

Postgraduate Diploma in Image Analysis with Artificial Intelligence for Medical Diagnosis

This is a private qualification of 540 hours of duration equivalent to 18 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

*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.

Postgraduate Diploma
Image Analysis with Artificial Intelligence for Medical Diagnosis

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Postgraduate Diploma

Image Analysis with Artificial Intelligence for Medical Diagnosis

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