60 ECTS Credits

12 months

Online

Master´s Degree in Artificial Intelligence, Model Management and Implementation

UCAM
UNIVERSIDAD
CATÓLICA DE MURCIA

Structuralia

SUMMARY

STRUCTURALIA

Structuralia is an online school specialized in graduate engineering, infrastructure, construction, energy, building, new technologies, and digital transformation programs and courses. We are dedicated to providing high-quality education for engineers, architects, and STEM (science, technology, engineering, and mathematics) professionals.

Since our creation in 2001, over 200,000 students from more than 90 countries have participated in our virtual classrooms as we disseminate knowledge and guide professionals toward success.

To this effect, we collaborate with leading international experts in each field, which enables our students to specialize under the guidance of active professionals. Our constant interaction with major companies in each sector, as their specialized training provider, enables us to tailor high-quality academic material to meet the current job requirements of our students.

Our master's programs are certified by our partner universities, such as the Universidad Católica San Antonio de Murcia, UDAVINCI, or Universidad Isabel I.

Every day we strive to provide the best training for engineers, architects, and STEM professionals with a clear goal: your professional success.

BRIEF SUMMARY

This Master's degree has been conceived to respond to the growing need for knowledge and skills in the development of AI models and algorithms demanded by today's technology-driven market.

As a matter of fact, many specialized staffing companies point to AI as one of the knowledge assets that will be the most demanded in the coming years, considering that the AI sector is expected to have a global business volume of 16 trillion dollars by 2030.

This program has been designed to benefit all professional profiles, with an Introduction to AI basics that does not require extensive prior knowledge of programming and statistics. It has been structured in two large sections: first, a technical section which explores the main Machine Learning and Deep Learning models and algorithms, and the second section addresses its business applications and implications.

Upon completion of the program, the students will have the necessary skills to manage and promote AI projects.

OBJECTIVES

The overall objective is to equip students with the necessary knowledge and tools to understand, manage and lead IA initiatives and projects in an organization.

The overall objective can be attained through the following specific objective:

1. Understand AI basic concepts, its limits, and possibilities.
2. Learn AI project programming languages, tools and platforms
3. Become familiar with the most used Machine Learning and Deep Learning algorithms
4. Analyze and learn other technologies to be able to develop innovative and differential business models.

5. Learn the main AI project management methodologies
6. Understand the implications and applications of AI in the different functional areas of a company

CAREER OPPORTUNITIES

AI is a cross-cutting discipline that affects all functional areas of a company, hence this program is aimed at any professional with interest in new technologies. It is especially focused on those who want to manage AI projects or lead this initiative at organizational level. Additionally, this program is very suitable for any department manager who wishes to update their technological skills which affect other areas within an organization.

WHO IS IT INTENDED FOR?

AI is currently one of the cross-cutting sectors with the most influence in all functional aspects of a business, hence why this master's degree is intended for any professional with an interest in new technologies, especially those who wish to manage projects and lead organizational initiatives. Furthermore, this program is suitable for department directors or coordinators who wish to update their current knowledge and avoid falling behind in terms of their interaction with this technology, which is currently affecting multiple sectors and areas inside many organizations.

This program is especially intended for:

- Software developers
- System engineers
- Computer engineers
- IT professionals
- Project Managers
- Department Directors/Coordinators
- Entrepreneurs

WHY PURSUE THIS MASTER´S DEGREE?

Artificial Intelligence is a technology that is quickly taking deep roots into businesses today, hence why investing in, and searching for specialized professionals in the area is on the rise. As a matter of fact, profile with technical knowledge on AI, and with the necessary organizational capacities to lead and implement projects are on high demand. This Master's degree has been designed to help the students become a leading figure in AI management in their organizations. They will also learn the main Machine Learning and Deep Learning algorithms, and understand the main applications, and implications of AI in a company. Moreover, for those with an entrepreneuring spirit, this program will help them to design innovative technology-based business models.

PROGRAM

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1. INTRODUCTION TO ARTIFICIAL INTELLIGENCE (AI)

Introduction to AI

- Introduction
- Motivation
- What is AI?
- Knowledge areas

Brief history of AI: from myth to reality

- Introduction
- The birth of AI
- From 1950's to 1960's
- From 1960's to 1970's
- From 1980's to 1990's - AI WINTER
- From 2000 to the present

Key concepts, agents, and knowledge representation

- Introduction
- Weak and strong AI
- The Turing test
- Agents
- Agent architecture
- Knowledge representation

Problem solving: automated reasoning and search

- Introduction
- Automated reasoning
- Search
- Conclusions

Automated learning: Supervised, unsupervised, reinforcement learning I

- Introduction
- Automated learning basic principles
- Supervised learning
- Conclusions

Automated learning: Supervised, unsupervised, reinforcement learning II

- Introduction
- Unsupervised learning
- Deep learning
- Reinforcement learning
- Conclusions

Big Data: Learning with Million data

- Introduction
- Data life cycle
- Information/data collection
- Information storage
- Information analysis
- Information exploitation
- Conclusions

Human-machine interaction: Artificial vision and natural language processing

- Introduction
- Artificial vision
- Computer vision process
- Computer vision learning tasks
- Speech recognition
- Language recognition process
- Natural language processing

The future of AI: Ethical issues and diversity

- Introduction
- AI Ethical issues
- The meaning of diversity
- The future of AI

2. SELF-SERVICE DATA PREPARATION. EXCEL, TALEND AND TRIFACTA

Unit 1: Data preparation
- Introduction
- Self – Service solutions
- Data processing techniques
- Data quality management
- Types of data issues

Unit 2: Excel
- Data cleansing with Excel
- DATASET
- Functions. Part I
- Functions. Part II
- Functions. Part III

Unit 3: Talend Data Preparation
- Installation instructions
- Data Cleansing with Talend Data Preparation
- Basic cleansing functions
- Data normalization
- Data enrichment

Unit 4: Trifacta Wrangler
- Registration instructions
- Data cleansing with trifacta
- Basic cleansing functions
- Data normalization
- Data enrichment

3. DATA MINING, MACHINE LEARNING AND DEEP LEARNING

UNIT I: SUPERVISED LEARNING (I)

- Introduction
- Simple, multiple and logistic linear regression (i)
- Simple, multiple and logistic linear regression (ii)
- Support vector machines (svm)
- Decision trees

UNIT II: SUPERVISED LEARNING (II)

- knn (k-nearest neighbors)
- Naive bayes
- Evaluation of supervised models
- Example exercise
- Proposed exercise

UNIT III: UNSUPERVISED LEARNING

- Introduction to clustering: purconsider and metrics
- K-means clustering
- Hierarchical clustering, other techniques and examples
- Principal component analysis (PCA)
- PCA example exercise

UNIT IV: DEEP LEARNING

- Artificial Neural Networks (ANN) (i)
- Artificial Neural Networks (ANN) (ii)
- Artificial Neural Networks (ANN) (iii)

- Example exercise
- Proposed exercise

4. ADVANCED DEEP LEARNING

Unit 1. SUPERVISED DEEP LEARNING (I)
- Introduction
- Review: artificial neural networks (Ann)
- Review: ann exercises
- Convolutional neural networks (Cnn)
- Cnn exercises

Unit 2. SUPERVISED DEEP LEARNING (II)
- Natural language processing (i)
- Recurrent neural networks (rnn) (i)
- Recurrent neural networks (rnn) (ii)
- Natural language processing (ii)
- Rnn exercise

Unit 3. UNSUPERVISED DEEP LEARNING (I)
- Boltzmann machines (bm)
- Restricted boltzmann machines (rbm)
- Recommender systems
- Recommender systems: metrics
- Rbm exercise

Unit 4. UNSUPERVISED DEEP LEARNING (II)
- Self-organizing maps (som)
- Som exercices
- Autoencoders (ae)
- Ae exercises
- Proposed exercise

5. POWER BI (ENGLISH)

Unit 1. Getting started

- Introduction to Power BI
- Different types of Power BI
- First simple report
- Power Query: Data Sources
- Data Transformation

Unit 2. Data Modeling and DAX

- Data Modeling
- Starting with DAX (I)
- Starting with DAX (II)
- Getting proficient in DAX (I)

- Getting proficient in DAX (II)

Unit 3. Data Visualization

- Table and Matrix
- Trends
- How to properly filter your data
- Bookmarks
- Drill through

Unit 4. Taking it to the next level

- Understanding Power BI Service in depth
- Sharing content in Power BI Service
- Comparing Power BI Service and Power BI Report Server
- Integrating Python and R in Power BI Desktop

- Introducing Bravo for Power BI Desktop

6. MACHINE LEARNING, DEEP LEARNING AND DATA SCIENCE PRACTICAL APPLICATIONS

Unit 1. Machine Learning

- Linear regression
- Logistic regression
- Basic Neural Network
- Clustering.
- Principal Component Analysis (PCA).

Unit 2. Deep Learning

- Deep learning
- Optimization
- Convolutional Neural Network
- Recurrent Neural Network
- Natural Language Processing (NLP)

Unit 3. Data Science

- Creating tables and Reports
- Transformation and filtering data
- Data visualization
- Relation between data tables
- Dashboard

Unit 4. Case study application

- Object detection in images
- Object classification in images
- Facial recognition
- Word detection
- Business Intelligence application

7. TECHNOLOGY ECOSYSTEMS

Unit 1. Introduction to technology ecosystems

- The fourth industrial revolution
- Digital transformation in companies
- Fundaments and key points
- Benefits
- Enabling technologies

Unit 2. Enabling technologies I

- Big data
- Cloud computing
- Blockchain
- Artificial intelligence
- Augmented and virtual reality

Unit 3. Enabling technologies II

- BIM
- Collaborative robots
- Additive manufacturing
- Hyperconnectivity
- IoT

Unit 4 enabling technologies III

- Manufacturing execution system (MES)
- Process integration and efficiency
- Use cases
- New methodologies: agile, lean startup or design thinking
- Business change management

8. IDEATION METHODOLOGIES AND TECHNIQUES AND AI PROJECT MANAGEMENT

Unit 1: Introduction

- Introduction
- Key elements for AI project management
- AI project characteristics
- Introduction to the main Agile and Ideation methodologies
- Methodology integration

Unit 2: Design Thinking

- Introduction
- Phase I: Empathize
- Phase II: Define
- Phase III: Ideate

- Phase IV: Prototype

Unit 3: Lean Start-Up And Scrum

- Lean start-up. Basic concepts
- Lean Start-up. Tools
- Scrum. Introduction
- Scrum. Roles
- Scrum. Ceremonies and artifacts

Unit 4: Application To Ai Projects

- Introduction
- Project ideation
- Project implementation
- Methodology implementation advice
- Summary and conclusions

9. THE IMPACT OF AI ON BUSINESS

Unit 1. AI applied to different sectors

- Financial sector
- Retail sector
- Industrial sector
- Agricultural sector
- Health sector

Unit 2. AI applied to different business areas

- Logistics and operations
- Marketing
- Sales and customer service
- Finance and control
- People analytics

Unit 3. AI and entrepreneurship

- Current scenario of a booming sector
- Financing
- Featured start-ups
- Future of the AI ecosystem
- Starting an AI company

Unit 4. Ethics. Business and society

- Ethics. General remarks
- Bias examples

- Global initiatives
- Public Institutions and regulations
- AI in the SDGs

MASTER´S FINAL PROJECT

The program is subject to possible variations / updates of the contents to improve their quality

AUTHOR PROFILE

DIRECTOR: NICOLÁS FERNÁNDEZ LÓPEZ

Regarding his professional background, Nicolás is a Telecommunications Senior Engineer from Universidad of Sevilla (US) and holds an International MBA from IE Business School. Additionally, he is a certified Design Thinking Workshop Facilitator and an AI expert from MBIT.

Nicolás Fernandez has been working in the field of technology, innovation, customer experience and organizational transformation for more than 14 years with significant international experience. Nicolas is currently in charge of managing and improving customer service in organizations at Servitelco. He is also a founding partner of CEXIA, a start-up that helps companies understand and apply Artificial Intelligence to their business models. Likewise, he collaborates with training schools and innovation consultancies as a facilitator of agile methodologies and AI workshops.

Throughout his professional experience in prestigious organizations such as DGT, Metro de Madrid, BBVA, ThyssenKrupp, PwC, ArcelorMittal, EDP or Ericsson, Nicolás has learned that one of the greatest challenges of many companies today have to do with adapting to the new ways of doing business that require changing from traditional to more agile organizations that are closer to customers, and eager to innovate. This realization has led Nicolas to specialize in Innovation, New Technologies, and Customer Experience in order to facilitate the transformation process for many struggling companies.

Finally, Nicolas has worked in more than 20 countries in Europe, Latin America, Middle East and Africa.

Nerea Luís is a Computer and Information Systems Engineer with a PhD in AI. She is currently a member of the AI team at **Singular**. In 2013, Nerea co-founded T3chFest, a technological information-sharing free event that hosted more than 2000 people. In 2016, she was awarded with the prize "Women Techmakers Scholarship" by Google in the Europe, Middle East and Africa category. She was also granted a scholarship to attend the Grace Hopper Conference in the United States, and that was how she fully bonded with the movement 'Women in Tech'. Since then, Nerea actively participates in different events promoting AI and technological diversity.

In January 2018, she joined the COTEC Foundation as an expert in Technology, Talent and Gender, which has served to spread their initiatives, ideas and knowledge in forums with audiences from different sectors. That same year, Nerea also joined Science in Parliament, where she has been able to speak in Congresses on Emerging Technologies in Transport and Communications. In 2019, she was awarded the medal of civil merit by the Royal House. She was recently chosen among the Top 100 leading women in Spain.

Nerea Sevilla BUSINESS INTELLIGENCE, BIG DATA & ADVANCED ANALYTICS. Nerea started her professional experience as an expert in Data Science as a value and business knowledge generator. She is currently the Head of Business Intelligence and BigData Projects in Lanbide, Basque Employment Service of the Basque Country Government/ Eusko Jaularitza (Spain). She has also led Business Intelligence and Advanced Analytics projects, thus contributing to the creation of data infrastructures (datawarehouse, data marts, ods and data-lakes) to manage corporate data life cycles. Nerea has also worked in corporate information governance, and led advanced analytics projects aimed at increasing process and service quality management.

Alberto Barbado González is a data scientist at the Luca Big Data unit in Telefónica. His work includes leading advanced analytics and AI proposals within some of the Big Data software products developed at the Unit (Luca Comms and Luca Fleet). Along with this, he conducts research in Trusted AI, mainly in explainable AI (XAI), which is the base for his PhD research. Alberto holds an Industrial Engineering degree, with a specialty in automation and electronics from the Polytechnic University of Madrid (UPM); a Master's degree in Data Science from the Universidad Rey Juan Carlos (URJC), and another one in advanced AI from the National Distance University (UNED). He has conducted different research studies in Natural Language Processing (NLP) and recommender systems.

María Aurora Otero is a Computer System Engineer specialized in Big Data and Business Intelligence, with over 10 years of experience as a consultant in information systems and technological development. For the past few years, she has participated in BI and Bid Data projects based on Microsoft technology for different clients such as Telefónica, Real Madrid, Santillana, El País, Diputación de Vizcaya (Provincial Council of Viscaya) and the Navarra Provincial Government. She is currently working as a Senior Data & Analytics Engineer in Santillana, where she leads advanced analytical applications at different online education platforms, as well as marketing campaigns in Latin America.

Sergio Segovia González

- Education

PhD in Artificial Intelligence from the Madrid Autonomous University (UAM), more specifically from its Polytechnical Institute

Industrial Engineering specialized in electronics, industrial robotics among others, from the University of Valladolid.

- Professional experience (Summary)

ENGIE ESPAÑA SL. Industrial Department Project Director – Automatization

TECNATOM S.A. Responsible for electromechanics in nuclear research and innovation projects.

- Current position

ENUSA Industrias Avanzadas/Advanced industries, S.A, S.M.E. Project Director – Technological development, robotics and AI for the nuclear sector.

Pedro Prieto is a lawyer with a Master's degree in stock market. He has played different roles in multinational companies such as Microsoft, Morningstar or Telefónica, and in 2013, he founded his own company that has improved the e-commerce shopping experience by segmenting its database and generating new qualitative information. Pedro is currently a lecturer of entrepreneurship in different business schools and is a business AI expert.

Carlos Villa is an Industrial Engineer with more than 10 years of experience in different sectors mainly focused on efficiency, process improvement and cultural transformation.

METHODOLOGY

At Structuralia, we apply a modern methodology adapted to the process of change we live in today. Our educational environment is based on an online learning system, that is, learning by observing, reflecting, and practicing with an organized and carefully programmed study pace, which comes along with the constant support from our team. Our learning solution is designed to facilitate learning at the student's own pace, with a uniform structure that includes continuous evaluations and practical exercises to reinforce knowledge.

Our program's calendar consists of 9 monthly modules, which are divided into 4 weekly teaching units. In addition, there are 3 months for the Master's Final Project (MFP). This structure may be adjusted depending on the innate complexities of the program.

Each of these units contain introductory videos on concepts, syllabus prepared by our experts (which can be viewed online or downloaded in PDF), and self-assessments. Some units may even have practical exercises or examples, if required by the expert. At the end of each module, there will be a compulsory exam in order to complete the module.

The Director will ask all students to complete a Master's project, in which they will apply everything they have learnt in the previous modules, to practical cases. Students will have 3 months to complete and submit the project, during which they will receive the support from the program's team.

Finally, you will receive the status reports from our team through regular follow-ups throughout the program.

EVALUATION

The assessment will be ongoing throughout the training program and will take into account not only the acquisition of knowledge, but also the development of skills and attitudes.

At the end of each monthly module, the student must answer a test-type exam on the online training platform, in addition to pose a variety of practical cases along the topics and optional unit test so as to achieve the maximum consolidation of technical concepts.
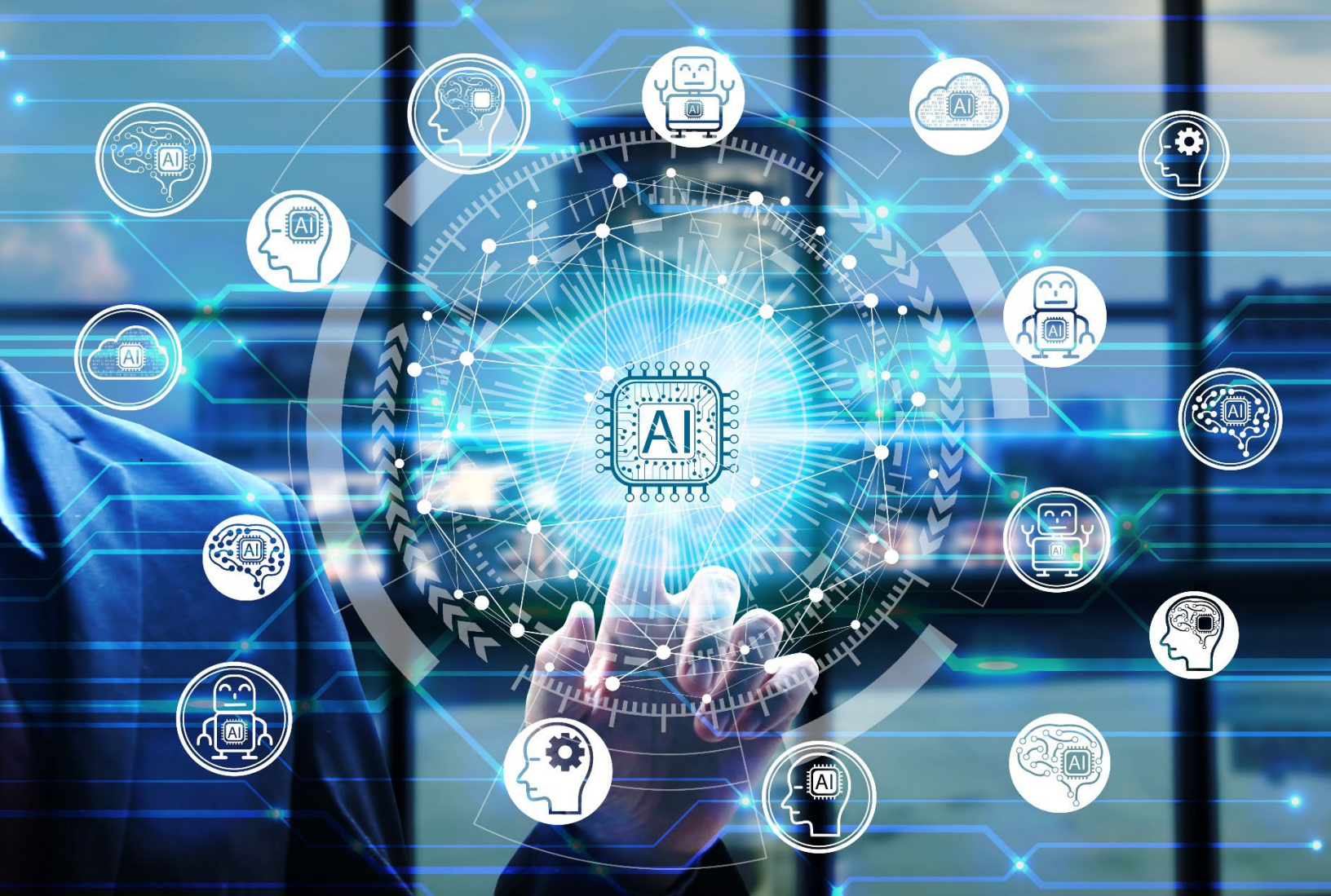
To obtain the degree it will be necessary to pass the assessable modules of the program.

DEGREE

Students who have visualized all the lessons, successfully passed the self-assessments and exams, and submitted the master's final project, will receive Structuralia's certificate and the title of Master of Professional Development by the Universidad Católica San Antonio de Murcia (UCAM), in digital format.

Likewise, the student can request a certificate of completion of his/her master's degree, or a certificate of completion from Structuralia.

The student may also request a the Hague Apostille on his/her certificate of completion from the university an additional fee.

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