

# INTRODUCTION

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# INDEX

- Who we are
- Next steps
- What is Deep Learning?
- About the Course



# 1 - W H O W E A R E

# WHO AM I



**Universidad Pontificia Comillas**  
Doctor of Philosophy - PhD, Artificial Intelligence  
Feb 2025 - Feb 2028

Explainability for Graph Neural Networks



**Universidad Carlos III de Madrid**  
Master of Science - MS, Artificial Intelligence  
Sep 2022 - Oct 2023  
Grade: 8.43

**Skills:** Computer Science · Natural Language Processing (NLP) · Communication



**Universidad Pontificia Comillas**  
Double Bachelor of Engineering - BE, Telecommunications Engineering and Business Analytics  
Sep 2017 - Jul 2022  
Grade: 8.28

**Skills:** Computer Science · Natural Language Processing (NLP) · Communication · Image Processing · Computer Vision



**The University of Texas at Austin**  
Exchange Program, Computer Science  
2020 - 2021  
Grade: 3.82/4

CS courses: Neural Networks, Natural Language Processing, Ethical Hacking, Autonomous Driving, Introduction to Security, Algorithms and Complexity  
ECO courses: Economic Statistics, International Finance  
EE courses: Smart Grids  
FIN courses: Foundations of Finance



**Ericsson**  
3 yrs 5 mos

**Senior Data Scientist**  
Full-time  
Jan 2024 - Present · 1 yr 1 mo  
Madrid, Community of Madrid, Spain · On-site  
Data Scientist at Ericsson Cognitive Network Solutions (JS6):  
• Member of the Data Science Board, group of experts who manage Machine Learning in the organiz...see more

**Experienced Data Scientist**  
Full-time  
Jun 2023 - Jan 2024 · 8 mos  
Madrid, Community of Madrid, Spain · On-site  
Data Scientist at Ericsson Cognitive Network Solutions (JS5):  
• Machine Learning Lead of the Uplink Optimizer 4G and 5G, telecommunications network optimizer t...see more

**Data Scientist**  
Full-time  
Jun 2022 - Jun 2023 · 1 yr 1 mo  
Madrid, Community of Madrid, Spain  
Data Scientist at Ericsson Cognitive Network Solutions (JS4):  
• Data Scientist in Uplink Optimizer, telecommunications network optimizer that improves the uplink i...see more  
♥ Oral Communication, High Performance Computing (HPC) and +7 skills

Show all 4 experiences →



**Adjunct Professor**  
Universidad Pontificia Comillas · Part-time  
Jan 2024 - Present · 1 yr 1 mo  
Madrid, Community of Madrid, Spain · On-site  
Mathematical Engineering and Artificial Intelligence Degree (IMAT):  
• Computer Vision II, Theory & Lab Professor (2024)...see more



**Software Engineer Intern**  
Stem Energy · Internship  
Sep 2020 - Mar 2021 · 7 mos  
Python & Django development  
♥ Computer Science



**Data Scientist Intern**  
Management Solutions · Internship  
Jul 2020 - Aug 2020 · 2 mos  
Intern in the front-end team for the development of an Auto Machine Learning tool  
♥ Computer Science



**Business Process Management Engineer Intern**  
Telefónica · Internship  
Jan 2020 - Jul 2020 · 7 mos  
Member of the Automation Lab. The mains tasks of the team were to analyze and develop automation tools for different departments inside Telefónica.



# ERICSSON COGNITIVE NETWORK SOLUTIONS



## Performance Diagnostics

Manage the complexity of network performance observability with AI-powered cell issue detection, analysis and classification. It provides automated root cause analysis (RCA) and solution recommendations for 200+ cases. In combination with Ericsson Performance Optimizers it provides a full solution to address your network performance and user experience challenges.



## Performance Optimizers

Using digital twins and advanced AI techniques like deep reinforcement learning, Ericsson Performance Optimizers provide recommendations for mobile network optimization to prevent and proactively solve issues in areas like mobility, interference, or energy management.



# ERICSSON CNS HUBS





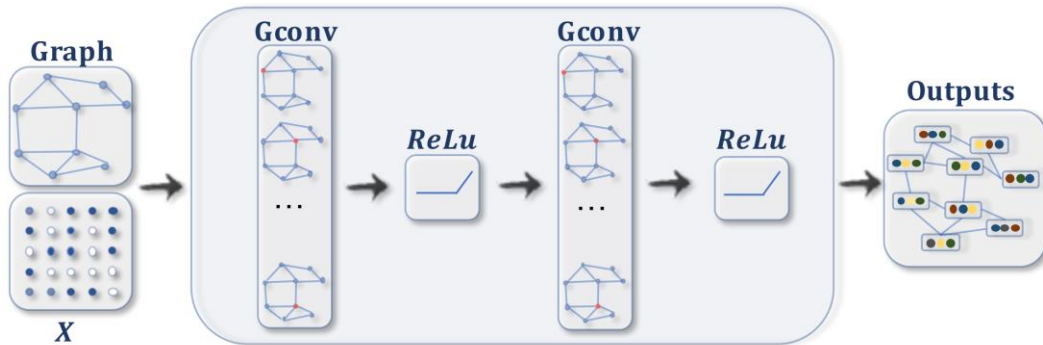
# Stanford University

WHERE YOU CAN  
FIND US

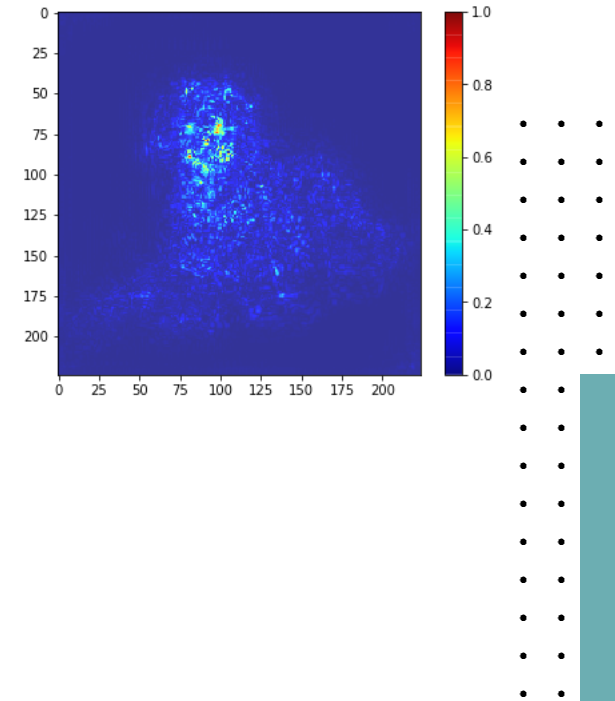
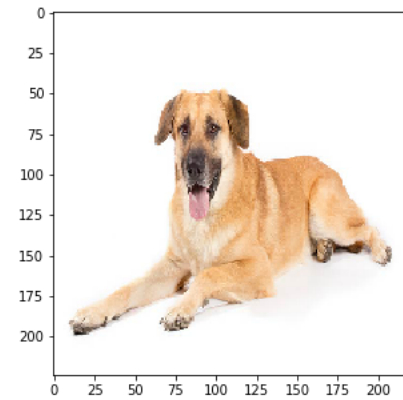


# MY RESEARCH INTERESTS

Geometric Deep Learning



Explainability





# WHO ARE YOUR PROFESSORS

Alberto Palomo Alonso

## F/ Senior Researcher

Fundación General de la Universidad de Alcalá · Full-time  
Nov 2021 - Present · 3 yrs 3 mos  
Escuela Politécnica Superior · On-site

Specializing in Natural Language Processing (NLP), my research journey has been both exciting and impactful. Collaborating with RTVE and ISDEFE, I played a key role in pioneering automatic text segmentation te ...see more

💎 TensorFlow, Aprendizaje automático and +7 skills

## F/ Research Internship

FGUA · Part-time  
Mar 2019 - Aug 2019 · 6 mos  
Alcalá de Henares, España

During a pivotal internship within a dynamic research group, I had the invaluable opportunity to deepen my knowledge and skills. Focused on the foundations of information theory, I honed my expertise in C, AI ...see more

💎 Aprendizaje automático, Python and +3 skills



### Universidad de Alcalá

Doctor of Philosophy - PhD, Inteligencia artificial  
Nov 2022 - Nov 2025

Activities and societies: GHEODE, ISDEFE.

Working on NLP, segmentation and classification problems.



### Universidad de Alcalá

Máster, Ingeniería de telecomunicaciones  
Jan 2021 - May 2022

Activities and societies: Trabajo de Fin de Máster en NLP. Experiencia en Diseño de redes, Diseño de aplicaciones, Diseño en FPGAs, Diseño de sistemas de comunicaciones, Gestión de proyectos, Inteligencia artificial y optimización, Procesado de señal.

Máster Universitario en Ingeniería de Telecomunicación. Es un máster habilitante a la profesión de ingeniero de telecomunicación con sello de calidad europeo.

Skills: Aprendizaje automático · Telecomunicaciones · C · C++



### Universidad de Alcalá

Grado en Ingeniería, Ingeniería de telecomunicaciones  
2016 - 2020

Activities and societies: Diseño de una BTS mediante una Raspberry Pi3 (Linux), TFG: Reconocimiento del habla (SpeechRecognition) orientado a un robot social (Lenguaje: Python, Linux), Diseño e implementación de una estación meteorológica en un microcontrolador (Lenguaje: C, protocolos de comunicación).

Programación. Sistemas. Matemáticas. Física. Redes y comunicaciones. Economía y proyectos.

Skills: Aprendizaje automático · Telecomunicaciones · C · C++

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Skills: Aprendizaje automático · Telecomunicaciones · C · C++



WHO ARE  
YOU



# WHO ARE YOU?

- What do you know about AI?
- What do you know about programming? Python?
- Favorite course?
- What do you want to be?
- Internships?



## 2 - N E X T S T E P S



# AI AT ICAI, PRESENT AND FUTURE



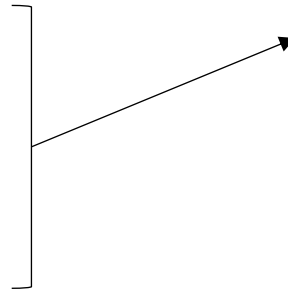
# WHAT WILL BE YOUR JOB?

US:

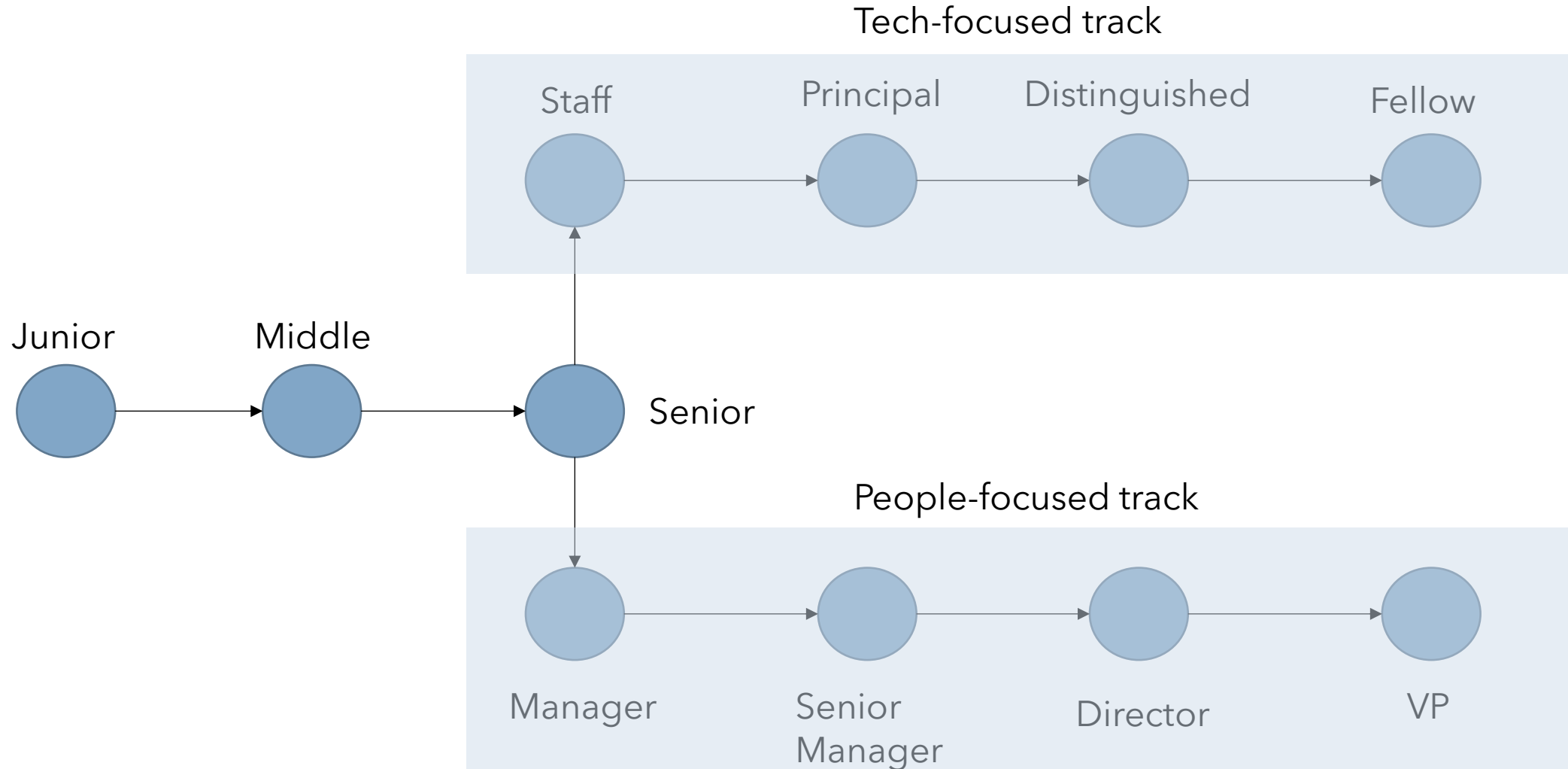
- Data Analyst
- Data Scientist
- Machine Learning Scientist
- Research Scientist
- Data Engineer
- Machine Learning Engineer

Spain:

- Data Analyst
- Data Scientist
- Data Engineer
- Machine Learning Engineer



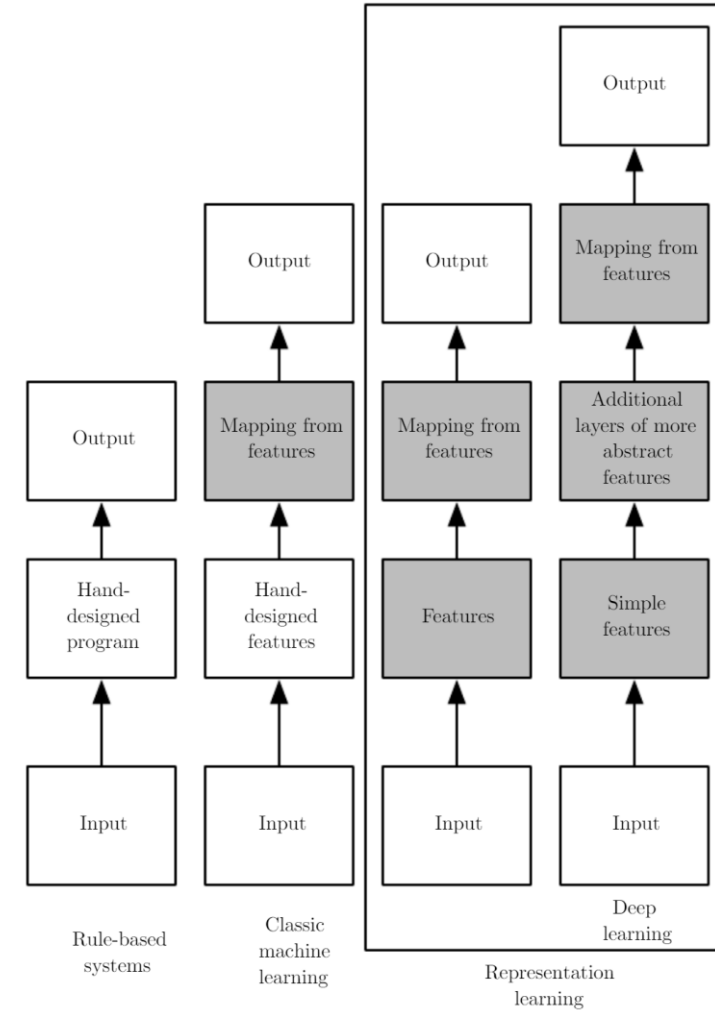
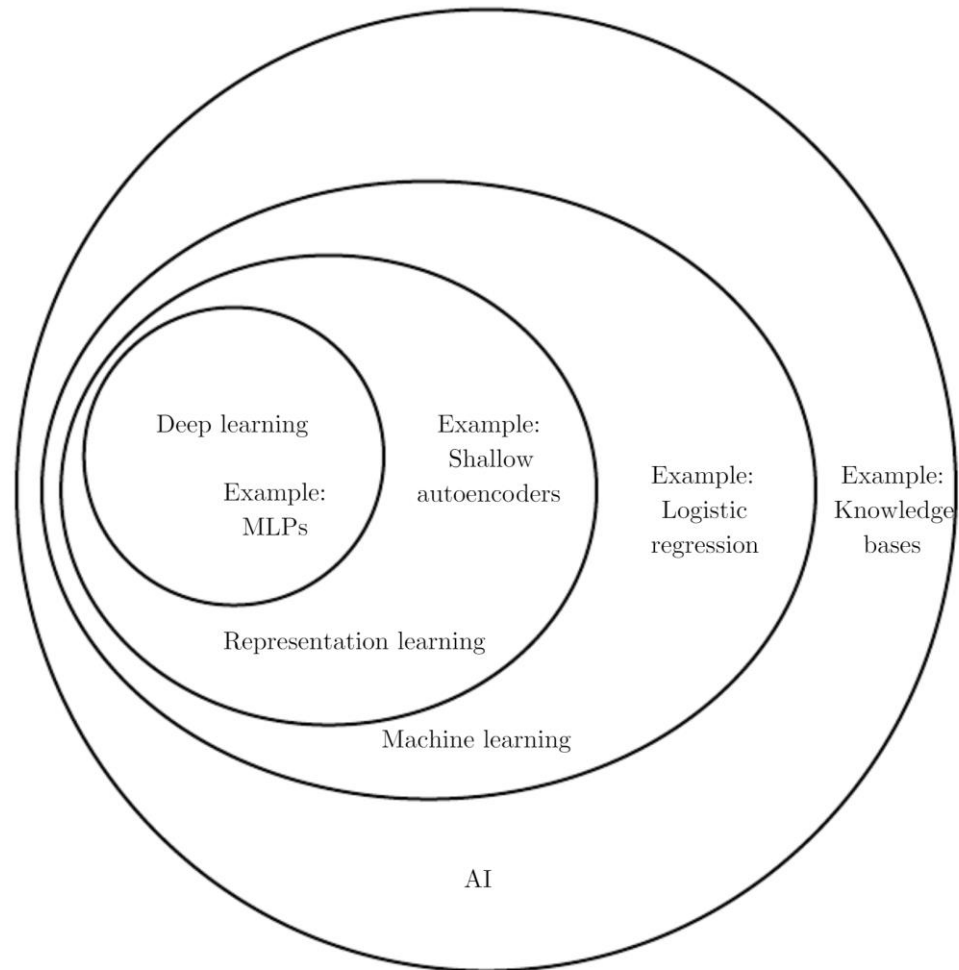
# CAREER PATH





# 3 - WHAT IS DEEP LEARNING?

# WHERE ARE WE?

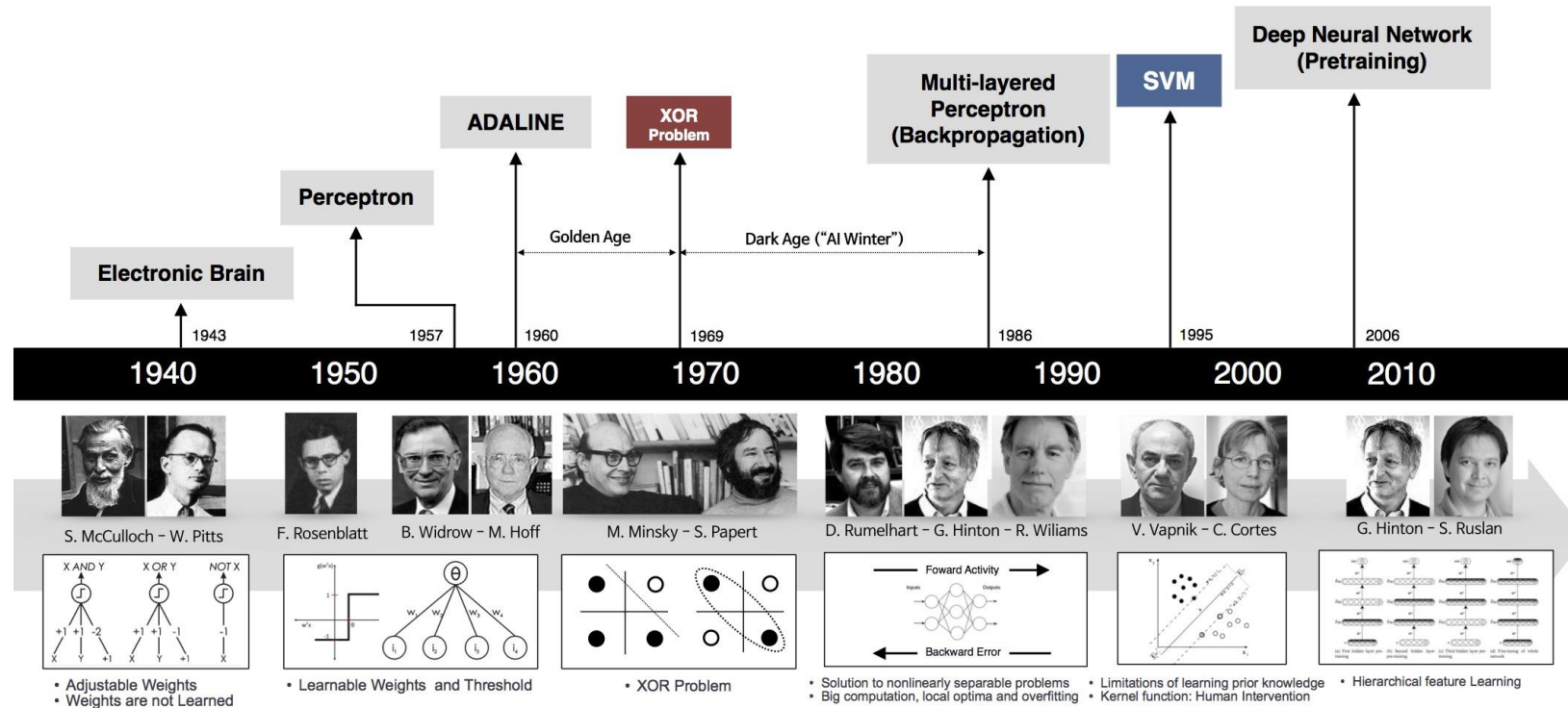


# WHY DEEP LEARNING?

- No more feature Engineering, let the machine learn for you
- End to end learning
- Capable of learning from unstructured data
- Now we can use it thanks to:
  - Specific hardware
  - High amounts of data




# HISTORY OF DEEP LEARNING



# WHAT CAN WE DO WITH AI? CHAT-GPT

[+ New Thread](#)

## ChatGPT




### Examples

"Explain quantum computing in simple terms" →

"Got any creative ideas for a 10 year old's birthday?" →

"How do I make an HTTP request in Javascript?" →




### Capabilities

Remembers what user said earlier in the conversation

Allows user to provide follow-up corrections

Trained to decline inappropriate requests





### Limitations


May occasionally generate incorrect information


May occasionally produce harmful instructions or biased content

Limited knowledge of world and events after 2021

 Light Mode

 OpenAI Discord

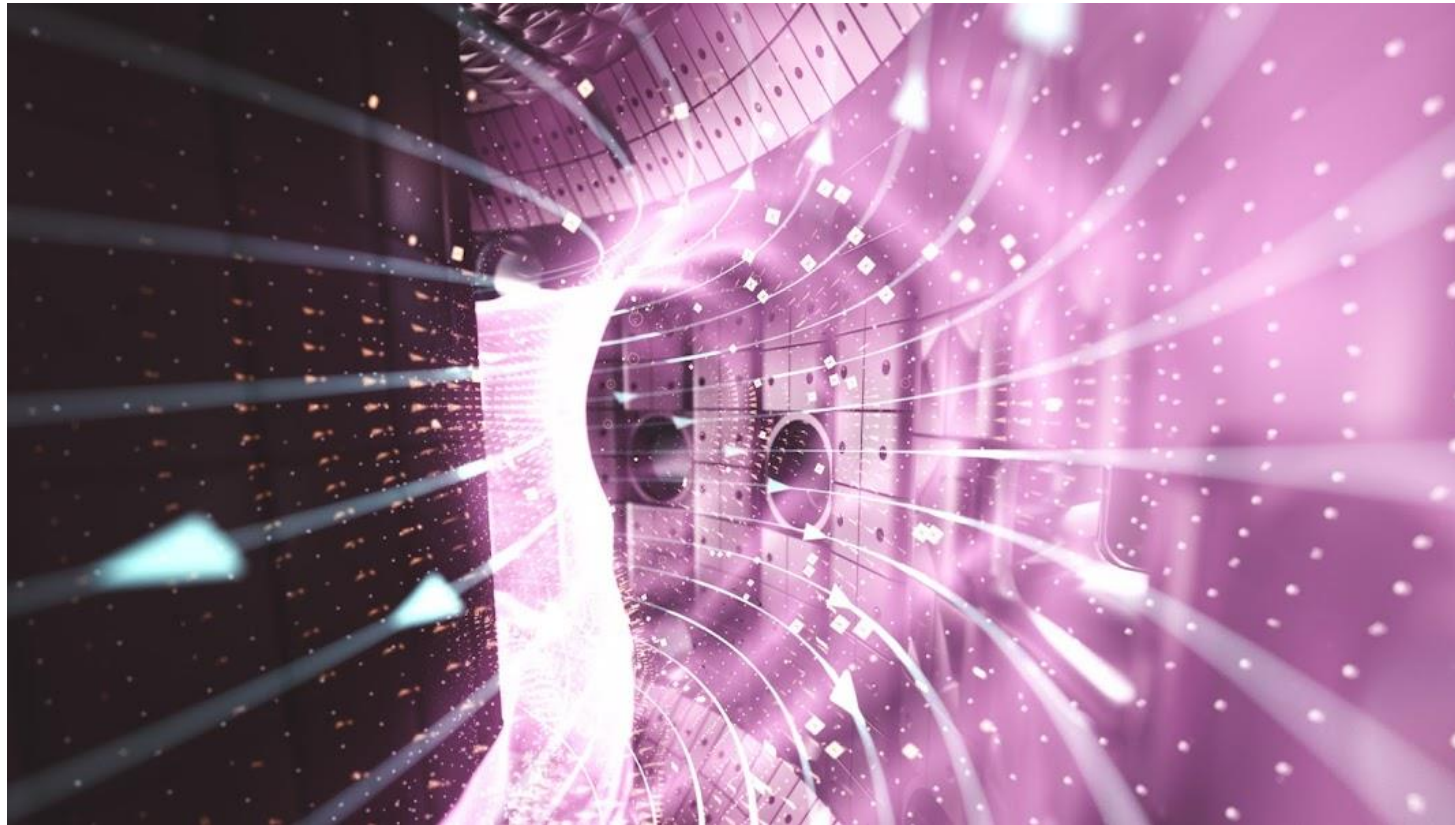
 Updates & FAQ

 Log out

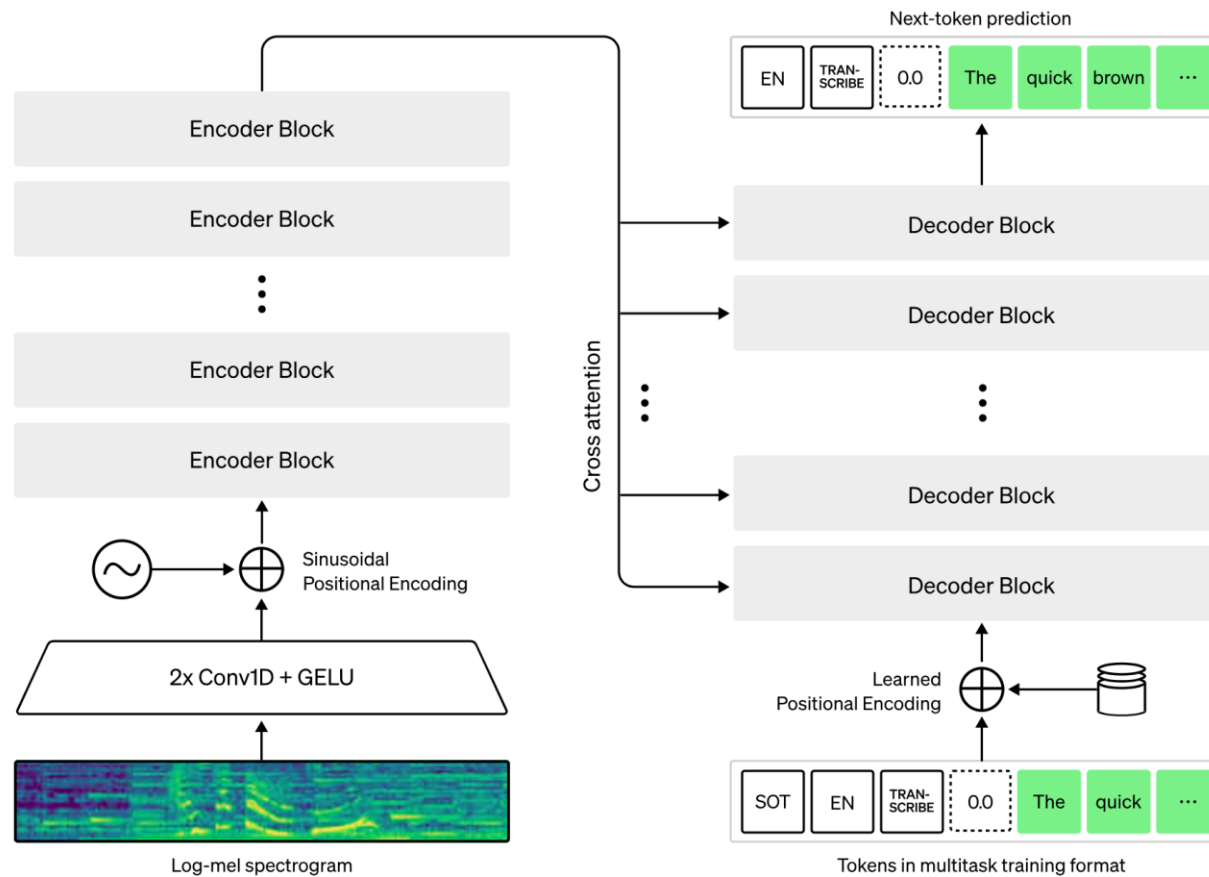
Free Research Preview: ChatGPT is optimized for dialogue. Our goal is to make AI systems more natural to interact with, and your feedback will help us improve our systems and make them safer.



# WHAT CAN WE DO WITH AI? COLD FUSION



# WHAT CAN WE DO WITH AI? WHISPER





# WHAT CAN WE DO WITH AI? ALPHA-GO

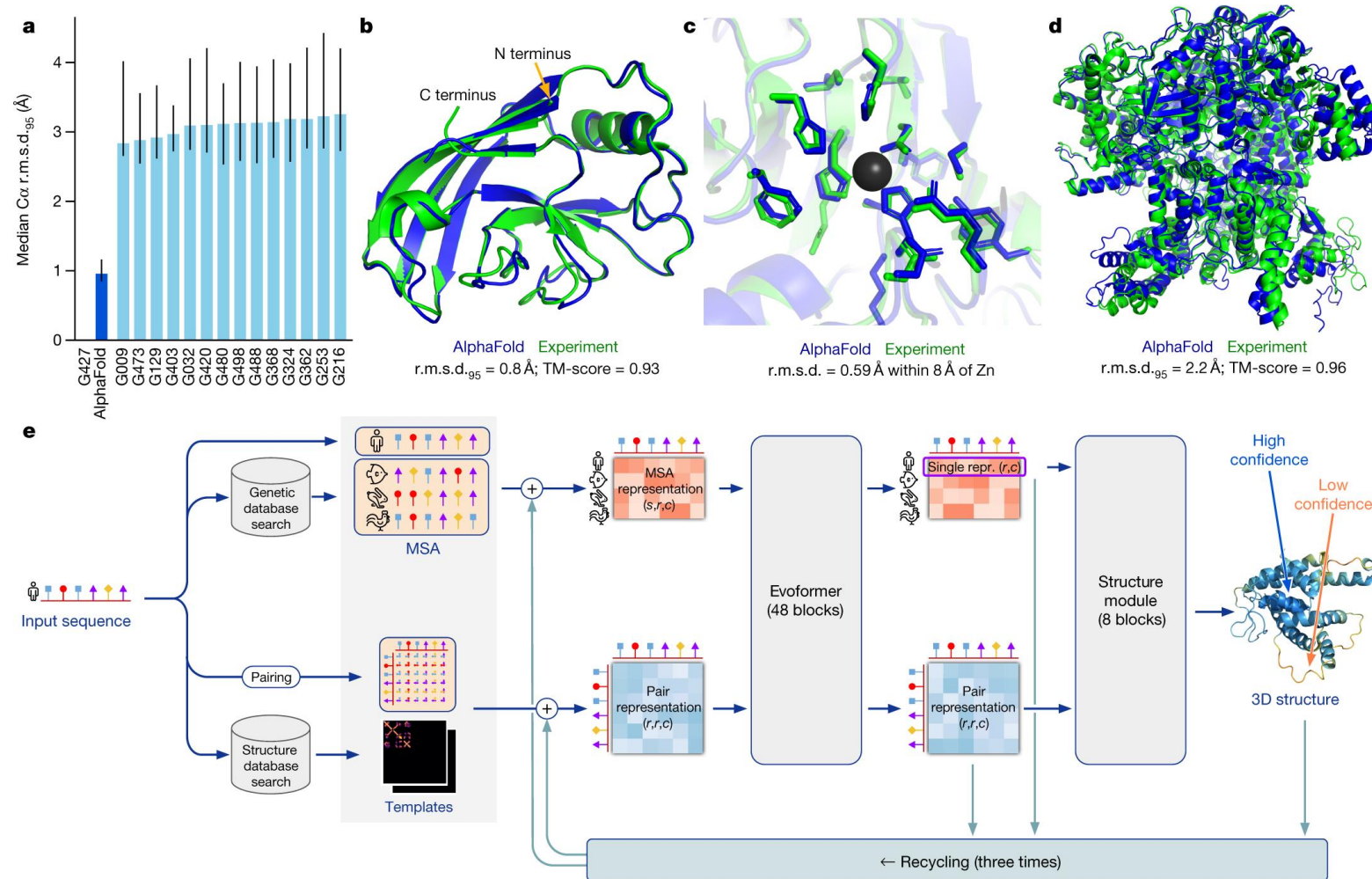


[https://www.youtube.com/watch?v=WXuK6gekU1Y&ab\\_channel=GoogleDeepMind](https://www.youtube.com/watch?v=WXuK6gekU1Y&ab_channel=GoogleDeepMind)





# WHAT CAN WE DO WITH AI? ALPHA-FOLD



# 4 - ABOUT THE COURSE

# SYLLABUS

- Deep Learning Frameworks
- Foundations of Neural Networks
- Convolutional Neural Networks (CNNs)
- Optimization and Regularization
- Recurrent Neural Networks (RNNs)
- Unsupervised Deep Learning
- Generative Adversarial Networks (GANs)



# EVALUATION

- Labs – 20%
- Group project – 30%
- Mid-term Exam – 15%
- Final Exam – 35% - Must have at least a grade of 5/10 and 4/10 in each part



# HOW IS EACH LAB EVALUATED

- All the labs will be individual
- Most of it is evaluated by automatic tests
- You will have all these tests available for running locally
- The rest will be evaluated by the professors, having the possibility of overriding part of the tests
- There will be random interviews to check authorship



# LATE SUBMISSIONS

- Each student will have 2 slip days for the 4 labs
- The submission date will not be changed.
- 1 day late = -20%
- 2 days late = -35%
- 3 days late = -50%
- 4 days late, grade = 0



# HOW WILL THE EXAMS BE?

- 50% test questions, about deep learning theory and use-cases
- 50% practical exam (you only have access to PyTorch documentation and PyTorch forums)
- You will have a sample exam to check it



# GROUP PROJECT

- Research Project in groups of 4 people
- Common final project with NLP course





# HONOR CODE

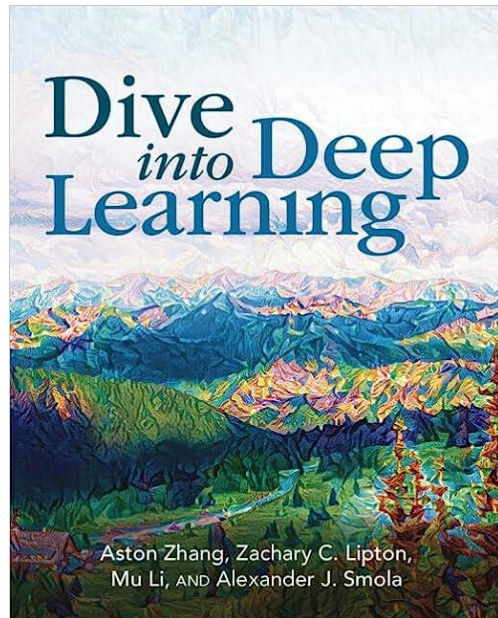
A violation of the course policy may include (but is not limited to) the following:

- Consulting forbidden materials or sources of information
- Collaborating or sharing information with another person regarding the material on any quiz, assessment or assignment, before, during and/or after any quiz, assessment or assignment
- Recording any quiz, assessment or assignment material in any format
- Failing to properly cite language, ideas, data, or arguments that are not originally yours
- The public (such that it can be viewed by more than one person) posting of any form of a test bank or group of questions from any assignment



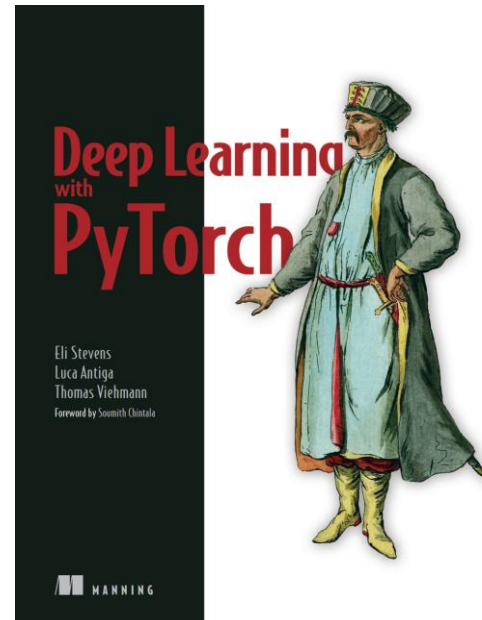
# REFERENCE BOOKS

Dive into Deep Learning



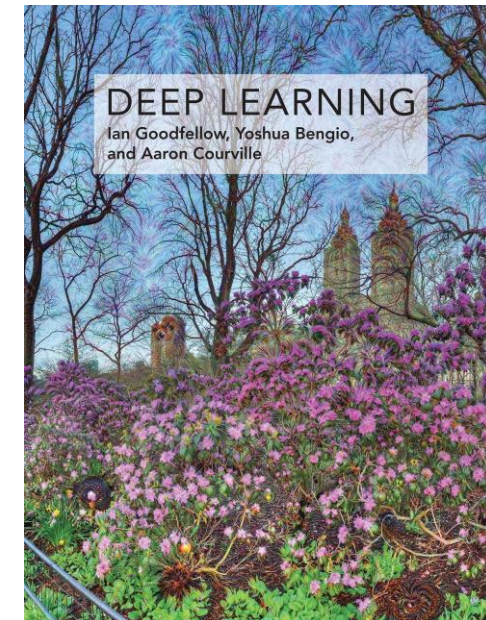
[Dive into Deep Learning – Dive into Deep Learning 1.0.3 documentation](#)

PyTorch Book



[Deep Learning with PyTorch: Build, Train, and Tune Neural Networks Using Python Tools : Stevens, Eli, Antiga, Luca: Amazon.es: Libros](#)

Deep Learning Book



[Deep Learning \(deeplearningbook.org\)](http://deeplearningbook.org)

