Fondamenti di Analisi dei Dati

from data analysis to predictive techniques

Prof. Antonino Furnari (antonino.furnari@unict.it)
Corso di Studi in Informatica
Dip. di Matematica e Informatica
Università di Catania

Introduction to the course

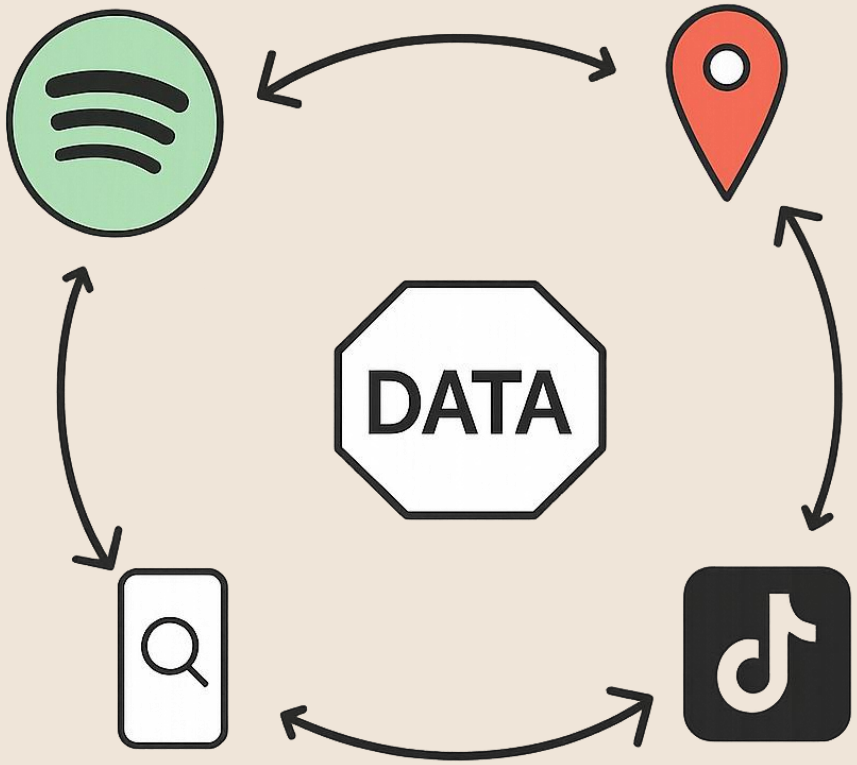
General Information

- **Course title**: Fondamenti di Analisi dei Dati
- **Teacher**: Antonino Furnari
- **CFU**: 9
- **Lectures**: Mondays and Wednesdays 8-11. Additional ~5 make-up classes on Tuesdays 14-17. Lectures follow a schedule shared on the Team.
- **Lecture rooms**: Room 23 (Tuesdays and Fridays) **+ Room 22 (Thursdays)**
- **Teaching material**: https://antoninofurnari.github.io/fadlecturenotes2526/
- **Announcements and schedule:** MS Teams team (code i87g4nb)
- **Office Hours**: Mondays 11.30-13.30 – check for variations and book here: https://antoninofurnari.github.io/ricevimento/
- **Syllabus**: https://web.dmi.unict.it/corsi/l-31/insegnamenti?seuid=4EDF6456-342B-4D35-909F-33B4B835AB44

Fondamenti di Analisi dei Dati

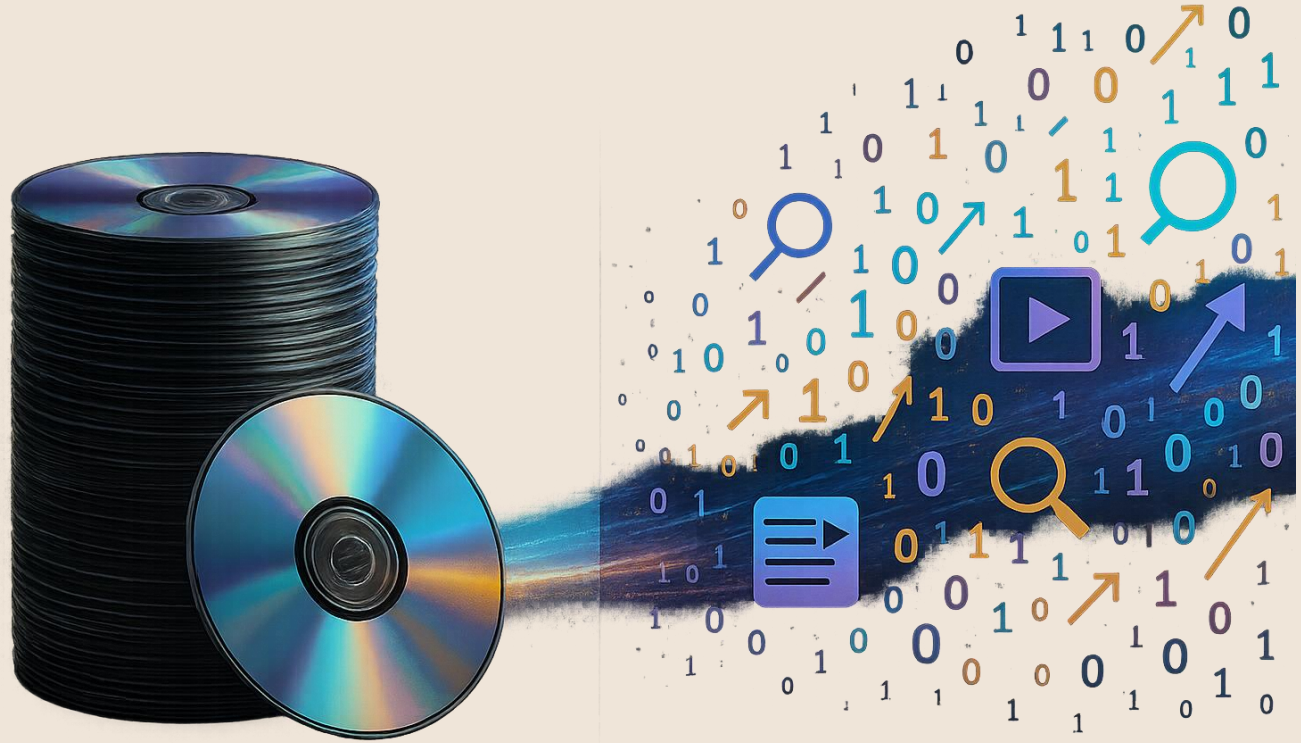
Fondamenti di Analisi dei Dati

Why Data Matters?



- Your Spotify playlist is curated by data;
- Your Google Maps route is optimized by data;
- Your TikTok feed is personalized by data;
- With every interaction (swipe, like, purchase, download, view, etc.), you contribute to a data science model.

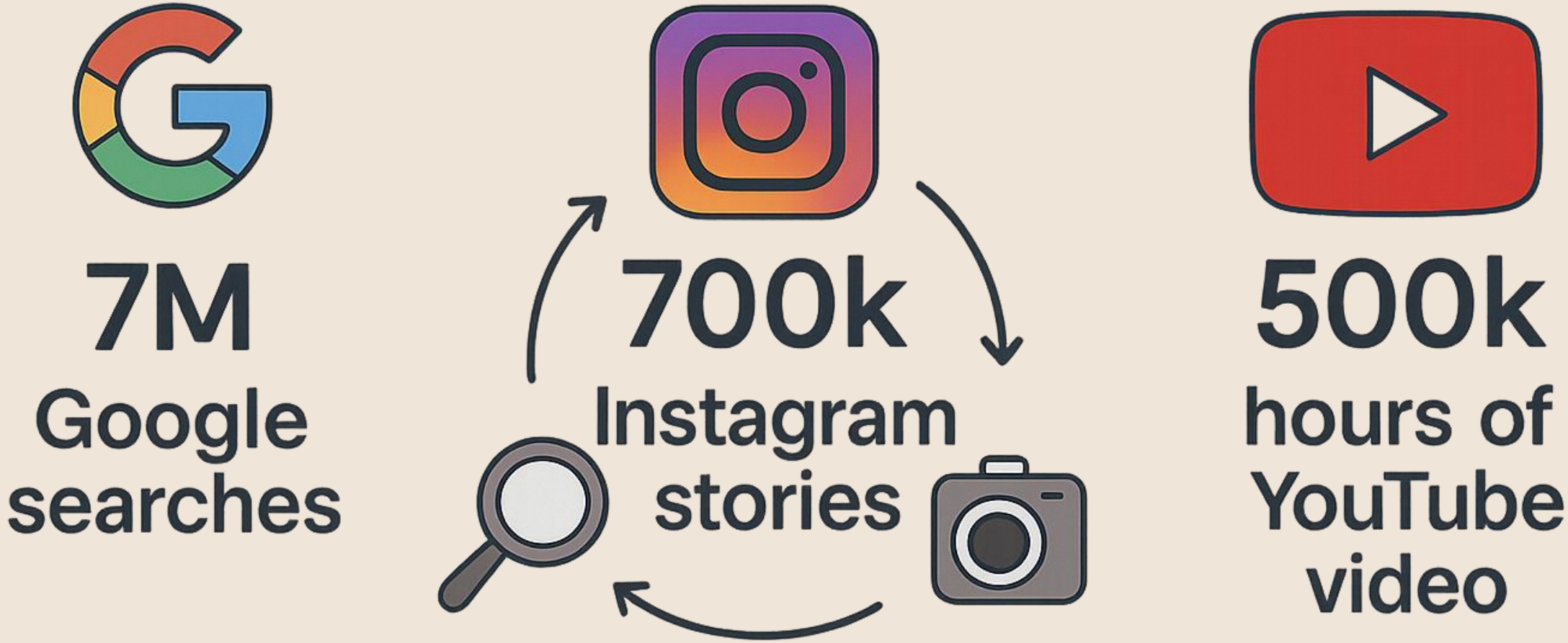
We are Living in a Data Explosion



- In the early 1990s, the world's digital computing data—excluding consumer media like music CDs and analog formats—was estimated at just a few dozen gigabytes, roughly **the size of 50 CDs**.
- Today, we generate that much data **in seconds**.

We are Living in a Data Explosion

Every Minute:



A (very) Brief History of Data

Ancient Civilizations

Sumerians used clay tablets to record grain inventories

Middle Ages

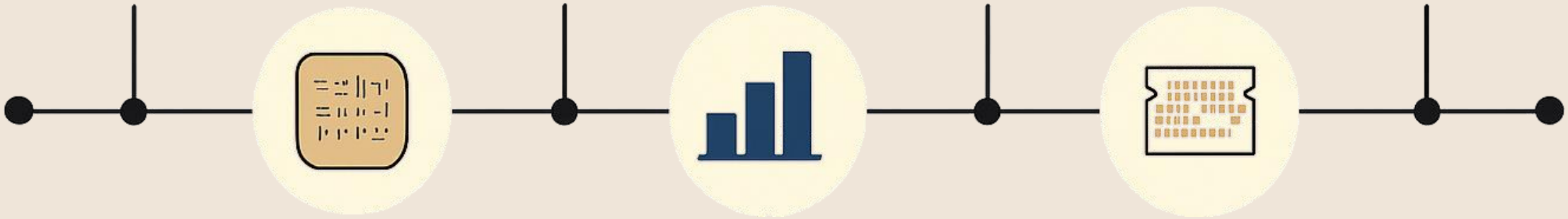
Census-taking and tax records in medieval Europe

Enlightenment

Birth of statistics: probability theory, population studies

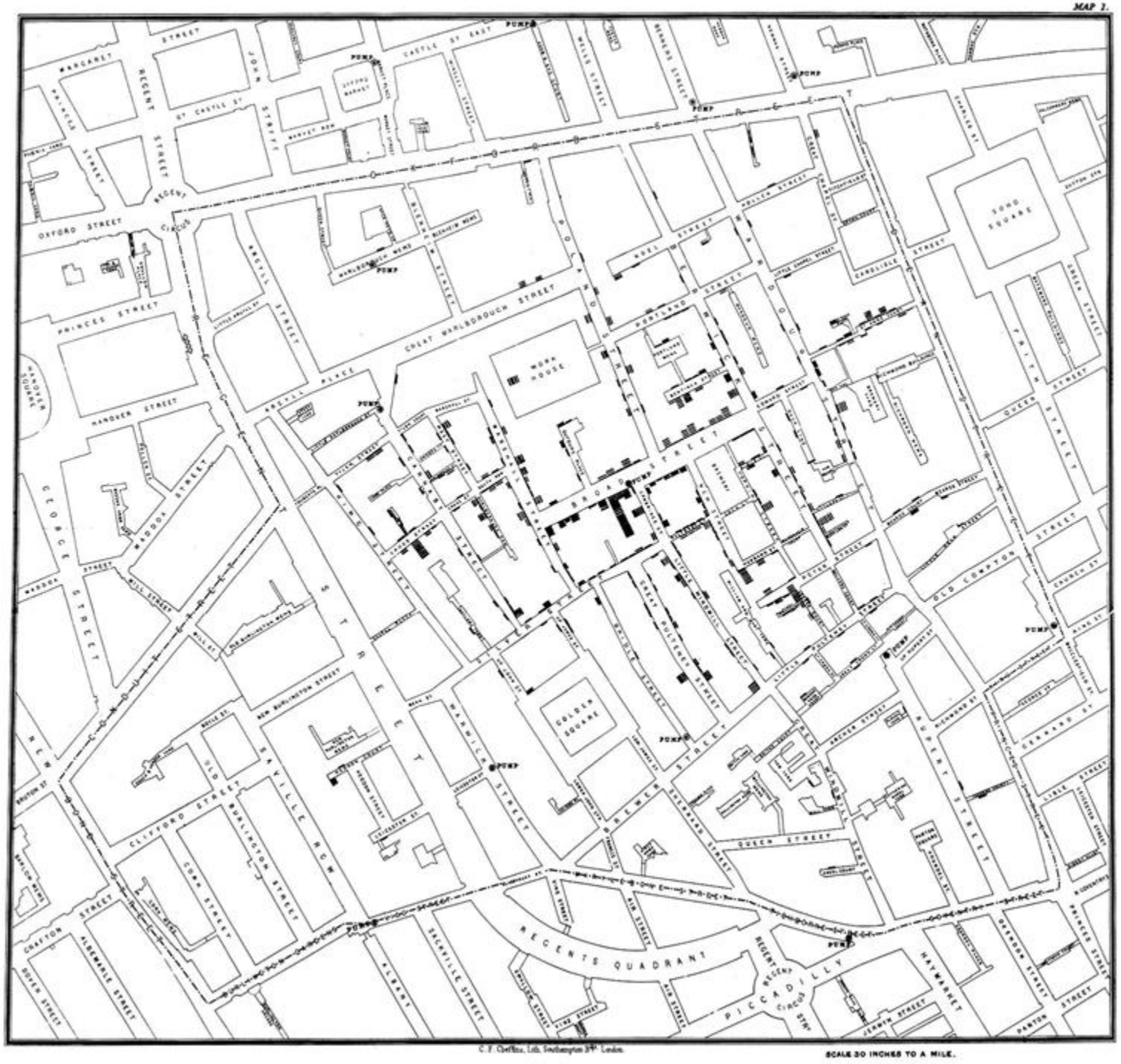
20th Century

IBM punch cards, government data systems



Jon Snow's Ghost Map (1954)

- Map of deaths during a cholera outbreak in London;
- Black lines represent deaths, localized in the map;
- Deaths concentrate in an area where citizens got water from a specific water pump;
- Jon Snow hypothesized that the cause was a contaminant and had the pump closed



GREAT MARLBOROUGH STREET
ARGYLL PLACE
LITTLE ARGYLL ST
WORK HOUSE
PORTLAND STREET
PORTLAND MEWS
BENTINCK STREET
WARDOUR MEWS
ST ANNS COURT
RICHMOND BUILDINGS
EDWARD STREET
PUMP
LITTLE MARLBOROUGH ST
TYLER STREET
MARSHALL ST.
MARSHALL STREET
WEST STREET
DUFOURS PLACE
BROAD STREET
PUMP
BREWERY
CAMBRIDGE ST
SOUTH ROW
CROSS ST
CROSS STREET
KING STREET
SILVER STREET
HUSBAND ST
PETER STREET
HEARDS STREET
HEARDS COURT
OLD COMPTON
LITTLE WINDMILL STREET
GREAT PULTENEY STREET
BRIDLE STREET
WILLIAM AND MARY YARD
UP JAMES ST
UP JOHN ST
GOLDEN SQUARE
LITTLE PULTENEY STREET
PUMP
UP. RUPERT ST
RICHMOND ST
OLD BURLINGTON MEWS
NEW BURLINGTON STREET
BEAK ST.

What’s Data Impact Today?

A few examples / case studies

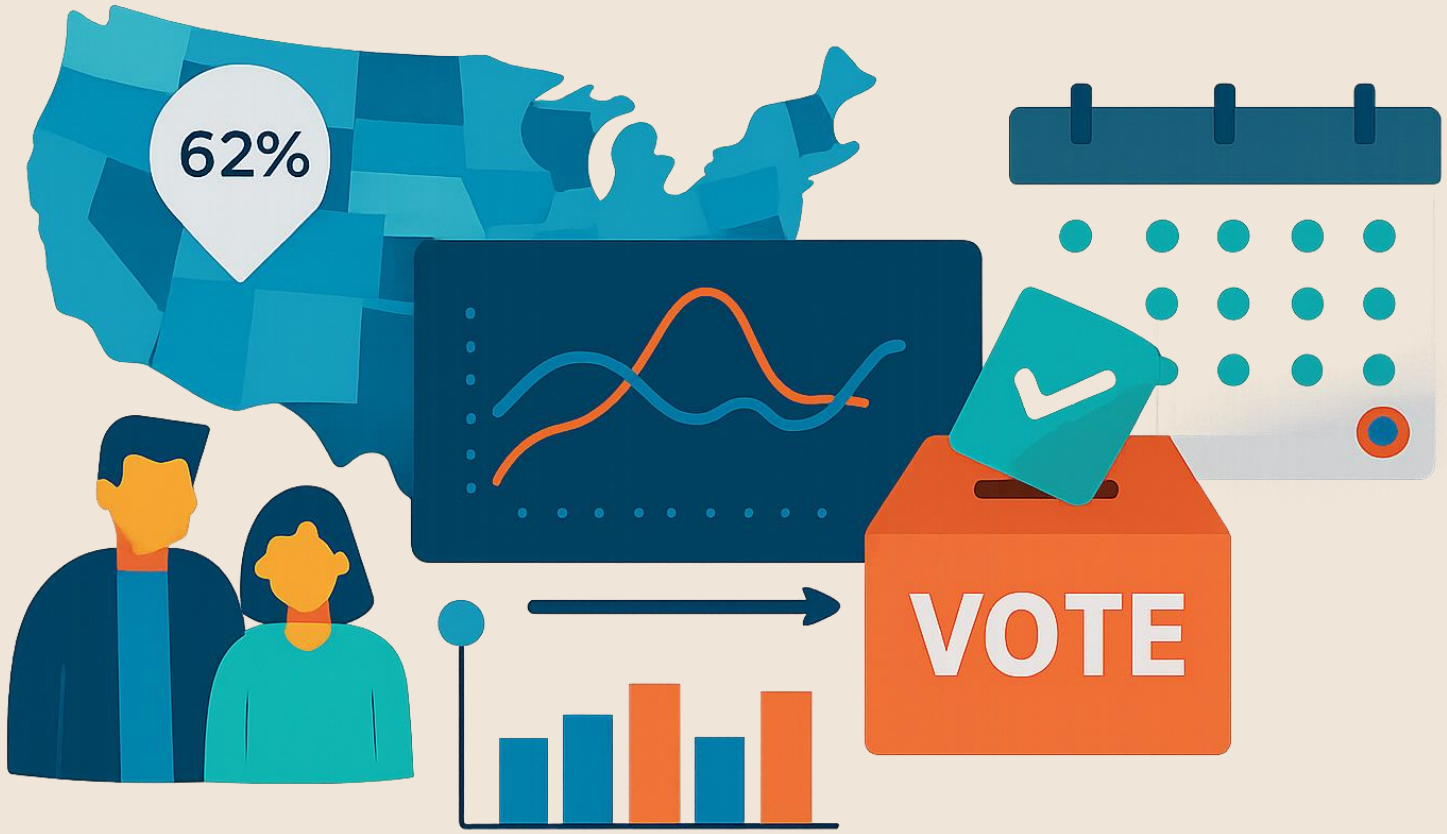
Vaccines and Public Health

- Epidemiologists track infection rates to decide when and where vaccines are needed
- Vaccine effectiveness is measured using large-scale clinical trial data
- Public health agencies use data to allocate resources and prevent outbreaks

Polls and Public Opinion

- Pollsters use representative samples to estimate public opinion
- Margin of error and confidence intervals help interpret results
- Poll data influences campaign strategy, media coverage, and policy decisions

Elections and Turnout

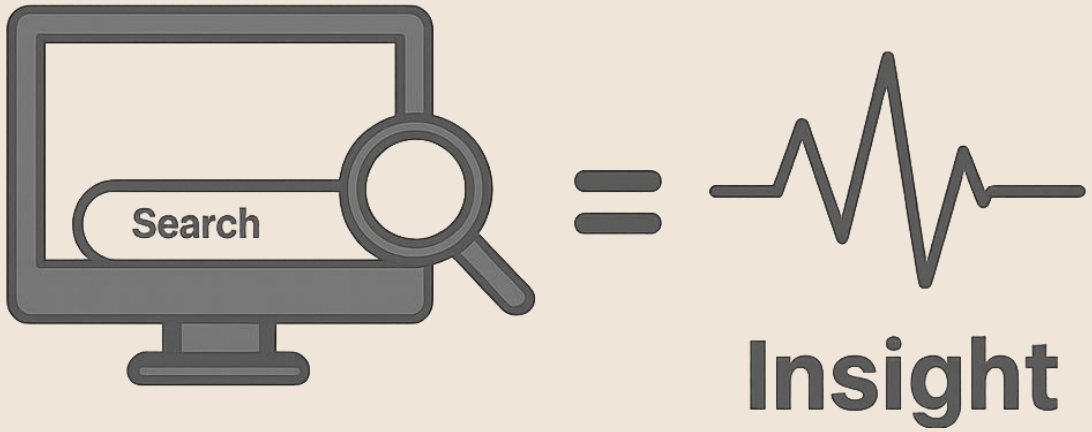


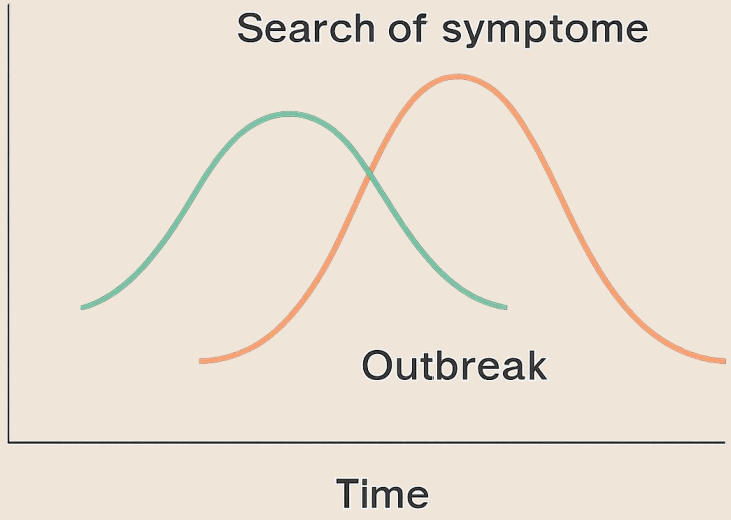
- Election officials use data to manage polling stations and prevent bottlenecks
- Geographic turnout data helps parties target outreach
- Historical voting patterns are used to forecast results

Beyond Analysis

Using Data for Automated Predictions and Decisions

Predicting Disease Outbreaks with Search Data





Search engines don’t just reflect curiosity—they reveal emerging health trends.

- Symptom-related searches (e.g., “fever,” “cough,” “loss of smell”) often surge before official case reports.
- Google Trends and similar tools provide real-time, population-scale signals.
- Used in epidemiology to complement traditional surveillance systems.

Predicting Arterial Fibrilation

- ⌚ Apple Watch uses optical sensors and algorithms to detect irregular heart rhythms.
- ❤️ It can notify users of potential atrial fibrillation—often before symptoms appear.
- 🧠 FDA-cleared feature, backed by clinical studies.
- 🌍 Millions of users have received early warnings, prompting timely medical intervention.

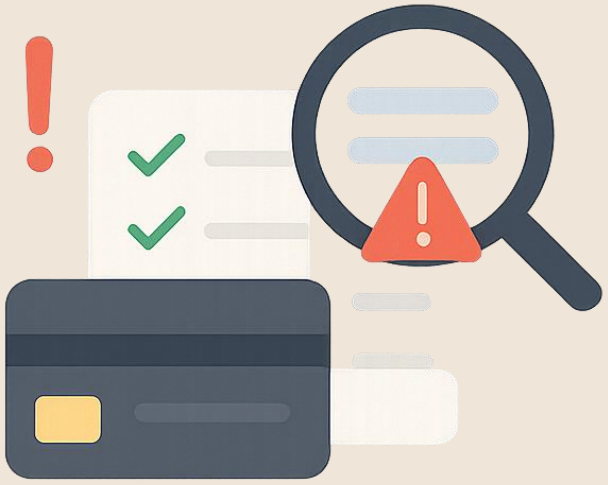
Personalized Entertainment—Recommendations That Surprise

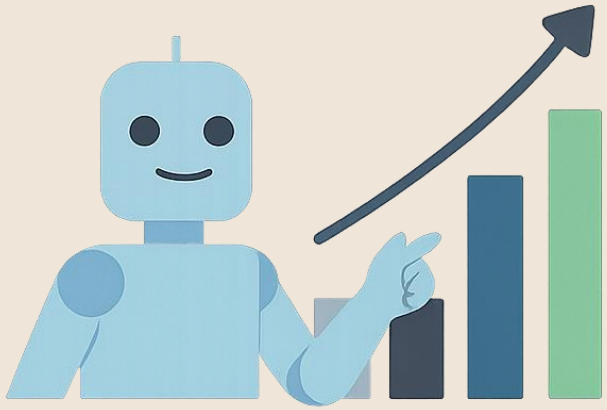
- Netflix’s recommendation engine: trained on billions of viewing hours
- Netflix Prize (2006): crowdsourced 10 % accuracy boost in movie suggestions.
- TikTok’s algorithm: learning your preferences in minutes
- Spotify Discover Weekly (2015): reached 40 M users in one year by clustering listening habits.

Smarter Journeys—Navigation & Smart Cities

- Waze community reroutes saved 10 min/trip on average; guided 500 K drivers around marathon closures.
- Google Maps ingests 20 PB of location data daily to avoid traffic.
- During an NYC marathon, Waze rerouted half a million drivers seamlessly.

Finance





- Fraud detection algorithms flagging suspicious transactions instantly
- Use statistical thresholds and anomaly detection—not always AI
- Robo-advisors managing investment portfolios based on data-driven strategies
- Offer low-cost, accessible financial planning—no human advisor needed

Climate & Environment

- Satellite data predicting deforestation (Global Forest Watch)
- AI models optimizing energy usage in smart cities
- NOAA runs calculations daily to forecast storms.
- NASA’s earth satellites now produce more data than Apollo missions did in their entire run.

Our Everyday Smart Homes

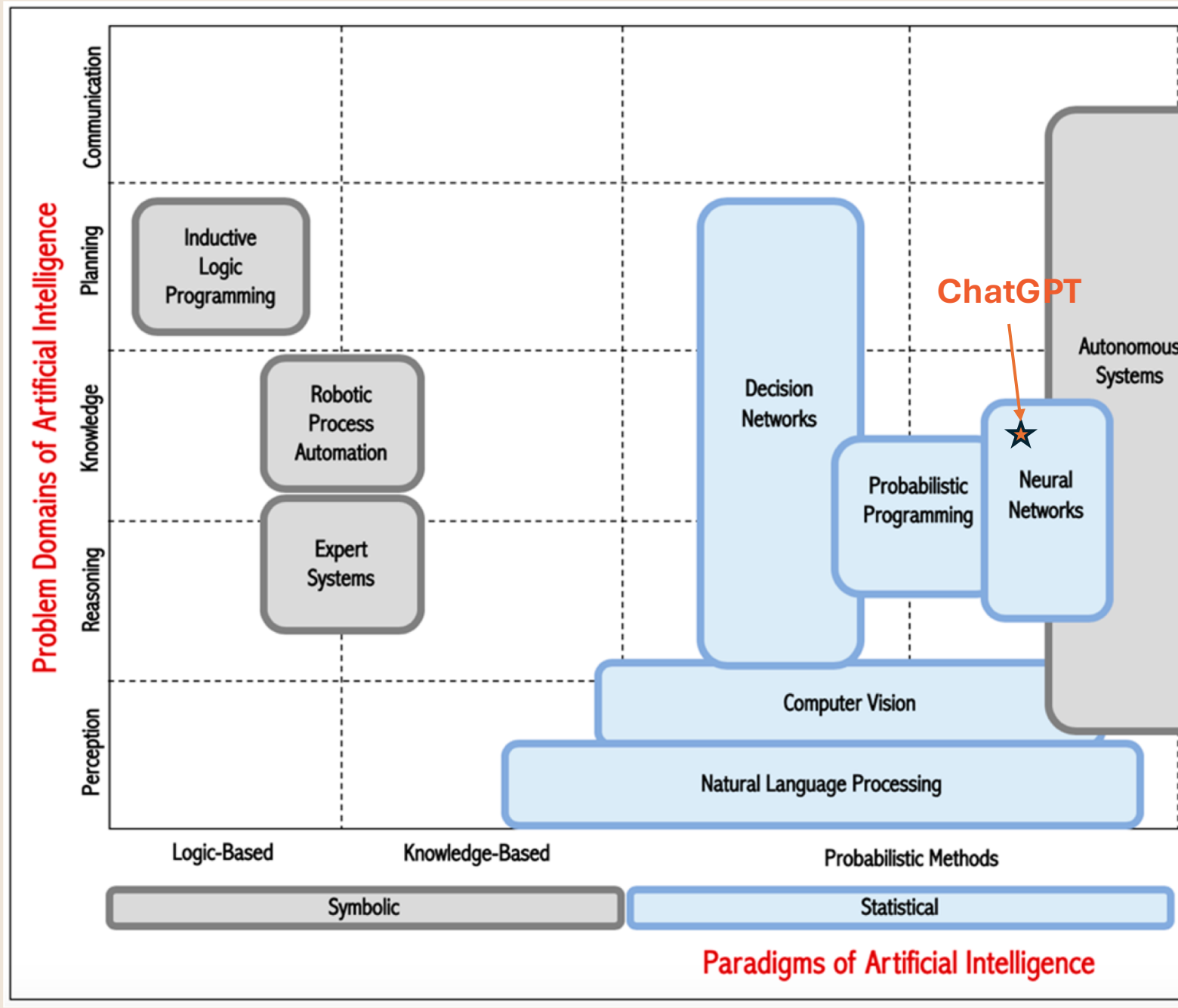
- Nest thermostat learns your routine—cuts heating bills by 10–12 %
- Smart fridges track groceries and suggest recipes from items about to expire
- Your home is collecting data to make you more comfortable—often before you know you’re cold”

From Data to Intelligence

How Data is Fueling the AI Revolution

Data Powers AI

- The AI revolution lives in the realm of «statistical» AI;
- Modern AI is fueled by data, which is used to train, refine, and validate AI;
- If AI is the brain, data is the experience.



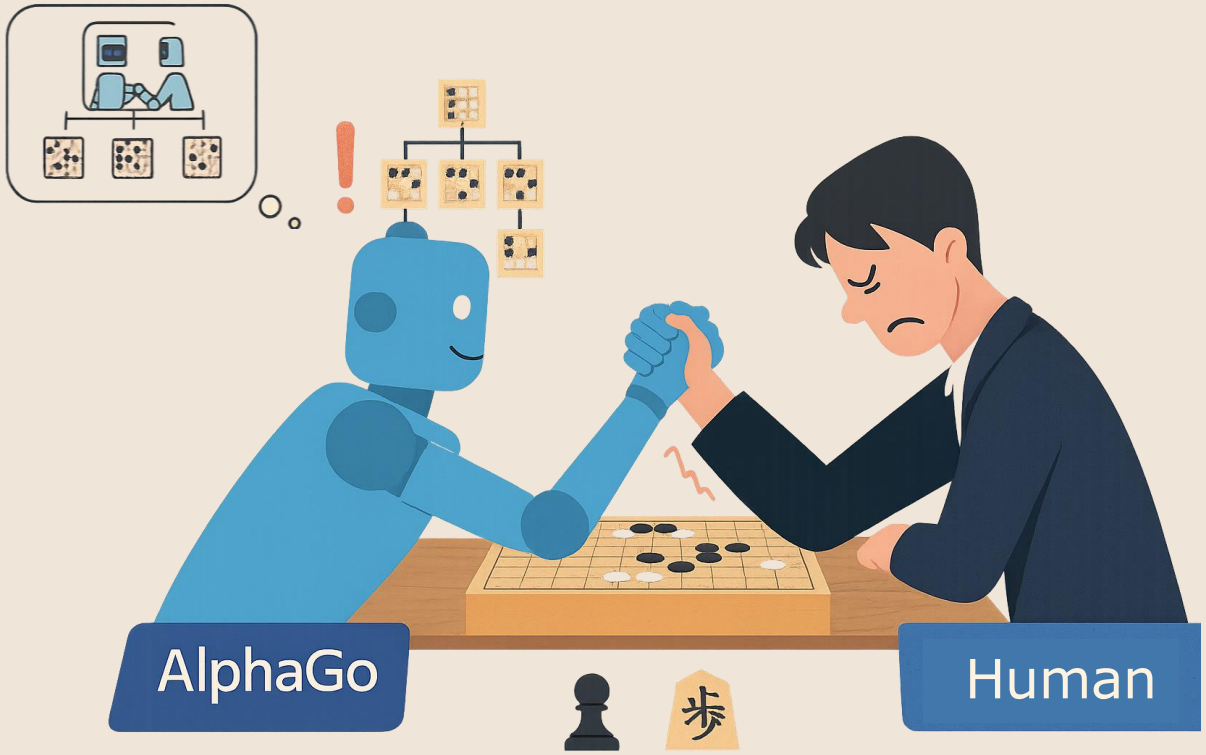
Yigitcanlar, T., Desouza, K. C., Butler, L., & Roozkhosh, F. (2020). Contributions and risks of artificial intelligence (AI) in building smarter cities: Insights from a systematic review of the literature. *Energies*, *13*(6), 1473.

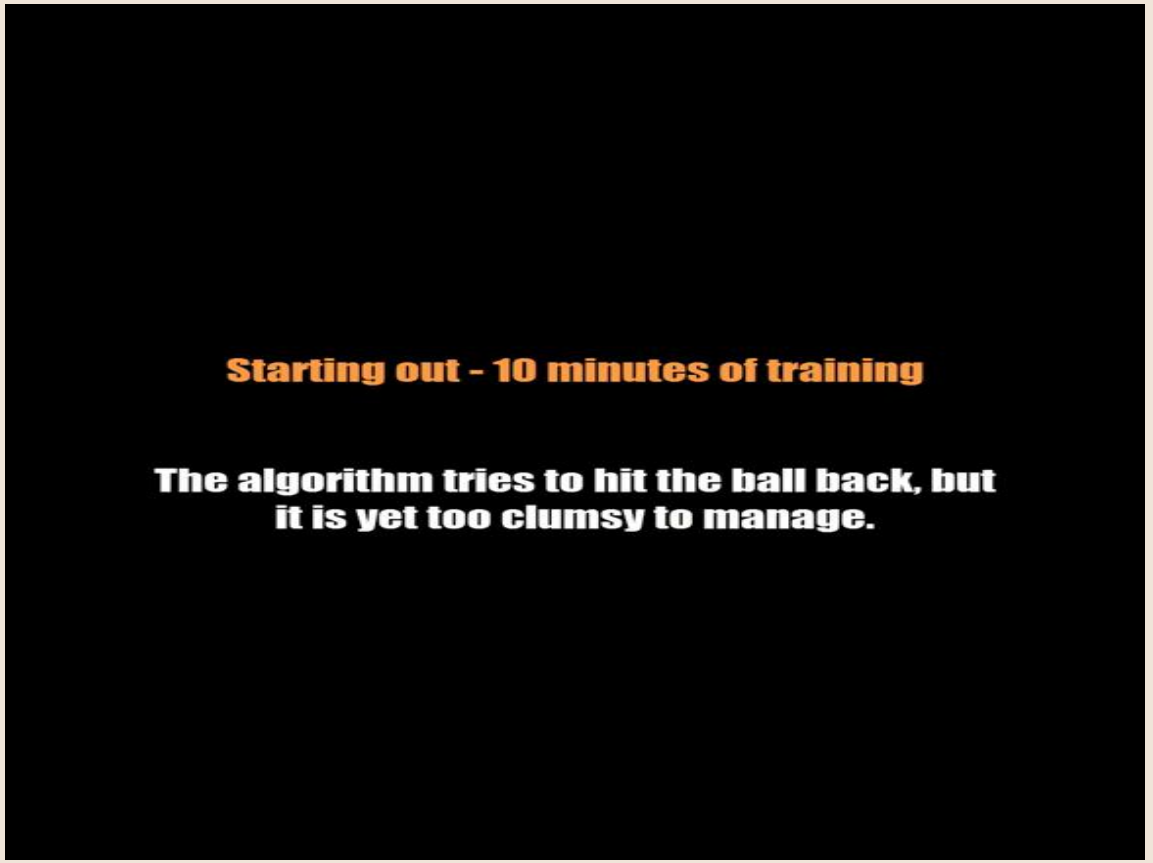
https://www.kdnuggets.com/2018/08/ai-knowledge-map-classify-ai-technologies.html

Beating the Best—Games & Self-Learning AI

- AlphaGo vs. Lee Sedol (2016): AI won 4–1 using deep learning and Monte Carlo tree search.
- Move 37 in Game 2 of AlphaGo stunned experts—an unorthodox strategy never seen before.
- AlphaZero (2017): mastered chess, shogi, Go from scratch—no human data.

Beating the Best—Games & Self-Learning AI





AlphaFold – Revolutionizing Protein Folding

- Proteins fold into unique 3D shapes essential for function—experimental methods once took years and cost ~$120 k per structure
- AlphaFold was trained on millions of amino-acid sequences paired with thousands of experimentally solved structures from the Protein Data Bank
- Predicts structures in minutes with near-experimental accuracy
- Over 200 million structures freely available via the AlphaFold Protein Structure Database, enabling breakthroughs in biology, drug discovery, agriculture, and environmental science
- Won the Nobel Prize!

AlphaFold – Revolutionizing Protein Folding

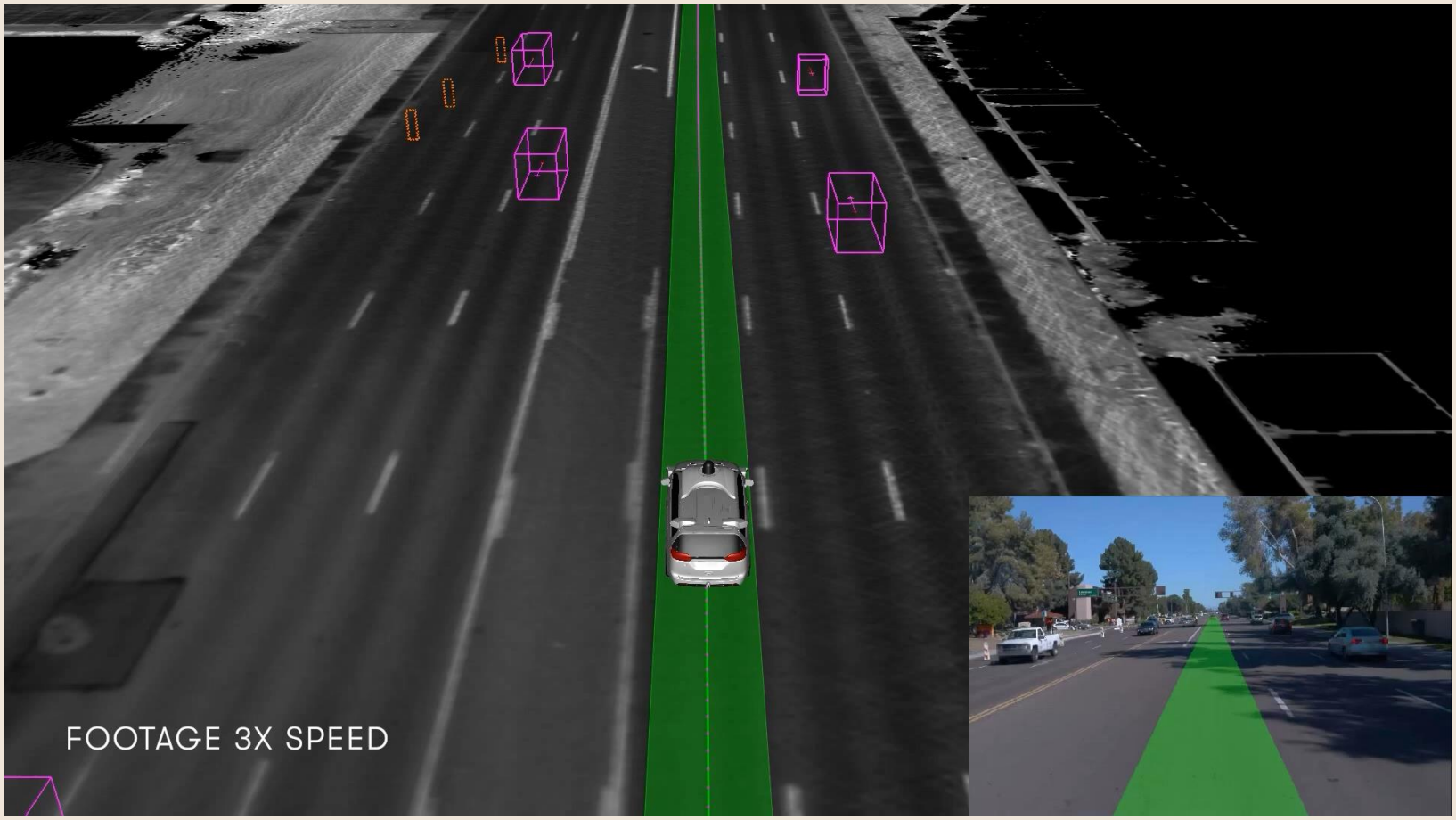
https://www.youtube.com/watch?v=Gk-PyJSNlcI

Self-Driving Cars

- Self-driving cars rely on vast sensor data—lidar, radar, cameras, GPS—to perceive their environment and predict movement.
- Algorithms trained on large datasets, including synthetic and simulated scenarios, learn to map sensory input to driving actions.
- Reinforcement learning is often used in simulation to teach agents how to drive by rewarding safe, goal-directed behavior.

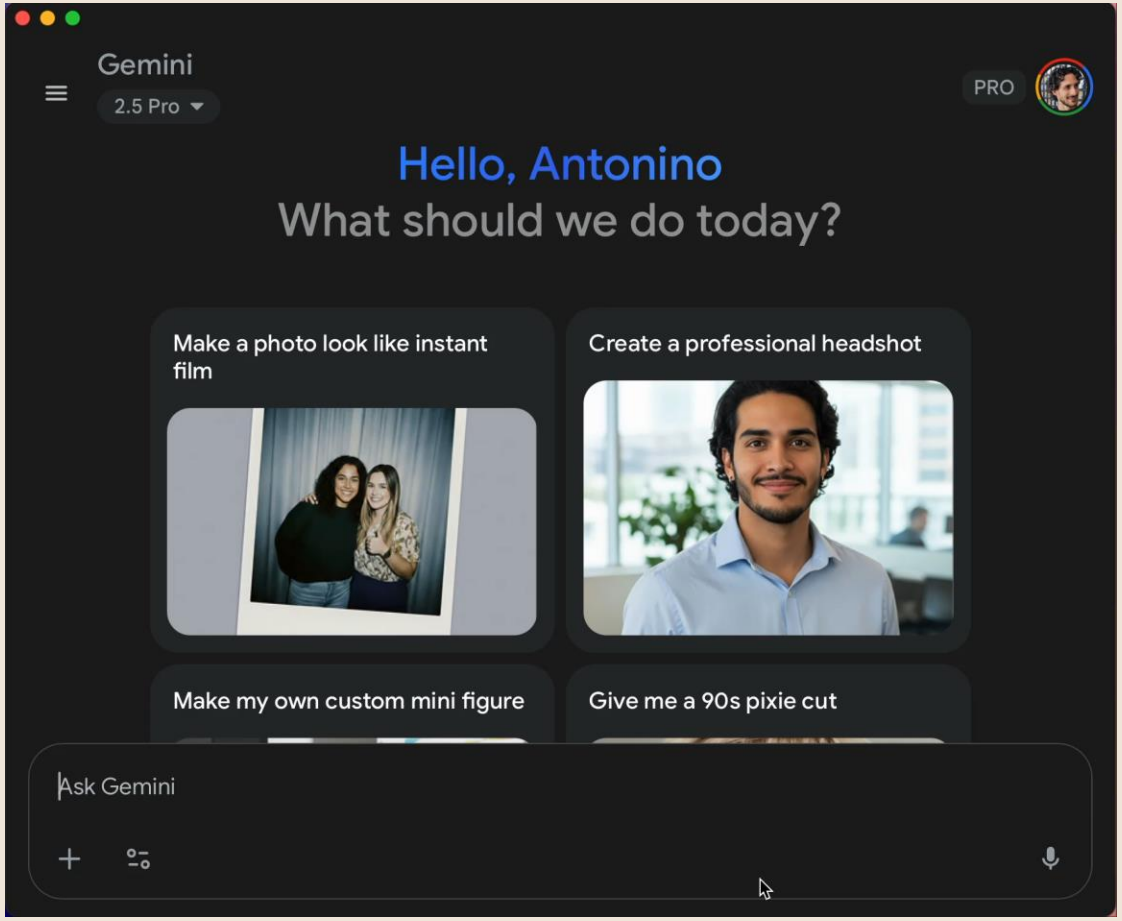
Self-Driving Cars

WAYMO



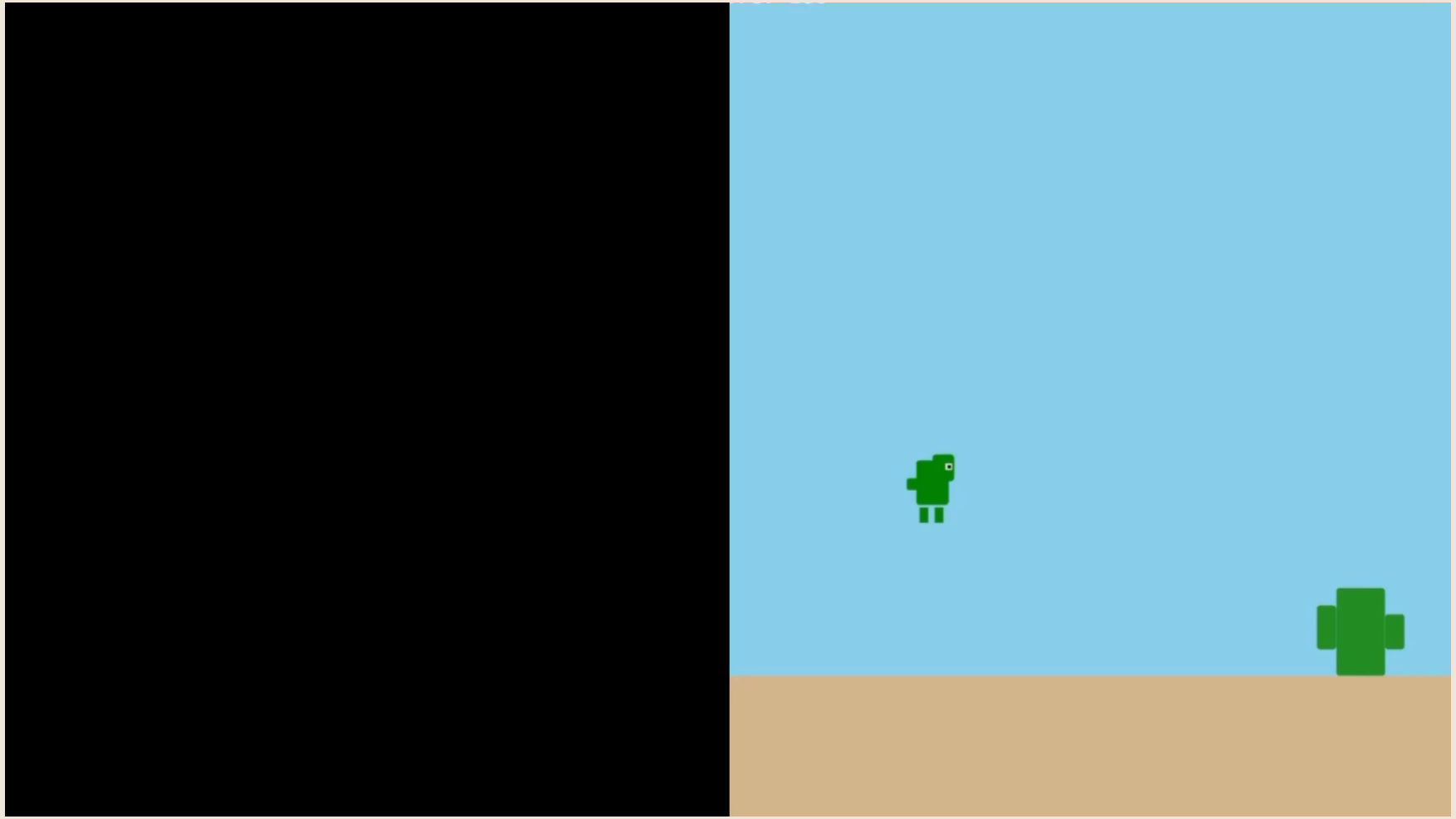
https://www.youtube.com/watch?v=OopTOjnD3qY

(Multimodal) Large Language Models, including ChatGPT



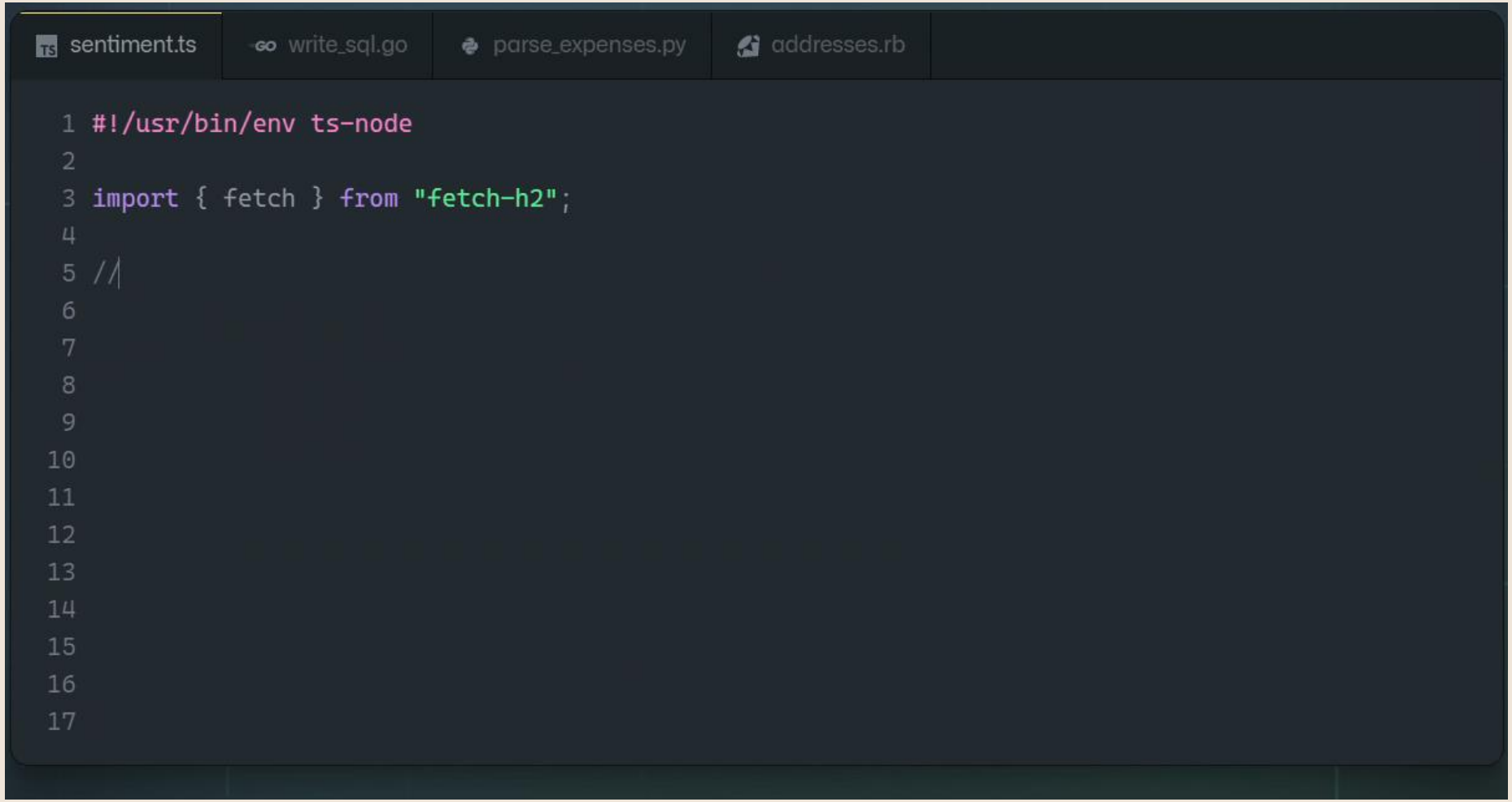
- Trained on massive datasets of text
- Predict the next word
- Learn patterns, grammar, facts, and reasoning from human language
- Can process text, images, audio, and even video
- Understand and generate across formats

Generating code based on a description



https://www.youtube.com/watch?v=RLCBSpgos6s

Github Copilot



https://copilot.github.com/

https://arxiv.org/abs/1912.04958

Impact - Generating Faces

https://thispersondoesnotexist.com/

DeepFake

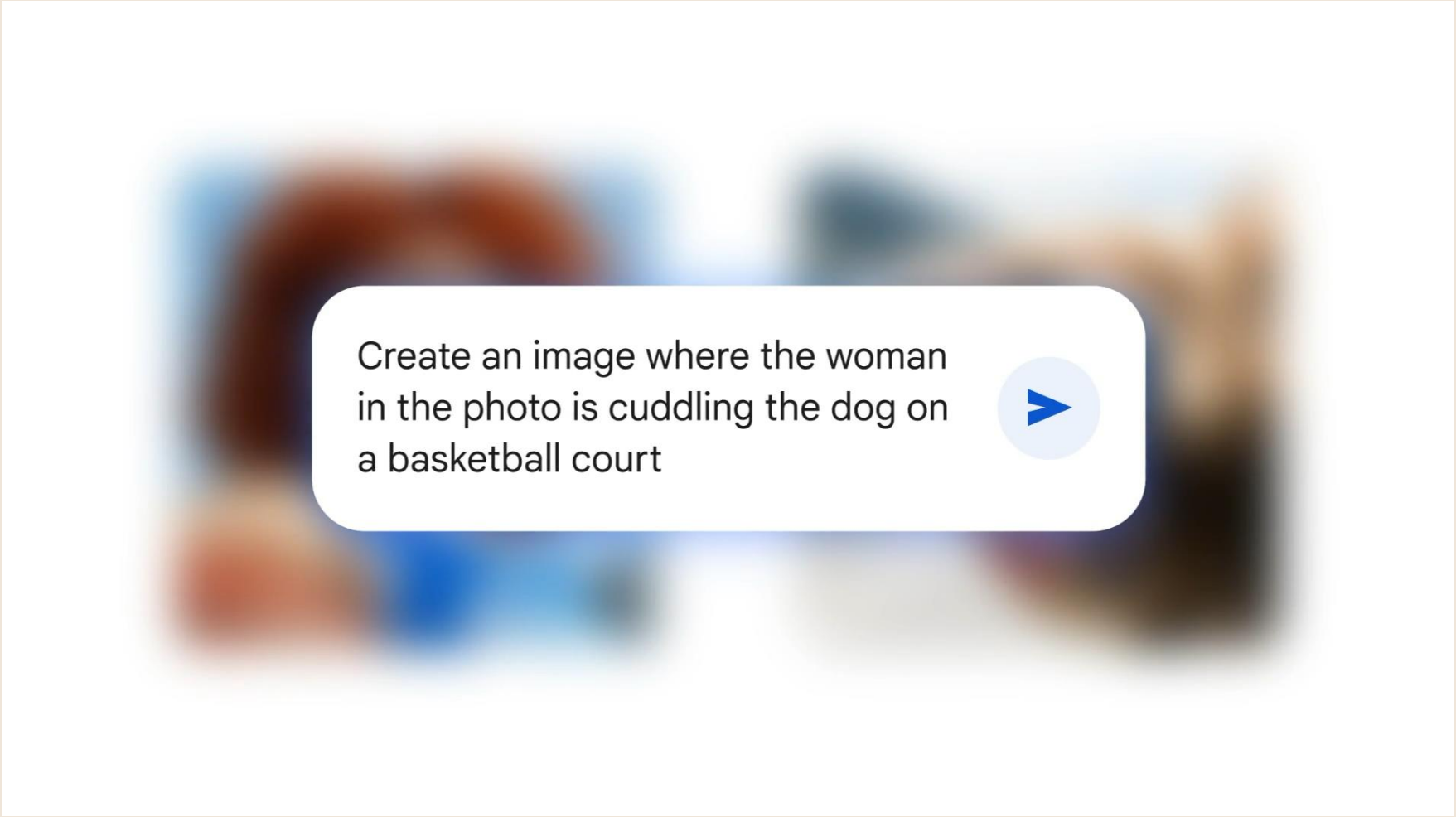
https://www.youtube.com/watch?v=z7e08rWpGHY&ab_channel=VFXChrisUme

Image Generation – Imagen (Google Deepmind)

https://deepmind.google/models/imagen/

Create a cinematic, photorealistic medium shot capturing the nostalgic warmth of a late 90s indie film. The focus is a young woman with brightly dyed pink hair (slightly faded) and freckled skin, looking directly and intently into the camera lens with a hopeful yet slightly uncertain smile. She wears an oversized, vintage band t-shirt (slightly worn) over a long-sleeved striped top and simple silver stud earrings. The lighting is soft, golden hour sunlight streaming through a slightly dusty window, creating lens flare and illuminating dust motes in the air. The background shows a blurred, cluttered bedroom with posters on the wall and fairy lights, rendered with a shallow depth of field. Natural film grain, a warm, slightly muted color palette, and sharp focus on her expressive eyes enhance the intimate, authentic feel.

Image Editing – Nanobanana (Google)



https://gemini.google/overview/image-generation/

Video Generation – Veo3

A medium shot frames an old sailor, his knitted blue sailor hat casting a shadow over his eyes, a thick grey beard obscuring his chin. He holds his pipe in one hand, gesturing with it towards the churning, grey sea beyond the ship's railing. "This ocean, it's a force, a wild, untamed might. And she commands your awe, with every breaking light"

https://deepmind.google/models/veo/

Ethics, Data Science, and Artificial Intelligence

- The great power arising from Artificial Intelligence and Data Science brings several ethics concerns;
- Like everything so powerful, these tools can be used in unethical ways;
- We won’t delve into this discussion, but data scientists need to be aware of ethics;
- The one on the right is a good summer read on the topic.

See “The great hack’’ documentary on Netflix

Ethics & Responsibility— Cautionary Tale

- Cambridge Analytica claimed to use data to change audience behavior;
- Through the analysis of such data, they knew what kind of message every person was susceptible to;
- They could hence create messages influence people’s opinion and change the way they voted;
- In 2018 Cambridge Analytica has been accused to have used illegal ways to harvest personal data from Facebook;
- They have been accused to use this data in Trump’s presidential campain and Brexit campain.

https://www.youtube.com/watch?v=cX91Rl82grY

How to Get There?

- In order to get there, we need to learn the **language of data**
- Data is never «given» and we need to learn how to transform into actionable feedback and models
- To do so, we need to understand both **fundamental concepts** and **advanced AI algorithms**
- Put is simple, a **data scientist** is a professional who is **proficient in the language of data**

The Sexiest Job of the 21st Century

- Coined by Harvard Business Review in 2012
- Fusion of statistics, programming & domain expertise
- Powers decisions in healthcare, finance, marketing & AI
- Projected >30% job growth; median salaries > $100 K
- High autonomy, cross-disciplinary teamwork & real-world impact

What's in a Data Scientist's Toolbox?

examining data

cleaning data

transforming data

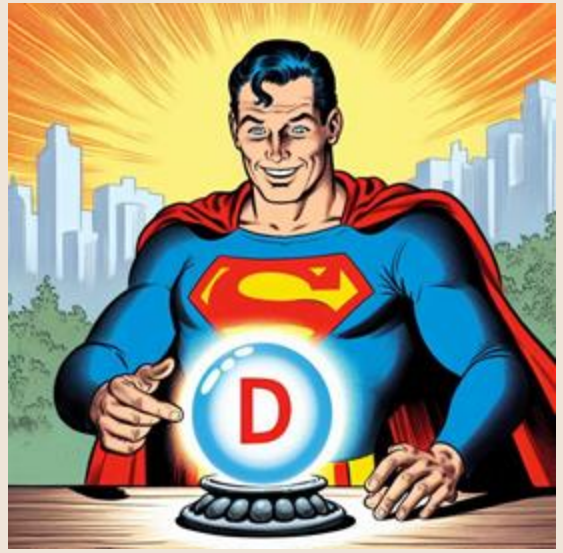
modeling data

The Data Scientist's Superpowers

discover information

draw conclusions

make decisions



build predictive models

Art or Science? (Maybe Both)

More than a **technique** or an **algorithm**, data analysis is a **process** requiring a series of steps, not always in the same order, to answer some data **analysis questions**.

It requires the knowledge of **theory behind algorithms**, some **programming skills**, and a certain degree of **intuition**, that is **developed through practice**.

Course Organization

Two modules:

- **Theory** (6 CFU)
- **Laboratory** (3 CFU)

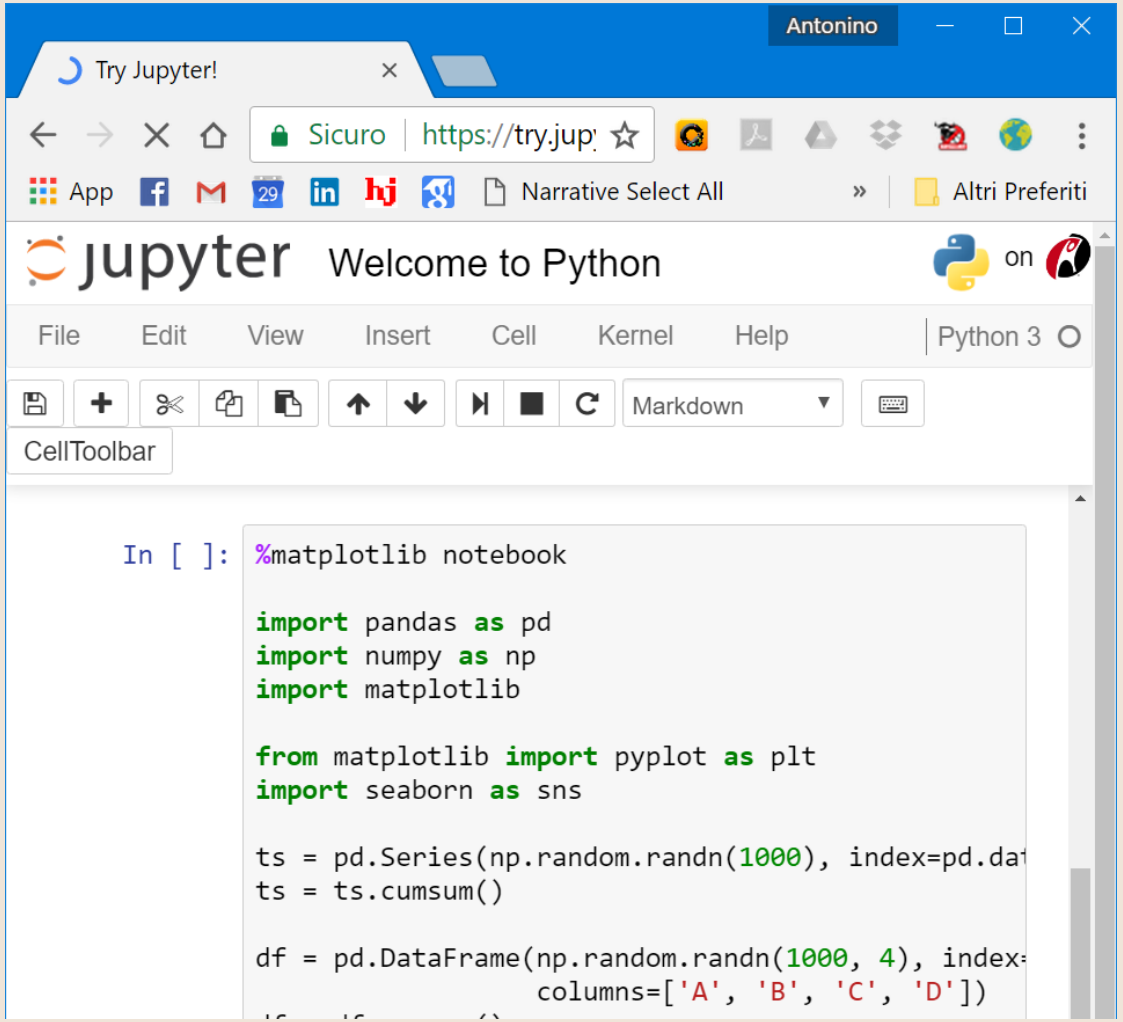
One kind of lecture:

Lectures will encompass both theoretical and practical aspects. In practice, each lecture will «switch» from a digital board to the Python interpeter to keep the course practical and interactive.

Practice in Python

We will use Python, as a modern and flexible language for data science, together with a number of standard package. We will use the Anaconda distribution.

Jupyter Notebooks

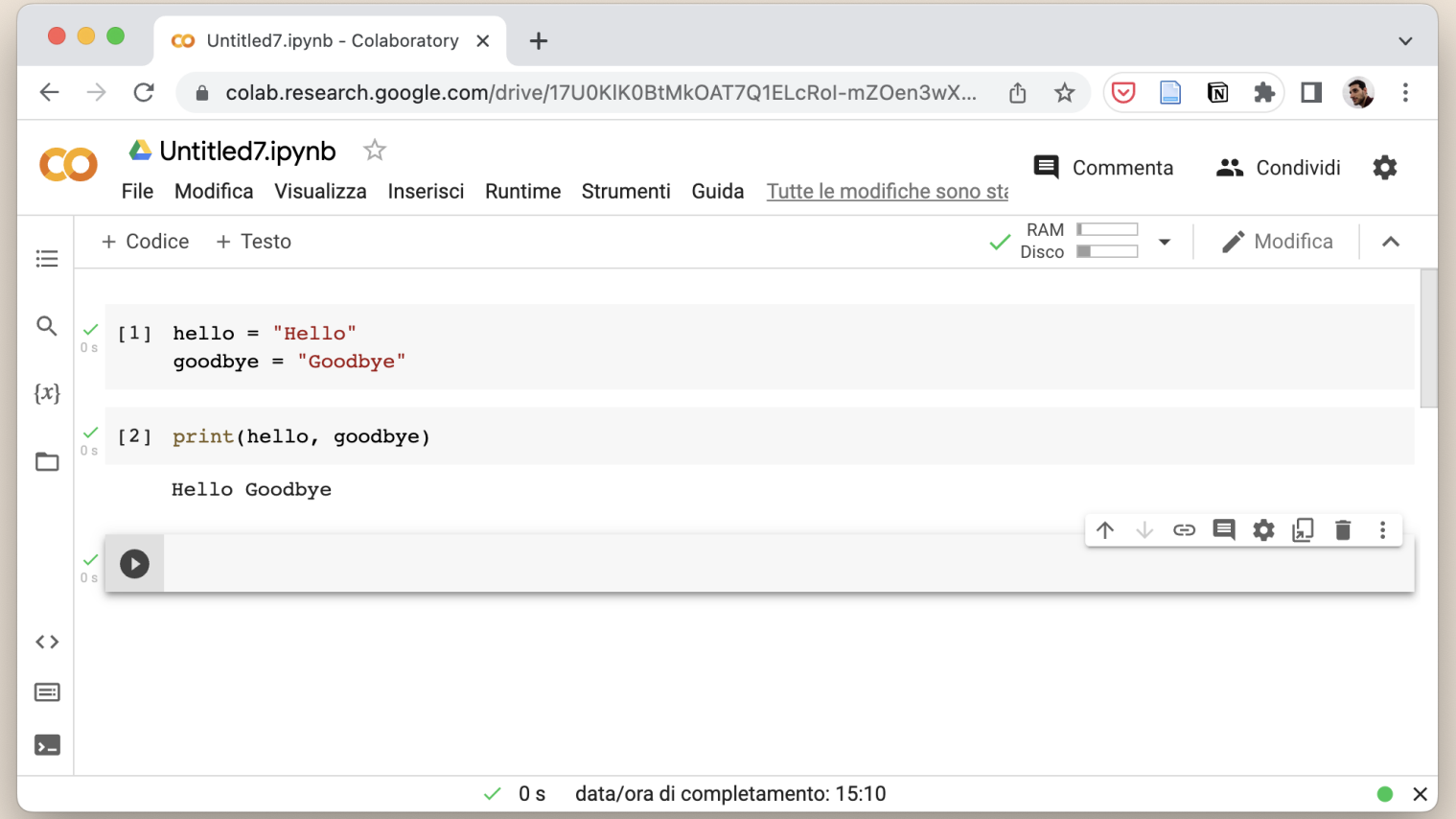


We will make extensive use of Jupyter Notebooks as they allow the creation (via a web interface) of “notebooks” containing:

- Formatted text
- Executable code
- The results (text, images) of computations

This is a very powerful tool and enables the generation of full-fledged reports of data analyses.

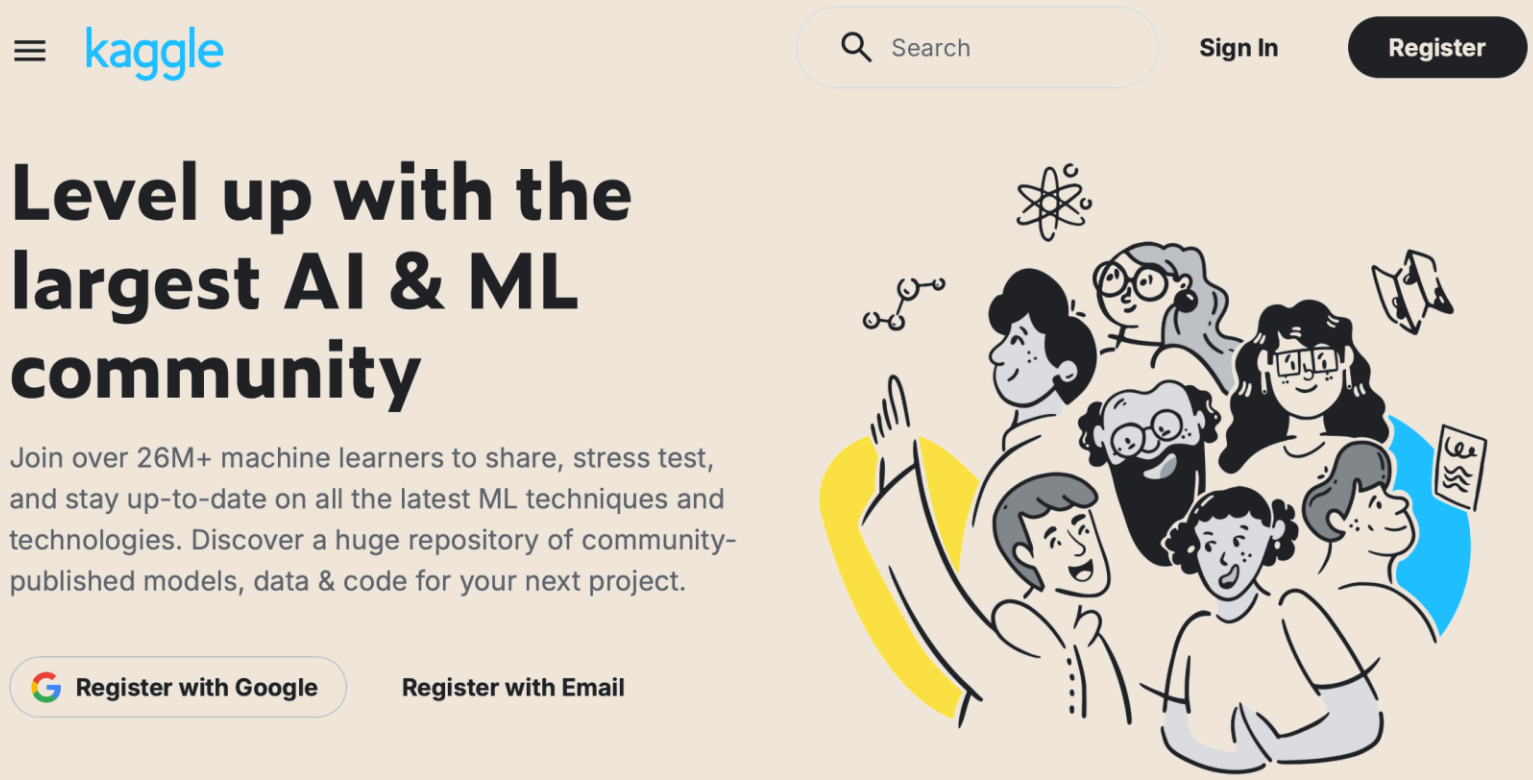
Google Colab



Google Colab offers a free-to-use interface to notebooks with limited computation on the cloud, which is sufficient for this course.

https://colab.research.google.com

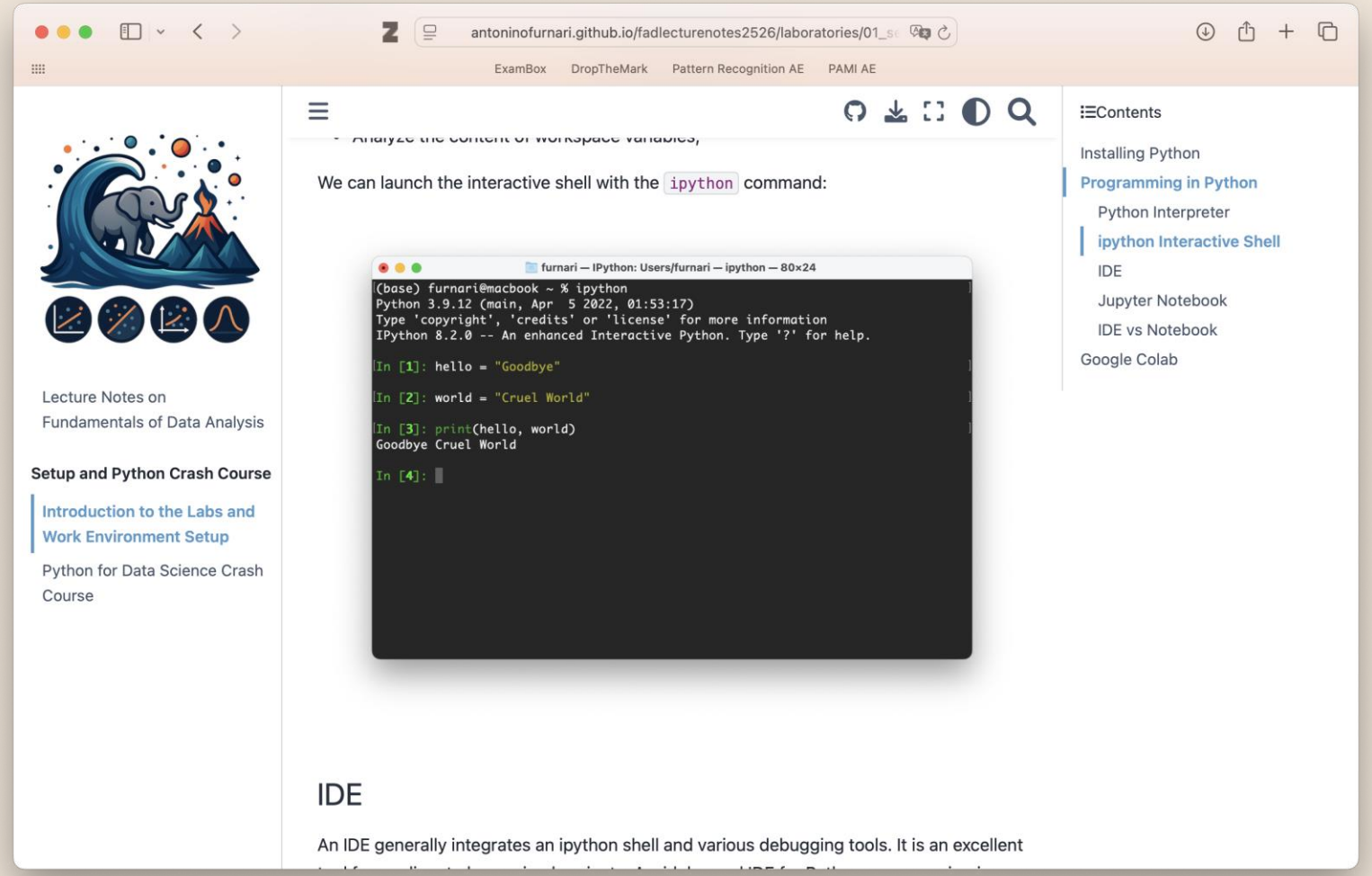
Kaggle



- A global platform for data science and machine learning
- Hosts competitions, datasets, and collaborative projects
- Offers free access to notebooks, GPUs, and tutorials
- Great for learning, experimenting, and showcasing your skills
- Community-driven: connect with experts, share code, and get feedback

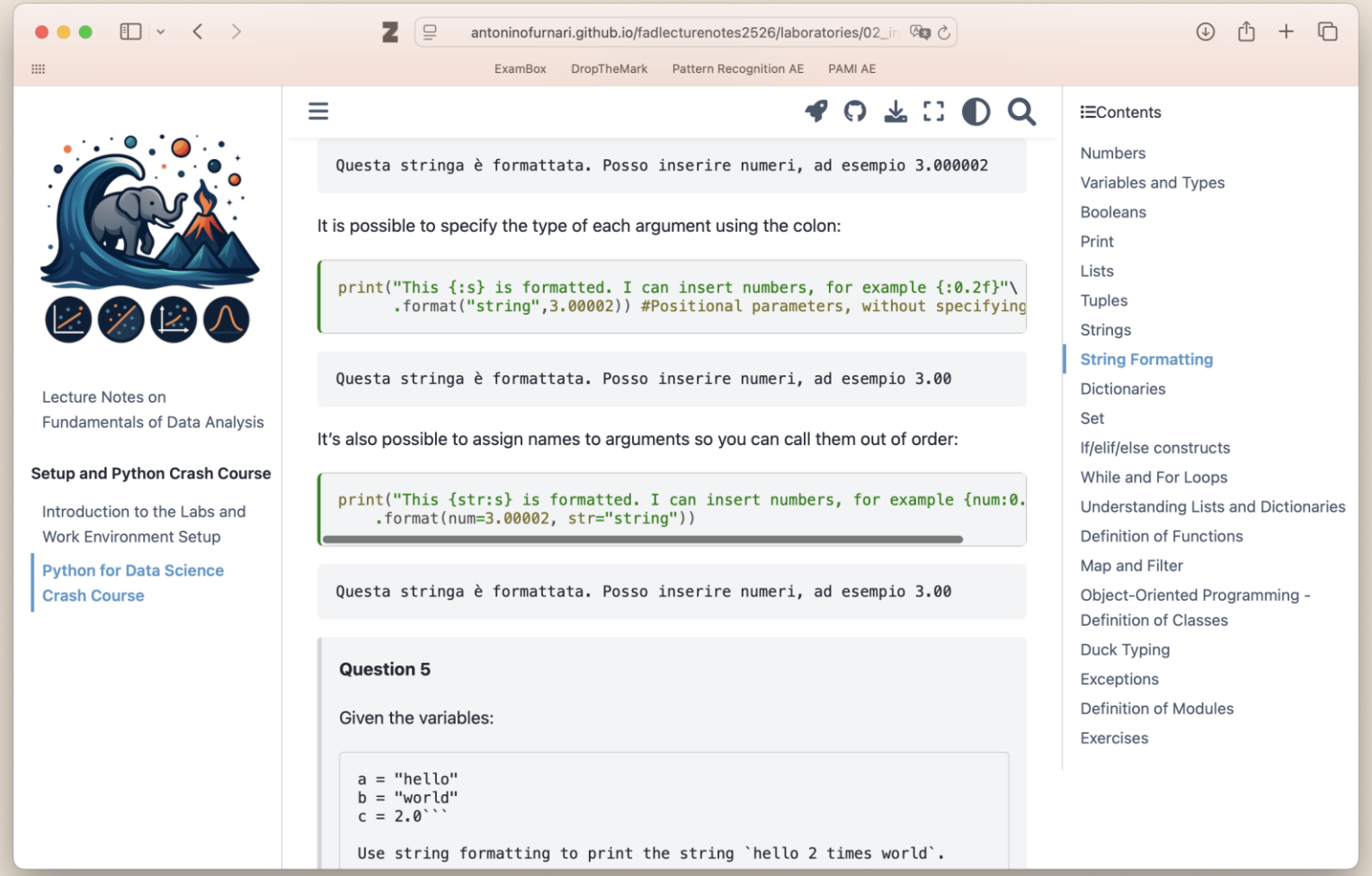
https://www.kaggle.com

Python Setup Guide



https://antoninofurnari.github.io/fadlecturenotes2526/laboratories/01_setup.html

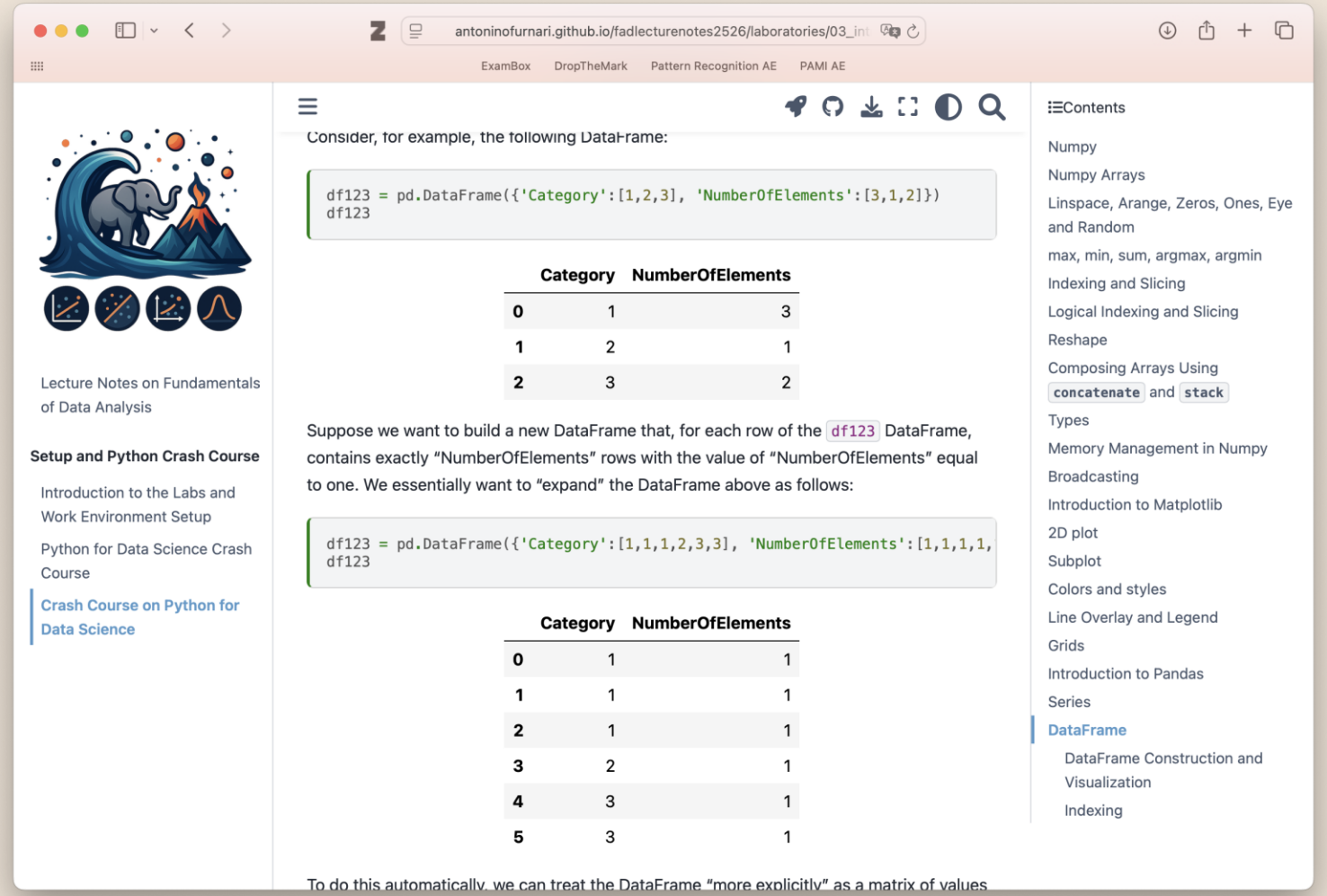
Flipped Classroom: Python Crash Course



- Crash Course on Python;
- Most of you probably don't need it!
- If you know C, you will be get up and running in little time;
- Start looking into it before the next lecture, but we'll recall important concepts as we go.

https://antoninofurnari.github.io/fadlecturenotes2526/laboratories/02_python_crash_course.html

Python For Data Science Crash Course

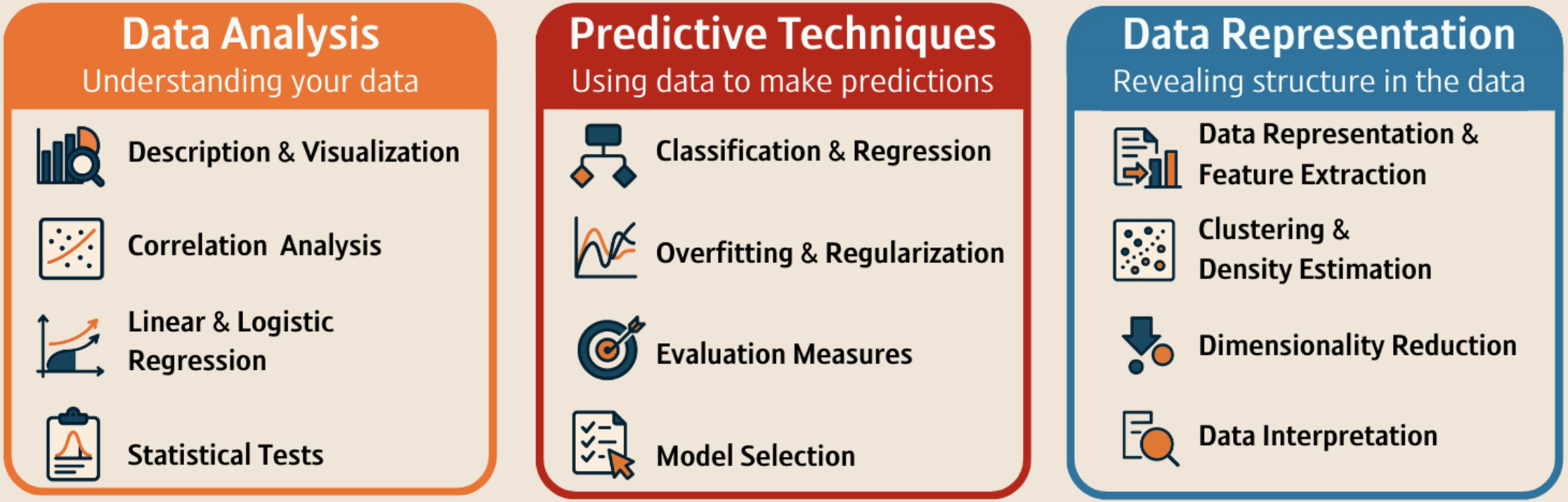


- Crash Course on Python for data science;
- Many of you may need it!
- Also for this, start looking into it before the next lecture, but we'll recall important concepts as we go.

https://antoninofurnari.github.io/fadlecturenotes2526/laboratories/03_python_data_science_crash_course.html

Syllabus

Three Main modules:



https://web.dmi.unict.it/corsi/l-31/insegnamenti?seuid=4EDF6456-342B-4D35-909F-33B4B835AB44

Skills and Career Paths

Skills You Will Learn

Theoretical and practical data analysis skills

- Python for Data Science
- Data Acquisition & Management
- Data Cleaning & Preprocessing
- Exploratory Data Analysis
- Data Visualization
- Predictive Modeling

Career Paths

The course provides the foundations to become

- Data Analyst
- Business Intelligence (BI) Analyst
- Data Scientist
- Research Scientist
- Analytics Consultant
- Machine Learning Engineer

2025/2026

(triennale)

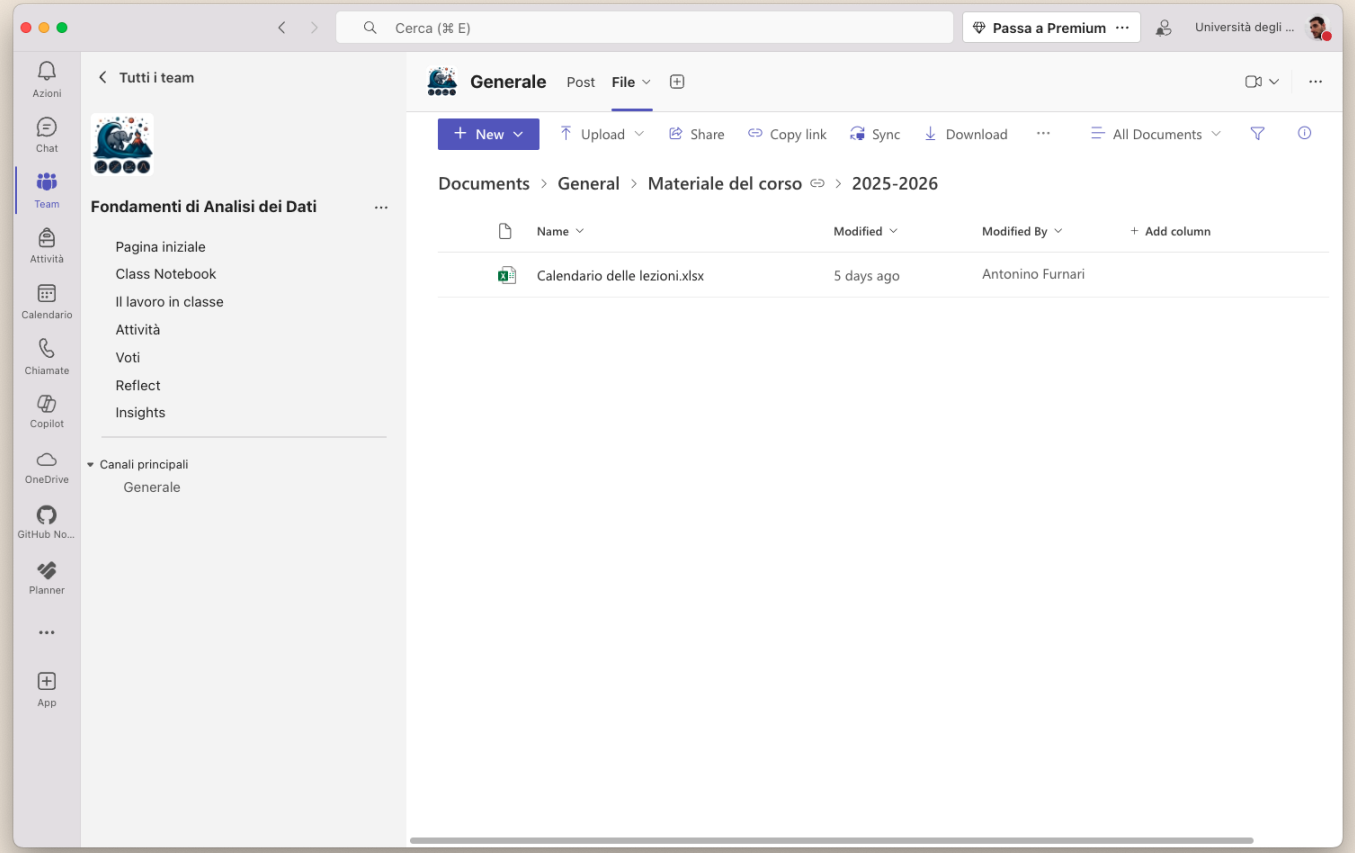
2023-2025

(magistrale)

Updated Syllabus

- Bilanciato il carico per la transizione
- Taglio maggiormente pratico con laboratorio e teoria affrontati in contemporanea
- Prove in itinere e modalità di esame seguono il taglio maggiormente pratico

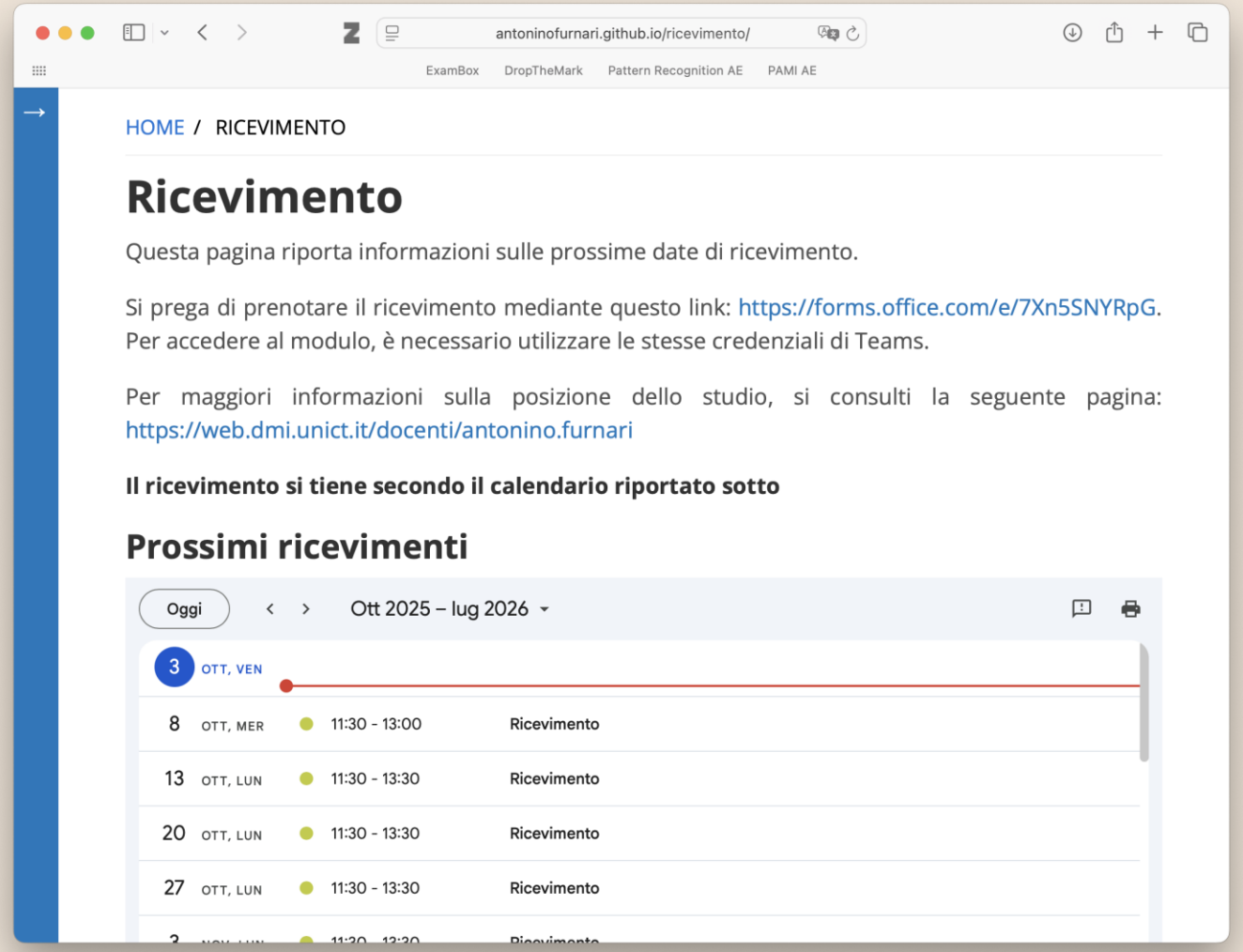
Communication



Announcements and pointers to teaching material will be given through Microsoft Teams.

Team code: **i87g4nb**

Office Hours – Online Calendar



- Generally on Mondays 11.30 – 13.30
- Please book in advance, so I know I should wait for you
- Check the online page for variations: https://antoninofurnari.github.io/ricevimento/

Tutor for the Course

Rosario Forte

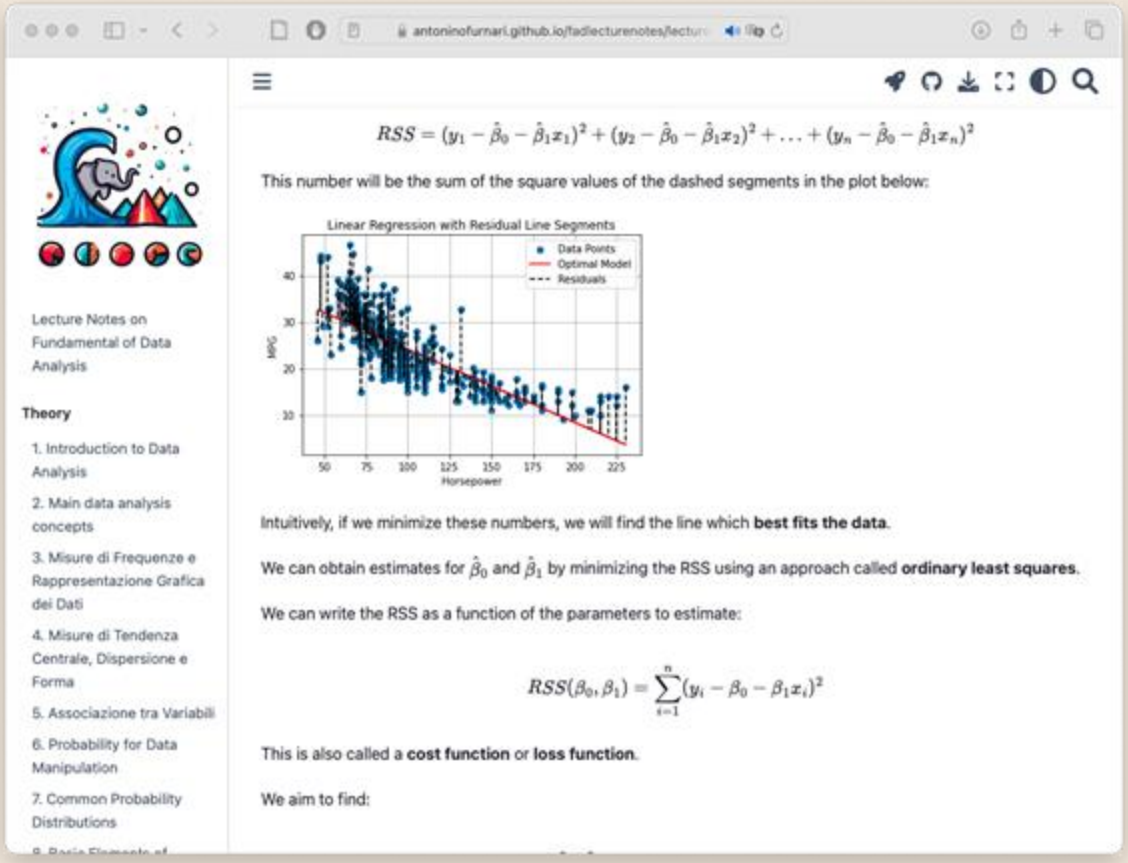
E-mail: rosario.forte@phd.unict.it

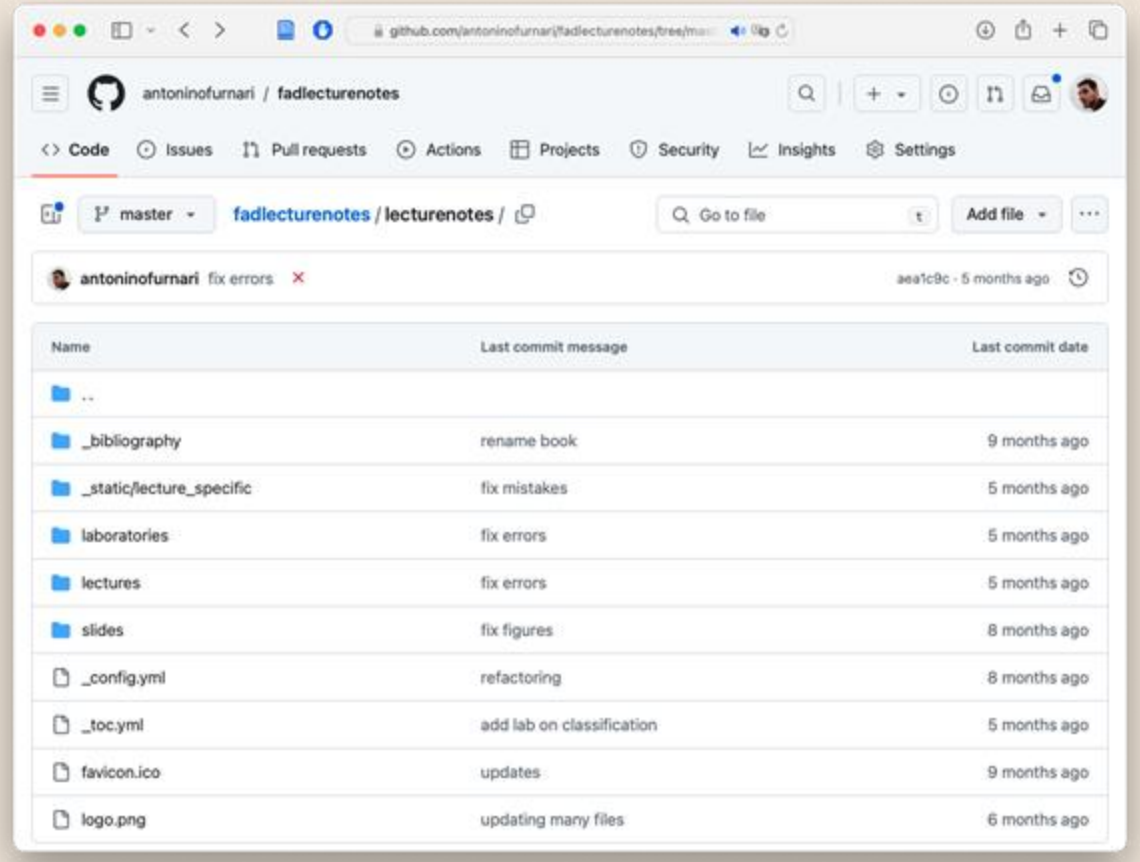
- Assistance in class when assigning and revising projects
- Coaching for projects on office hours (will write on the Team)

E-Mails

- Students can communicate with the teacher by sending an email to antonino.furnari@unict.it
- Some simple rules to follow when sending an email:
  - Use the studium address provided by the University. This is to minimize the likelihood of your email ending up in spam;
  - Always sign at the end of the email, so that I can know who is contacting me;
  - Always identify yourself in relation to the course (e.g. "I am a student of Fundamentals of Data Analysis 2025/2026");
  - Reread the email before sending it.

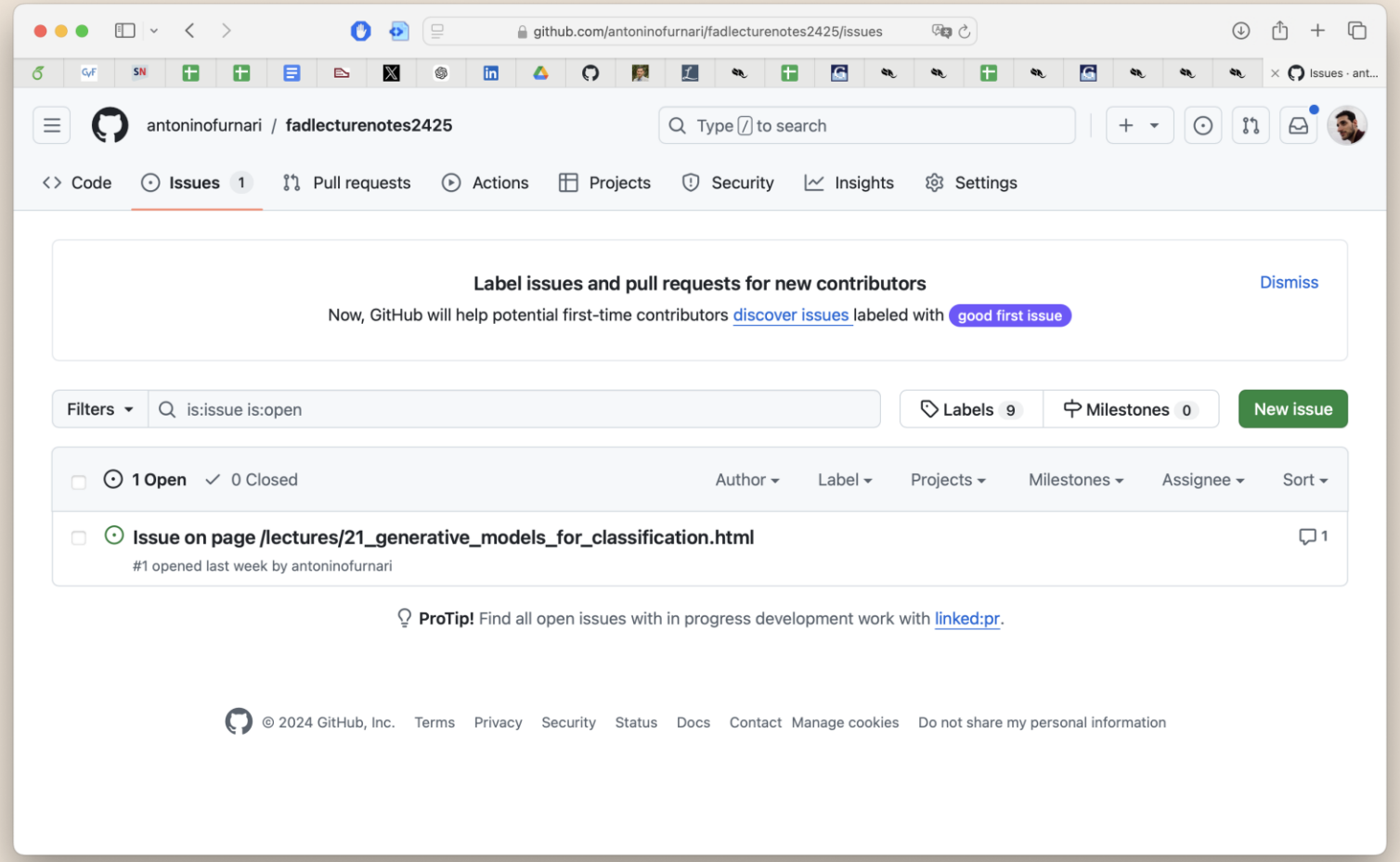
Teaching Material: Notes





https://antoninofurnari.github.io/fadlecturenotes2526/ **OPEN SOURCE!**

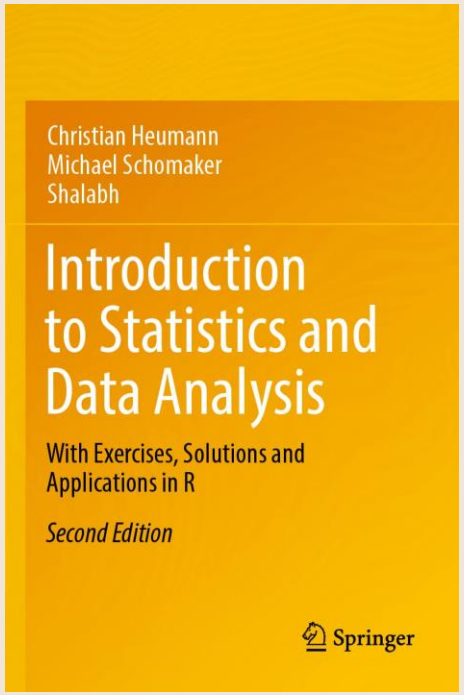
Teaching Material: Welcome to contribute!

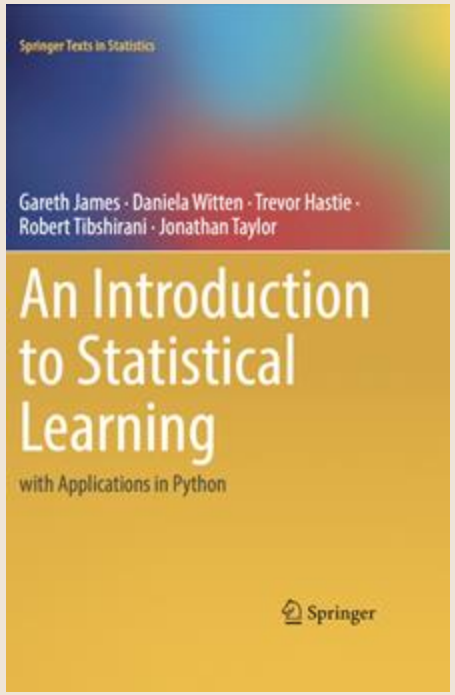


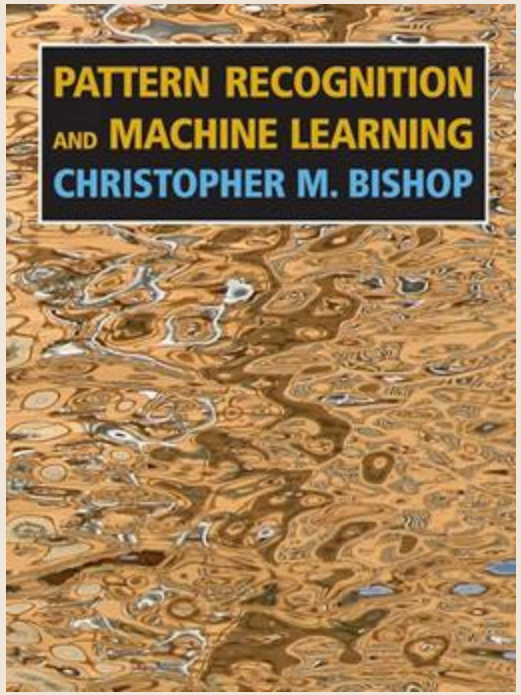
If you want to notify a mistake, you can open an issue (or even better a pull request!)

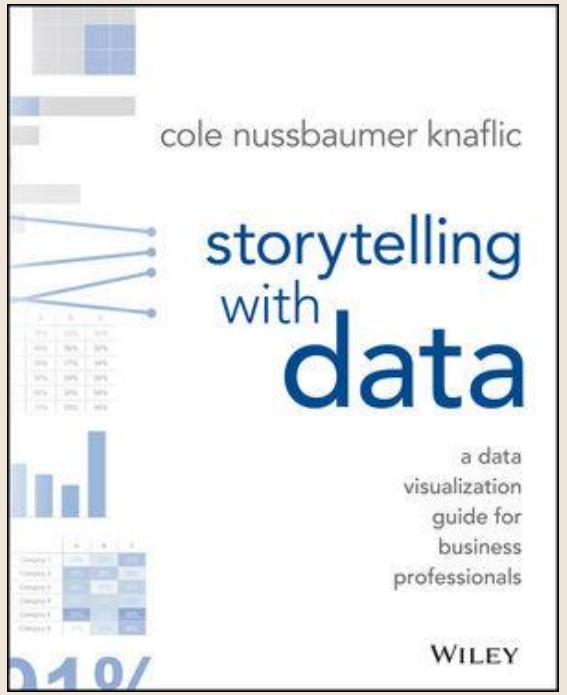
https://antoninofurnari.github.io/fadlecturenotes2526/ OPEN SOURCE!

Teaching Material: Pointers to Book Chapters









- Peck, Roxy, Chris Olsen, and Jay L. Devore. Introduction to statistics and data analysis. Cengage Learning, 2015.
- James, Gareth Gareth Michael. An introduction to statistical learning: with applications in Python, 2023.https://www.statlearning.com
- Bishop, Christopher M. "Machine Learning. Machine learning, 2006. https://www.microsoft.com/en-us/research/publication/pattern-recognition-machine-learning/
- Knaflic, Cole Nussbaumer. *Storytelling with data: A data visualization guide for business professionals*. John Wiley & Sons, 2025.

Esami: Due parti

Teoria (40% del voto finale)

- Un test scritto a scelta multipla per verificare la conoscenza dei concetti di base e della teoria
- Sebbene il corso sia progettato con un orientamento pratico, una buona data science richiede una solida conoscenza degli aspetti metodologici
- È previsto il rilascio di una piattaforma online per prepararsi a questo test
- La valutazione sarà espressa in trentesimi

Pratica (60% del voto finale)

- Un progetto assegnato dal docente, da svolgere in gruppi da 1 a 3 studenti
- Il progetto prevede l'analisi di un dataset, inclusa la progettazione e la verifica di algoritmi predittivi
- Il progetto viene presentato tramite una presentazione PowerPoint
- Il codice viene inviato al docente
- La valutazione è espressa in trentesimi

Il voto finale è una media pesata dei due voti.

Esami: Due Percorsi

Prove in itinere

Solo esame finale

In-Itinere

Teoria (40% del voto finale)

- Tre prove in itinere durante il corso, ciascuna relativa a uno dei tre moduli principali
- Ogni prova contiene 22 domande da completare in 45 minuti
- Ogni prova vale 11 punti
- Il totale è 33 punti, arrotondato a 30 (quindi gli studenti hanno 3 punti extra)

Pratica (60% del voto finale)

- Il progetto viene assegnato il giorno della prima prova in itinere
- Gli studenti lavorano in aula sotto la supervisione del docente e del tutor
- Il lavoro prosegue a casa
- La seconda e la terza parte del progetto vengono assegnate durante la seconda e la terza prova in itinere
- Il progetto viene presentato in un giorno precedente al primo appello d’esame (che verrà comunicato per tempo)

Solo Esame Finale

Teoria (40% del voto finale)

- Una prova scritta con 30 domande da completare in un’ora
- Ogni prova vale un totale di 30 punti

Pratica (60% del voto finale)

- Il progetto è assegnato agli studenti dal docente
- Gli studenti lavorano in autonomia e possono chiedere una revisione al docente
- Il progetto viene presentato e valutato il giorno dell’esame
- Il codice viene inviato al docente
- Il progetto vale 30 punti

Timeline e Dettagli

In itinere:

- È necessario completare teoria e pratica secondo la timeline prevista
- Gli studenti devono prenotarsi per il primo appello disponibile almeno 48 ore prima per la registrazione

Solo esame finale:

- Le due parti possono essere sostenute in **sessioni diverse**, ma dopo la prova scritta l'esame deve essere completato entro dicembre dello stesso anno solare
- Gli studenti devono prenotarsi per l'esame almeno 48 ore prima
- Se l'esame non viene completato entro la data del prossimo appello, verrà registrato come «ritirato» o «assente» a seconda del caso, e sarà necessaria una nuova prenotazione

Schedule of the Lectures (on Teams)

Numero	Giorno	Giorno della settimana	Aula	Orario	Argomenti della lezione
1	06/10/25	Lunedì	24	08:00 - 11:00	Inotroduzione al corso
2	08/10/25	Mercoledì	24	08:00 - 11:00	Introduzione a Python e lo stack per la data science. Concetti principali di data sceince, ottenere i dati
3	13/10/25	Lunedì	24	08:00 - 11:00	Descrivere e visualizzare i dati
4	14/10/25	Martedì	24	14:00 - 17:00	Probabilità per l'analisi dei dati
5	15/10/25	Mercoledì	24	08:00 - 11:00	Associazione tra variabili
6	27/10/25	Lunedì	24	08:00 - 11:00	Distribuzioni di dati
7	28/10/25	Martedì	24	14:00 - 17:00	Inferenza statistica per l'analisi dei dati

Fondamenti di Analisi dei Dati

9 CFU

from data analysis to predictive techniques

Prof. Antonino Furnari (antonino.furnari@unict.it)
Corso di Studi in Informatica
Dip. di Matematica e Informatica
Università di Catania
Università di Catania

Data Analysis
Understanding your data

- Description & Visualization
- Correlation Analysis
- Linear & Logistic Regression
- Statistical Tests

Predictive Techniques
Using data to make predictions

- Classification & Regression
- Overfitting & Regularization
- Evaluation Measures
- Model Selection

Data Representation
Revealing structure in the data

- Data Representation & Feature Extraction
- Clustering & Density Estimation
- Dimensionality Reduction
- Data Interpretation

Skills You Will Learn
Theoretical and practical data analysis skills

- Python for Data Science
- Data Acquisition & Management
- Data Cleaning & Preprocessing
- Exploratory Data Analysis
- Data Visualization
- Predictive Modeling

Career Paths
The course provides the foundations to become

- Data Analyst
- Business Intelligence (BI) Analyst
- Data Scientist
- Research Scientist
- Analytics Consultant
- Machine Learning Engineer

Lectures
Exams

72 hours of frontal lectures covering formal concepts and data analysis examples in Python
Two paths: in itinere tests and project and standalone exam with written text and project

- In itinere tests + Guided group project
- OR
- Written exam + Individual project

Theses & Internships

Info & Notes
open source on github

More info & Notes
open source on GitHub

SCAN ME

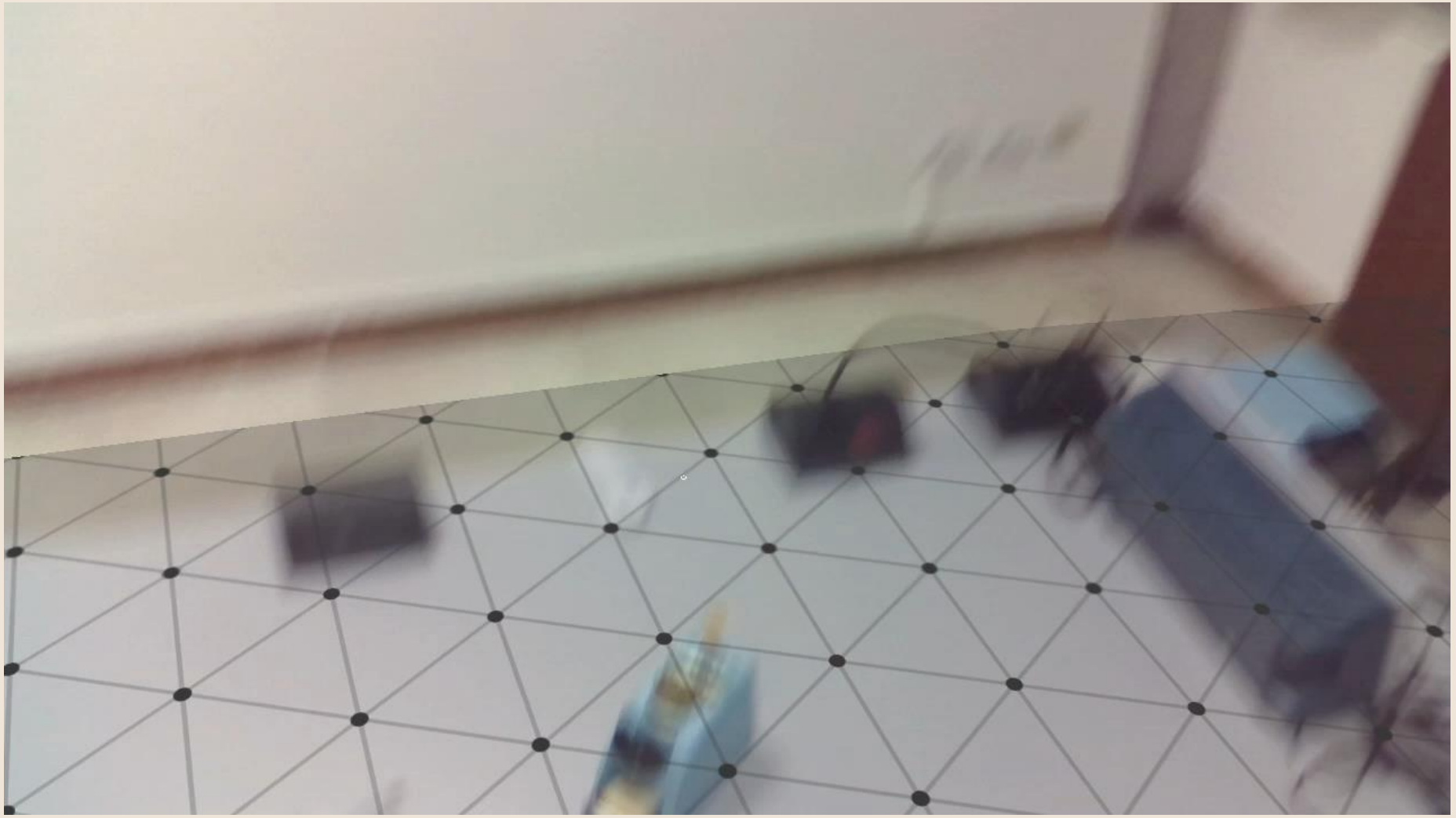
https://antoninofurnari.github.io/fadlecturenotes/

Opportunities for Internships and Theses on the Topics of the Course and Beyond

some examples of past projects in the following

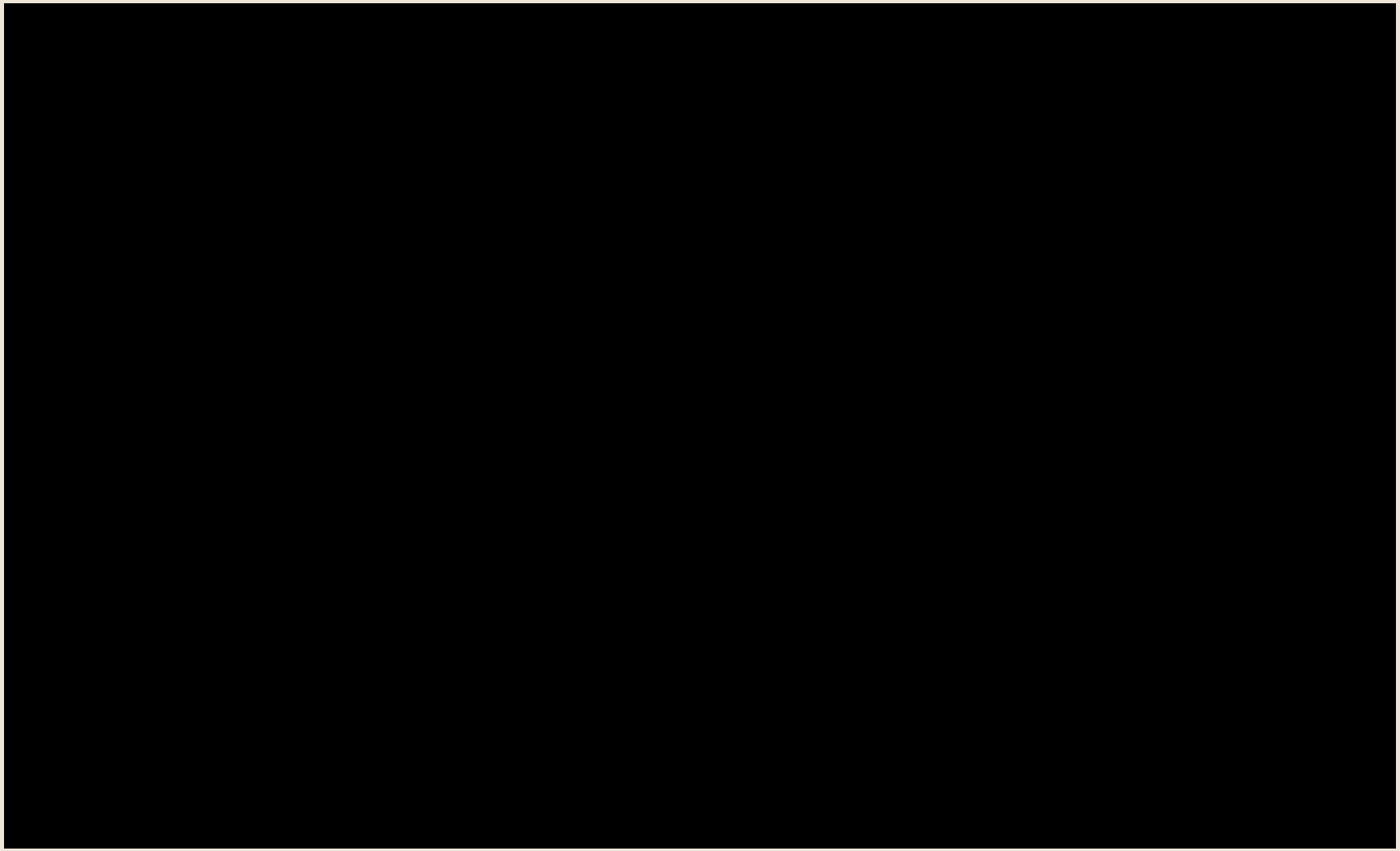
Riconoscimento di interazioni da dispositivi indossabili

VISAPP 2023

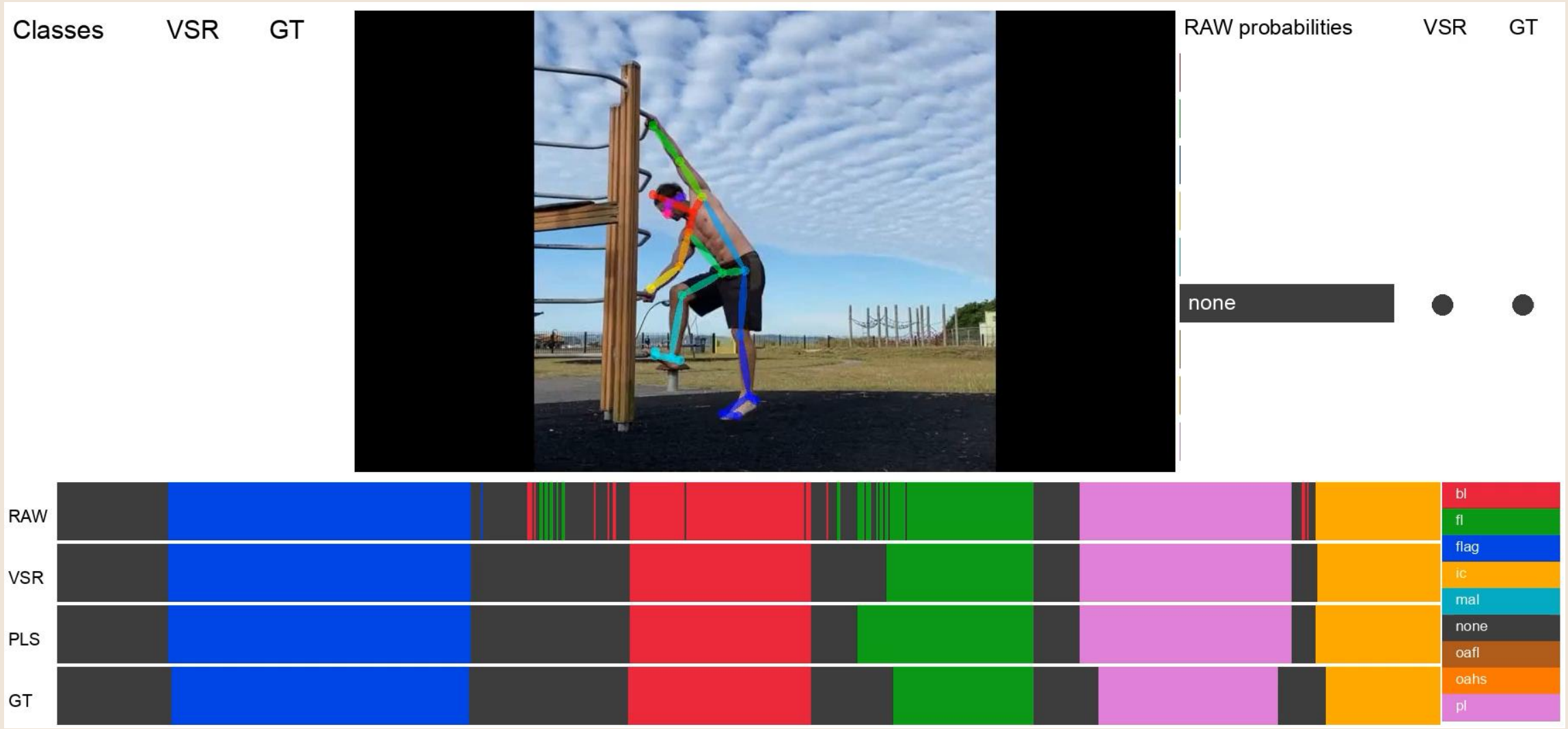


Alessandro Resta, 2021/2022

Chatbots (Multi-Agent RAG System)



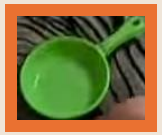
Sports Video Analysis

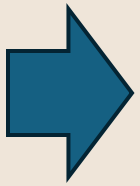


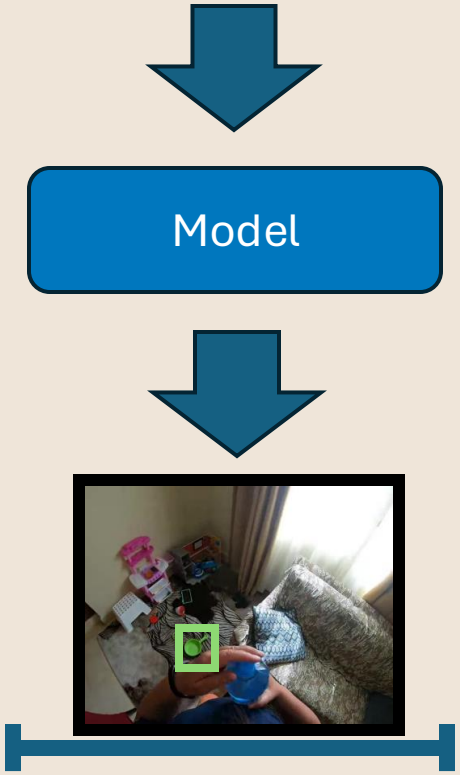
Egocentric Streaming Object Memory

Egocentric Video

Query





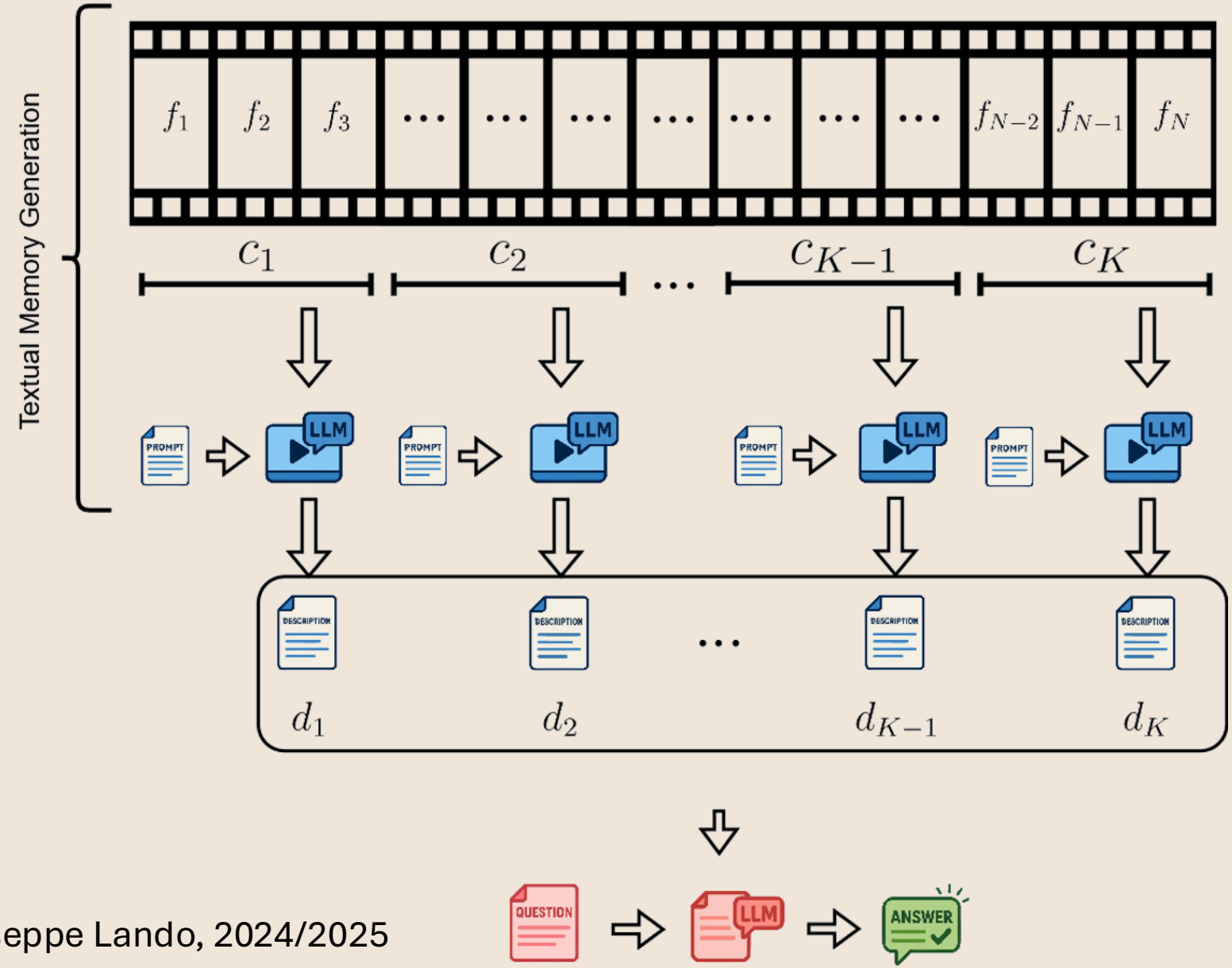


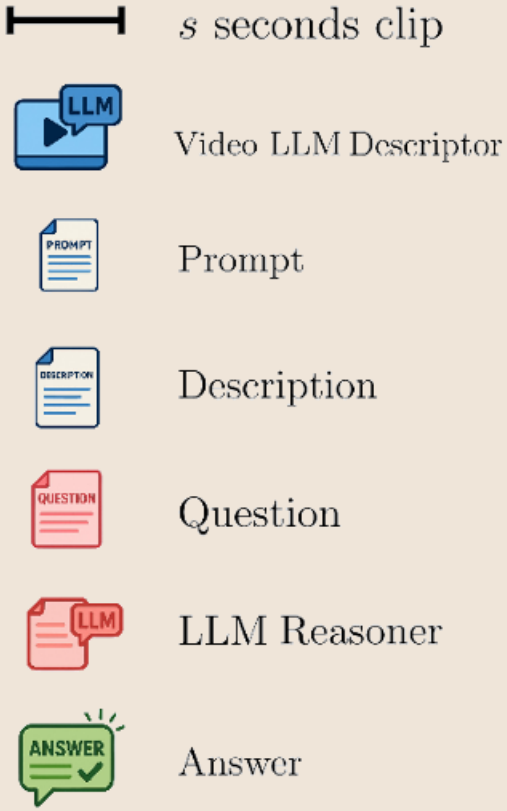
Problems:

- The visual query is known **a priori**.
- Different queries on the same video lead to reprocess the sequence.
- Edge devices cannot keep in memory the full video until the query is issued.

Antonio Finocchiaro, 2024/2025

LLM-Based Online Episodic Memory Retrieval





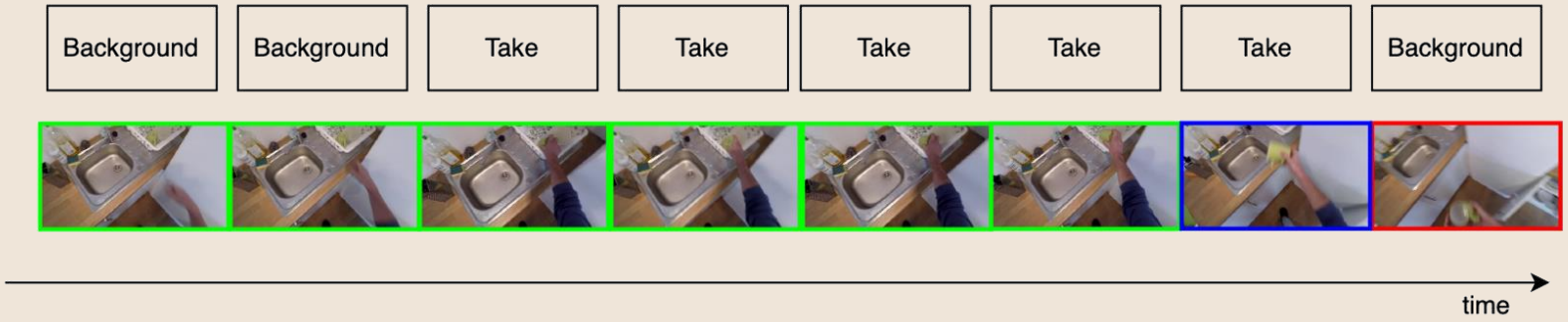
Best student paper award

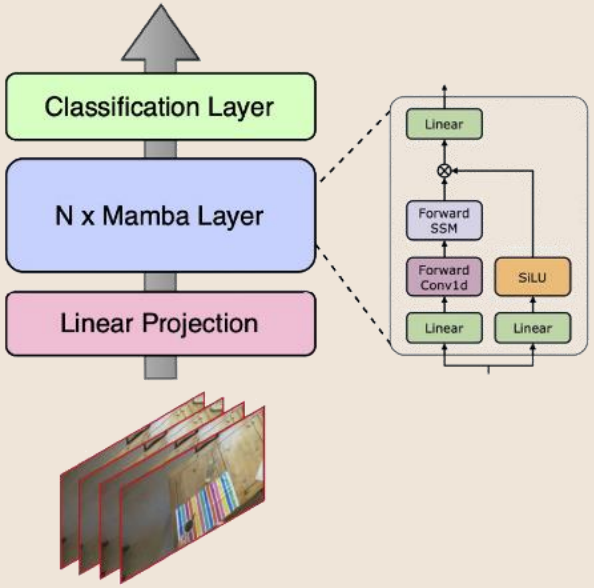
Giuseppe Lando, 2024/2025

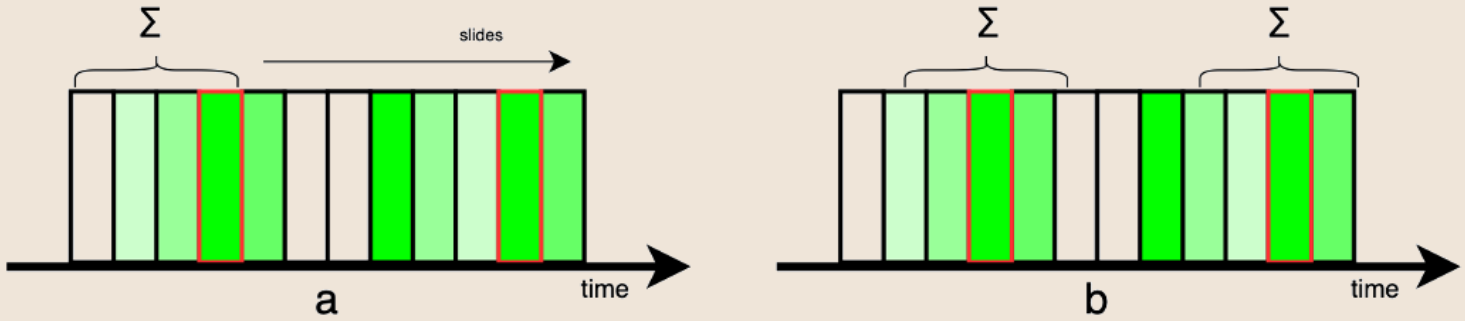
MAMBA-OTR for Take/Release Recognition

Take

Release







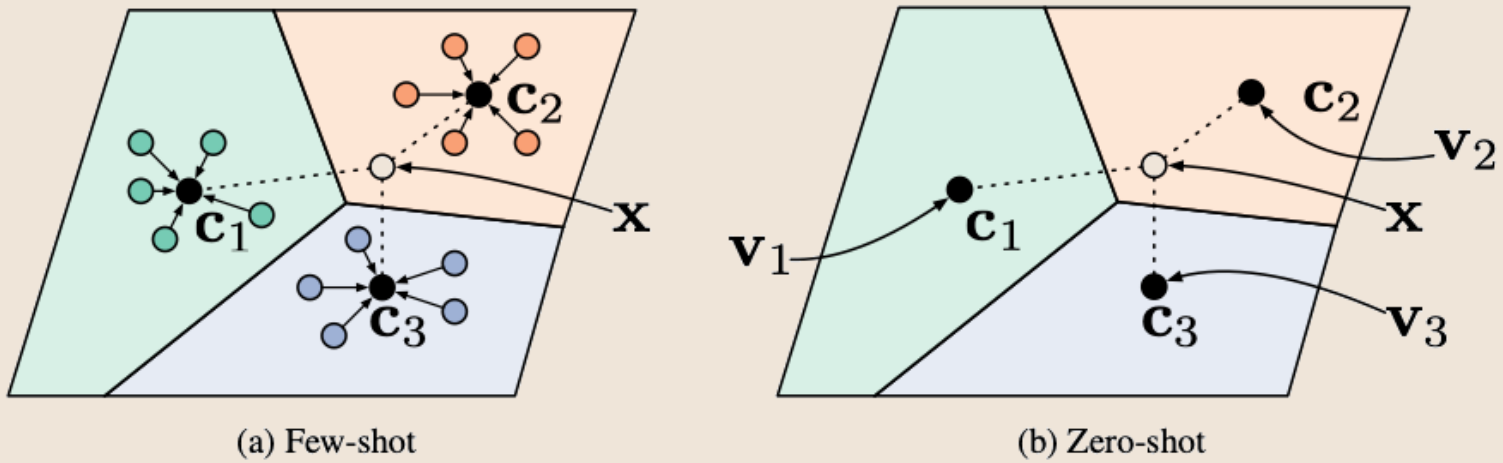
	Time ↓		mp-mAP↑	
Model	**Video**	**Frame**	**Sliding↑**	**Streaming↑**
Mamba-OTR	**0.14s**	**8ns**	**45.48**	43.35
Transformer	**0.14s**	**8ns**	38.96	0.04

Thesis Proposals

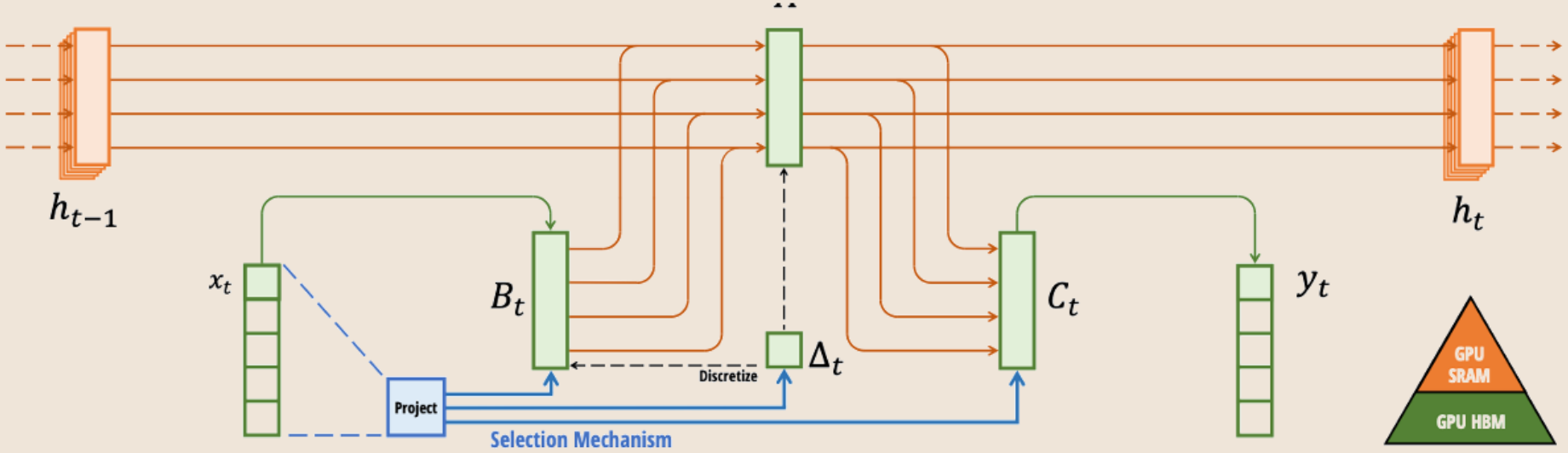
Few-Shot Action Recognition from Wearable Devices

L'obiettivo della tesi è sviluppare modelli di action recognition da wearable devices che possano essere allenati con pochi dati di training.

https://antoninofurnari.github.io/proposte-tesi/



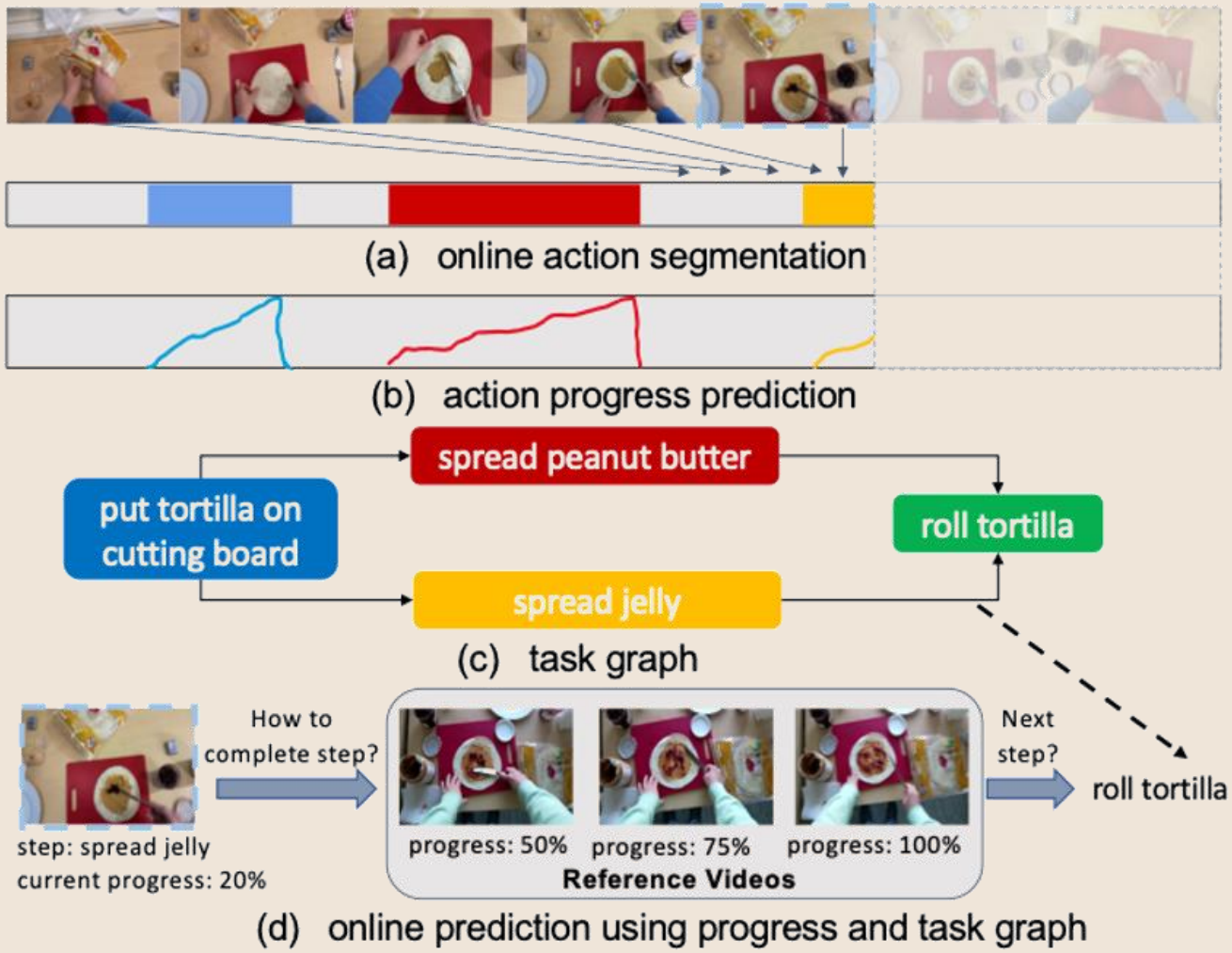
(a) Few-shot (b) Zero-shot



Action Verification from Procedural Video

L'obiettivo della tesi è sviluppare algoritmi capaci di verificare le azioni effettuati dall'utente da video procedurale acquisito da dispositivi indossabili.

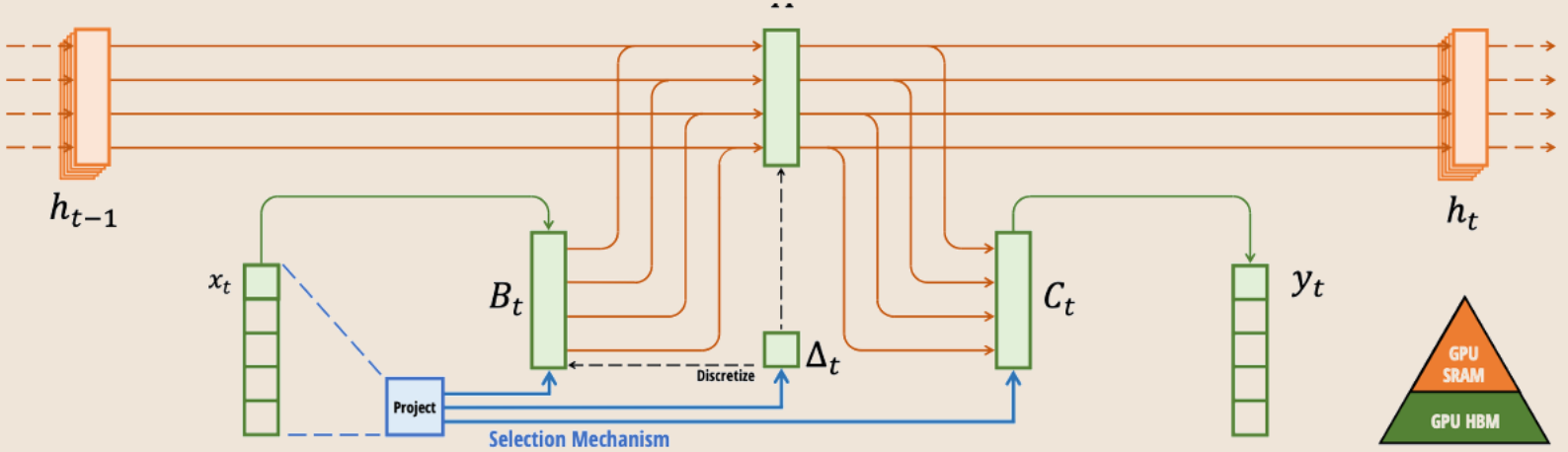
https://antoninofurnari.github.io/proposte-tesi/

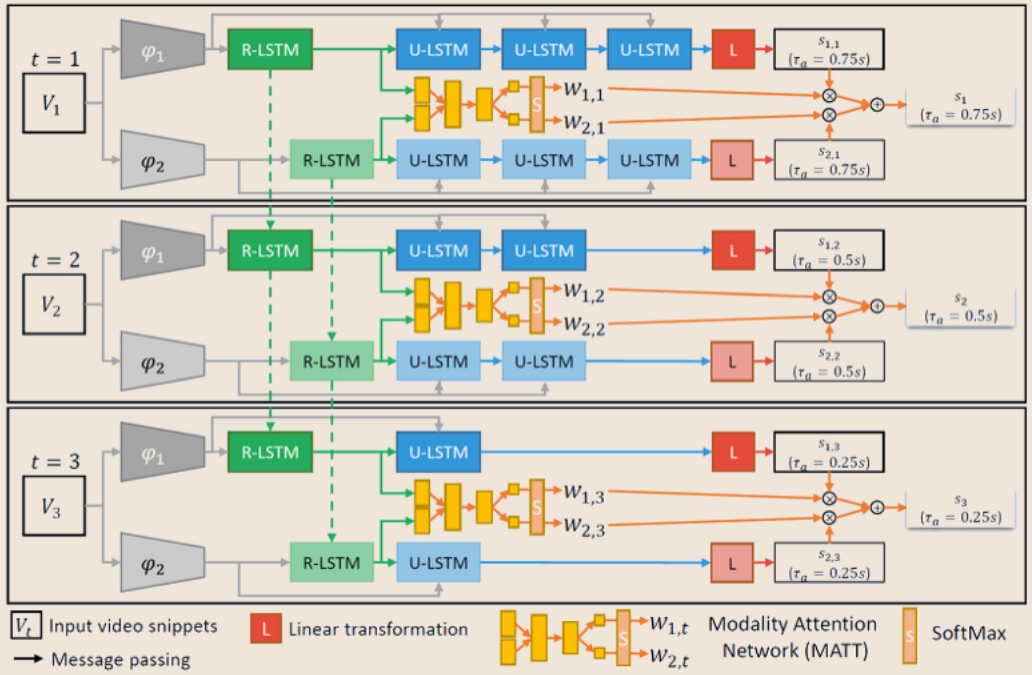


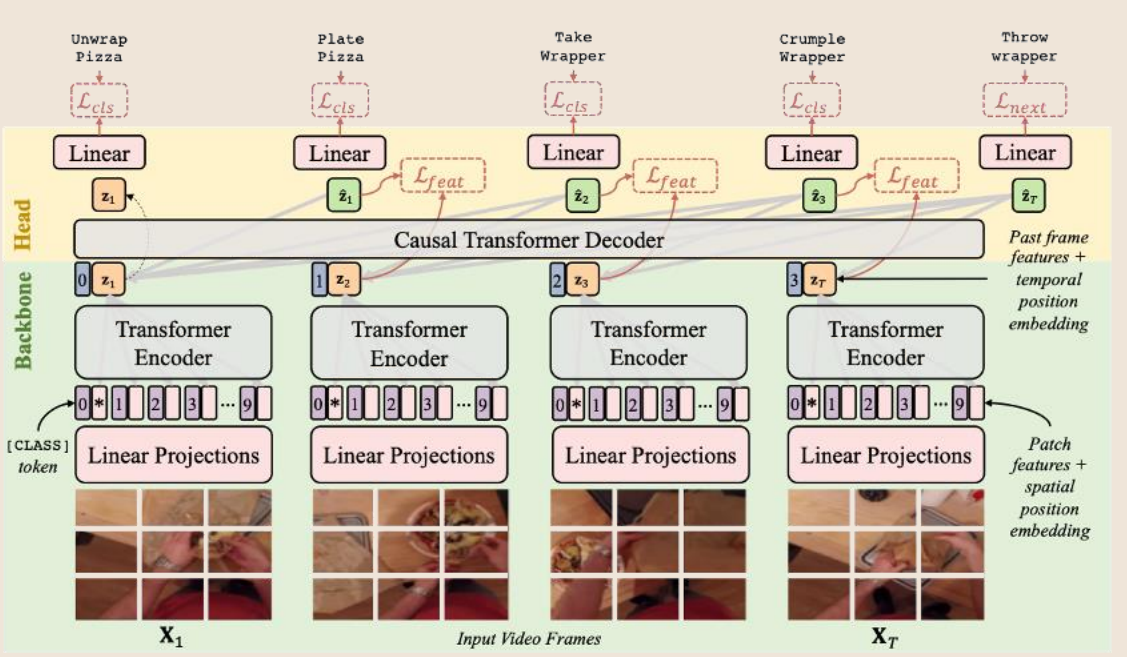
Egocentric Action Anticipation con Architetture Mamba

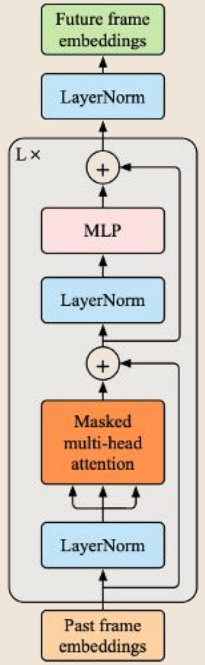
L'obiettivo della tesi è quello di sviluppare modelli di egocentric action anticipation facendo uso di modelli di tipo Mamba e opzionalmente di Transformer.

https://antoninofurnari.github.io/proposte-tesi/





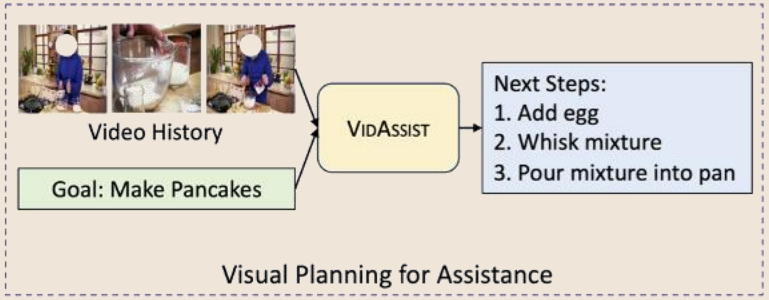


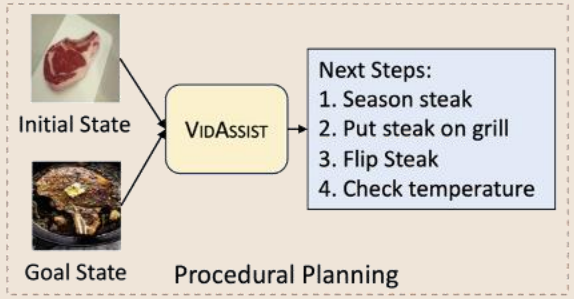


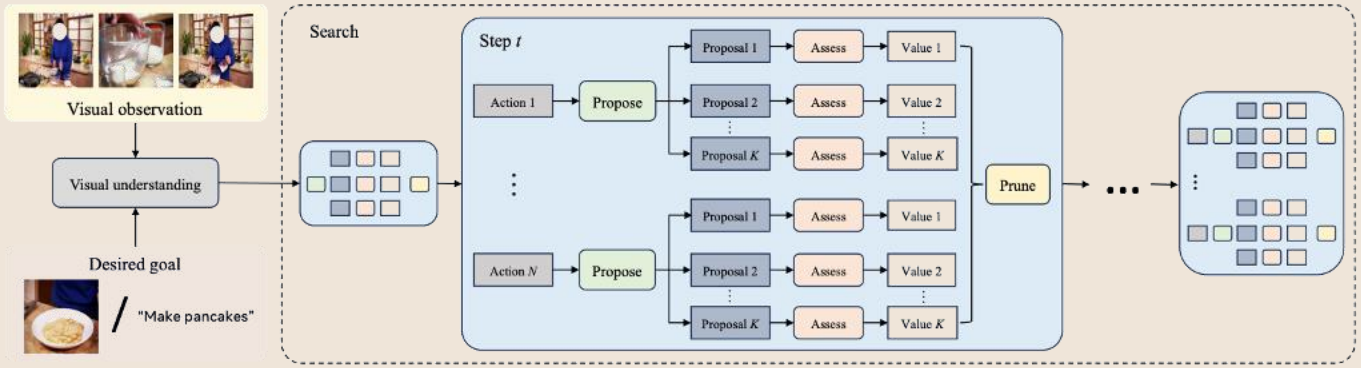
Planning da video mediante rappresentazioni a grafo e Large Language Models

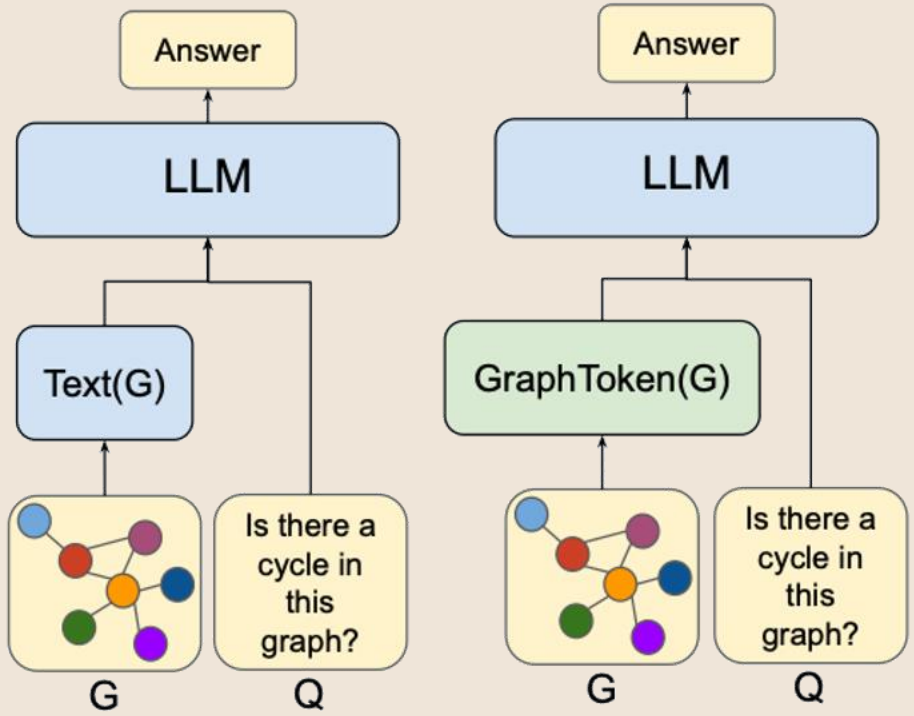
Procedure planning da video mediante rappresentazioni a grafo e Large Language Models

https://antoninofurnari.github.io/proposte-tesi/





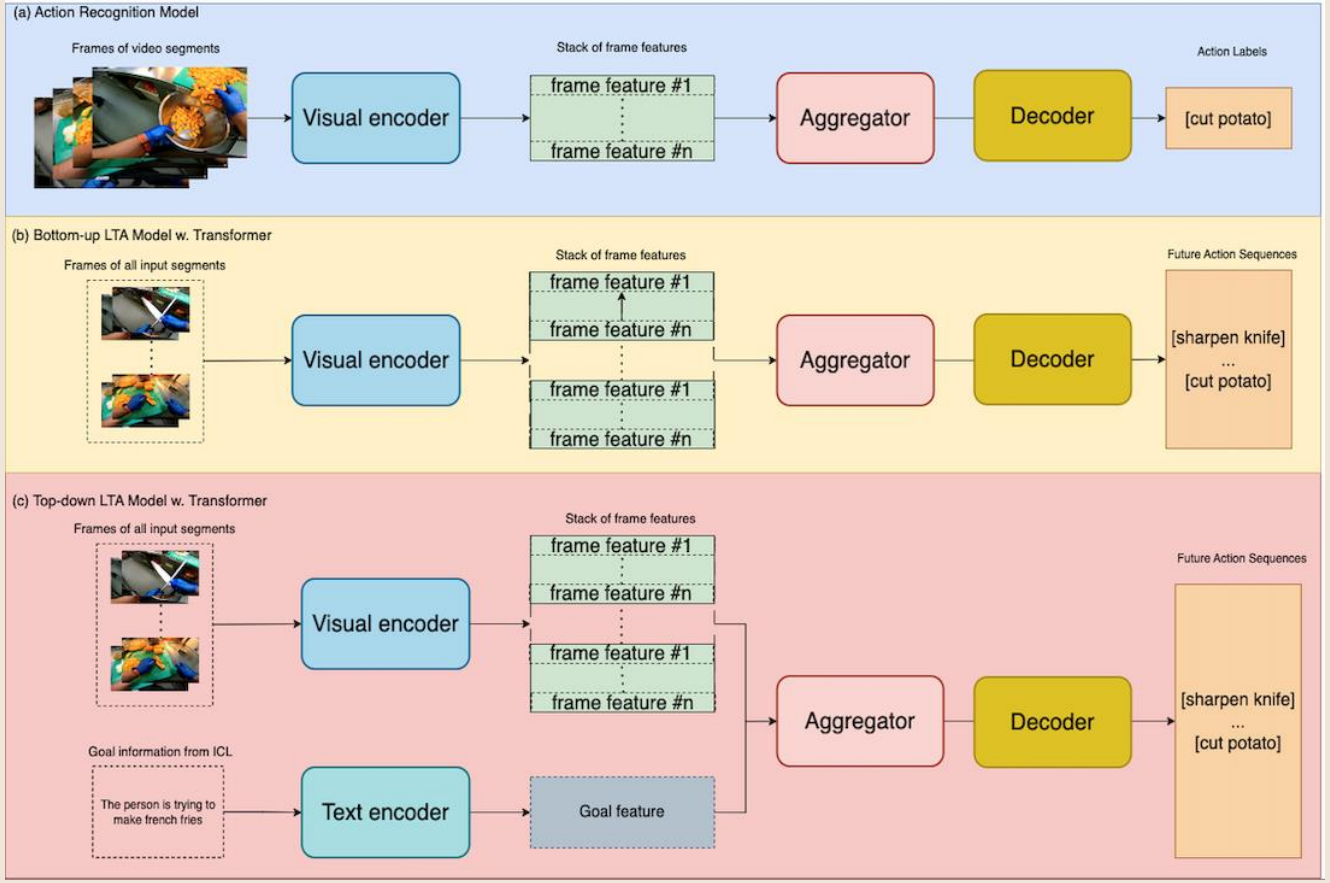


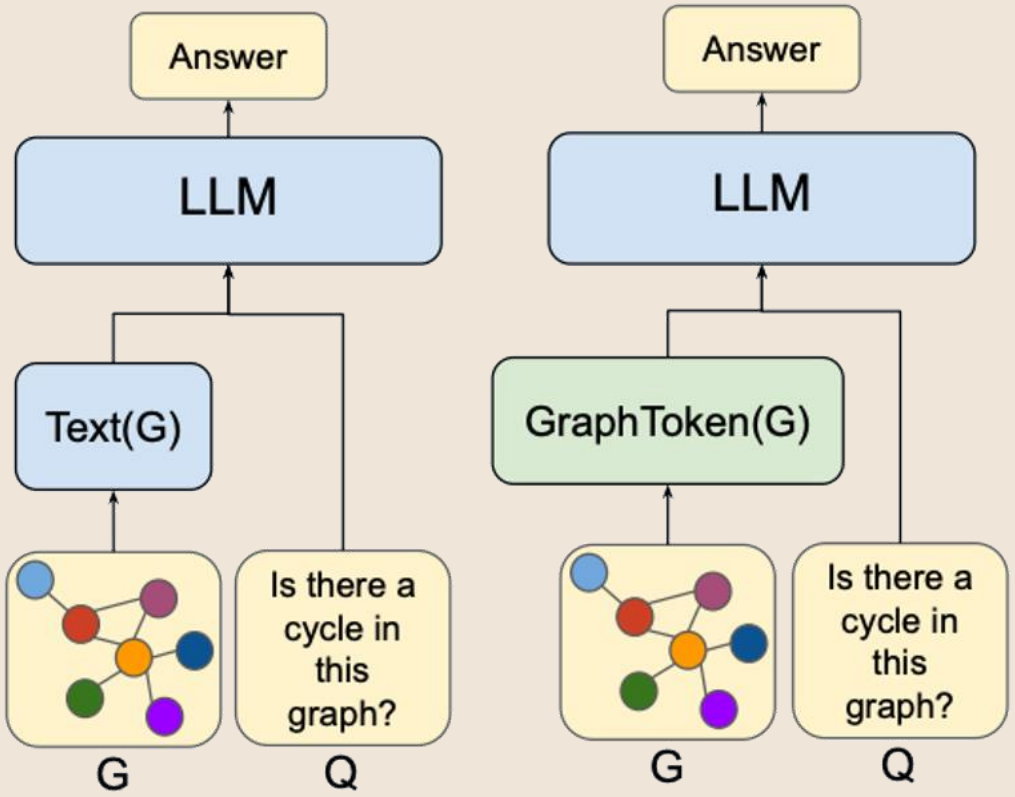


Action anticipation da video mediante rappresentazioni a grafo e Large Language Models

Lo scopo della tesi è quello di integrare la conoscenza fornita da un grafo all'interno di un modello LLM per la predizione di azioni future.

https://antoninofurnari.github.io/proposte-tesi/

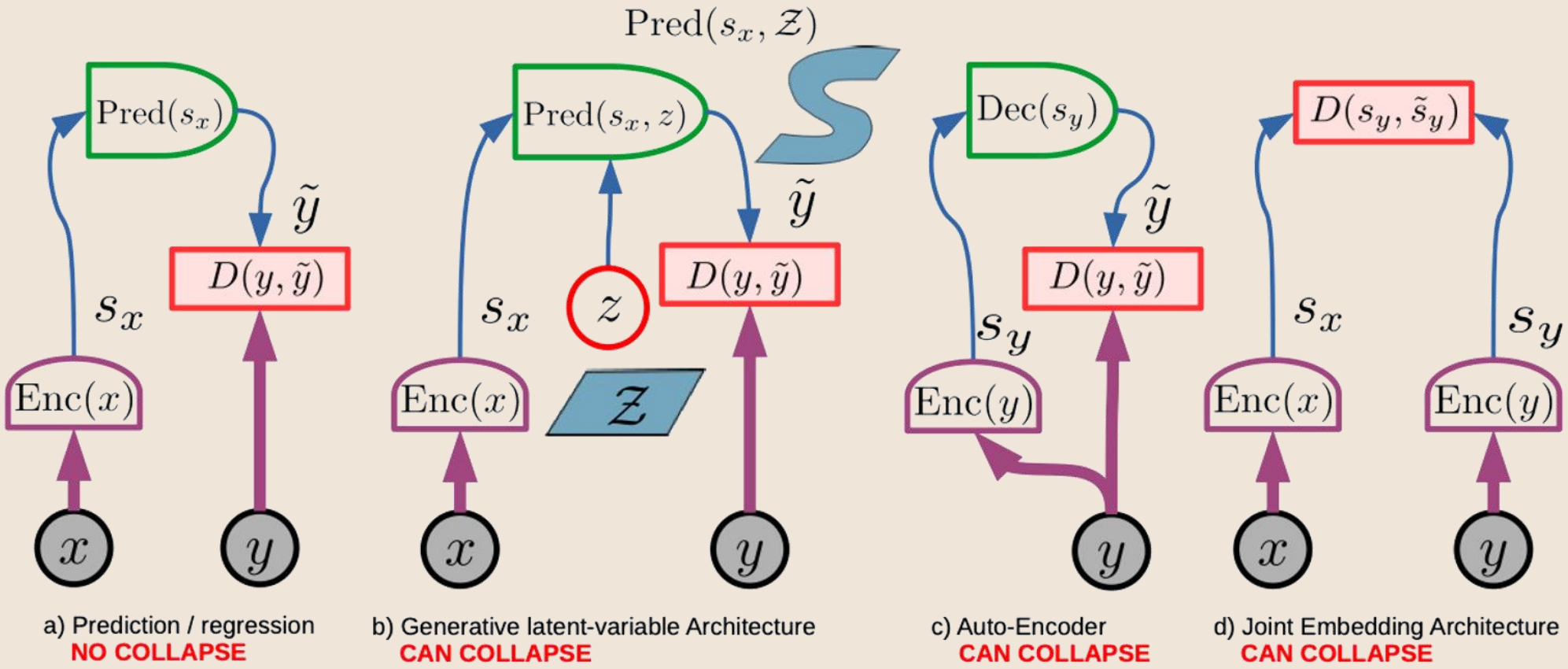




Egocentric Action Anticipation con Architetture JEPA

L'obiettivo della tesi è quello di sviluppare modelli di egocentric action anticipation facendo uso di metodi di representation learning basati sul paradigma JEPA.

https://antoninofurnari.github.io/proposte-tesi/



Fondamenti di Analisi dei Dati

from data analysis to predictive techniques

Prof. Antonino Furnari (antonino.furnari@unict.it)
Corso di Studi in Informatica
Dip. di Matematica e Informatica
Università di Catania

Università di Catania

The End