UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Laboratorio 2 - Big data analytics: modelli di machine learning e GenAI per l’analisi dei dati

2627-2-F8804N028

Learning objectives

Understand the challenges and opportunities of Big Data; Acquire knowledge of European regulations and ready to use tools regarding the collection and use of digital traces; Use machine learning models for data analysis; Integrating Generative Artificial Intelligence into social research.

Contents

Definition and uses of Big Data; GDPR and DSA applied to digital data collection in the European context; Introduction to machine learning trough Weka and Teachable Machine; Applications of large language model - such as GPT, Claude and Mistral - in different social research tasks.

Detailed program

Lesson 1: A definition of Big Data
Main topics:
Definition and characteristics of Big Data (volume, variety, velocity, veracity, value).
Regulations for accessing and using Big Data in the European context: from the General Data Protection Regulation (GDPR) to the Digital Services Act (DSA).
Methods for collecting digital traces: sources and tools.
Activities:
Ready-to-use online tools for Big Data Analytics.
Exercises in collecting digital traces using Zeeschuimer.

Lesson 2: Introduction to Machine Learning
Main topics:
Comparison between Weka Workbench and Teachable Machine.
Advantages and disadvantages of open source tools versus closed commercial products.
Activities:
Exercises in classifying quantitative and qualitative data.

Lesson 3: Introduction to Large Language Models
Main topics:
Comparison between GPT, Claude and Mistral.
Advantages and disadvantages of open source tools versus closed commercial products.
Activities:
Exercises in transcribing interviews with WhisperAI and analyzing texts using Claude.

Lesson 4: Final Project
Main topics:
Review of the topics covered during the lab course.
Implementation of a final project in small groups, hackathon style.
Activities:
Group work on designing and developing the final project and presenting it to the other participants.

Prerequisites

Basic programming concepts.

Teaching methods

The course is designed as a hands-on learning experience based on the 'learning by doing' principle. The teaching method will follow a 'flipped classroom' approach: readings will be carried out independently, while in class, we will discuss key concepts and guided exercises will be carried out.

Assessment methods

The evaluation will be based on active participation during lessons and the quality of the final project.

Textbooks and Reading Materials

Handout provided by the teacher at the beginning of the course.

Sustainable Development Goals

QUALITY EDUCATION