

AI and the paleography of Greek papyri: presentation of the new EGRAPSA project

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Abstract

In the realm of historical artifacts, ancient papyri serve as invaluable windows into the past, offering insights into the cultural, social, and intellectual landscapes of bygone eras. Approximately 80,000 ancient Greek papyri provide a comprehensive yet dispersed source of information, posing challenges in understanding their nature and content. Palaeography, the study of handwritings, remains an essential tool for identifying authors, locations, and timelines but is hindered by a lack of consensus among experts.

Advancements in Computer Science and Artificial Intelligence (AI) present an opportunity to revolutionize the field of palaeography. The new project “EGRAPSA: Retracing the evolutions of handwritings in Graeco-Roman Egypt thanks to digital palaeography” seeks to establish a novel theoretical framework for the palaeography of Greek papyri. Utilizing robust evidence, the project aims to trace the evolutionary trajectories of handwritings, creating a model capable of organizing the extensive papyrological documentation into a cohesive panorama. This not only enhances the reliability of dating and writer identifications based on palaeographical grounds but also addresses the complexities inherent in the multitude of scripts.

Deep Learning (DL) methodologies can tackle the intricate challenges posed by analyzing historical manuscripts. With a primary focus on handwritten texts inscribed on papyri, the project aims to develop a robust framework for measuring the similarity between distinct instances of ancient Greek script. Neural networks are trained using both images and textual information to discern nuanced patterns and relationships within images of papyri. DL models not only learn the intrinsic features of ancient Greek handwriting but also generalize its understanding to effectively compare and quantify the similarity between different instances.

One of the key challenges in studying ancient manuscripts lies in accurately determining their age, as historical records may lack precise dating or contain conflicting information. The availability of a large dataset with precisely dated papyri images could open new avenues for addressing this challenge through the application of machine learning techniques.

One of the main goals of the project is to introduce a groundbreaking dataset featuring images of ancient Greek papyri, each meticulously dated, providing a rich resource for historical research. The dataset not only presents an extensive collection of digitized papyri but also showcases the potential of artificial intelligence in accurately dating these historical documents. Preliminary experiments utilizing convolutional neural networks (CNNs) have shown promising results in training AI models to predict the chronological placement of these documents.

The implications of successfully training AI models to date ancient Greek papyri and measure similarity between manuscript writings extend beyond the realm of historical research. Such models could assist scholars in validating or refining existing chronological timelines, shedding light on historical events, linguistic evolution, and cultural shifts. Additionally, the dataset's availability could facilitate interdisciplinary collaborations, encouraging researchers from diverse fields to explore the rich historical tapestry woven into these ancient texts.



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Profile

Artificial Intelligence (AI) researcher with a PhD in Information Engineering and experience in developing and implementing innovative algorithms for handwriting recognition for historical documents. Demonstrated expertise in machine learning, computer vision, and document processing. Skilled in leading research teams, publishing in academic journals and attending international conferences, and collaborating with industry partners. Strong communication and problem-solving skills with a proven track record of delivering high-quality research outputs.

Personal Info

Date of Birth: **12/04/1989**
Place of Birth: **Salerno (IT)**
Nationality: **Italian**

Employment History



PostDoc

Project "EGRAPSA: Retracing the evolutions of handwritings in Greco-Roman Egypt thanks to digital palaeography"
Department of Ancient Civilizations of the University of Basel



Research Grants

DIEM Department, University of Salerno, Fisciano Italy.

"Few-Shot learning techniques for the elaboration of handwritten documents of historical interest"

"Support tools for the transcription of handwritten documents of historical-cultural interest"

Education



Ph.D. in Information Engineering

DIEM Department, University of Salerno, Fisciano Italy.

Specific field of the degree course: Ingegneria dell'Informazione ING-INF/05

Thesis Title: *N-gram Retrieval for Word Spotting in Historical Handwritten Collections*



Master's Degree in Computer Engineering

DIEM Department, University of Salerno, Fisciano Italy.

Thesis Title: Early Diagnosis for Neurodegenerative diseases from Handwriting Analysis: AI-based Approach



Bachelor's Degree in Computer Engineering

DIEM Department, University of Salerno, Fisciano Italy.

Thesis Title: Un Linguaggio per la Descrizione di Modelli Fiscali (A Language for the Description of Tax Models)

Studies and Experiences Abroad



Abroad Research Period

Computer Vision Center (CVC) - Universidad Autònoma de Barcelona, Spain

Basel, 05.02.2024