Christina Saravanos

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Personal Information

Swiss Resident (B permit), EU Citizen, US Citizen

Scientific Interests

Bridging research and production in Generative and Agentic AI

• Data Science • Machine Learning • Agentic AI • Natural Language Processing • Signal Processing

Skills

Programming Languages: Python, MATLAB ●●●●● Java, shell ●●●●●
Python Packages: langchain, tensorflow, pytorch, pandas, spaCy, nltk, flask, librosa, opencv, skimage
Version Control: git **NoSQL Databases:** Mongo, Cassandra **Cloud Computing:** Storm, Spark

Experience

Nestlé *February 2024 - Present*
Research Associate, Data Scientist & AI Engineer *Lausanne, Switzerland*

– **AI-Enabled Scientific Intelligence** (Main project)
Brief Description: Development of a platform that comprises an **AI-enabled chatbot**, a **search engine** and an **automated literature review process** via Generative and Agentic AI to facilitate researchers.
Key Responsibilities:
∗ Design and develop the AI stream of the project.
∗ Present use cases, AI components, findings and results to candidate user teams and within Nestlé.
∗ Collaborate with developers, data engineers and data scientists based in Switzerland, Portugal and India.
∗ Continuously adapt the tasks of the AI stream in an agile environment.
Key Contributions:
∗ Implementation and optimization of the AI components in Python used in various use cases during the different stages of the project's life-cycle.
∗ Conducted research and evaluated the effectiveness of various state-of-the-art models and technologies during the different stages of the project's life-cycle.
Outcomes:
∗ The Proof-of-Concept phase of the project was successfully completed and down-selected to move on to subsequent phases (Minimal Viable Product, Prototype, Scaling-Up and Production).
∗ The platform successfully completed the first 6 phases of its life-cycle and is now in Production phase.
∗ The platform is already being successfully used by hundreds of researchers and scientists based in Switzerland within Nestlé.

– **Automation of Writing The Discoveries of Ongoing and Future Projects.** (Additional project)
Brief Description: Development of a pipeline in Python to facilitate Project Managers by automating the process of writing the discoveries of projects via Generative AI.

– **Cell Colony Counting in Microscopy Images** (Additional project)
Brief Description: Development of a pipeline in Python that accurately counts cell colonies from microscopy images via image processing and computer vision techniques.

Prisma Electronics S.A. *February 2023 - September 2023*
Data Scientist *Athens, Greece*

- **Forecasting A Ship's State Based On Digital Twins and Deep Learning Frameworks** (Main Project)
  Brief Description: Development of a pipeline used to **forecast** the future **forecast the future state of ships** based on **time-series** obtained from **Digital Twins** and Recurrent Neural Networks (RNNs).
- **Estimating Air Pollutant Concentration In Urban Areas** (Additional Project)
  Brief Description: Development of a pipeline used to **estimate the concentration of air pollutants** in Greek cities using data obtained from sensors before and during COVID-19 and regression techniques.

Other Responsibilities:
- Contributed to writing proposals for soliciting funding by the European Union.
- Wrote articles and technical reports.

IBM Research *September 2021 - February 2022*
Research Intern, Scalable Knowledge Ingestion *Ruschlikon, Zurich, Switzerland*

- **Python Packages For Entity Recognition And Relationship Extraction From Entity Reports Via Natural Language Processing (NLP)** (Project)
  Brief Description: Development of Python packages for **Named Entity Recognition** and **Relationship Extraction annotators** via NLP to find and extract entities and their respective relationship from PDF documents concerning enterprises.
  Key Contributions:
  * Developed effective Named Entity Recognition and Relationship Extraction annotators in Python to identify and extract entities and their respective relationships from text and tables of PDF documents.
  * Developed several work flows to populate a Knowledge graph using the entities and the relationships obtained by using the annotators.

  Outcomes:
  * The annotators were integrated into IBM's DeepSearch (released in 2022) and by IBM and its clients.
  * The project was presented at the AMLP EPFL 2022 workshop.

SwissRe *November 2020 - May 2021*
Actuarial Control and Claims Reserving Intern *Zurich, Switzerland*

- **Hierarchical Compartmental Reserving** (Project)
  Brief Description: Development of a pipepline to **predict future cumulative and incremental outstanding and incurred losses** via compartmental reserving approaches and forecasting algorithms.
  Key Contribution:
  * Developed in R and evaluated forecasting techniques used for actuarial data e.g., one- and two-stage compartmental reserving models to predict the incurred and outstanding losses using data obtained from market cycles from 2000 to 2019.

The Goodyear Tire & Rubber Company *March 2020 - August 2020*
Data Science Intern *Colmar Berg, Luxembourg*

- **Treadwear Tire Prediction Via Telematic Data And Machine Learning Techniques** (Project)
  Brief Description: Development of a pipeline used to **predict tire quality and treadwear and identify vehicles** using data extracted from Controller-Area-Network (CAN) signals and Deep Learning (DL) frameworks.
  Key Contribution:
  * Developed a pipeline in Python that calibrates sensors placed in fleets of cars, predicts future metrics and tire treadwear, identify vehicles using data from CAN signals and RNNs and shows the results in a webpage that ran locally built via Flask.

  Outcome:

* The project was integrated into Goodyear's main infrastructure of processing CAN signals and forecasting tire quality and treadwear.

IBM *May 2019- - July 2019*
Data Science Intern, Defense, NATO and Intelligence team , IBM Benelux *Brussels, Belgium*

– **CV Verification and Augmentation** (Project)
Brief Description: Development of a pipeline for **CV verification** by scraping candidates' CV from LinkedIn and verifying them based on candidates' social media profile pages via NLP and Machine Learning (ML) techniques
Key Contribution:
* Development of a pipeline in Python that scrapes the CVs potential candidates from LinkedIn and verifies them against the content of their social media pages which were extracted by using several crawlers; the results were displayed in a webpages created via Flask.
Outcome:
* The project was integrated into IBM's overall Curriculum Vitae (CV) Verification platform

Education

University of Patras, *2020*
M.Sc. in Signal Processing and Communication Systems *Patras, Greece*
GPA: 8.4/10 - magna cum laude
Thesis: *"Audio-Fingerprinting Via the K-SVD Algorithm"*, Advisor: Prof. K. Berberidis
Key Developments:
– Proposed, designed, developed and evaluated a novel, robust audio-fingerprinting scheme utilizing sparse coding and dictionary learning techniques.
– The proposed audio-fingerprinting scheme proved to be more effective and robust than audio-fingerprinting paradigms that rely on conventional signal processing techniques (e.g., the algorithm applied by Shazam).
– The code was implemented in MATLAB.
– Presented in the 20th IEEE International Workshop on Multimedia Signal Processing 2020.

University of Patras, *2015*
Engineering Diploma (Integrated M.Sc.-B.Sc.) in Computer Engineering *Patras, Greece*
Minor: Software Engineering, Data Science
GPA: 6.81/10 - suma cum laude
Thesis: *"Mining Knowledge From Social Networks"*, Advisor: Assoc. Prof. C. Makris
Key Developments:
– Designed, developed and evaluated a pipeline to find X (Twitter)'s most influential users in real time by combining several clustering and voting algorithms which were modified to run for streaming data.
– The code was implemented in JAVA, and ran on a Storm cluster, while NoSQL databases were used to dynamically update the parameters of the clustering algorithms.
– Presented in the 12th IEEE International Conference on on Information Intelligence Systems and Applications 2021.

Publications

Journal Articles

1 **C. Saravanos** and A. Kanavos, "Predicting stock market alternations using social media sentiment analysis", *Neural Computing and Applications*, 2024.

2. C. Spandonidis, D. Paraskevopoulos, and **C. Saravanos**, "Neighborhood-level particle pollution assessment during the covid-19 pandemic via a novel iot solution", *Sustainability*, 2023.

Conference Proceedings

1. **C. Saravanos** and A. Kanavos, "Forecasting stock market alternations using social media sentiment analysis and regression techniques", in *Artificial Intelligence Applications and Innovations*, Springer.
2. C. Spandonidis, D. Paraskevopoulos, and **C. Saravanos**, "Design and implementation of a digital twin of a ship for sustainable operations", in *17th Ann. Conf. of the Hellenic Marine Technology Institute*.
3. **C. Saravanos** and A. Kanavos, "Forecasting stock market alternations using social media sentiment analysis and deep neural networks", in *14th International Conference on Information, Intelligence, Systems & Applications (IISA)2023*, IEEE, 2023.
4. **C. Saravanos**, G. Drakopoulos, A. Kanavos, E. Kafeza, and C. Makris, "Discovering influential twitter authors via clustering and ranking on apache storm", in *12th International Conference on Information, Intelligence, Systems & Applications*, IEEE, 2021.
5. **C. Saravanos**, D. Ampeliotis, and K. Berberidis, "Audio-fingerprinting via dictionary learning", in *IEEE 22nd International Workshop on Multimedia Signal Processing (MMSP)*, IEEE, 2020.

Personal Projects

- Entity Extraction From Large Document Datasets Via LLMs
- Automated Playlist Generation Via Deep Learning
- Music Genre Classification Via Deep and Dictionary Learning
- Cover Song Identification *(collaborated with C. Theophilou)*
- Song Identification via Data-Driven Dictionaries *(with Prof. D. Amepliotis and Prof. K. Berberidis)*
- Predicting the U.S. Stock Market Volatility Via Social Media Analysis *(with Prof. A. Kanavos)*

Languages

- **English**, Native Lagnuage, *EXAMS: Certificate of Proficiency In English- University of Michigan*
- **French**, Advanced, *EXAMS: Diplome d'Etudes En Langue Francaise (DELF 1er Degre)*
- **Greek**, Native Language,

References

- Peter W.J. Staar,
  Principal Research Staff Member,
  Master Inventor, Manager of
  "AI for Knowledge" group,
  IBM Research Zurich,
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