Mariaclaudia Nicolai

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Interests

biology, pharmacology, bioinformatics, machine learning, deep learning

Languages

Italian

English

Biography

Mariaclaudia works as a research assistant at the Università della Svizzera italiana (USI) in Switzerland, where she is broadening her knowledge in computational biomedicine. Her broad scientific perspective aims to combine traditional biological and chemical lab work with cutting-edge computer modeling approaches. In particular, she is using AI algorithms to investigate the structure and function of biological systems.

Research experience

Research assistant   07/2023 - present
Università della Svizzera italiana (USI), Switzerland

Application of language models used in Natural Language Processing (NLP) to find machine learning-based solutions by developing tools for microscopy data analysis for the IMMUNEMAP project.

Research trainee   03/2021 - 06/2023
Institute for Research in Biomedicine (IRB)
Università della Svizzera italiana (USI), Switzerland

Evaluation of the resistance mechanism to venetoclax as a consequence of mutations in the regulators of apoptosis BCL2. The research was conducted by studying the binding affinity of the BCL-2 protein family and its inhibitor venetoclax by analyzing protein structure with PyMol and the binding by performing molecular dynamics simulations with Amber.

Prediction of new mutations of the SARS-CoV-2 spike protein. The research was conducted by analyzing virus structure with PyMol and creating a database of the amino acid sequences of the spike protein from data published on GISAID to train the artificial neural network LSTM and predict new mutations.

Prediction of T cell receptor (TCR) and antigen binding. The research was conducted by training deep learning BERT and GPT2 models based on the transformer architecture. Models were trained by leveraging either TCR-antigen known or unknown binding specificity amino acid sequences by applying either transfer learning or self-supervised learning.

Visiting student   07/2018 - 06/2019
Delft University of Technology (TU Delft)
Delft, The Netherlands

Investigate the role of user feedback on Android healthcare applications. The research was conducted by analyzing user reviews to classify the comments left for healthcare and non-healthcare apps and by applying the sentiment analysis on these reviews to assess the sentiment between healthcare and non-healthcare apps. Findings from the research presented at the international conference in Tallinn, Estonia.

Work experience

Assistant   04/2020 - 04/2020
Foodie Lab
Naples, Italy

Managing and promoting the activities on social media. Daily cooperation with the manager, creative presentation of new content, handling customer requests.

Soft skills

Interpersonal

Organizational/Planning

Leadership

Teamwork

Research skills

Investigation/Observation

Problem Solving

Critical thinking

Attention to detail

Computer skills

MS Office

Python

Unix shell

Keras/Pytorch

GMDH Shell, Weka

Gromacs, Amber

LaTeX

August 2023

Educational intern   05/2018 - 11/2018

Farmacia Dr. Italiano
Benevento, Italy

Practice ethical and deontological aspects of the profession of pharmacist. Managing health products. Educating consumers about health prevention and medication usage.

Quality control operator   07/2015 - 06/2017

Bruitparif
Paris, France

Collaboration with a research organization responsible for monitoring environmental noise. Testing of electronic devices with precision digital equipment.

Education

Master's degree in Pharmacy   03/2020

University of Salerno, Italy

Master's thesis focused on the impact of artificial intelligence on predicting the activity of antimicrobial peptides and provided models to support the discovery of new peptides. Using computational methods proved a valuable strategy to support the development of novel drugs. The machine learning algorithm applied was from Weka and GMDH Shell software which provided regression tools used for the training.

Publication

- "Healthcare Android Apps: A Tale of the Customers' Perspective"
  <u>Mariaclaudia Nicolai</u>, Luca Pascarella, Fabio Palomba, Alberto Bacchelli
  ACM SIGSOFT International Workshop on App Market Analytics (WAMA2019)

Professional service

- Invited journal reviewer for the Health Informatics Journal (2021)

Award

- Scholarship and housing services at the University Residences provided by the University of Salerno (2015/2016)

Hard skills

- Quantitative and qualitative analysis, laboratory tests and measurements, use of laboratory equipment

- Communication with customers and warehouse management

- Assembly operations, electronic welding, and verification test activities

- Processing of analytical results, compilation of documents, drafting of reports, development of executable programs