Ruoying Yuan

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RESEARCH INTERESTS

(1) Developing machine learning and deep learning models and applying them in the bioinformatics field.
(2) Biomedical image and graphic processing. I did an interesting project on "Microtubules Tracking" recently. There's a demo of it on my personal website in case you are interested.
(3) Data mining including image classification and disease prediction.

EDUCATION

Washington University in St. Louis (WUSTL), St. Louis, MO Sep 2021-May 2023(expected)

Master of science in computer science; Current GPA: 3.88/4.0

Relevant Courses: Machine Learning, AI, Data Mining, Geometric Computing for Biomedicine, Algorithms for Computational Biology

University of Electronic Science and Technology of China, Chengdu, China

Bachelor of Engineering in Software Engineering; GPA: 3.6 /4.0 Sep 2016 – Jun 2020

Obtained the title **"Model Student of Academic Excellence"** in September 2017

PUBLICATIONS AND MANUSCRIPTS

1. **Ruoying Yuan***, Jiarui Feng*, Heming Zhang*, Yixin Chen, Philip Payne, Fuhai Li. *Multi-omics data integration via novel interpretable k-hop graph attention network for signaling network inference.* Submitted to *2023 AMIA Summit.* Under review.

RESEARCH AND PROJECT EXPERIENCE

Washington University in St. Louis (WUSTL) **St. Louis, MO**

Research Assistant, Department of Pediatrics March 2022 – Present

- Developing and applying novel k-hop graph attention network models to integrate multi-omics data and rank the essential targets gene and infer the related signaling pathways. And the proposed model outperforms the normal GAT and GCN models. The thesis: "Multi-omics data integration via novel interpretable k-hop graph attention network for signaling network inference" is under review by AMIA 2023.
- Currently working on developing new k-hop GAT models that can handle large-scale (millions of 2-hop edges) data.

University of Electronic Science and Technology of China **Chengdu, China**

Independent project, school of information and software engineering

- **Research and Development of Knowledge Graph System:** Sep 2019 – Dec 2019
- Crawled entries regarding animals on websites and transformed semi-structured and non-structured data into structured data
- Established a graph system of animal knowledge and stored it in the Neo4j
- The thesis was published on Modern Information Technology (ISSN 2096-4706, 2009, 05-0013-05, Page 13-17) in March 2019
- **Vehicle License Plate Recognition System:** Sep 2018 – Feb 2019
- Positioned the license plate based on edge detection and flood fill using the OpenCV library

- Achieved plate classification (with CNN on TensorFlow), character segmentation (based on the horizontal and vertical projection method), and character classification.
- **Prediction on the Click Rate of Tencent's s Advertisements (Group Research):** Sep 2017-Jan 2018
- Applied logistic regression model and gradient boosting decision tree to predict the click rate of Tencent's advertisements, and achieved an accuracy rate of 0.84 (out of 1.0)

Internship Experience

TCL Electronics Holdings Limited, Shenzhen, China
algorithm engineer, AI Team Nov 2020 – July 2021

- **Image classification:** My team was trying to identify what object (including all kinds of objects) it is by photos for TCL's television's real-time image recognition which helps viewers to know what they are looking at without searching on the internet blindly. I'm responsible for national flags, cars, and land view classification. Using mobile-net to classify national flags, cars, and land views and achieve 98.75% for national flags classification and 96.67% for photo categories classification.
- **3D face reconstruction:** Assist in 3D face reconstruction through one single photo and using a camera to capture facial expressions to drive the 3D face model. I assisted in some graph computation algorithms and helped build the client using C++ and using Ogre as the drive of the model.

Wonders Information Co., Ltd, Shanghai, China
Assistant Data mining engineer Feb 2019 – Aug 2019

- Organized unstructured data (medical records) and transformed them into structural data for data preprocessing.
- Build a model using logistic regression and random forest for predicting the probability of one having a particular disease based on the patient's symptoms and the model was accepted by the Ruijin Hospital Shanghai Jiaotong University School Of Medicine.

SKILLS AND TOOLS

Programming: Python, C/C++, Java, JavaScript, Mathematica/Wolfram
Computer Skills: CSS, HTML, SQL, Spark, Hadoop

Tools and framework: Git, Jupyter Notebook, PyCharm, Visual Studio, TensorFlow, PyTorch, OpenCV, Sklearn, pandas, NumPy, Napari…