Mingyan Tu

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Research Interest

Computational neuroscience (e.g. time series analysis of brain electrical activity)
Causal inference in medical research
AI for drugs (e.g. small molecular property prediction)

Education

East China University of Science and Technology, Shanghai, China 2020.9 – Present

Master of Medicine, Medical Informatics
Major courses: Mathematical Statistics (GPA: 4.0/4.0), Artificial Intelligence Technology and Application (GPA: 4.0/4.0), Academic Writing (GPA: 4.0/4.0), Applied Pharmacology (GPA: 4.0/4.0)

East China University of Science and Technology, Shanghai, China 2016.9 – 2020.6

Bachelor of Science, Pharmacy
Bachelor of Engineering, Computer Science
Major courses: Advanced Mathematics (GPA: 4.0/4.0), Advanced programming (GPA: 3.7/4.0), Medicinal Chemistry (GPA: 3.7/4.0), Scientific Research Training (GPA: 4.0/4.0)

Research Experience

Phenotype Based Large-scale Drug Screening System 2021.11 – Present

Shanghai Key Laboratory of New Drug Design

Supervised by Prof. Kai Zhang (Computer Science Department, East China Normal University) and Prof. Honglin Li (School of Pharmacy, East China University of Science and Technology).

- Guided the research group (5 students).
- Implemented elastic image registration of diverse biological microscopic images.
- Analyzed statistics of biological noise and diagnosed anomaly signals.
- Developed a feature extraction method for high dimensional biological time series.
- Devised a supervised classification method for high-throughput drug & formula screening.

Dynamic Functional Connectivity between Zebrafish Brain and Drugs 2021.11 – Present

Shanghai Key Laboratory of New Drug Design

Supervised by Prof. Kai Zhang (Computer Science Department, East China Normal University) and Prof. Honglin Li (School of Pharmacy, East China University of Science and Technology).

- Implemented brain image segmentation and cell clustering.
- Established a database of drug chemical and physical properties.
- Analyzed brain dynamic functional connectivity.
- Analyzed small molecule phenotypic signatures based on functional group fingerprints and machine learning methods.
- Wrote a research report and a blog that has helped thousands of people.

A Causal Inference Model for the Diagnosis of Cardiovascular Diseases Summer 2022

Department of Computer Science and Technology, University of Cambridge

Supervised by Prof. Pietro Lio (Department of Computer Science and Technology, University of Cambridge).

- Contributed to the idea of causal inference in medical systems.
- Developed a risk prediction model based on probability trees for cardiovascular diseases.
- Originated a recommendation method based on counterfactuals that provide healthy lifestyle suggestions.

Potential Therapeutic Drugs for Huntington's Disease–Design of Small Molecule Inhibitors of MAPK11 2020.9 - 2021.12

Shanghai Key Laboratory of New Drug Design

Supervised by Prof. Honglin Li (School of Pharmacy, East China University of Science and Technology).

- Investigated Huntington's disease (HD), its current therapeutics as well as related biological targets, and found p38 MAP kinase (MAPK11) as a potential target.
- Designed MAPK11 inhibitors for the treatment of HD and analyzed their structure activity relationship (SAR) utilizing molecular docking approaches.

Skills

- Programming: Python > Ruby > C# > C++ == Matlab
- DL Frameworks: Pytorch > TensorFlow == Keras
- IDE: Jupyter Notebook > Vim > VS Code == Visual Studio == RubyMine > Notepad
- Platform: Linux
- Typesetting: LaTex
- Drug Design: Schrödinger == Pymol > Autodock
- Cheminformatics: RDkit > ChemDraw > Openbabel

Papers

Gong M*, **Tu M***, Sun H*, Li L, Zhu L, Li H, Zhao Z, Li S. Design, Synthesis, and Structure-Activity Relationship Study of Potent MAPK11 Inhibitors. Molecules. **2021** Dec 29; 27(1): 203.

A deep neuron network enables novel drug screening. (Manuscript)

Drug associated brain dynamic networks of larval zebrafish. (Manuscript)

Lifestyle recommender systems for cardiovascular disease patients based on causal inference. (Manuscript)

Honors and Awards

China National Scholarship 2022
Excellent Research Assistant 2022
First Prize in AI track of DeepModeling Hackathon 2021
Inspirational Scholarship for Outstanding Graduate Students 2020
The Special Prize Scholarship for Seniors 2020
Excellent Undergraduate's Paper 2020
Second Prize in National College Students Math Model Competition Shanghai Division 2018
The First Prize Scholarship 2022, 2021, 2020