Hanwen Xu

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Education

Tsinghua University, Beijing, China Sep. 2020 – Present

Master student in Automation, GPA: 3.78/4.0

Working on genetic elements design, high-throughput data analysis

Advised by Prof. Xiaowo Wang

Tsinghua University, Beijing, China Sep. 2016 – Jun. 2020

Bachelor of Engineering in Automation, GPA: 3.7/4.0

Thesis: *A cell type deconvolution method based on componentwise conditional numbers*

Advised by Prof. Xiaowo Wang

Publications

ProTranslator: zero-shot protein function prediction using textual description

***Hanwen Xu**, Sheng Wang*

- **RECOMB 2022**, under review
- **First author**

PccGEO: prior constraints conditioned genetic elements optimization

Hanwen Xu, Pengcheng Zhang*, Haochen Wang*, et al.*

- **RECOMB 2022**, under review
- **Joint first author**

ARIC: accurate and robust inference of cell type proportions from bulk gene expression **or DNA methylation data**

Wei Zhang, **Hanwen Xu***, Rong Qiao, Bixi Zhong, Xianglin Zhang, Jin Gu, Xuegong Zhang, Lei Wei, Xiaowo Wang*

- **Briefings in Bioinformatics, 2021 (Impact factor: 11.6)**, published
- **Joint first author**

Learning dynamic graph embedding for traffic flow forecasting: A graph self-attentive method

Zifeng Kang, **Hanwen Xu***, Jianming Hu, Xie Pei*

- **IEEE Intelligent Transportation Systems Conference, 2019**, published
- **Joint first author**

S3: Side Channel Attack on Stylus Pencil Through Sensors

*Habiba Farrukh, Tinghan Yang, **Hanwen Xu**, Yuxuan Yin, He Wang and Z.Berkay Celik*

- **UbiComp, 2021**, published

cfDNApipe: A comprehensive quality control and analysis pipeline for cell-free DNA **high-throughput sequencing data**

*Wei Zhang, Lei Wei, Jiaqi Huang, Bixi Zhong, Jiaqi Li, **Hanwen Xu** et al.*

- **Bioinformatics, 2021 (Impact factor: 6.9)**, published

Experience

Research Intern 2021.3 – Present

Paul G. Allen School of Computer Science & Engineering, University of Washington, Seattle

- Annotate proteins only based on text descriptions to a novel function that is not collected in the Gene Ontology and does not have any annotated proteins
- Embed descriptions of GO functions into the same low-dimensional space, where similar functions are co-located
- Project the new function in the low-dimensional space based on its textual description and then transfer annotations from other GO functions
- Generate sentences that can best describe the function of a set of given proteins

Research Assistant 2020 – Present

WangLab, Tsinghua University

- Propose a knowledge-constraint deep learning model named PccGEO
- Utilize a novel "fill-in-the-flank" strategy with a conditional generative adversarial network structure
- Optimize the flanking regions of known DNA functional sequences derived from the biological prior knowledge
- Automatically design functional genetic elements with high success rate and efficiency

Research Assistant 2019 – 2020

Ministry of Education Key Laboratory of Bioinformatics, Tsinghua University

- Propose a novel two-step marker selection strategy, including collinear feature elimination based on the component-wise condition number and adaptive removal of outlier markers
- Accurately estimate in both DNA methylation and gene expression data from different experiments
- Investigate the survival prediction of ovarian cancer and monitored the condition of chronic kidney disease

Research Intern (Undergraduate) 2019.6 – 2019.9

SIMBA Lab of Prof.He Wang, Computer Science Department Purdue University, USA

- Investigate iPad information leakage caused by the 2nd generation Apple Pencil
- Infer the users' handwritings from magnetic data
- Propose S3: Side Channel Attack on Stylus Pencil Through Sensors

Research Assistant (Undergraduate) 2019.2 – 2019.6

Group of Prof.Jianming Hu, Division of Systems Engineering, Tsinghua University

- Propose a multi-nodes transportation flow forecasting method based on graph representation learning
- Propose a Spatial-Temporal Sequence to Sequence model
- Demonstrate the feasibility of integrating the Attention module into RNN cells

Professional activities

Reviewer of RECOMB 2022

Member of Professional Committee of Chinese Association for Artificial Intelligence

Awards

The Scholarship for Comprehensive Outstanding Performance of Graduate Students 2021

Outstanding Graduates (Beijing, Tsinghua University & Dept. of Automation) 2020

National Scholarship 2019

- Highest scholarship awarded by the Chinese government, $<$ **0.1%**

Tsinghua Innovation Award of Science and Technology 2020

- Awarded to undergraduate students with excellent research potential, **0.2%**

Technical Skills

English Skills: TOEFL 110 (Reading 30, Listening 29, Speaking 22, Writing 29), GRE 327 (V: 158, Q: 169, W: 4.0)
Programming Languages: C/C++, Python, R, Matlab
Softwares/Platforms/Libraries: CUDA, PyTorch, TensorFlow
Research Tools: DAVID, MEME, WebLogo, LaTex, Adobe Illustrator