

# TZU-HSIN YANG

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## RESEARCH INTERESTS

Bayesian Inference, Deep Probabilistic Models, Uncertainty Estimation, Network Science

## EDUCATION

**National Cheng Kung University (NCKU)**, Tainan, Taiwan Jul. 2018

- Master of Science in Computer and Communication Engineering
  - Overall GPA: 4.0/4.0

**National Chiao Tung University (NCTU)**, Hsinchu, Taiwan Jun. 2016

- Bachelor of Science in Electrical and Computer Engineering
  - Last 60 GPA: 3.27/4.0

## WORK EXPERIENCE

**Research Assistant**, Academia Sinica, Taipei, Taiwan Oct. 2020 – Present

- Developing an Insurance Fraud Detection System based on **GNN** models
- Developing a graph visualization system with **Node.js** and **D3.js**

**Data Scientist**, KKBOX, Taipei, Taiwan Jun. 2019 – Aug. 2020

- User Behavior Analysis
  - Developed **XGBoost** and **LightGBM** to predict churn users
  - Discovered key factors of churn behaviors with **SHAP**
  - Developed **ARIMA** models to predict the number of transactions
  - Modeled user journeys on the application via semantic embedding with **fastText**
  - Visualized data with **Redash** dashboards and **PrestoSQL**
- Music Personalized Recommendations
  - Developed Spark ML Pipelines for playlists recommendation
  - Diversified playlists by excluding bias of data to increase user retention
  - Conducted **Firebase** A/B testing
- Public Opinion System
  - Developed a regular crawler pipeline using GitLab and Jenkins
  - Implemented a NER system with Chinese NLP tools (**CkipTagger**)

**Deep Learning Scientist and Bioinformatician**, Insilico Medicine, Taipei, Taiwan Aug. 2018 – May 2019

- Molecule Generation: developed conditional generative models
- MRI Brain Image Analysis: implemented the **Unet** model to segment images

**iOS Mobile App Developer**, NCKU Library, Tainan, Taiwan Aug. 2017 – Jun. 2018

- Developed a mobile library application for students and the faculty

**Teaching Assistant**, Department of Electrical Engineering, NCKU, Tainan, Taiwan Sept. 2016 – Jun. 2017

- Teaching assistant for Introduction to Computers (C++)
- Won Teaching Assistant Awards for both fall and spring semesters

## PUBLICATIONS

**T. Yang, H. Ma and J. Huang, "DNA: General Deterministic Network Adaptive Framework for Multi-Round Multi-Party Influence Maximization", 2018 IEEE 5th International Conference on Data Science and Advanced Analytics (DSAA)**

- Developed an **MCTS**-based framework that adapts to network changes in the long run
- Developed influence maximization algorithms from game theory perspectives
- Designed a network similarity estimation method for new data prediction

**H. Hsieh, J. Jiang, T. Yang and R. Hu, "LSTMEnsembler: A LSTM-based Ensemble Framework for Predicting the Success of Mediation Requests Using Case Properties and Textual Information", submitted to 2020 ACM Digital Government: Research and Practice**

- Conducted the first research on predicting the success of real-world mediation cases
- Developed an **LSTM**-based framework based on the case information and textual descriptions
- Implemented a system for public servants and the public to decide whether entering mediation

## COMPETITIONS

|  |           |
|--|-----------|
| <b>COVID19 Global Forecasting</b> , held by The White House OSTP   | Mar. 2020 |
| <ul style="list-style-type: none"> <li>• Forecasted confirmed cases and fatalities between March 25 and April 22 by region <ul style="list-style-type: none"> <li>- Ranked in the top 13% in the competition</li> <li>- Developed a <b>VARIMA</b> model to predict regional values</li> </ul> </li> </ul>  |           |
| <b>MolHack: Apply deep learning to speedup drug validation</b> , held by Insilico Medicine   | May 2018  |
| <ul style="list-style-type: none"> <li>• Predicted the stability of the complex given ligand-pharmacophore pairs <ul style="list-style-type: none"> <li>- Won 2nd place in the competition out of 13 teams</li> <li>- Developed a feedforward neural network based on normalization</li> </ul> </li> </ul>   |           |
| <b>KKBOX Data Game: TV Show Recommendation</b> , held by KKBOX   | Jun. 2017 |
| <ul style="list-style-type: none"> <li>• Designed an algorithm to predict the next TV show <ul style="list-style-type: none"> <li>- Performed exploratory data analysis and developed linear regression models</li> </ul> </li> </ul>  |           |
| <b>Mei-Chu Hackathon</b> , held by NCTU and National Tsing Hua University  | Dec. 2014 |
| <ul style="list-style-type: none"> <li>• Developed an Automated Jumpshot Photo System <ul style="list-style-type: none"> <li>- Won 1st place in the competition out of 30 teams</li> <li>- Developed an Arduino module with accelerometer sensors</li> <li>- Developed an iOS camera application connecting to the Arduino module</li> </ul> </li> </ul> |           |

## PROJECTS

|  |           |
|--|-----------|
| <b>Statistics with R Specialization</b> , Duke University (Coursera)   | Dec. 2019 |
| <ul style="list-style-type: none"> <li>• Analyzed and visualized data in R and performed frequentist and Bayesian statistical inference</li> </ul>   |           |
| <b>Air Quality Analysis &amp; Prediction</b> , KKBOX Screening Question  | May. 2019 |
| <ul style="list-style-type: none"> <li>• Analyzed time series data and predicted the air quality in the upcoming days <ul style="list-style-type: none"> <li>- Performed exploratory data analysis and developed <b>RNN</b> models</li> </ul> </li> </ul>  |           |
| <b>Energy Consumption Analysis &amp; Prediction for Household Planning</b> , NCKU  | Jan. 2017 |
| <ul style="list-style-type: none"> <li>• Designed an algorithm to predict household electricity consumption <ul style="list-style-type: none"> <li>- Selected important features with random forest and developed linear regression models</li> </ul> </li> </ul>                                      |           |
| <b>Mining Geo-Social Services for Optimal Location Placement</b> , NCKU  | Nov. 2016 |
| <ul style="list-style-type: none"> <li>• Designed an algorithm to rank top locations for hotel and theater placement <ul style="list-style-type: none"> <li>- Used hill climbing optimization algorithm with <b>NDCG</b> ranking scores</li> </ul> </li> </ul>   |           |
| <b>Social Relationship inference from Urban Footprint</b> , NCKU   | Oct. 2016 |
| <ul style="list-style-type: none"> <li>• Designed an algorithm to predict whether people are friends on social media with check-in data <ul style="list-style-type: none"> <li>- Selected important features and used cosine similarity to measure the similarity between pairs</li> </ul> </li> </ul> |           |

## SKILLS

### Programming Languages

- Python, C++, R, Scala, SQL, HTML, CSS, JavaScript, MATLAB, Swift, MongoDB

### Certificate

- Microsoft Certified: Azure Fundamentals

## LEADERSHIP EXPERIENCE

|   |                        |
|---|------------------------|
| <b>President of Social Service Team</b> , NCKU  | Sept. 2012 – Jun. 2013 |
| <ul style="list-style-type: none"> <li>• Visited and held service activities in Social Welfare Organizations</li> <li>• Held summer and winter camps for rural primary school students</li> </ul> |                        |