Yu-Chieh Jesse Kuo

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Education

National Taiwan University Taipei, Taiwan

B.B.A. in Information Management; ***GPA: 3.98/4.30*** *September 2018 – June 2023*

- **Ph.D. Economics Courses:** Microeconomic Theory, Econometrics Theory (Python, R), Computational Methods for Econometrics (Python, R, Stata), Economic Analysis of Social Networks (Python, R), Topics in Econometrics.
- **Ph.D. Management Courses:** Information Economics, Platform Strategy, Game-Theoretic Approach Marketing.
- **Computer Science Courses:** Introduction to Text Mining (Ph.D. level; Python), Machine Learning (Ph.D. level; Python), Data Structure and Advanced Programming (C++, Python), The Design and Analysis of Algorithms (Python), Database Management (SQL), System Analysis and Design.
- **Mathematics Courses:** Calculus, Statistics, Advanced Statistics (Ph.D. level), ODE/PDE, Linear Algebra, Operations Research (Python), Convex Optimization (Ph.D. level; Python).

Research Experience

Department of Economics, National Taiwan University

Research Assistant to Professor ***Chih-Sheng Hsieh*** *and Professor* ***C.Y. Cyrus Chu*** *Jun 2022 – Present*

- Organized over 500 suspicious celebrities related to the MeToo movement and collected suspects' characteristics and searching records from Google Trends to build a complete 2-year panal data.
- Using a statistical estimation model to calibrate the normalized raw data from Google Trends to enable further analysis.
- Analyzed the effect of certain big events and spillover effects in the MeToo movement by implementing the regressions.
- Conducted and visualized a large-scale networks from 14GB Taiwanese companies' dataset with millions of entries.
- Conducted several literature reviews of corporate finace applying social network analysis to improve further research.

Department of Information Management, National Taiwan University

Research Assistant to Professor ***Chih-Ping Wei*** *June 2022 – Present*

- Simulated the Brownian motion of molecules in a SISO MCvD system and predicted simulation parameters such as receiver radius, diffusion coefficient, and transmitter-receiver distance using CNNs with Python.
- Plotted the arrival of molecules per symbol duration in a SISO MCvD system using Binomial, Poisson, and Gaussian model approximations with MATLAB.
- Ran Monte Carlo simulations of the Gaussian model to encode/decode randomized binary sequences in a SISO MCvD system using BCSK modulation technique and calculated the bit error rate (BER) on Z-channel.

Work Experience

SESTEK Speech Enabled Software Technologies Istanbul, Turkey

Natural Language Processing R&D Intern *Jan 2022 – Feb 2022*

- Implemented common NLP tasks using transformers such as named-entity recognition (NER), part-of-speech (POS) tagging, sentiment analysis, text classification, and extractive/generative question answering.
- Built a generative question answering system via Dense Passage Retrieval (DPR) and Retrieval-Augmented Generation (RAG) using the Haystack framework with Python.
- Worked on a custom Turkish open-domain question answering system by fine-tuning a BERT base model transformer. Evaluated the exact match and F1 scores using different Turkish data sets and compared the evaluation results.

Meteksan Defense Industry Inc. Ankara, Turkey

Analog Design Engineering Intern *Jul 2021 – Aug 2021*

- Designed numerous analog circuits such as voltage-mode controlled buck converter, phase-shifted full-bridge isolated DC-DC converter, and EMI filters with LTspice. Integrated these circuits and implemented a 320 W power distribution unit to be used in a radar system's power circuit board.
- Researched real-world compatible electronic components to be used in such circuits including GaNFETs, high-side gate drivers, and Schottky diodes.
- Assembled PCBs of both common and differential mode filters and used VNA Bode 100 to measure the cut-off frequencies.

Awards & Achievements

National University Admission Exam (YKS): Ranked 75^{th} in Mathematics and Science among ca. 2.3 million candidates with a test score of 489.92/500.

KYK Outstanding Success Scholarship: Awarded to undergraduate students who have been ranked in the top 100 on National University Admission Exam by Higher Education Credit and Hostels Institution (KYK).

Boaziçi University Success Scholarship: Awarded to undergraduate students who have been ranked in the top 100 on National University Admission Exam by Boaziçi University.

TÜBTAK 2247-C Intern Researcher Scholarship: Awarded to undergraduate students who take part in research projects carried out by the Scientific and Technological Research Council of Turkey (TÜBTAK).

Duolingo English Test (DET): Overall Score: 135/160

Kocaeli Science High School Salutatorian Award: Graduated as the second-highest ranked student in my class.

Projects

Filters and Fractals | *GitHub*

- A C project which implements a variety of image processing operations that manipulate the size, filter, brightness, contrast, saturation, and other properties of PPM images from scratch.
- Added recursive fractal generation functions to model popular fractals including Mandelbrot set, Julia set, Koch curve, Barnsley fern, and Sierpinski triangle in PPM format.

Chess Bot | *GitHub*

- A C++ project in which you can play chess against an AI with a specified decision tree depth that uses alpha-beta pruning algorithm to predict the optimal move.
- Aside from basic moves, this mini chess engine also implements chess rules such as castling, en passant, fifty-move rule, threefold repetition, and pawn promotion.

Rocket Flight Simulator | *GitHub*

- A Simulink project which can accurately simulate the motion of a flying rocket in one-dimensional space.
- The project implements the forces acting on a rocket which are drag, weight, and thrust as subsystems that take time-variant parameters into consideration such as distance from the center of Earth, mass and velocity of the rocket, and air density at different layers of Earth's atmosphere.

Netlist Solver | *GitHub*

- A MATLAB project that uses modified nodal analysis (MNA) algorithm to calculate the node voltages of any analog circuit without dependent sources given in netlist format.
- Added a module that sweeps the resistance of a load resistor, plots power dissipation as a function of load resistance, and finds the resistance value corresponding to maximum power.

CMPE 250 Projects | *GitHub*

- Five Java projects assigned for the Data Structures and Algorithms (CMPE 250) course in the Fall 2021-22 semester.
- These projects apply DS&A concepts such as discrete-event simulation (DES) using priority queues, Dijkstra's shortest path algorithm, Prim's algorithm to find the minimum spanning tree (MST), Dinic's algorithm for maximum flow problems, and weighted job scheduling with dynamic programming to real-world problems.

Skills

Programming: C, C++, Java, Python, MATLAB, R, MySQL, VHDL

Technologies: Git, Arduino, ROS, Simulink, LTspice, Xilinx ISE

Languages: Turkish (Native), English (Professional), German (Elementary)

Relevant Coursework

Major coursework: Calculus I-II, Matrix Theory, Differential Equations, Materials Science, Electrical Circuits I-II, Digital System Design, Numerical Methods, Probability Theory, Electronics I-II, Signals and Systems, Electromagnetic Field Theory, Energy Conversion, System Dynamics and Control, Communication Engineering

Minor coursework: Discrete Computational Structures, Introduction to Object-Oriented Programming, Data Structures and Algorithms