

Ismail Uluturk

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SUMMARY

PhD with a focus on applied Machine Learning and Data Science approaches for engineering problems, particularly on wireless and techno-social networks. Firm grasp of the entire stack from hardware and embedded software to web, with 9 years of R&D experience over 2 **start-ups**; both developing novel IoT solutions from ground-up that are currently deployed internationally. I especially enjoy multidisciplinary collaboration and interdisciplinary research and collaboration.

EDUCATION

University of South Florida, Tampa, Florida, USA

- PhD in **Electrical Engineering**, Jan 2013 – May 2020
 - Co-Advisors: Prof. Ismail Uysal, Prof. Kwang-Cheng Chen
 - Research Focus: Machine Learning applications for wireless and techno-social networks.
- MSEE in **Electrical Engineering**, Jan 2013 – Dec 2017
 - Focus: Machine Learning, Statistical Inference, Network Science.

Istanbul Technical University, Istanbul, Turkey

- B.S. in **Electrical Engineering**, Sep 2008 – Jun 2012
 - Graduation Project: Real-Time Localization of Mobile Nodes in Wireless Sensor Networks

RESEARCH PROJECTS

Collaborative Trajectory Control for Aerial Networks: Decentralized multi-agent trajectory planning of UAV based access points to implement a flexible aerial Radio Access Network (RAN) that can be rapidly deployed in previously unknown environments, utilizing Network Science and Reinforcement Learning.

SANCHO: Data informed model examining staffing strategies to handle healthcare worker absenteeism while accounting for the structured contact-network heterogeneity, with a case study of a COVID-19 Hospital in Central Florida using real data. Simulations & Analysis in *Python*.

Social Bots on Twitter: Studying the implications for the significant existence of social bots on Twitter, with a focus on bot detection and data science approaches. Conducting a validation study on publicly available bot detection tools and developing an open-sourced data annotation tool. *Python & JavaScript*.

Study on Social Integration of Refugees in Turkey: Using an unprocessed 1.95GB Call Detail Record (CDR) dataset from 50k users, I have constructed mobility networks based on a variable high-order network topology, and identified distinct markers for spatial segregation of refugees. Analysis in *Python*.

Sketch Recognition of Circuit Schematics (Undergraduate): Worked on translating freehand sketches of circuit schematics on paper to SPICE netlists. Lack of temporal information from the input method made segmentation a challenge. Implemented a dynamic programming based segmentation solution in *Java*.

COMPUTER SKILLS

- 7+ years Python experience for data ETL, analysis, visualization, and simulations and machine learning.
 - TensorFlow, Keras, pandas, NumPy, scikit-learn, Matplotlib, NetworkX, Plotly, Bokeh, Flask, etc.
- 4+ combined years of C and Embedded Software development experience, bare metal and with RTOS.
- Experienced in MATLAB, R, Git, SQL, Web (JavaScript, HTML, CSS).
- Familiar with SQL, C++, Java, Unix, GNU/Linux, Heroku, compute clusters.

WORK EXPERIENCE

Skylo, Palo Alto, California, USA

Algorithm Engineer

Jan 2021 – Present

- Designed and implemented an adaptive concave hull algorithm to calculate the mobile equipment coverage area; ~10x reduction of error against baseline over a representative test set. *Python* and *Java*.
- Designed and implemented an online algorithm to run on a resource constrained embedded platform to improve GNSS performance; ~4x average improvement in CEP on real hardware. *Python* and *C*.
- Implemented an algorithm for compensating Doppler shift resulting from orbital mechanics of geostationary satellites; ~7x average, ~3x worst case margin to maximum tolerable error. *Python*.
- Ownership of 3 modules related to core network (satellite NB-IoT), application, and embedded firmware.
- Supported international development and product teams with specialist expertise, developed PoCs.

University of South Florida, Tampa, Florida, USA

Research Technologist

Sep 2020 – Current

- Developing a grant proposal on Industry 4.0 topics with wireless constraints; MRTA and AGV routing.
- My contribution: applying Decentralized Multi-Agent Reinforcement Learning with Networked Agents.

Graduate Assistant

Jan 2013 – Jan 2020

- Teaching: **Deep Learning**, Signals & Systems. Handled all projects and programming assignments.

Borda Technology, Istanbul, Turkey & Tampa, Florida, USA

R&D Engineer (**Start-up**, one of the first 10 employees)

Sep 2010 – Oct 2018

- Solution R&D for an IoT indoor localization (RTLS) product that is deployed in 7+ hospitals where I worked on virtually every aspect from concept to deployment in a fast-paced start-up environment.
 - Developed an indoor localization system with room level resolution for healthcare settings.
 - This project won The Best Health-Care RFID Implementation from RFID Journal Awards 2018.
- Wrote embedded firmware in C for ARM and MSP430 platforms, both on bare metal and with an RTOS.
 - Part of a team following Agile Development practices, utilizing Version Control (git).
- Designed and shipped 6 IoT products with end-to-end ownership from initial concept to production and deployment for; including RF wearables and gateways to enable necessary data.
- Took significant part in hiring and personal development of interns and new graduates.

SOFTWARE PROJECTS

social-annotate: A configurable Chrome extension to simplify manual annotation of users and content on social media sites while enabling crowd-sourcing. Open-source, main author and maintainer. *JavaScript*.

gently-multiagent: A Multi-agent Aerial Vehicular Network simulator that is easy to customize, with simulation environments for Reinforcement Learning. Only author. Work in progress. *Python*.

PUBLICATIONS

JOURNALS

- [J4] Uluturk, I., & Varol, O. (under review). **Social-Annotate: Browser extension to annotate and collect social media data.** *Journal of Open Source Software*.
- [J3] Aguilar, E., Roberts, N.J., Uluturk, I., Kaminski, P., Barlow, J.W., Zori, A.G., Hébert-Dufresne, L., & Zusman, B.D. (2021) **Adaptive staffing can mitigate essential worker disease and absenteeism in an emerging epidemic.** *Proceedings of the National Academy of Sciences*.
- [J2] Varol, O., & Uluturk, I. (2019). **Journalists on Twitter: Self-branding, Audiences, and Involvement of Bots.** *Journal of Computational Social Science*.
- [J1] Varol, O., & Uluturk, I. (2018). **Deception strategies and threats for online discussions.** *First Monday*, 22(5).

BOOK CHAPTERS

- [B1] Salah, A. A., Altuncu, M. T., Balcisoy, S., Frydenlund, E., Mamei, M., Arslanlı, K. Y., ... Uluturk, I. (2019). **Policy implications of the D4R Challenge.** *Guide to mobile data analytics in refugee scenarios: the 'Data for Refugees Challenge' study*, (pp. 481-498).

REFEREED CONFERENCES

- [C5] Uluturk, I., & Varol, O. **Social Bot Followers of Journalists on Twitter.** IC2S2, 2020.
- [C4] Uluturk, I., Uysal, I., & Varol, O. **Refugee Integration in Turkey: A Study of Mobile Phone Data for D4R Challenge.** Data for Refugees Challenge Workshop, 2019.
- [C3] Uluturk, I., Uysal, I., & Chen, K.C. **Efficient 3D Placement of Access Points in an Aerial Wireless Network.** CCNC 2019.
- [C2] Uluturk, I., & Uysal, I. **A novel approach for generating fast multi-class SVM topologies with nested dichotomies.** IJCNN 2016.
- [C1] Kilinc, O., Dalzell, A., Uluturk, I., & Uysal, I. **Inertia Based Recognition of Daily Activities with ANNs and Spectrotemporal Features.** ICMLA 2015.

POSTGRADUATE CLASSWORK

- Deep Learning
- Data Mining
- Random Processes
- Network Science
- Mathematical Statistics
- Statistical Inference
- Statistical Pattern Recognition
- Digital Signal Processing I&II
- Wireless Networks

APPLIED ML EXPERIENCE

- Deep Learning
- Reinforcement Learning
- Clustering and Community Detection
- Classification
- Regression
- GMM
- SVM
- Random Forest
- PCA
- Stochastic Graphs
- Collaborative Filtering

CLASS PROJECTS

Detection of Social Bots on Twitter: I have built a working social bot detector with a mean AUC of 0.84 using Twitter API, public Honeypot data, Random Forest classifiers, and engineered features, using Python.

RF Circuit Design: Designed, Manufactured, and Characterized two passive filters, a UHF Class-A Power Amplifier, and a 350MHz Colpitts Oscillator for RF & Microwave and RF Applications classes.

Wastewater Treatment Plant Aerator Fan Control: Using real data from a plant in Valrico, Florida and M5P Regression Trees we achieved a correlation coefficient of 0.927 with control signal from a real expert.

VOLUNTEERING

- ITU Control and Automation Society (OTOKON) Education Committee, Chair 2009-2011
 - Taught widely attended, public, and free “Introduction to Programming with C” classes for 4 semesters.

STUDENT PROJECTS & AWARDS

- Student Research Award, The Florida High Tech Corridor (FHTC) Council, USA 2020
 - Brought a total of **\$124,989** in FHTC matching research awards through industry partnership.
- Dissertation Fellowship, University of South Florida, Tampa, USA 2019
 - Chosen from a university-wide pool of doctoral candidates for a total of **\$8,000** + tuition and fees.
- ITU Hezarfen UAV Team for **AUVSI-SUAS Competition**, Maryland, USA 2012
 - Team lead, responsible for avionics and communication subsystems.
- ITU Hezarfen CanSat Team for **Annual International CanSat Competition**, Texas, USA 2011
 - **First place** out of 16 teams. Responsible for avionics, communications, and embedded software.
- Turkish National Team for **EUROSKILLS Mobile Robotics Category**, Lisbon, Portugal 2010
 - Won the **first place** out of 6 teams in the national competition to be included in the national team.

[CV compiled on 2021-11-11]