Besim Avci

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Summary

Applied scientist with expertise in natural language understanding, conversational agents, deep learning, recommender systems, spatio-temporal data management, and machine learning at large.

Work experience

◇ **Applied Scientist** Apr. '16 - Now
Amazon, Inc.
Working with Conversational Recommendations team. I have been building models for a text-based shopping assistant. Specifically, I implemented ML components of our natural language understanding module such as intent classification, named entity extraction, and entity resolution. Previously, I developed music recommendation strategies for Alexa customers to navigate music space through conversation.

◇ **Machine Learning Scientist Intern** Jun. '15 - Sept. '15
Amazon, Inc.
Worked on a video recommendation project with Personalization team that aims to drive customer engagement with Amazon Instant Video service.

◇ **Software Engineering Intern** Jun. '12 - Aug. '12
Orbitz LLC.
Worked under Machine Learning team on data analysis and visualization using R and Hadoop/Hive. Developed a tool for visual representation of historic data and statistical analysis for future sales.

Education

◇ **Northwestern University**, Evanston, IL. Mar '16
Ph.D. in Computer Engineering.
Thesis Title: *Adaptive Spatio-temporal Predicates in Wireless Sensor Networks.*
Advisors: Peter Scheuermann and Goce Trajcevski.

◇ **Norhtwestern University**, Evanston, IL. Jun '13
M.S. in Computer Engineering.
Thesis title: *Motion Trends Detection in Wireless Sensor Networks.*
Advisors: Peter Scheuermann and Goce Trajcevski.

◇ **Bilkent University**, Ankara, Turkey. Jun '10
B.S. in Computer Science.

Skills

Programming

· Fluent: Java, Python, C++, C, SQL
· Competent: R, VHDL, nesC, Verilog, Assembly
· Familiar: C#, Matlab, Lisp, Smalltalk, perl

Libraries and Tools

· MXNet, Pandas, Numpy, Spark, Tensorflow

Research experience

Research Assistant in Database Management and Sensor Networks lab at Northwestern University from June 2010 to February 2016. I worked on various problems starting with **hole routing** in the first few years, followed by **motion trends detection in tracking applications** in wireless sensor networks. Then, worked on **spatial complex event detection** which was succeeded by **spatial anomaly detection in differentially private databases**. My last paper was about a **middleware between sensory data streams and a spatial database**.

My dissertation was on how to monitor and track complex events in the streaming sensory data. The goal was to infer complex events from data using techniques from data mining to event-based data collection to in-network processing. Our most recent work was focused on probabilistic spatial anomaly detection through sensor fusion.

Publications

"Tracking Uncertain Shapes with Probabilistic Bounds in Sensor Networks"
Besim Avci, Goce Trajcevski, Peter Scheuermann, ADBIS 2016

"Efficient Detection of Motion-Trend Predicates in Wireless Sensor Networks"
Besim Avci, Goce Trajcevski, Roberto Tamassia, Peter Scheuermann, Computer Communications 2016

"Incorporating Weather Updates for Public Transportation Users of Recommendation Systems"
Muhammed Mas-ud Hussain, **Besim Avci**, Goce Trajcevski and Peter Scheuermann, MDM 2016

"Semantics-Aware Warehousing of Symbolic Trajectories"
Goce Trajcevski, Ivana Donevska, Alejandro Vaisman, **Besim Avci**, Tian Zhang, Di Tian, ACM IWGS 2015

"Privacy-Preserving Detection of Anomalous Phenomena in Crowdsourced Environmental Sensing",
Mihai Maruseac, Gabriel Ghinita, **Besim Avci**, Goce Trajcevski, Peter Scheuermann, SSTD 2015

"Demo: Evolving Shapes in Wireless Sensor Networks",
Besim Avci, Muhammed Masud Hussain, Bing Zhang, Goce Trajcevski, SenSys 2014

"Managing Evolving Shapes in Sensor Networks",
Besim Avci, Goce Trajcevski, Peter Scheuermann, SSDBM 2014

"Motion Trends Detection in Wireless Sensor Networks",
Goce Trajcevski, **Besim Avci**, Fan Zhou, Roberto Tamassia, Lauren Miller, Adam Barber, MDM 2012

"Distributed Data Management for Large-scale Wireless Sensor Networks Simulations",
Stephen Wylie, James Heide, **Besim Avci**, Dennis Vaccaro, Oliviu Ghica, Goce Trajcevski, EDBT 2012

"Sensor Synchronization for Energy Efficent Multiple Object Tracking",
Fan Zhou, Goce Trajcevski, **Besim Avci**, Peter Scheuermann, ICNSC 2012

"Tracking Coverage throughout Epochs with Bounded Uncertainty",
Fan Zhou, Goce Trajcevski, **Besim Avci**, NCA 2011

"Bypassing Holes in Sensor Networks: Load-Balance vs Latency",
Goce Trajcevski, Fan Zhou, Roberto Tamassia, **Besim Avci**, Peter Scheuermann, Ashfaq Khokar, Globecom 2011

Honors & awards

- ◇ Kindle Unlimited Hackathon Peoples Choice Award winner, 2015.
- ◇ Terminal Year Fellowship from McCormick School of Engineering, 2015.
- ◇ 2nd place in EECS Poster Fair with project "Managing Evolving Shapes in Sensor Networks, 2014.
- ◇ Awarded Walter P. Murphy fellowship by EECS Department at Northwestern University, 2010.
- ◇ Full undergraduate scholarship from Bilkent University Engineering Faculty, 2005-2010 .

Other projects

2015 - *"Predicting Semantic Locations from Mobile App Data"*. Implemented a model that would predict user's semantic location using real mobile phone traces in Python with Zack Witten.

2013 - *"Event Detection Using Kademlia DHT Network in Distributed Active Data Management Systems"*. Designed and implemented a distributed publish/subscribe data management system and build an event detection scheme on top of it in Go with Saurabh Kadekodi, Arindam Paul.