Cem Koc

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EDUCATION

University of California, Berkeley
B.S. in Electrical Engineering and Computer Sciences — May 2017 (expected)

- **Coursework**: Deep Learning(graduate), Computer Vision(graduate), Machine Learning, Linear Algebra Theory, Probability Theory, Artificial Intelligence, Operating Systems, Algorithms

SYMPOSIUM

Terrain Classification with Force-Torque Sensor Equipped Millirobot

Cem Koc*, Can Koc*, Brian Su*, Ron S. Fearing

Presented at Bay Area Robotics Symposium (BARS), 2016.

RESEARCH EXPERIENCE

Berkeley Artificial Intelligence Research (BAIR) Lab — September 2015 – Present
Undergraduate Research Assistant

Worked under guidance of Professor Ronald S. Fearing in Biomimetic Millisystems Lab.

Undergraduate Research Projects

- **Terrain Classification with Force-Torque Sensor Equipped Millirobot**
  Worked with a 10cm long, hexapedal milli-robot with force-torque sensing shell attached on top. Worked on binary classification of densely cluttered terrain using time series force-torque sensor data. Implemented and trained ensemble learning, gradient boosted decision trees, SVMs and neural nets to create a robust model. Our model can identify dense terrains in noisy environments with 97% accuracy.
- **Environmental Drag in Densely Cluttered Terrains on Millirobot through Intrinsic Force Sensing** (in progress)
  Not much research has been done on investigating the interactions of a milli-robot passing through a grass-like terrain. We have access to a palm-sized milli-robot with force-sensing shell attached on top. Using our robotic platform we are are trying to identify properties of forces on top of the robot through a data-driven approach. We hypothesize that understanding these properties, such as drag forces, cost of transport, will lead better navigation capabilities in dense terrains.

StatNews Project — January – September 2015
Undergraduate Research Assistant

Worked under the guidance of Professor Laurent El Ghaoui.

We applied statistical and machine learning approaches to the analysis of large text corpus. We explored various ways for topic modeling including NMF-TFIDF, Sparse PCA and used regression methods to discover trends of topics and relations between documents.

INDUSTRY EXPERIENCE

Apple — June – September 2016
Software Engineering Intern — Sunnyvale, CA

- Interned at Apple Maps Special Projects Group
- Worked on OSM basemap generation with millions of nodes. Worked on map-matching data, implemented geo-filtering on top of map reduce.
- Worked on the approximation of NP-Hard routing problems such as vehicle routing problem and longest path problem.
- Implemented state-of-the-art graph approximation algorithms such as Iterative Local Search, Genetic Algorithms to improve routing with sparse graph.

- Created automated machine learning framework to ingest data for traffic estimation, route validation.

TubeMogul June – September 2015
Software Engineering Intern Emeryville, CA

- Worked in the Ads Machine Learning team.
- Developed and integrated a Java framework to collect and process real-time bidding results of digital ads.
- Processed peta-bytes of files to forecast how likely an add will win in a given auction.
- Created an auction simulator in back-end using Java and a front-end dashboard to monitor the results.

PERSONAL PROJECTS

DeepDoom: Implemented Prioritized Experience Replay from Schaul et al. to do fast deep reinforcement learning on Doom game. Uses ViZDoom, Keras, OpenAI Gym.
AnimeFaces: Learn to recognize faces in Anime frames! Fine tuned computer vision models such as GoogleNet, AlexNet and VGGFace. Uses Caffe and Keras.
Atlas: Use deep Learning to do landmark image recognition. Uses SVM, NMF-TFIDF and Clarifai.
Osiris: Android based personal assistant that is completely offline. Uses Twilio, Google Maps APIs and Yelp API.

TECHNICAL SKILLS

Interest Areas: Machine Learning, Computer Vision, Sensorimotor Learning, Deep Learning, Robotics
Programming Skills: Java, Python, C, Hadoop/Spark, TensorFlow, Caffe.
Github Link: https://github.com/cemkoc