Cem Koç

515 Lincoln Ave, Apt 442
San Jose, CA 95126
http://cemkoc.me

cemkoc@berkeley.edu
(415) 298-3952
https://github.com/cemkoc

EDUCATION

University of California, Berkeley
B.S. in Electrical Engineering and Computer Sciences   May 12, 2017 (conferred)

- **Major GPA: 3.34, Math GPA: 3.682**
- **Coursework**: Deep Learning (graduate), Computer Vision (graduate), Operating Systems, Data Structures, Algorithms, Computer Architecture, Machine Learning, Statistics and Probability Theory, Linear Algebra Theory, Artificial Intelligence
- **Awards & Leadership**: Qualcomm Quest Scholar 2014, Hackers @ Berkeley Teaching Lead: Teaching EE/CS undergrads beginner skills such as launching personal websites from scratch, Github, Python etc.

TEACHING

CS 61A: Structure and Interpretation of Computer Programs

- Worked as a TA for the summer 2014 offering of the introductory computer science course at UC Berkeley. Designed the class projects, graded exams and held office hours. With other course staff we also prepared a wiki for students to access for questions and guidance based on past offerings of the class.

INDUSTRY EXPERIENCE

Apple   July 2017 – Present
Software Engineer   Sunnyvale, CA

- Working in the Maps Data Science & Analytics Product team. Working on creating parallel batch and stream processing algorithms, distributed computation frameworks on top of Spark to do processing of geospatial and textual data at scale.
- Worked on building the POI (place of interest) popularity pipeline that leverages Spark and uses a distributed deterministic pushdown automaton (DPDA) to extract popularity features from user event logs coming from iOS devices.
- Worked on building a reverse geocoder library that provides a scalable and fast solution when doing point-in-polygon lookups, polygon intersections and more.
- Working on creating a modular graph based stream or batch data processing framework for doing complex stateful transformations, joins, projections and approximations. Supports languages such as Python and Scala and allows users to create complex data processing graphs by using higher level operators built on top of Spark.
- **Patent**: I am the co-inventor on a 2019 US Patent Application (currently undisclosed) filed by Apple in distributed combinatorial optimization.

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

- Worked in Apple Special Projects Group. Worked on creating distributed combinatorial optimization algorithm to tackle a specific NP-hard problem similar to Capacitated Arc Routing which is a variant of Travelling Salesman Problem. Approximated near-optimal solutions by investigating genetic algorithms as well as a combination of perturbation based randomized algorithms on sparse graphs. Created a Spark program to aggregate and estimate edge weights using GPS Probe data which was utilized to constrain the search space and iteratively improve solutions.

TubeMogul (*Adobe Inc.*)   June 2015 – 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 online auction. Created an auction simulator in back-end using Java and a front-end dashboard to monitor the results.

PUBLICATIONS & CONFERENCES

Body Lift and Drag for a Legged Millirobot in Compliant Beam Environment

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

Published in ICRA, 2019. arXiv 1904.09101.

Terrain Classification with Force-Torque Sensor Equipped Millirobot

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

Presented at 2016 Bay Area Robotics Symposium (BARS).

RESEARCH EXPERIENCE

Berkeley Artificial Intelligence Research (BAIR) Lab   May 2015 – June 2017

Research Assistant   Emeryville, CA

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

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.

- **Body Lift and Drag for a Legged Millirobot in Compliant Beam Environment through Intrinsic Force Sensing**

  In this work we utilized a (previously developed) low-cost 6-axis force/torque sensing shell to measure the interaction forces between a hexapedal millirobot and a set of compliant beams which models a densely cluttered environment. Built a batch and online data processing framework to analyze large timeseries dataset of sensor readings. Discovered the drag and lift forces, specific resistance required to pass through dense terrains could be measured. We further discovered that, interestingly, some contact between the robot and the compliant beams can lower specific resistance of locomotion.

UC Berkeley StatNews Project   Jan 2015 – May 2015

Research Assistant   Emeryville, CA

Worked under the supervision 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 sparse PCA, NMF-TFIDF) and used regression methods to discover trends of topics and similarities between unstructured corpora.

Nanostructures and Nanoelectronics   Jan 2014 – Jan 2015

Research Assistant   Emeryville, CA

Worked under the supervision of Prof. Jeffrey Bokor. Collected measurements on CN-FETs and wrote Python to process measurement data. Designed and built a 700 Gauss electromagnet to be used in polar MOKE (magneto-optic Kerr Effect) experiments.

PERSONAL PROJECTS

Deep Portfolio: Implemented a financial model-free reinforcement learning framework from Jiang et al. for the portfolio management problem. Trained agent utilized policy gradient methods to trade on cryptocurrencies in real life.

Deep Doom: 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.

TECHNICAL SKILLS

Interest Areas: Machine Learning, Computer Vision, Robotics, Streaming Algorithms, Big Data Frameworks, Combinatorial Optimization, Distributed Computing

Programming Skills (order of recency): Java, Python, Scala, Spark/Hadoop, Tensorflow/Pytorch, C, C++, Caffe