Doron Tal

Full Stack Developer / Architect / DEVOPS

Goal: Build high impact software that solves meaningful problems

New York, NY
(510) 847-1072
doron@tracktunes.org
linkedin.com/in/mountainbot
github.com/dorontal
github.com/tracktunes

QUALIFICATIONS

- Python
- Building hybrid apps with Angular / Ionic / Typescript / Postgres
- C++ / C
- Computer Vision
- Docker
- AWS (S3/EC2/Cloudfront/Route 53)
- SOLR / Search
- Karma / Jasmine unit testing
- Linux / Unix / networking
- Nagios
- Google Analytics
- Web scraping
- Apache / Nginx
- HTML / CSS / Javascript
- Bash
- OpenCV
- Matlab, NumPy, PyLab, Scipi, Matoplotlib
- SQL (PostgreSQL)
- Django REST Framework
- Continuous Integration (Travis)
- Wordpress (server)
- Github
- Redis / MongoDB / Memcached
- Apache / Nginx
- End-To-End / Unit Testing
- Node.js

KEY ACHIEVEMENTS

- **Most recent job:** (1) Built the Cornell Tech Directory App for people to find out about each other - this included an API server with its database (EC2 node), and a client-app static file server (S3 bucket). It was implemented in Ionic / Angular / Typescript for the client with Django REST Framework and PostgreSQL on the server; (2) Implemented computer vision algorithms to recognize and estimate the pose of a Lego brick (Python & OpenCV); (3) Built a video portal to connect two places far apart with cameras, projectors and Raspberry Pi boards (Linux / Python / OpenCV). Co authored three, accepted, publications related to these projects.
- **Startups: Founded Tracktunes** Inc and developed the "garage band on the cloud" technology behind it, as well as its social networking infrastructure and design. Early member at **three startups**: one is listed on NY Stock Exchange (Visionics, Inc), and another was acquired by Microsoft in 2010 (Videosurf, Inc).
- **Won two government grants as Principal Investigator:** (1) NIH Training Grant in Vision Science; (2) a NASA Discretionary Fund to build a four-legged rugged terrain robot and teach it to walk using machine learning and 3D simulation of robot dynamics in rugged terrains.
- **Front-end app building:** Designed and built an open source audio recording app that leverages new browser technologies (Web Audio Api, IndexedDB, AngularJS). Designed and built a social networking international music collaboration app (Tracktunes Inc).
- **Back-end app building:** Built a prototype "Garage Band On the Cloud" system that can mix thousands of separate audio channels in real time and broadcast them as a stereo mp3 stream, allowing for mixer board parameters to change in real-time while the music never stops (Tracktunes Inc). See also the 'Textual data analysis' work for Videosurf Inc, below.

- **Face recognition:** Developed a multi-scale algorithm to locate the pupil of each eye at sub-pixel accuracy, significantly improving face recognition, in C++. Implemented, tested, deployed and maintained a system to automatically pan / tilt a camera, which tracks the movement of a person's head (Visionics Corporation). Created, implemented and tested a multi-scale algorithm for scale- and rotation-invariant head pose estimation. Input was a face image; output was the head's 3D angle. This greatly improved face recognition by only considering face shots directly facing the camera (Videosurf Inc). Developed software at Videosurf to estimate the direction in which a face is looking. It helped the company because we were able to only perform the face recognition on faces that faced the camera, significantly improving both accuracy and efficiency.
- **Computer Vision:** Developed a theory of human image segmentation (Ph.D. research). Implemented the Normalized Cuts image segmentation algorithm as a part of one of the largest open-source packages exported out of UC Berkeley's Computer Science Department. Augmented the algorithm with the ability to use pixel color as a segmentation cue (UC Berkeley). Developed and field-tested an algorithm for building 3D models of the world from a stereo vision pair of cameras that were placed 1 meter apart on a remote-controlled helicopter (NASA Ames Research Center). Developed an algorithm to estimate the six parameter position and orientation of a camera mounted on a flying rover. Input was (a) the location of the sun; (b) heights and albedos of a known terrain model (c) camera images; output was the camera pose.
- **Robotics:** Pioneered the use of machine learning to teach four legged robots how to walk, together with Andrew Ng and Gregory Williams at UC Berkeley.
- **Textual data analysis*:*** Automated downloading the entire Wikipedia content once a week and matching it to the text that came with each video in our growing 300 million video database. This allowed our company to enhance our video search website by showing you relevant info from Wikipedia next to each video. I developed, tested, maintained and deployed this back-end system (Videosurf Inc).
- **Neuroscience:** Published a well-known, simple model of how neurons add or multiply their signals (Ph.D. research). Ph.D. Thesis is a novel theory of how image segmentation occurs in the brain.

PROFESSIONAL EXPERIENCE

Cornell Tech	Senior Research Engineer	Dec. 2017 - Present
Tracktunes Inc	CEO	Jul. 2013 - Present
Full Stack App Developer	Consultant	Jul. 2013 - Dec. 2017
Wyzant (wyzant.com)	Tutor (Profile page)	Dec. 2016 - Dec. 2017
Videosurf Inc	Sr. Computer Vision Scientist	Sep. 2007 - Oct. 2010
USRA, NASA Ames Research Center	Computer Vision Scientist	Apr. 2002 - Mar. 2006
UC Berkeley	Postdoctoral Fellow	Feb. 2000 - Mar. 2002
Visionics Corporation	Computer Vision Scientist	Jul. 1997 - Dec. 1999

EDUCATION

Boston University	Ph.D.	Theoretical Neuroscience / Neural Networks
Cornell University	M.Eng.	Computer Science
Cornell University	B.A.	Computer Science & Philosophy double-major