

Ilya Kelner

Embedded Software Engineer and Algorithms Scientist

Education

Carnegie Mellon University
// Pittsburgh, PA

Bachelor of Science // 2007-2011
Electrical Engineering
Computer Engineering
Focus on Robotics

Technology

// Platforms
Windows | Linux | Kubernetes
Visual Studio | MatLab
Docker | LXC | VMWare | HyperV
// Languages
C | C++ | Python | C# | Java
Assembly | Perl | Batch | Bash
XML | PHP | JavaScript | SQL
// Architectures
Cortex-{M0 | M0+ | M3 | M4}
x86 | x64 | AVR | PIC
// Compilers
GCC | Clang | MSBuild | MDK-ARM
// Software Version Control
Git | SVN | TFS

Skills

Algorithm
Research & Development
Low-level Optimization
Full-stack Debugging
System Architecture
Data & Information Analysis
Product Lifecycle Management
Technical Leadership
Machine Learning Application
Tech Specification Development

Patents

Extending Gameplay With
Physical Activity Monitoring
Device
Automatic Exercise Segmentation
And Recognition
Personal Training With Physical
Activity Monitoring Device
Motion Based Estimation Of
Biometric Signals
Intelligent Vessel

Publications

RecoFit: Using a Wearable Sensor
to Find, Recognize, and
Count Repetitive Exercises
ACM CHI 2014
DOI 10.1145/2556288.2557116

Experience

SpaceX Corp | Starlink Satellite Internet // Sept 2015 - present
Flight Software Engineer

Responsible for all aspects of Telemetry, Tracking, and Control ground software systems and architecture. Principally responsible for hardware abstraction antenna dish controlling software to integrate with company standard software stack, and the antenna time scheduler for allocating communications with satellites. Built constellation network simulation software from scratch using data collated from public sources for analysis to optimize business operations and deployment plans.

// Key Achievements

- » Designed and deployed the satellite communication task scheduler responsible for prioritizing and dispatching communication tasks between satellites and ground data centers for such things as health monitoring, telemetry/ephemeris updates, and transmission and verification of software updates to satellites in flight.
- » Built a general purpose antenna dish operating application that is extensible to any vendor's hardware, via any interface. Co-constructed and implemented proprietary algorithms for reliably making contact with satellites, accounting for unpredictable sources of error.
- » Directly supported satellite operations with software by providing many mission critical tools to ensure the safe and reliable operation of vehicles in space.
- » Overhauled MVP architecture used for demonstration mission into a production ready global satellite internet service provider back-end capable of servicing billions of users.

Mark One Lifestyle | Vessyl // Oct 2014 - Aug 2015
Director of Firmware and Algorithms

Built and managed two separate but inter-related software teams to develop the firmware and algorithms for the Vessyl smart cup. Lead the technical specification creation, contributed to the product specification creation, and selected major hardware components for cost-effectiveness and performance. Mentored junior developers in the creation of a unified code-base that was platform-agnostic to support alternate component sourcing and long-term evolution of the hardware.

// Key Achievements

- » Crafted a chip vendor independent, event driven, embedded operating system focusing on power efficiency, featuring a decentralized cross-library signalling mechanism and extensive debugging capabilities.
- » Developed the company's core intellectual property signal processing and machine learning algorithms for drink identification and nutrient detection.
- » Wrote a MatLab based visualization front-end that was used to demonstrate the technology to investors and press, and used internally to test sensor hardware iterations.

Microsoft | Personal Devices // Dec 2011 - Oct 2014
Software Development Engineer

Worked extensively on biometric algorithms alongside Microsoft Research focusing on world-first automatic human activity recognition and exercise agnostic repetition counting. Organized rigorous scientific validation studies of established medical science papers, identifying critical flaws, and incorporating the fixed implementations into the Microsoft Band product.

// Key Achievements

- » Invented an algorithm for repetitive exercise counting leveraging established techniques from audio beat and pitch detection.
- » Ported a MatLab based machine learning proof-of-concept algorithm to an embedded platform using custom built math libraries and processing pipeline optimization tricks.
- » Developed an algorithm for estimating a user's heart rate based on their activity level to interpolate between actual measurements being taken, allowing for a 90% efficiency gain at no loss of fidelity.