

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 (Embedded & Ubuntu)
Visual Studio | MatLab
VMWare | HyperV

// Languages
C | C++ | C# | Java | Assembly
Python | Perl | Batch | Bash
XML | PHP | JavaScript | SQL

// Architectures
Cortex-{M0 | M0+ | M3 | M4}
x86 | x64 | AVR | PIC

// Compilers
MSBuild | MDK-ARM | GCC | Clang

// 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

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

Built from scratch 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

- » Designed and built from scratch a command-line IDE that combined Visual Studio, MSBuild, Keil μ Vision, MDK-ARM, and Git for cohesion between developers and workstation configurations.
- » 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.
- » Innovated testing methods for validation of algorithms running on a device.
- » 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.

Disney Research | Tesla Touch // Aug 2011 - Dec 2011
Product Development Engineer

Revised a research hardware prototype into a cost effective and mass producible design. Developed versatile and fault-tolerant embedded software to integrate with existing host driver and software. Designed, simulated, and prototyped electronics for driving high voltage, human contact safe signals.

// Key Achievements

- » Built a USB powered 400VDC constant current boost circuit and used it to modulate a software defined analog waveform.