San Francisco, CA
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Mark Sena

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Skills

Languages: MATLAB, *familiar with*: Python, SQL, *exposure to*: C++, Java, regex, jQuery
Tools: MATLAB Stats Toolbox, GIT, LaTeX, Pandas, scikit-learn, Flask, AWS, Harvest

Experience

Fellow, Insight Data Science, *Palo Alto* **1/15-present**
Recognition of physical activities using ATHOS smart clothing (embedded EMG-sensors)

- Engineered a feature set to quantify dynamic muscle activity from 8-D time series
- Implemented a SVM to classify 5 different physical activities with 86% accuracy
- Produced a source-code-linked report describing my approach and results, available at: marksena.me/insight/blog-post

Chief Science Officer, Co-founder, BIONIKS, *Alameda* **1/13-12/14**
Research-grade movement analysis for sports-medicine professionals and patients

- Spun out a 3-D motion analysis company based on graduate work with the Kinect
- Wrote high-scoring SBIR and STTR grants for the company
- Led team to win the "*Idea to IPO*" business plan competition (Steve Burrill)
- Conducted >100 consumer interviews during the "*Lean Launchpad*" (Steve Blank)
- Won "*Best App for Patients and Healthcare Professionals*" at Hacking Health

Graduate Researcher, UC San Francisco - Orthopaedic Surgery **9/09 - 12/14**
Low-cost 3-D movement analysis using the Microsoft Kinect and retroreflective markers

- Invented a method for tracking the position of anatomical markers using the Kinect
- Developed an OO framework in MATLAB for processing data streaming at 1.3 Gb/min
- Implemented computer vision algorithms for segmentation and labeling of markers
- Tracked anatomical joints with 10x greater accuracy than Microsoft's markerless method
- Produced a provisional patent for a 3-D motion tracking system using infrared markers

Method and apparatus for quantitative assessment of dynamic knee joint stability

- Invented a mechanical device for automating the "*Pivot Shift*" test for ACL injury
- Increased the repeatability and inter-examiner reproducibility of the test by >10-fold
- Extracted knee stability metrics from streams of 6-D force and motion data at 100 Hz
- Used ANOVA and logistic regression to explain differences between ACL reconstructions
- Produced two 1st author papers and one patent for a mechanical device to evaluate joints

Undergraduate, University of Washington, *Seattle* **9/08**
Program to verify the identity of a user speaking a password into a microphone

- Designed features based on time-varying intensity and pitch of the user's voice
- Implemented a password rejection algorithm in MATLAB based on correlation thresholds

Education

University of California (UC), **San Francisco** and **UC Berkeley** **9/09 - 12/14**
Ph.D., Bioengineering (joint program)

University of Washington, Seattle **9/05 - 8/09**
BS, Bioengineering

Selected Awards

UC - **Office of the President Proof of Concept Award** **6/13**
UCSF - **T1 Translational Catalyst Award** **10/12**
NSF - **Graduate Research Fellowship** (accepted) **4/10**
DOE - **Office of Science Graduate Research Fellowship** (declined) **4/10**