Jeffrey Peterson

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Professional Overview

Experienced and motivated Senior Software Engineer seeking an opportunity to contribute to the development and implementation of an impactful and compelling project in healthcare and patient safety. I am interested and experienced in full-stack software development, clinical data science, and machine learning.

Experience

Senior Software Engineer – Clinical Decision Technology Laboratory (Massachusetts General Hospital) 2018 – Present

Software Engineer – Clinical Decision Technology Laboratory (Massachusetts General Hospital) 2016 – 2018

Research Affiliate – Integrative Neuromonitoring and Critical Care Informatics (MIT) 2016 – Present

Clinical Engineer – Medical Device Plug-and-Play Research Lab (Massachusetts General Hospital) 2014 – 2016

Clinical Engineer – Dept. of Biomedical Engineering (UMass Memorial Medical Center) 2011 – 2014

Professional Projects

BPCi (VIGORIS) Blood Pressure Control Clinical Decision Support System (MGH CDTL) 2018 – Present

- Built a system to provide automated guidance for reducing the duration of hypotension in ICU patients on vasopressors
- Developed clinical decision support system data server (Python, PostgreSQL, Numpy/SciPy)
  - The server aggregates all clinical data and calculates several algorithms including the Clinical Decision Support messages and the Blood Pressure Control Index. ZeroMQ used for communication between server and UI(s).
- Developed bedside clinical decision support user interface (JS/HTML/CSS with React/Redux, D3 plots)
- Created the 4th iteration of the BPCi algorithm (originally developed at U of Maryland)
  - Developed a modified autoregressive model to predict the likelihood of sustained hypotension
  - Developed a MATLAB data analysis pipeline to analyze timeseries vital signs from several hundred subjects, including from MIMIC II and MGH data repositories, then pre-process, fit, and compare different predictive models

APPRAISE Hemorrhage Clinical Decision Support System (MGH CDTL) 2016 – 2018

- Designed and implemented a prototype UI to view the patient's vital sign trends, the novel clinical index (APPRAISE risk strata), and the clinical decision support notifications for use on a wall mounted display in MGH's trauma bay 1
  - The APPRAISE algorithm is a logistic regression model that outputs a hemorrhage injury risk score which was stratified using historical data. The index is a critical input into the clinical decision support message algorithms.
- Created a new iteration of the model based on a larger dataset, TraumaDB that I assembled by meticulously reconciling all existing trauma project datasets and new expert adjudications into a standardized schema in PostgreSQL

Education

Master of Science in Biomedical Engineering – University of Connecticut, Storrs, CT May 2013
Thesis: Investigation into the Efficacy of Alarm Fatigue Reduction Strategies GPA: 4.1/4.3

Bachelor of Science in Biomedical Engineering – University of Connecticut, Storrs, CT May 2011
Senior Design: Adaptive Equipment Designed and Constructed for a Child with Rett Syndrome GPA: 3.5/4.0

Technical Skills

Language Competencies – Python, JavaScript (es6+), SQL (pgSQL), MATLAB, HTML/CSS, Shell (Bash), LabView
Full Stack Application Dev – Responsive web design / GUI design, API design, database schemas, serial port comm.
Clinical Decision Support Algorithms – Regression models, normalization techniques, timeseries analysis
Data Science – Data munging, annotation / adjudication tooling, visualization, classification, presentation, technical writing
Machine Learning – Python (Keras, TensorFlow), MATLAB, 5-part deeplearning.ai certification and Coursera Stanford ML
Hospital Specific – Regulatory submissions (IRB, FDA IDE), medical device integration, human factors engineering