Kinjal Shah

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EXPERIENCE

Apercu Diagnostics | Product Consultant Freelance | Remote | Aug 2022-Present

- Managed alignment between leadership and an internationally distributed 8 person product development team including project managers, electrical engineers, mechanical engineers, and data scientists
- Advised CEO on prototype development, testing platform design, data quality, and product feasibility
- Identified gap in data analytics strategy and defined new requirements for data generation pipeline and algorithm development to detect presence of bacteria in urine from noisy bedside spectroscopy data

MyoExo | Data & Algorithms, Product Lead | Startup Founding Team Boston, MA | Jun 2022-Present

- Developed wearable device to monitor progression of neuromuscular disorders
- Defined minimal viable product, created spin-out strategy, and communicated research findings to investors
- Evaluated regulations for medical devices under Direct-to-Consumer versus Business-to-Business market models
- Utilized advanced techniques including PCA, LSTM, and frequency domain analysis to identify digital biomarkers linking multi-sensor data to clinical assessments for Parkinson's Disease
- Led data analysis pipeline development to process data from 7 sensors over 13 experimental conditions per study participant

Harvard Biodesign | Translational Research Engineer Boston, MA | Dec 2021-Mar 2023

- Evaluated research to product tech transfer viability for 2 translational research projects
- Conducted market analysis of collaborative robotics growth in New England to support submission of NSF Engine grant proposal seeking $160M to create an accelerator for collaborative robotics research
- Explored impact of user priming on force delivered by assistive wearable robot to enable adaptive human-robot interaction

Johns Hopkins University | HCI Researcher Baltimore, MD | Jul 2020-Dec 2021
Full Time Researcher (Jan-Dec 2021), **Graduate Student Researcher** (Jul-Dec 2020) Advisor: Prof. Mathias Unberath
Master's Thesis: Enabling Cognitive Load Aware User Interfaces for Mixed Reality
Accepted to Women in Machine Learning (WiML) Workshop co-located with NeurIPS 2020 - Poster Presentation

- Proposed new research direction and led the design and evaluation of initial proof of concept resulting in patent application and two $100K+ grant proposals on designing more accessible human-AI interfaces
- Developed predictive models for cognitive state change detection from pupillometry data in unconstrained environments
- Built real-time signal processing pipeline for multi-sensor time series data while maintaining temporal alignment
- Designed experimental protocols for user study to capture eye tracking data under varied light and cognitive load levels

Accenture | Life Sciences Research and Development Philadelphia, PA | Nov 2016-Apr 2019
Management Consultant (2018-19), **Senior Analyst** (2017-18), **Analyst** (2016-17)

- Designed R&D technology transformation road-map for clinical and pre-clinical functions at global biotechnology company with projected annual savings of over $100M
- Managed Medidata Clinical Cloud and Veeva Clinical Vault implementations, encompassing future state design, requirements gathering, user acceptance testing, and cross-functional change management with 40+ client partners resulting in successful launches for two $10M+ programs
- Directed a 5 person global team to complete waterfall Software Delivery Life Cycle (SDLC) documentation and user testing across 9 workstreams over 12 months

EDUCATION

Johns Hopkins University, MSE in Robotics May 2021
Master's Thesis: Enabling Cognitive Load Aware User Interfaces for Mixed Reality

University of Pennsylvania, BSE in Bioengineering | *Magna Cum Laude* Aug 2016
Concentration in Biomedical Devices

The Wharton School, BS in Economics | *Magna Cum Laude* Aug 2016
Concentration in Operations, Information, and Decisions with focus on Healthcare Management

SKILLS

Product: Market Analysis, User Research, Cross Function Management, Requirements Definition, SaMD
Machine Learning and Data Analysis: PyTorch, OpenCV, Scikit-Learn, SciPy, NumPy, Pandas
Programming, CAD, and Data Visualization: Python, MATLAB, Git, SolidWorks, Plotly, Matplotlib
Mixed Reality: Unity, Microsoft HoloLens, Pupil Core, Human-AI Interfaces, Human Subjects Research, Haptic Interfaces

PATENTS

Methods, Systems, and Related Aspects for Determining a Cognitive Load of a Sensorized Device User
M Unberath, **K Shah**, W Gu
Patent Pending, PCT Application Serial No. 18/556,973, filed October 23, 2023

PUBLICATIONS

Enabling Cognitive Load Aware User Interfaces for Mixed Reality
K Shah
Master's Thesis

A Calibration-free Workflow for Image-based Mixed Reality Navigation of Total Shoulder Arthroplasty
W Gu, **K Shah**, J Knopf, M Unberath
MICCAI 2021 Joint Workshop on Augmented Environments for Computer-Assisted Interventions

Intraoperative Guidance of Orthopaedic Instruments Using 3D Correspondence of 2D Object Instance Segmentations
I Bataeva, **K Shah**, R Vijayan, R Han, N Sheth, G Kleinszig, S Vogt, G Osgood, JH Siewerdsen, A Uneri
SPIE Medical Imaging 2021

Causal model for cognitive load estimation in mixed-reality environments
K Shah, W Gu, M Unberath
Women in Machine Learning (WiML) 2020 - Poster Presentation

Feasibility of Image-based Augmented Reality Guidance of Total Shoulder Arthroplasty Using Microsoft HoloLens 1
W Gu, **K Shah**, J Knopf, N Navab, M Unberath
Outstanding Paper Award
MICCAI 2020 Joint Workshop on Augmented Environments for Computer-Assisted Interventions

Proposing a framework for evaluating haptic feedback as a modality for velocity guidance
K Shah*, S Ravichandar*, JD Brown
Haptics Symposium 2020: Work-in-Progress Track

SELECT ENGINEERING PROJECTS

Early Fall Detection from Video using 3D-CNNs Baltimore, MD | Nov-Dec 2020
Winner of Intuitive Surgical Best Project Award

- Automated fall detection dataset generation using natural language descriptions to filter falls from 20000+ action videos
- Implemented transfer learning using a 3D-ResNet action recognition model with supervised fine-tuning on fall datasets
- Developed video-processing engine combining neural 3D-pose estimation and optical flow analysis to determine fall speed

Intraoperative Guidance of Orthopaedic Instruments using Machine Learning Baltimore, MD | Jan-Jun 2020
Accepted to SPIE Medical Imaging 2021 Advisor: Dr. Ali Uneri

- Implemented and evaluated performance of U-Net and Mask R-CNN architectures for surgical guidewire detection
- Designed simulated data generation pipeline enabling generalization to clinical images with 87% recall and 90% precision

Wearable Haptic Feedback Device for Upper Limb Motion Guidance Baltimore, MD | Sep 2019-Feb 2020
Accepted to 2020 Haptics Symposium Work-in-Progress Track

- Developed wearable device prototype to enable motion guidance for rehabilitation through cutaneous haptic feedback
- Designed haptic feedback algorithm to stimulate Piezoelectric vibration motors in response to IMU sensor data

HONORS AND AWARDS

LCSR Faculty Scholarship - $60K	2019-2021
Intuitive Surgical Best Project Award	2020
AE-CAI Outstanding Paper Award	2020
Bioengineering Senior Design Award	2016
First Honorable Mention - SEAS Senior Design Competition	2016
Ruhr Fellowship	2014
Advancing Women in Engineering Research Scholar	2013