

SIDHARTH MAHOTRA

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PRINCIPAL SCIENTIST

Results-oriented and versatile research scientist and seasoned software architect. Proven track record in mentoring junior engineers and collaborating effectively to tackle unique challenges across diverse technological domains, fostering impactful real-world solutions.

Master's degree in electrical engineering, specializing in Signal Processing and skilled in Computer Vision, Image & Audio Signal Processing, Machine Learning, Natural Language Processing (NLP), Deep Learning, GenAI, and Large Language Models.

Extensive experience in solving complex problems with a tangible impact in healthcare and technology. Strong publication record in leading journals and conferences.

Proven ability to bridge technical and business objectives, translating complex data insights into actionable product strategies. Passionate about the intersection of audio technology and health, with a desire to contribute to Masimo Consumer's vision of a health-focused smart home.

TECHNICAL SKILLS

Data Science/Computer Vision: C, OpenCV, Python, Pandas, Sklearn, Numpy, Keras, TensorFlow, Matplotlib, Seaborn, SciPy, MATLAB, Sage Maker, AWS, Python, TCL, Assembly

CORE COMPETENCIES

Feature Engineering, Clustering, Regression, Deep Learning, LLM's, Dimensionality Reduction, Statistical & Hypothesis Testing, Object Detection, Segmentation, Remote Sensing, Object Tacking, 3-D Vision, Fixed & Adaptive Filters, Time-Frequency & Time Series Analysis, Noise Estimation, Enhancement & Cancellation, Fixed Point & Assembly Language Code Optimization

ACCOMPLISHMENTS

- Engineered new noise reduction filters for features that go into SG modeling; work was instrumental in securing GMED approval for Simplera sensors under EU MDR. (<https://news.medtronic.com/2024-01-08-MedtronicDiabetes-announces-worlds-first-approval-for-MiniMed-TM-780G-System-with-Simplera-Sync-TMdisposable,-all-in-one-sensor>).
- Pioneered machine-learning-based DSP parameter tuning using ML-based techniques to automate the current audio parameter optimization, resulting in an **average 2-month faster time to market** and improved response at Synaptics.
- **Book author** and **technical reviewer** for the Journal of Real-Time Image Processing.

PROFESSIONAL EXPERIENCE

Principal Data Scientist and Signals Engineer | Medtronic Diabetes | Los Angeles -CA Apr 2021 - Present

- **Product Innovation & Optimization:**
 - Led simulations, design, statistical data analysis and guidance to stakeholders for improvement of current sensor glucose algorithm, resulting in extended sensor lifetime and improved accuracy.
 - Contributed to technology roadmap planning, advocating for the incorporation of generative AI into next-generation product tools.
 - Collaborated to use convex optimization in termination and blanking logic within Sensor glucose algorithm with tangible benefits in improved sensor lifetime without loss of accuracy.
- **Data Driven Product enhancement:**
 - Designed and implemented an automated feature normalization pipeline for CGM systems, significantly reducing manual effort and accelerating development timelines.
 - Collaborated with DevOps to transition MATLAB-based tools to Python, facilitating efficient model evaluation and performance tracking.
- **Leadership & Mentorship:**
 - Mentored new hires in ML, generative AI, and signal processing, ensuring rapid onboarding and skill development

Senior Researcher | Hamilton Eye Institute | Memphis, TN Jan 2020 - Apr 2021

- **Technology Innovation**

Spearheaded the adoption of deep learning-based methodologies for detecting Age-Related Macular Degeneration (AMD) from fundus photographs, significantly advancing the field of ophthalmic diagnostics. (<https://dm2l.lab.uthsc.edu>)
- **Research and Collaboration**
 - Engaged with ophthalmic doctors and researchers to improve disease detection and progression and wrote research proposals leading to successful grants from the lab. (<https://news.uthsc.edu/uthscs-yousefi-awarded-600000-in-grants-to-develop-artificial-intelligence-to-improve- glaucoma-research-diagnosis/>) .

Staff Audio Signal Processing Engineer – Smart Speakers and Tv's | Synaptics Incorporated | Irvine, CA Jan 2018 - Jan 2020

- **New Audio Product Development:**

- Formulated a new DSP design for AGC and earbud in/out detection to be used in the next generation of smart speakers, ANC headsets, and TV's. (<https://www.synaptics.com/company/news/audiosmart-edge-ai-headset-Plattform>)

▪ **Audio Data Preprocessing Redesign:**

- Worked closely with product development, engineering, and innovation groups to revamp the data preprocessing and feature extraction efforts for the audio wake word engine.

Senior Audio DSP Software Engineer -Headphones and speakers | Cirrus Logic | Mesa, AZ

Apr 2015 - Jan 2018

▪ **Algorithm Development & Optimization:**

- Proposed and implemented a new coherence-based residual echo suppression, leading to Improved ERLE for echo cancellation.

▪ **Technical Infrastructure Enhancement:**

- Based on market trends and competitive analysis, designed a new Jenkins-based CI/CD system for regression testing of audio DSP blocks, resulting in improved code quality and faster bug fixes.

▪ **Cross-Functional Collaboration:**

- Worked with Development and Test teams through C code development, test bench verification, and real-time implementation (on Largo/ Florida DSP boards) for audio algorithm blocks like Echo cancellation, VAD and AGC

Senior Audio DSP Engineer -Hearing aids | Zounds Hearing | Tempe, AZ

Jul 2013 - Apr 2015

- Collaborated with Audiologist and sales teams to create market-leading customer value through introduction of company's first Tinnitus testing for patients utilizing new GUI-based software.
- Created company's first production test to test and evaluate Enza (CIC) hearing aids through anechoic testing per various ANSI standards and accelerated DSP code development for algorithms like impulse noise reduction.

Software Development Engineer | Spirent Communications| Fort Worth, Tx

Oct 2011 – July 2013

- Engineered comprehensive test cases, conducted DVT for UMTS mobiles using Spirent systems, resolved complex customer issues, and spearheaded the development, testing, and bug tracking for WCDMA 3-G Network Emulator software

EARLY EXPERIENCE

Research Assistant | The University of Texas at Dallas | Dallas, TX

- Thesis "Real-Time Disparity Computation and Tracking for Hand-Pair Gesture Recognition," with results at http://www.youtube.com/watch?v=Y-LHD_zij88, a Texas Instruments sponsored project that demonstrated for the first time use of a low resolution off the shelf webcam for hand gesture recognition.

Scientist-SC | ISRO - Indian Space Research Organization | India

▪ **Collaborating and Influencing**

- Organized and worked with a team of over 100 scientists in various domains to investigate the root cause analysis for Insat VHRR satellite anomaly, resolving conflicts and working towards a common solution
- Spearheaded internal dialogue with analog, systems, electrical and mechanical teams to design harness tester circuit board for automated testing of large harnesses that removed manual checking, improved accuracy, and **reduced test times from 2-3 weeks to 2 days.**

▪ **Algorithm innovation**

- Invented an MTF estimation and deconvolution algorithms for Cartosat- satellite imagery, pioneering advancements in image deblurring technology.

EDUCATION

M.S, Electrical Engineering; Communications and Signal Processing | The University of Texas at Dallas | Dallas, TX

PUBLICATIONS

- **New Filters for Improved Longevity and Day 1 Performance in Next Generation CGM Sensors**, 2023 Medtronic Science and Technology Conference, USA
- **Detecting Glaucoma Progression Using Deep Archetypal Analysis of Retinal Nerve Fiber Layer Thickness Measurements** <https://iovs.arvojournals.org/article.aspx?articleid=2773632>
- **Detection of Glaucoma Progression from Retinal Nerve Fiber Layer Thickness Measurements Using Machine Learning** <https://iovs.arvojournals.org/article.aspx?articleid=2773816>
- **Detecting age-related macular degeneration severity from fundus photographs using deep learning**, ARVO-2020
- **Patterns of retinal nerve fiber layer loss in patients with glaucoma identified by deep archetypal analysis** <https://ieeexplore.ieee.org/document/9378395>
- **Book: Digital Signal Processing Laboratory: LabVIEW-Based FPGA Implementation** <http://www.universal-publishers.com/book.php?method=ISBN&book=1599425505>
- **Real-Time Computation of Disparity for Hand-Pair Gesture Recognition Using Video Stereo Images** <https://link.springer.com/article/10.1007/s11554-011-0207-8>
- **FPGA Implementation Made Easy for Applied Digital Signal Processing Courses** <https://ieeexplore.ieee.org/document/5947089>
- **Real-Time Hand-Pair Gesture Recognition Using a Stereo Webcam** <https://ieeexplore.ieee.org/document/6152464>