

Syed Shabih Hasan

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INTERESTS	Machine Learning, Artificial Intelligence, Signal Processing, Mobile Health, Internet of Things, Indoor well-being, Healthcare, Affective Computing, Ubiquitous Health Applications
TECHNICAL SKILLS	<p>Programming: Python, Java, MATLAB, C</p> <p>Techniques: Supervised Learning, Unsupervised Learning, Cloud Computing, Mobile Ecological Momentary Assessment, Digital Signal Processing, Sentiment Analysis, Social-Network Analysis</p> <p>Cloud: Azure - IoT Hub, HDInsight, Azure Functions, Data Lake Store; AWS - IoT Core, DynamoDB, S3, Lambda Functions</p> <p>Operating Systems: MacOS, Linux (Ubuntu, Fedora, Raspbian), Android, Windows</p> <p>Tools: Eclipse, Android Studio, PyCharm, Vi, Weka, OpenSmile, VoiceBox</p> <p>Source Control: Git, SVN</p> <p>Internet of Things: Raspberry Pi, Grove Pi, Parallela Boards, Empatica E4 Bands, InterSense Motion Sensor, Shimmer3</p>
EDUCATION	<p>University of Iowa Iowa City, IA <i>Doctor of Philosophy</i> - Computer Science Graduated: May 2017 GPA: 4.0/4.0 Advisor: Dr. Octav Chipara Thesis Title: Mobile Ecological Momentary Assessment for Hearing Aid Evaluation</p> <p><i>Master of Science</i> - Computer Science Graduated: May 2017 GPA: 4.0/4.0</p> <p>Aligarh Muslim University Aligarh, India <i>Bachelor of Technology</i> (with Honors) - Computer Engineering GPA: 9.26/10.0</p>
PROFESSIONAL EXPERIENCE	<p>Director - Computer Sciences New York, NY and Rochester, MN Delos Living LLC. June 2017 - Present</p> <p><i>Technical Responsibilities:</i> Delos Labs (New York)</p> <ul style="list-style-type: none">• Leading the development and implementation of core cloud computing solution for ingesting data in a highly scalable way, and also implementing machine learning for insightful analytics.• Leading the development of new IoT sensing modalities that for understanding well-being in the built environments.• Working directly with the CTO to align product and research goals. <p>Well Living Lab (Rochester, MN)</p> <ul style="list-style-type: none">• Leading the development of portable sensing platforms using off-the-shelf sensors. This includes building new hardware, and software for collecting, processing, and analyzing environmental and behavioral data.• Using machine learning techniques to extract novel relationships between occupant behavior and environmental factors.• Developing complete end-to-end software and hardware pipelines for collecting novel information about occupant behavior.• Lead the implementation of a cloud-based analytics platform for generating research insights.

- Actively participate in experiment design, protocol writing, and data analysis with other researchers.

Leadership Responsibilities:

- Mentoring and guiding interns, and research analysts.
- Invited to give a talk related to Living Labs at Sensors Expo in San Jose in 2018. Sensors Expo is the largest industrial gathering of the sensing industry.
- Led the submission and successful execution of a workshop on the Living Lab methodology at the premier ACM CHI-2018 conference. The ACM CHI conference is the #1 venue for any HCI related research.
- Acting as a key point for research relationships with multiple industry partners.

Research Intern

Starkey Laboratories
May 2015 - August 2015

Berkeley, CA

Primary Project: Worked on exploring, proving, and modeling the existence of identifiable head movement gestures that represent human intent for advancing hearing aid control.

- Proved the existence of head movement based gestures that constitute intent in accelerometer data using non-parametric statistical methods.
- Built optimized tree based ensembles for recognizing gestures in real-time for individuals with mean accuracy for approximately 90% against a mean baseline accuracy of 60%.
- Designed, implemented, and analyzed experiments from the beginning to the end.
- Implemented a complete data collection, processing, and analysis pipeline using C and MATLAB.

Secondary Project: Global noise meter using Twitter

- Created the first global noise map through hashtag and geotag based data collection from Twitter using Python for identifying locations with high noise exposure.

ACADEMIC RESEARCH

AudioSense: Mobile Ecological Momentary Assessment (mEMA) for evaluating hearing aids, predicting user success, and objective data

- Designed and implemented the most comprehensive android application for mEMA for jointly characterizing hearing aid performance and auditory contexts.
- Developed machine learning models for determining the success of a hearing-aid prescription based on user perception of device performance with accuracies over 90% against baseline accuracy of 50%.
- Characterized lifestyle patterns of hearing aid users for the first time from in-situ data.
- Successfully deployed in the field for 55 study participants making the study the largest of its kind.
- Created a complete pipeline to analyze acoustic exposure variation across users using GPS data.
- Currently working on (i) novel methods for reduction in assessment burden through modeling auditory context constituents like acoustic activity and noise level using features extracted from in-situ audio, (ii) GPS based assessment delivery methodology.

Using Mobile Ecological Momentary Assessment(mEMA) to identify differences in hearing aid performances

- Worked with a global leader in electronics manufacturing to evaluate the performance of their prototype hearing aids.

- Proved existence of statistical differences between the prototype and an off-the-shelf hearing aid using approximately 4000 real-world data samples via mEMA.
- Validated the drawbacks associated with traditional evaluation methodologies by statistically proving that differences between the hearing aids were not captured by them.

Real-time mobile phone based hearing aid configuration tuning

- Worked with one of the largest hearing aid manufacturers in the world.
- Designed and implemented a state-of-the-art android application for collecting contextual information and hearing aids' internal parameters in real-time.
- Data collected will be used to build optimal hearing aid configuration identification models based on joint distribution of auditory context, user-perception of hearing aid performance, and hearing aids' internal parameters.

Social Network Communication Analysis of Middle School Students

- Built an end-to-end pipeline for analyzing text, twitter, and facebook messages between middle school students from a graph theoretic perspective in Python for a team consisting of researchers from Public Health, Informatics, Social Sciences, and Communication Sciences.
- Compared the performance of several off-the-shelf sentiment analyzers for overlaying polarity on the communication network.
- Proved that the social network conformed to weak structural balance theory.

Identifying Transcription Factors in Amino Acids

- Built models to predict whether a given protein was a transcription factor with the accuracy of 88% (baseline accuracy 56%) using a multi-layered neural network.
- Compared the performance of various machine learning algorithms like classification trees, random forests, logistic regression, support vector machines, and ensembling techniques like boosting and bagging.
- Found that natural groupings of essential and non-essential amino acid probabilities in the dataset.

Low Cost Distributed Data Analysis Using Parallela Boards

- Explored the feasibility of using Parallela, a linux based \$120 credit card sized computer, for distributed data analysis.
- Achieved a 3x computational speedup relative to a standard high performance node with a 18x less energy consumption.
- Implemented a GPU based k-nearest neighbor search.
- Used the Million Song Dataset as our underlying Big Data source for processing.

RESEARCH PAPERS

1. Yu-Hsiang Wu, Elizabeth Stangl, Octav Chipara, **Syed Shabih Hasan**, Sean DeVries, Jacob Oleson
Efficacy and Effectiveness of Advanced Hearing Aid Directional and Noise Reduction Technologies for Older Adults with Mild to Moderate Hearing Loss
Submitted to Ear and Hearing
2. **Syed Shabih Hasan**, Anja Jamrozik, Carolina Campanella, Sara Aristizabal, Rongpeng Zhang, Nicholas Clements
Living Labs: Measuring Human Experience in the Built Environment
In Proceedings of the 2018 ACM Conference on Human Factors in

- Computing Systems (CHI 2018)
3. Yu-Hsiang Wu, Elizabeth Stangl, Octav Chipara, **Syed Shabih Hasan**, Anne Welhaven, Jacob Oleson
Characteristics of Real-World Signal to Noise Ratios and Speech Listening Situations of Older Adults With Mild to Moderate Hearing Loss
Ear and Hearing: March/April 2018 - Volume 39 - Issue 2.
 4. **Syed Shabih Hasan**, Octav Chipara, Ryan Brummet, Yu-Hsiang Wu,
Assessing the Performance of Hearing Aids Using Survey and Audio Data Collected In-Situ
In Proceedings of the 6th IEEE Annual International Workshop on Mission-Oriented Wireless Sensor and Cyber-Physical System Networking (MiSeNet @ INFOCOM 2017).
 5. **Syed Shabih Hasan**, Ryan Brummet, Octav Chipara, Yu-Hsiang Wu, Tianbao Yang
In-situ Measurement and Prediction of Hearing Aid Outcomes Using Mobile Phones
In Proceedings of the 2nd IEEE International Conference on Healthcare Informatics (ICHI 2015).
 6. Farley Lai, **Syed Shabih Hasan**, Austin Laugesen, Octav Chipara
CSense: A Stream-Processing Toolkit for Robust and High-rate Mobile Health Systems
In Proceedings of the 13th ACM/IEEE The International Conference on Information Processing in Sensor Networks (IPSN 2014).
 7. **Syed Shabih Hasan**, Octav Chipara, Yu-Hsiang Wu, Nazan Aksan, Title:
Evaluating Auditory Contexts and Their Impacts on Hearing Aid Outcomes with Mobile Phones
In Proceedings of the 8th International Conference on Pervasive Technologies for Healthcare (Pervasive Health 2014).
 8. **Syed Shabih Hasan**, Farley Lai, Octav Chipara and Yu-Hsiang Wu, Title:
AudioSense: Enabling Real-time Evaluation of Hearing Aid Technology In-Situ
In Proceedings of 26th IEEE International Symposium on Computer-Based Medical Systems(CBMS 2013). [**Best Student Paper**]
 9. **Syed Shabih Hasan**, Mohd. Abdul Qadeer
Security Concerns in WiMAX
In Proceedings of 1st IEEE Asian Himalayan International Conference on the Internet (AH-ICI 2009)
 10. **Syed Shabih Hasan**, Mohd. Abdul Qadeer
WiMAX as a next generation wireless network
In Proceedings of the 2nd IEEE International Conference on Computer Science and Information Technology (ICCSIT 2009)

POSTERS

1. Yu-Hsiang Wu, **Syed Shabih Hasan**, Octav Chipara, Elizabeth Stangl
Using GPS Location Data of Smartphones to Predict Listening Demand
Presented at the 41st Annual American Auditory Society Scientific and Technology Meeting (2014)
2. **Syed Shabih Hasan**, Mohd. Abdul Qadeer, Praveen Varshney
Vehicular Communication network: Inter-Vehicular Communication of the near future
International Conference & Workshop on Emerging Trends in Technology

(ICWET 2011)

3. **Syed Shabih Hasan**, Praveen Varshney, Mohd. Abdul Qadeer
Mobi browser with remote video streaming
International Conference & Workshop on Emerging Trends in Technology (ICWET 2011)

INVITED AND PROFESSIONAL TALKS

1. **Syed Shabih Hasan**, Sara Aristizabal
Understanding Human Health and Well-Being Through Sensing Technology
Talk delivered at the Medical Sensors Design Conference 2018 in San Jose as a part of the Sensors Expo 2018.
2. Jinjing Xu, Yu-Hsiang Wu, Elizabeth Stangl, Shareka Pentony, Dhruv Vyas, Octav Chipara, **Syed Shabih Hasan**, Jeff Crukley, Jason Galster
Assessing auditory ecology of younger normal-hearing listeners and older hearing aid wearers using a smartphone/hearing aid-based ecological momentary assessment system
Presented by Dr. Xu at the 3rd International Meeting on Internet & Audiology in 2017

MEDIA COVERAGE

Academic Research

- CBS News : Hearing Aids Get a Boost from Smartphone App, appeared 04/04/2014
[Link](#)
- USA Today/Press-Citizen: Smartphones give Iowa researchers hope for hearing loss, appeared 04/04/2014
[Link](#)

AWARDS

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| National Science Foundation Travel Award
\$500 awarded for attending IEEE ICHI 2015 | 2015 |
| Strategic Initiative Fund Award
Awarded for exceptional performance as a PhD student by CS Department at U.Iowa. Full tuition, benefits, and a stipend for 1 semester. | 2015 |
| Best Student Paper Award
Best Student Paper Award for AudioSense @ CBMS 2013 | 2013 |
| Strategic Initiative Fund Award
Awarded for the best performance among all PhD students in the qualifying exam by CS Department at U.Iowa. Full tuition, benefits, and stipend awarded for 1 semester. | 2013 |
| Nurul Hasan Merit Scholarship
Awarded for academic performance in undergraduate Computer Engineering coursework by the A.M. University (India). | 2008, 2009, 2010 |

PROFESSIONAL SERVICE

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| Invited Speaker <ul style="list-style-type: none">● Speaker at the 2018 Medical Sensor Design Conference in San Jose | June 2018 |
| Organizer <ul style="list-style-type: none">● Living Labs Workshop at CHI 2018 (No. 1 Ranked Conference in HCI) | April 2018 |
| Reviewing <ul style="list-style-type: none">● International Conference on Data Communication and Networks - 3 | |

- papers
- ACM Designing Interactive Systems 2018 (DIS 2018) - 3 papers
 - Elsevier Journal Future Generation Computer Systems (FGCS) - 1 paper
 - 15th International Conference on Wireless and Optical Communication Networks (WOCN 2018) - 5 papers
 - 14th International Conference on Wireless and Optical Communication Networks (WOCN 2017) - 14 papers
 - International Conference on Multimedia, Signal Processing, and Communication Technologies (IMPACT 2017) - 3 papers
 - Future Generation Computer Systems Journal (FGCS) - 1 paper
 - International Conference on Multimedia, Signal Processing, and Communication Technologies (IMPACT 2013) - 4 papers

Volunteering

- Student volunteer at IEEE ICHI 2015.

Professional Society Membership

- Association of Computing Machinery