Saad Hassan

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RESEARCH INTERESTS

My research interests include human-centered AI, accessibility, natural language understanding (NLU), human-computer interaction (HCI), and information retrieval (IR).

EDUCATION

Rochester Institute of Technology | Rochester, NY, USA — Aug 2019 – Present

- PhD in Computing and Information Sciences, *CGPA : 4.0*
- Advisor: Matt Huenerfauth

Lahore University of Management Sciences | Lahore, Pakistan — Aug 2015 – Jun 2019

- B.S. in Computer Science, *Graduated with merit*

SELECTED RESEARCH PUBLICATIONS

Akhter Al Amin*, **Saad Hassan***, and Matt Huenerfauth. 2020. Caption-Occlusion Severity Judgments across Live-Television Genres from Deaf and Hard of-Hearing Viewers. In Proceedings of The 18th International Web for All Conference (Web4All '21). ACM, New York, NY, USA, 12 pages.

Akhtar Amin*, **Saad Hassan***, Matt Huenerfauth. Effect of Occlusion on Deaf and Hard of Hearing Users' Perception of Captioned Video Quality. Universal Access in Human-Computer Interaction. HCII 2021. Lecture Notes in Computer Science. Springer, Cham, 2021. (to appear).

Saad Hassan, Oliver Alonzo, Abraham Glasser, and Matt Huenerfauth. (Journal Article Submitted). Effect of Sign-Recognition Performance on the Usability of Sign-Language Dictionary Search. ACM Transaction on Accessible Computing, 33 pages. 2021.

Saad Hassan, Aiza Hasib, Suleman Shahid, Sana Asif, and Arsalan Khan. 2019. Kahaniyan-Designing for Acquisition of Urdu as a Second language. In IFIP Conference on Human-Computer Interaction. Springer,207–216.

Saad Hassan, Oliver Alonzo, Abraham Glasser, Matt Huenerfauth. 2020. Effect of Ranking and Precision of Results on Users' Satisfaction with Search-by-Video Sign-Language Dictionaries. In Sign Language Recognition, Translation and Production (SLRTP) at European Conference on Computer Vision (ECCV '20) Workshop-Extended Abstracts.

Saad Hassan, Larwan Berke, Elahe Vahdani, Longlong Jing, Yingli Tian, and Matt Huenerfauth. 2020. An Isolated-Signing RGBD Dataset of 100 American Sign Language Signs Produced by Fluent ASL Signers. In Proceedings of the LREC2020 9th Workshop on the Representation and Processing of Sign Languages. European Language Resources Association (ELRA), Marseille, France, 89–94.

RESEARCH WORK EXPERIENCE

Google LLC, Mountain View, California
Research Intern — May 2021 – Present

- •Working with the American Sign Language group within the Perception Team
- •Conducting research on sign-language recognition and search interfaces
- •Rapid prototyping to improve the design of sign language search interfaces

Rochester Institute of Technology, Rochester, New York
Graduate Research Assistant — Aug 2019 – Present

Conducting research on Accessibility and Human Computer Interaction at the ***Center for Accessibility and Inclusion Research (CAIR)*** and designing education technology for people who are trying to learn American Sign Language at the ***Linguistics and Assistive Technology Lab (LATLab)***. Summary of projects is listed below:

- •**American Sign Language (ASL) Search Via Webcam**
  - –National Science Foundation (NSF) funded project with a larger goal of designing an American Sign Language (ASL) dictionary that allows users to record a video of a sign in front of a webcam to search for an unfamiliar words
  - –Investigating user behavior in search interfaces that take video-based input by conducting lab-based studies in order to make the task of sign lookup easier for users

– Collecting a large annotated dataset of ASL signs from fluent signers to support sign-language-recognition research

• **American Sign Language Learner Feedback**

– Conducted lab-based study to evaluate user preferences about getting feedback on ASL homework assignments

– Conducted formative study using interviews to explore the utility of various ways of providing feedback, including side-by-side video of novice and fluent signers and face swapping

• **Social Bias against People with Disabilities**

– Conducted analyses on the output of a large-scale BERT language model for word prediction task

– Used sentiment analysis and topic modeling to evaluate the output of BERT

• **Kinect based American Sign Language Education Tool**

– National Science Foundation (NSF) funded project with a larger goal of designing an educational tool that automatically provides feedback to people learning American Sign Language

– Designing and experimentally evaluating technology that can automatically recognize aspects of American Sign Language signing and provides instant feedback to students, giving them a time-flexible way to practice and improve their signing skills

• **Caption Evaluation Metric for Live Television**

– National Institutes of Health (NIH) funded project with a larger goal of designing a caption evaluation metric that automatically evaluates the quality of a captioning in live television

– Collecting and analyzing datasets of Deaf and Hard of Hearing (DHH) users' judgements regarding placement and presentation of caption across different genres of live television to develop an automatic caption evaluation metric

Lahore University of Management Sciences, Lahore, Pakistan
Undergraduate Researcher Jun 2018 – Jun 2019

Conducted research on language acquisition technologies and mobile-health based assistive technologies for depression at the ***Computer Human Interaction and Social Experience Lab (CHISEL)***. Summary of the projects is listed below:

• **Assisting Diagnosis and Rehabilitation of Adolescents with Major Depressive Disorder**

– Conducted semi-formal interviews and diary study to understand how psychiatrists treat adolescents with Major Depressive Disorder (MDD) and how they employ technological solutions

– Co-designed a tool with psychiatrists that allowed better verbalization of symptoms of major depressive disorder (MDD) in adolescents by the use of a game- based solution.

– Investigated how to best incorporate aspects of Cognitive Behavior Therapy and Narrative Therapy into the gamified solution to help assist in rehabilitation of adolescents with MDD

• **Designing Game Based Learning Solutions for Urdu as Second Language**

– Created a story-based game framework tailored to assist acquisition of a second language

– Empirically investigated the suitability of the use of gamification to assist second language learning within the context of interactive storytelling in an experimental study

– Investigated how psychological and linguistic aspects of language learning coupled with contextual task analysis can be used to inform of the design of a language learning tool

• **Emotion-based vs Fact-based Self-reflection in Behavior Change Mobile Applications**

– Investigated whether a self-tracking application that prompts users to periodically record emotional state while indulging in an activity promotes better self-reflection and consequently behavior change

– Conducted a longitudinal study to measure the change in behavior as measured by the frequency of a self-reported positive or negative activity that the user wanted to change

TEACHING EXPERIENCE

Lahore University of Management Sciences, Lahore, Pakistan
Teaching Assistantship (CS 360: Software Engineering Dec 2018 – May 2019

- Assisted in preparation of course materials including lectures, tutorials, grading rubrics, and exams for a Software Engineering course
- Conducted tutorials to fimiliarize students with different front-end development tools and good interface design practices
- Supervised six student teams in their semester long projects and assisted the instructor with grading at the end of the course

Alumni Development Program, The Citizen Foundatios, Lahore, Pakistan
Teaching Fellow May 2016 – Aug 2016

- Conducted classes of assigned subjects (Mathematics and Problem Solving, English)
- Completed scheduled coursework, tests and exams, and correcting them
- Managed students - attendance, complaint resolution, result tabulation, and recording, and handling on-ground challenges
- Served as the focal point with Alumni Department at TCF for on-ground crisis management
- Executed and monitored the programme for assigned schools

UNIVERSITY SERVICE

Center for Accessibility and Inclusion Research, Rochester, NY
Communication Chair Jun 2020 – Present

- Setting agendas for the weekly meetings of the research group
- Invite different speakers to deliver talks on state-of-the-art HCI and accessibility research

CERTIFICATIONS AND OTHER INTERNSHIPS

Teach Access: Accessible Technology Design and Development, Remote
Student Feb 2021 – 20210415

Learned the following concepts:

- Assistive technology
- Web/app accessibility
- Accessible events
- Racial justice, intersectionality, and disability rights
- Accessible design
- Inclusive marketing and storytelling

Association for Computing Machinery, Remote
Intern May 2017 – 20170715

Learned the following concepts:

- Object-Oriented Design
- Tree and Graph problems
- Recursion and Memoization
- Complexity analysis of algorithms
- Android Development

AWARDS AND SCHOLARSHIPS

Student Excellence Award, Rochester, NY Jun 2020 – Present
*Recognized as the recipient of the **2021 Language Science and Computational Linguistics Student Excellence Award** for my research and coursework in natural language processing. This award was made by the Language Science Curriculum Committee, and it came with a certificate and monetary prize.*

Merit-based Ph.D. scholarship, Rochester, NY Jun 2020 – Present
Financial support that covers tuition fee and a living stipend

GRADUATE-LEVEL COURSES

Rochester Institute of Technology, Rochester, NY

- ENGL-681 **Computational Linguistics**, Dr. Cecilia Alm, (Grade: A) Spring 2021
- ENGL-681 **Qualitative Research Methods**, Dr. Kristen Shinohara, (Grade: A) Spring 2021
- ENGL-681 **Introduction to Natural Language Processing**, Dr. Cecilia Alm, (Grade: A) Fall 2020
- SWEN-610 **Foundations of Software Engineering**, Dr. A.M. Wahaishi, (Grade: A) Fall 2020
- CISC-807 **Teaching Skills Workshop**, Dr. Yin Pan, (Grade: A) Fall 2020
- CISC-830 **Cyberinfrastructure Foundations**, Dr. Minseok Kwon, (Grade: A) Spring 2020
- CISC-863 **Statistical Machine Learning**, Dr. Rui Li, (Grade: A) Spring 2020
- CISC-810 **Research Foundations**. Dr. Pengcheng Shi, (Grade: A) Fall 2019
- CISC-820 **Quantitative Foundations**, Dr. Linwei Wang, (Grade: A) Fall 2019
- HCIN-600 **Research Methods in HCI**, Dr. Roshan Peiris, (Grade: A) Fall 2019

Lahore University of Management Sciences, Lahore, Pakistan

- CS-666 **Topics in Interactive Computing**, Dr. Suleman Shahid, (Grade: A) Spring 2019
- CS-466 **Human Computer Interaction**, Dr. Suleman Shahid, (Grade: A) Spring 2019

TECHNICAL AND RESEARCH SKILLS

Research Skills

Experimental evaluations with human participants, natural language understanding (NLU), prototyping, user testing, interviews, expert reviews, journal studies, surveys, focus groups, statistical analysis, thematic analysis, ethnography, A/B tests, co-design, contextual inquiry, metric design, eye-tracking, WCAG 2.1

Programming Languages

Python (5 years), MATLAB (3 years), C++ (2 years), Haskell, GoLang, JavaScript, Java, R, Y86 assembly

Programming, Mock-up, Prototyping, and Testing Tool

React Native, MongoDB, Android Studio, Firebase, Expo, Proto.io, Axure, Sketch, Balsamiq Mockups

Other Tools

MS-Office, LaTex, LibreOffice Calc, Prezi, PTC Creo, NVivo, Rstudio, Jupyter Notebook, Google Docs

SELECTED COURSE PROJECTS

Automatic Classification and Reviewer Selection of Research Papers | Natural Language Processing

- Developed a supervised learning algorithm that predicts the Computing Classification System (CCS) concepts of papers submitted to an Association for Computing Machinery (ACM) conference
- Developed an unsupervised learning algorithm that predicts the appropriate reviewer committee for a paper submitted to an ACM conference

Emojis and Emotional Well-being | Research Methods in HCI

- Investigated how to use emoji usage data to understand user's emotional well-being
- Designed a prototype of an emoji usage tracker that allows self-monitoring of emoji usage and obtained feedback from college students

Sports Match-making Application | Software Engineering

- Designed a mobile application using React Native to enhance the sporting culture in my University by facilitating the process of match scheduling and resolving the problem of finding a match partner

Campus Events News Website | Human Computer Interaction

- Reviewed current campus news and event scheduling websites on the basis of adherence to Norman's design principles and principles of visualization
- Designed a prototype of a campus news website after rectifying some of the problems

Handwriting Improvement Tool Using Sobel technique | Artificial Intelligence

- Implemented an e-learning software to recognize and evaluate the quality of handwriting of children using inputted pictures of students handwriting scripts
- Used edge detection algorithms and neural networks for segmentation and feature extraction from pictures and provided feedback to students

E-learning Tool to Teach DNA Mutation | Computational Problem Solving

- Implemented a simulation tool using MATLAB Bioinformatics toolbox to teach the processes of transcription, translation, protein synthesis, and mutations in cells

REFERENCES

Dr. Matt Huenerfauth matt (dot) huenerfauth (at) rit (dot) edu