Raju Maharjan, Ph.D.

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EDUCATION

02/2018 – 11/2021 Ph.D., Digital Health Technology, Technical University of Denmark (DTU)
Title: Speech-Enabled Conversational Agents to Support the Self-Report of Mental Health & Wellbeing
Supervisors: Jakob E. Bardram & Per Bækgaard

02/2015 – 01/2017 MA, Web & Multimedia Design, Touro Graduate School of Technology, NY

02/2011 – 06/2013 BSc, Dynamic Web Design, The Graduate Center, The City University of New York

02/2007 – 08/2009 AAS, New Media Technology, LaGuardia Community College, The City University of New York

RESEARCH EXPERIENCE

12/2019 – Present **Postdoctoral Research**, Project ReHyb

This project aims to help the rehabilitation of stroke patients through an exoskeleton system. I am designing conversational interaction to employ verbal persuasion strategies in an exoskeleton-based rehabilitation system and investigating its effect on stroke patients' engagement and experiences while using the system.

08/2019 – 11/2021 **Ph.D. Research**, Project SOFIA

This research project that aims to improve the quality of life of people living with mental illness. As a part of the research, I investigated the feasibility of a speech-enabled conversational agent to support the self-report of mental health and wellbeing by assessing its capacity to accurately capture the wellbeing self-reports in compared to the paper based method, understanding users' perception of the system's usability, and comparing users' engagement and experiences with the agent vs. traditional web-based app.

02/2018 – 07/2019 **User Research & System Design**, Project mCardia

The goal of this highly interdisciplinary research project is to design, develop, and evaluate the clinical feasibility of a smartphone-based ambulatory heart monitoring system. Adopting the user-centered design approach, I designed the prototype of the mCardia system which included patient-facing mobile app that enabled real-time visualization of the cardiovascular data (e.g., Heart Rate (HR), Heart Rate Variability (HRV), and Electrocardiogram (ECG) data collected via a two-channel Holter device and contextual information such as patient self-reports) and a web application that allowed clinicians to analyze and annotate the ECG data with the contextual information.

06/2011 – 01/2012 **Director of Technology**, Project Artbox

Artbox is a National Science Foundation (NSF)-funded app development project with an aim to create an engaging online community of artists and art enthusiasts. My role was to research mobile technology and propose features to engage a diverse group of users, help them make connections with each other, and encourage them to keep coming back to the app. To do so, we conducted semi-structured interviews with artists and patrons to investigate how they use technology and social media and visited museums, auction houses, and art exhibitions to conceptualize the app's business model.

TEACHING EXPERIENCE

Student Supervision

07/2019 – 12/2019 Chen Wang, MSc Capstone Project, Digital Media Engineering

- Supervised on the research, design and development of a Microbit-based medicine container to improve medical adherence.

Teaching Assistant

01/2019 – 03/2019 02808, Personal Data Interaction for Mobile and Wearables, 41 students, rating 4.3/5

- Advised student groups on the research, design, and development of course projects.
- Graded and provided constructive feedback on the finalized projects.
- Guest lectured on "Personal Health Data Visualization" to provide insights on history, and principles of data visualization and presented a case study of a visualization design for an mHealth application.

01/2019 – 01/2019 02266, User Experience Engineering, 110 students, rating 4.8/5

- Developed an assignment that required student groups to design a smartphone-based heart monitoring system following the user-centered design method.
- Graded and provided feedback on the research methods and technology used on the final designs of the system.

09/2018 – 11/2018 User Experience Design Prototyping, 150 students, rating 4.25/5

- Guest lectured on "Conversational User Interface (CUI) design" and demonstrated conversational agent prototyping tools: Dialogflow and Adobe XD.
- Supported student groups with project assignments.

PROFESSIONAL EXPERIENCE

10/2017 – 01/2018 Frontend Developer, Google, CA

03/2015 – 08/2017 UI/UX Engineer, Abbott Point of Care, NJ

08/2013 – 07/2014 Frontend Developer, Harland Clarke, TX

04/2012 – 05/2012 Frontend Developer, HIV/AIDS Services, NYC Human Resource Administration, NY

06/2011 – 01/2012 Director of Technology, Artbox – NYC College of Technology, NY

04/2011 – 01/2012 Web Designer & Developer, NYC College of Technology, NY

11/2009 – 09/2010 Web Developer, IBREA Foundation, NY

11/2009 – 10/2010 Web Developer, Iced Media and Boom Digital Ventures, NY

07/2007 – 05/2008 Technology Mentor, The City University of New York Research Foundation, NY

AWARDS & HONORS

2012 – 2013 **Thomas W. Smith Fellowship**, The City University of New York, NY

12/12/2012 **Promise Prize**, Code for Change, New York University, NY

SKILLS

Prototyping	Conversational Agents, Chatbots, Mobile Application, Web Application, 3D Models
Design Tools	Dialogflow, Figma, Axure, Illustrator, Photoshop, Indesign, After Effects, Premiere Pro, Maya
Development	Javascript, PHP, HTML, CSS, MySQL, Java
Research	Qualitative, Quantitative & Mixed-Method Study Design, User-Centered Design, Design Thinking, Participatory Design, Survey, Workshop, Interviews, Focus Groups
Data Analysis	Text Mining, Topic Modeling, Data Visualization, Thematic Analysis, R, Python, MS Excel

COMMUNITY SERVICE

Paper Reviewing

2019 – Present	ACM Conference on Human Factors in Computing Systems (CHI)
2021	ACM International Symposium on Wearable Computers (ISWC)
2020	EAI International Conference on Pervasive Computing Technologies for Healthcare

Student Volunteer

2019	Conference on Ubiquitous, Pervasive and Wearable Computing (Ubicomp)

PUBLICATIONS

Journals

Raju Maharjan, Darius Adam Rohani, Kevin Doherty, Per Bækgaard, and Jakob E. Bardram. 2022. What's up with these Conversational Health Agents? [IN PREPARATION]

Raju Maharjan, Darius Adam Rohani, Kevin Doherty, Per Bækgaard, and Jakob E. Bardram. 2022. What's the Difference? Investigating the Self-Report of Wellbeing via Conversational Agent and Web App. *IEEE Pervasive Computing, Special Issue on Mental Health, Mood, and Emotion.* [ACCEPTED]

Raju Maharjan, Kevin Doherty, Darius Adam Rohani, Per Bækgaard, and Jakob E. Bardram. 2022. Experiences of a Speech-Enabled Conversational Agent for the Self-Report of Wellbeing Among People Living with Affective Disorders: An In-The-Wild Study. *ACM Trans. Interact. Intell. Syst.* DOI:https://doi.org/10.1145/3484508 [ACCEPTED]

Devender Kumar, **Raju Maharjan**, Alban Maxhuni, Helena Dominguez, Anne Frølich, and Jakob E. Bardram. 2022. mCardia: A Context-Aware Ambulatory ECG Collection System for Arrhythmia Screening. *ACM Transactions on Computing for Healthcare* [ACCEPTED]

Conferences

Raju Maharjan, Darius Adam Rohani, Per Bækgaard, Jakob Bardram, and Kevin Doherty. 2021. Can we talk? Design Implications for the Questionnaire-Driven Self-Report of Health and Wellbeing via Conversational Agent. *CUI 2021 - 3rd Conference on Conversational User Interfaces*. Association for Computing Machinery, New York, NY, USA, Article 5, 1–11. DOI:https://doi.org/10.1145/3469595.3469600

Giovanna Nunes Vilaza, **Raju Maharjan**, David Coyle, and Jakob Bardram. 2020. Futures for Health Research Data Platforms From the Participants' Perspectives. In *Proceedings of the 11th Nordic Conference on Human-Computer Interaction: Shaping Experiences, Shaping Society* (*NordiCHI '20*). Association for Computing Machinery, New York, NY, USA, Article 39, 1–14. DOI:https://doi.org/10.1145/3419249.3420110

Workshops

Raju Maharjan, Per Bækgaard, and Jakob E. Bardram. 2019. “Hear me out”: smart speaker based conversational agent to monitor symptoms in mental health. In *Adjunct Proceedings of the 2019 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2019 ACM International Symposium on Wearable Computers* (*UbiComp/ISWC ’19 Adjunct*). Association for Computing Machinery, New York, NY, USA, 929–933. DOI:https://doi.org/10.1145/3341162.3346270

Raju Maharjan, Per Bækgaard, and Jakob E. Bardram. 2018. Leveraging Multi-modal User-labeled Data for Improved Accuracy in Interpretation of ECG Recordings. In *Proceedings of the 2018 ACM International Joint Conference and 2018 International Symposium on Pervasive and Ubiquitous Computing and Wearable Computers* (*UbiComp ’18*). Association for Computing Machinery, New York, NY, USA, 636–641. DOI:https://doi.org/10.1145/3267305.3267548

Poster

Pegah Hafiz, **Raju Maharjan**, and Devender Kumar. 2018. Usability of a mood assessment smartphone prototype based on humor appreciation. In *Proceedings of the 20th International Conference on Human-Computer Interaction with Mobile Devices and Services Adjunct* (*MobileHCI ’18*). Association for Computing Machinery, New York, NY, USA, 151–157. DOI:https://doi.org/10.1145/3236112.3236134