Affective Natural Language Processing: An Approach to Mental Health Support.

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In recent years, the growing need for mental health treatments, along with the developing capabilities of artificial intelligence (AI), has fueled the development of digital mental health therapies (DMHIs).Conversational agents, have been implemented into DMHIs to help with delivery, screening, symptom management, and behavioural modification. Conversational AI allows humans and machines to interact effectively, empathetically and clearly via speech or text. Because emotions are integral in communication, decision making, learning, and other aspects of human life, AI should learn to recognise and express them effectively. Although existing platforms may provide human-like interactions, they lack in flexibility and understanding of the social systems and the environment in which we live. Despite the growing availability of technology-enabled supports and specifically relational agents to support peoples mental health, their full potential remains untapped due low engagement rates and limited amounts of data.

1 INTRODUCTION

Work in HCI has set out to understand both how mental health is experienced and the interactions that experience can have on technology use [9]. This includes understanding and predicting how individuals will express mental problems in online and social contexts through analysis of social media and online forums [6, 7] as well as designing behavioural interventions to improve people's mental health [8, 10]. Language interactions are an important part of mental health assessment and treatment, as they provide a useful lens for mental health analysis [?]. Natural Language Processing (NLP) is a rapidly evolving interdisciplinary field that studies human language content and its use in predicting human behaviour [2]. NLP models utilise computational models to analyse unstructured, user-generated text to identify patterns and related outcomes [4]. NLP offers a useful set of tools for analysing audio/text data generated in Digital Health Interventions (DHI) and for building predictive models. Conversational agents or dialogue systems that carry out coherent conversations with people through text or speech are also enabled by NLP. In the course of the dialogue with the user they offer the most relevant information whilst enabling users to lead the conversation.

In the context of mental health these systems are still in their early stages and most chatbots are rule-based and follow scripts that are difficult to customize to each users needs. In addition, retaining and engaging users with chatbots is often challenging with some people being reluctant to use them due to stigma. Although NLP techniques could create more engaging, responsive and adaptive interventions based on information about the user or their environment there remains a need for design of intelligent systems that can support treatment and prevention of mental health illness according to each users needs. As such open questions remain: How can NLP techniques provide a suitable delivery

channel to effectively meet user needs and provide in-situ support and learning? How could CAs provide empathetic and personalised mental health support? Would users accept the collection of automated insights about their health/life through speech and behaviour analysis to predict emotional states and provide the necessary support? Which choices and strategies might designers employ to overcome the current limitations of CAs to support the design of meaningful and supportive interactions between agents and humans?

In my previous research I have sought to understand how to better support and design technologies for parents lived experience and needs with the aim of improving family well being and child mental health. By taking a situated lens my previous work identified existing challenges and opportunities for design of user-centred parenting supports. Specifically, we conducted a multilevel study were we examined how parents experience evidence-based, digitally mediated, parenting interventions such as apps whilst looking to support their parenting goals. We identified an array of parenting needs that need to be addressed within the technology space (i.e., personalisation, engagement, reflection, clarity on parenting choices/strategies, collaboration among parents) that are currently not met by Digital Parenting Apps (DPAs). Building on these insights my future research aims to explore if and how we can employ NLP techniques to support parenting needs and in turn, provide better mental health outcomes for parents and children. To do so, I am currently designing a study in which we will envision, develop, and test NLP design fictions that could support parents' objectives and in-situ delivery. Design fiction probes allow the user to explore potential consequences of the use of technologies before they exist [1, 5]. In my study I will create a fictional world where participants can imagine where/how these automated NLP systems live. I will then test these probes with parents through co-speculation activities to elicit insights about the design of alternate delivery approaches, gather input for the development of new technologies, address concerns and expectations.

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