Thesis Project Portfolio

AI Solutions for Health Equity: NLP and ML Approaches to Analyzing Social Determinants of Health

(Technical Report)

ANALYZING TECHNOLOGICAL INFLUENCES ON HEALTHCARE WORKER BURNOUT

(STS Research Paper)

An Undergraduate Thesis

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Andrew Lucktong

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Department of Computer Science

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Sociotechnical Synthesis

Physician burnout poses a significant challenge to patient care and healthcare worker well-being. Burnout has clearly become a major issue in the healthcare industry over the past five years, with more than one third of healthcare workers in the United States experiencing symptoms of burnout even prior to the COVID-19 pandemic in 2020. One of the driving factors to burnout is the excessive administrative workload placed on healthcare professionals, which forces physicians and nurses to spend more overall time with technologies and less quality time with patients. The implementation of artificial intelligence (AI) models, specifically those using machine learning (ML) and natural language processing (NLP) techniques, presents an opportunity to alleviate this burden and enhance productivity and patient care in the healthcare setting. Despite the significant innovation in AI healthcare technologies from large tech companies like Microsoft, there are not many resources available for properly creating a human-centered system for healthcare purposes that addresses implementation for limiting aspects of burnout. Using Susan Leigh Star's 1999 paper the *Ethnography of Infrastructure* as a framework, this paper will explore current healthcare technologies and the problems they create for both provider and patient. As artificial intelligence integration continues to rise in popularity across multiple industries, it is essential to create a system that works for the client rather than against them. Applying the knowledge gained from Star's paper to healthcare technology can help reveal some of the frequently overlooked aspects of technology that influence how a system functions. The research conducted in this paper consists of literature reviews of papers and discussions from medical journal databases PubMed, OVID Medline, and the Cochrane Library. Papers were reviewed for their relevance to the topic and information was synthesized to answer the research question: How is technology currently used in healthcare systems and how does it influence physician burnout and patient care? These papers address different aspects of technology and burnout in healthcare and are used to gain inside perspectives of the people affected by healthcare technology. The main focuses of this research include factors of interoperability, system usability, proper use of medical standards and the "invisible work" of the background elements that often goes unnoticed and can dictate how well a system works. The research analyzes how healthcare workers use technology daily and how symptoms of burnout arise in clinicians as well as how burnout and technology influences patient care. The findings within this paper show many of the current issues with healthcare technology infrastructure. From the research, it was determined that there were many problems with how technology impeded workflow, requiring healthcare workers to spend a large amount of their time interacting with technologies like electronic health records (EHRs) during a workday. Research also found patient care to be negatively impacted by technology, altering patient-physician communication patterns, and weakening relationships between patient and provider. Overall, the research found that AI systems may provide a promising solution for improving healthcare worker wellbeing, improving patient care, and reducing symptoms of burnout directly caused by healthcare technology.