UNIVERSITY OF SOUTH FLORIDA

Major Research Area Paper Presentation

Predicting Psychometric Properties Using Artificial Intelligence

by

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For the Ph.D. degree in Computer Science and Engineering

Transformer-based language models (LMs) continue to achieve state-of-the-art performance on natural language processing (NLP) benchmarks, including tasks designed to mimic human-inspired "commonsense" competencies. To better understand the degree to which LMs can be said to have certain linguistic reasoning skills, researchers are beginning to adapt the tools and concepts from psychometrics, the science of psychological assessment. But to what extent can benefits flow in the other direction? In other words, can LMs be of use in predicting the psychometric properties of test items, when those items are given to human participants? If so, the benefit for psychometric practitioners is enormous, as it can reduce the need for multiple rounds of empirical testing. We gather responses from numerous human participants and LMs (transformer- and non-transformer-based) on a broad diagnostic test of linguistic competencies. We then use the responses to calculate standard psychometric properties of the items in the diagnostic, and measure how well properties calculated using LMs correlate with the human properties. We find that transformer-based LMs can achieve strong and significant correlation with humans across multiple measures. Furthermore, we find cases in which transformer-based LMs predict psychometric properties consistently well in certain categories, but consistently poorly in others, thus providing new insights into fundamental similarities and differences between human and LM reasoning.

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Online: MS Teams

THE PUBLIC IS INVITED

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