ABSTRACT

DESIGNING HUMAN-CENTERED COLLECTIVE INTELLIGENCE
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Human-Centered Collective Intelligence (CI) is an emergent research area that seeks to bring together major research areas like machine learning, statistical modeling, information retrieval, market research, and software engineering to address challenges pertaining to deriving intelligent insights and solutions through the collaboration of several intelligent sensors, devices and data sources. An archetypal contextual CI scenario might be concerned with deriving affect-driven intelligence through multimodal emotion detection sources in a bid to determine the likability of one movie trailer over another. On the other hand, the key tenets to designing robust and evolutionary software and infrastructure architecture models to address cross-cutting quality concerns is of keen interest in the “Cloud” age of today. Some of the key quality concerns of interest in CI scenarios span the gamut of security and privacy, scalability, performance, fault-tolerance, and reliability.

I present recent advances in CI system design with a focus on highlighting optimal solutions for the aforementioned cross-cutting concerns. I also describe a number of design challenges and a framework that I have determined to be critical to designing CI systems. With inspiration from machine learning, computational advertising, ubiquitous computing, and sociable robotics, this literature incorporates theories and concepts from various viewpoints to empower the collective intelligence engine, Zoei, to discover affective state and emotional intent across multiple mediums. The discerned affective state is used in recommender systems to support content personalization. I dive into the design of optimal architectures that allow humans and intelligent systems to work collectively to solve complex problems. I present an evaluation of various studies that leverage the Zoei framework to design collective intelligence.