Engaging Opinion Building in Argumentative Dialogue Systems

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Abstract (should be within 1st page)

Argumentation is central to human reasoning and decision-making, particularly when individuals encounter conflicting information or controversial issues. However, information processing is strongly shaped by cognitive biases, most notably confirmation bias, which leads individuals to selectively seek and interpret information that reinforces existing beliefs. In conversational AI, this presents a challenge: although modern dialogue systems can provide information and sustain interaction, they rarely account for such biases or support balanced opinion formation. Many argumentative dialogue systems instead adopt persuasion-oriented paradigms that may reinforce biased reasoning. This thesis proposes a cooperative, bias-aware approach to argumentative dialogue systems that integrates cognitive bias awareness, dynamic user modelling, adaptive dialogue strategies, and engagement-oriented interaction design to support balanced opinion formation while maintaining engagement.

First, the thesis introduces domain-independent dynamic user models that capture users' preferences, interests, and susceptibility to filter bubbles during interaction, inferred from observable behaviour.

Second, it develops adaptive dialogue strategies that guide interaction through interest-driven adaptation, bias-counteracting interventions, and fallback strategies when user information is limited.

Third, the thesis investigates how belief-challenging arguments should be communicated to sustain engagement, examining linguistic adaptation and the non-verbal behaviour of embodied conversational agents.

Evaluations in laboratory and crowdsourcing studies show that user-model-driven adaptation fosters reflective engagement, reduces one-sided information exploration, and sustains interaction when users encounter preference-inconsistent arguments.