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Formalization and Implementation of ViolEx: An Active Inference perspective

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Abstract

Expectations play a critical role in human perception, cognition, and decision-making. There has been a recent surge in modelling such expectations and the resulting behaviour when they are violated. One prominent recent proposal is the ViolEx model. To move the model & the literature forward, we identified three areas of concern and addressed two in this study - Lack of formalization and implementation. Specifically, we aim to provide the first implementation of ViolEx using the Active Inference formalism by leveraging the rich overlap between them. As a result, we successfully simulated all expectation violation coping strategies of ViolEx and analyzed their potential mediators. Through this analysis, we identified novel predictors of immunization & assimilation and documented the computational mechanism of their mediation. We see this as the first step in developing a formal research framework to study expectation violations and hope to serve as a base for future ViolEx studies.