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Title: Modeling the cognitive process during strategic reasonings using HMM

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Abstract: This paper proposes a novel method to dynamically model process-data such as mouse tracking or eye tracking data in strategic games utilizing a class of machine learning model: hidden markov models(HMM). The HMM model can reveal the underlying mental reasoning processes on different time points during strategic processes. Besides, this model induces a new strategic level system, the result of which is comparable to the estimations using the traditional level-k type approaches. This new levels of reasoning method overcomes the main the identification problem by estimating the levels on a single trial basis. With further containing the fixation duration data, we developed a continuous-time hidden Markov model (ctHMM), which can be used to predict how exactly time pressure changes choices and strategic results.