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Discrete State Prediction Algorithm Design with Self Performance Enhancement Capacity

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Abstract : This work presents a discrete quantitative state prediction algorithm with intelligent behavior making it able to self-improve some performance aspects. The specificity of this algorithm is the capacity of self-rectification of the prediction strategy before the final decision. The auto-rectification mechanism is based on two parallel mathematical models. In one hand, the algorithm predicts the next state based on event transition matrix updated after each observation. In the other hand, the algorithm extracts its residues trend with a linear regression representing historical residues data-points in order to rectify the first decision if needs. For a normal distribution, the interactivity between the two models allows the algorithm to self-optimize its performance and then make better prediction. Designed key performance indicator, computed during a Monte Carlo simulation, shows the advantages of the proposed approach compared with traditional one.

Keywords : discrete state, Markov Chains, linear regression, auto-adaptive systems, decision making, Monte Carlo Simulation
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