GP Assignment - Simple Markov Process Investigation

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Abstract: This assignment entails a search for knowledge about Markov processes, real world applications of Markov processes, and perspectives on the strengths and weaknesses of Markov models. It then calls for the expression of that knowledge in the form of a short essay.

Markov Process Concept

The Markov process was created by a mathematician known as Andrey Markov. Markov had a curiosity for transition probabilities and according to american-scientist.org, in 1913 he released a variant on the written novel Eugene Onegin using the first instance of the markov process (2018). The novel was written in language but it was modeled mathematically by capturing vowel transition probabilities. As a result the variant was not similar to the original and it did not create a poem that made sense either, but it was the first representation of language being modeled mathematically. Markov processes have since been used to model various unique transition probabilities and predict possible sets.

Markov Process Application

Markov processes can be seen in many domains. For instance, "Markov chains and their respective diagrams can be used to model the probabilities of certain financial market climates and thus predicting the likelihood of future market conditions" (Myers, 2019, pg. 4). Another example is statistics. "In statistics, the chains provide methods of drawing a representative sample from a large set of possibilities" (american-scientist.org, 2018). Markov processes are used all across the sciences for its ability to produce probability theory.

Strengths and Weaknesses for Modeling

There are many strengths and weaknesses to modeling with Markov Processes. The first weakness is that modeling transition states in matrices is a long process even with a relatively small data set. If someone tried to calculate transition probabilities of a large set like Markov did with the novel and it's vowell's, they would find themselves making mistakes along the way. Another weakness is that it's not useful for understanding or explaining data. On the other hand, it is however useful to make predictions on probabilities amongst sets. Another benefit as far as modeling goes is that it's practically useful and can be applied wherever there are transitions amongst states which is why Markov processes can be seen in many sciences.

References

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