

Introduction to Markov Chains & Hidden Markov Models

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1 Basics

In this section, we record some basic information.

Number of students: Up to 20.

Age group: Any.

Time: 55 minutes.

Goals:

- Introduce students to Markov Chains and Hidden Markov Models.
- Create Markov Chains given certain probabilities.
- See the Viterbi Algorithm in action.
- Have some fun predicting hidden states!

2 Outline of plan

(0-5) Let students enter, get settled in. Give an introduction to the Warren Buffett problem.

(5-15) Introduction to Markov Chains.

(15-20) Problem solving with Markov Chains & drawing our own Markov Chains.

(20-25) Discuss emission probabilities.

(25-30) Present an example of the Hidden Markov Model (the sunny-rainy example).

(30-35) Walk through a Maximum Likelihood example.

(30-45) Walk through a Viterbi's Algorithm example (time permitting).

(45-50) Run Viterbi's algorithm to get predictions of market performance for the Warren Buffett problem.

(50-55) Closing remarks. Hope they had fun!

3 Other Notes

- The plan is to have PowerPoint slides for the more lecture style parts of the course.
- For designing our own Markov Chains and more whiteboard type problems, the plan is to share an iPad screen via Zoom.
- We will provide annotated lecture materials so that they can review and look back at it when class is over.