MASTER'S THESIS PRESENTATION

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Hidden Markov Models and Their Application in Finance

TUESDAY, January 31, 2023, at 3:30 PM
Jones 303, 5747 S. Ellis Avenue

ABSTRACT

Hidden Markov models have been intensively used in finance since they can well describe the nature of financial time series such as volatility clustering. To retrieve information from the hidden Markov model, we have to solve three problems. First, how can we efficiently calculate the probability of the observable sequence given the model parameters? Second, how can we estimate the model parameters that maximize the above probability? Finally, how can we recover the hidden sequence that best describes the observable sequence? In this thesis, we will review several methods that solve these questions: forward-backward algorithm, Baum-Welch algorithm, gradient Markov chain Monte Carlo and Viterbi algorithm. We will then use some simulated data to examine the effectiveness of these methods and provide a financial application in the end.