**A Survey of Deep Learning Techniques for Algorithmic Cryptocurrency Trading Outline**

1. Abstract
2. Introduction
3. Why is cryptocurrency interesting?
4. Brief history of modeling and algorithmic techniques in finance
5. Why algorithmic trading?
6. What are neural networks and why are they interesting?
7. What we hope to accomplish in this paper
8. Background and literature review
9. Primer on Classical Statistical Methods
10. Primer on ANNs
11. Primer on Reinforcement Learning
12. Papers exploring ANNs in finance
13. Technical Indicators, Data Processing, and PCA
14. Examples of Technical Indicators
15. Explanation of the types/class of technical indicators used
16. Coins chosen and why, data timeframe, and labeling scheme
17. Example of a row of the X+label matrix
18. PCA
19. Algorithms Used
20. Classical Statistical Algorithms
21. SARMA/SARIMAX

* Mathematical Formulation
* Differencing
* Autocorrelation
* Moving Average
* Seasonality
* Final Models
* Visualization of performance

1. ETS

* Mathematical Formulation
* Diagram of Structure
* Grid Search and Parameters chosen (Code Snippet)
* Visualization of Confusion Matrix

1. ANNs
2. MLP

* Mathematical Formulation
* Diagram of Structure
* Grid Search and Parameters chosen
* Visualization of Confusion Matrix

1. CNN

* Mathematical Formulation
* Diagram of Structure
* PCA data into “images”
* Grid Search and Parameters chosen
* Visualization of Confusion Matrix

1. RNN/LSTM

* Mathematical Formulation of RNN
* Diagram of Structure
* Additional Mathematical Structure of LSTM and why
* Diagram of Structure
* Data Preparation for Time-Series Prediction of Price Change

1. Augmented Dickey-Fuller Test for Stationarity of Price Change data
2. Determining the number of lags
3. Grid Search and Parameters Chosen

* Visualization of performance
* Data Preparation for Classification

1. Determining the number of lags
2. Grid Search and Parameters chosen

* Visualization of Confusion Matrix

1. Deep Q-Learning
2. Still learning about this one. Will fill in later
3. Results, Out-of-Sample, and Backtesting Comparison
4. Confusion Matrix and regression visualization on novel data across all 3 time-frames
5. Backtesting and investment modeling
6. Discussion
7. Which methods performed the best
8. Moving Forward
9. Alternatives for labeling
10. Alternatives for technical indicator selection
11. Hyperparameter tuning
12. Sentiment Analysis
13. Conclusion
14. Restate the primary goal
15. Reiterate the conclusions
16. Why is this important?
17. Summarize moving forward
18. Software/Packages
19. References/Acknowledgements
20. Code Snippets
21. Github

Things to remember:

* Save seeds
* Save computational/run times