# Table of Contents

Contents:

# Abstract

This report covers the entire production cycle for two reasonably complex AI models representative of some of the major areas of past, current and even potential future research in this domain; random forest and “xLSTM-TS” (a unique variant of “Long Short Term Memory”), by following two case studies (with an emphasis on the later) as blueprints for developing and applying a practical understanding of the general practices commonly used, the theory and mathematics that underpin how these models function and future recommendations for both further study and areas of weakness in the report to more effectively evaluate its aim and outcomes.

The case studies were focused on exploring the effectiveness of different techniques on creating effective time series forecasting in financial markets. While this report narrows that focus more specifically to the potential time series models have in trend prediction/forecasting for high volatility markets. Bitcoin-US dollar price paring (BTC-USD) was selected due to domain familiarity, with a variety of loosely correlated feature sets and selection methods. The evaluations of these approaches attempted to cast a wide net, detailing practical considerations and key areas essential for the models performance.

As AI models mature in sophistication, increasing the utility and potential they provide in financial forecasting expands with the growing body of research and adoption. Inevitably and increasingly so has “prices out” retail traders and investors. With the accelerating complexity of automated financial instruments such as automated arbitrage, trend forecasting, sentiment and technical analysis etc. The increasing expertise, funds or “capital costs” required for training, constructing and maintaining these ever more complex AI systems is serving to deepening the disparity between retail and institutional money in trading markets.

"As public trust in institutions declines with rising inequality and an increasingly volatile market, traditional means of maintaining or gaining financial security have fell short. Savings accounts, ISA’s and pension plans are losing their relative value as they become outstripped by inflation, rising living costs and the “liberalisation” of welfare and social programs. People are turning towards riskier financial instruments such as trading platforms like “Robinhood”or decentralized crypto currency markets, both of which have seen explosive growth in recent years, leaving retail investors uncertain if their traditional strategies can compete in modern times and the new more risk tolerant investor blind to the markets they choose to gamble in” - is my full suggestion

# Introduction

adhadh

# Problem statement

adfhadfhadfh

# Aims and objectives

adfhadfhadfh

# AI approach

Hsfghshahf

Proposed approach

adfhadh

# Libraries, dependencies and dataset

adfhadh

# Exploratory data analysis

adfhadfh

# Data cleaning

agadfgadg

# Data visualization

adfhgadg

# Data re-processing

agasg

# Feature selection

asdgasg

# Model select

Asdgasg

Learning models

Asdgasg

List of different models

Asdgasg

Advanced models we're looking at

asdgasg

# Model evaluations

Asdgasg

Feature selection comparison

Asdg

Hyper Parameter tuning comparison

sadfgasfg

# Summery

asasfd

# Conclusion

asdfasf

# Recommendations

asfasf

# Future considerations

asdfsaf

# References

asdfasf

# Appendix

Sfsfsf

(Gil et al., 2024)

(Tyralis & Papacharalampous, 2017)

(Pabuccu & Barbu, 2023)

(Ghosh et al., 2022)