Imperial College London

Department of Mathematics

Title of the Thesis

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The work contained in this thesis is my own work unless otherwise stated.

Signed: STUDENT'S NAME   Date: DATE

Abstract

ABSTRACT GOES HERE

Acknowledgements

ANY ACKNOWLEDGEMENTS GO HERE

Contents

Contents

Notation

$\boldsymbol{X}$ is a matrix

y is a vector

Abbreviations

DAIN   Deep Adaptive Input Normalization

RDAIN Robust Deep Adaptive Input Normalization

EDAIN Extended Deep Adaptive Input Normalization

1 Introduction

The introduction section goes here[1].

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[1]Tip: write this section last.

2 Background

TODO: introduction to this chapter

2.1 Deep learning

TODO: write details

2.1.1 Sequence models

2.2 Data preprocessing

TODO: introduction

2.2.1 Static distribution transformations

2.2.2 Adaptive distribution transformations

DAIN

The Deep Adaptive Input Normalization (DAIN) method...

RDAIN

BiN

2.3 Normalizing flows

TODO: write details

3 Methods

TODO: introduction to this chapter

3.1 EDAIN

TODO: write details

3.2 EDAIN-KL

TODO: write details

3.3 PREPMIX-CAPS

TODO: write details

4 Results

TODO: introduction to this chapter

4.1 Evaluation methodology

Small introduction

4.1.1 Sequence model architecture

4.1.2 Fitting the models

Mention scheduling, early stopping, optimizer used, learning rate etc.

4.1.3 Tuning adaptive preprocessing model hyperparameters

Details on the tuning for all the methods presented

4.1.4 Evaluation metrics

4.1.5 Cross-validation

4.2 Simulation study

Small introduction, including motivation

4.2.1 Multivariate time-series data generation algorithm

4.2.2 Negative effects of irregularly-distributed data

4.2.3 Preprocessing method experiments

4.3 American Express default prediction dataset

4.3.1 Description

4.3.2 Preprocessing method experiments

5 Discussion

TODO: introduction to this chapter

5.1 EDAIN

5.2 EDAIN-KL

5.3 PREPMIX-CAPS

6 Conclusion

6.1 Summary

Conclusion goes here.

6.2 Main contributions

6.3 Future work

References