University of Bergen Department of Informatics

GNN

Author: Bendik Akselsen Solevåg

Supervisors: Ramin Hasibi and Tom Michoel



UNIVERSITETET I BERGEN Det matematisk-naturvitenskapelige fakultet

January, 2023

	1 4	
Δ	\mathbf{bstrac}	T
$\boldsymbol{\mathcal{L}}$	บอบเนเ	

Abstract

Acknowledgements

Acknowledgements

 $\begin{array}{c} {\tt Bendik~Solevåg} \\ {\tt Sunday~22^{nd}~January,~2023} \end{array}$

Contents

1	Intr	Introduction			
2	Background				
	2.1	Artific	cial Intelligence	3	
	2.2	Machi	ne Learning	3	
		2.2.1	Linear Regression	3	
		2.2.2	Multi Layer Perceptron	3	
		2.2.3	Neural Networks	3	
		2.2.4	Backpropagation	3	
		2.2.5	Supervised and unsupervised learning	3	
	2.3	Graph	ıs	3	
		2.3.1	Nodes and Edges	3	
		2.3.2	Directed Acyclic Graphs	3	
	2.4	Graph	Neural Networks	3	
		2.4.1	The Convolution Layer	3	
		2.4.2	Permutation invariance and equivariance	3	
		2.4.3	Attention and Message Passing	3	
	2.5	Gated	Recurrent Units	3	
		2.5.1	Backpropagation Through Time	3	
3	Project methodology and setup				
	3.1	The G	Geauvadis Dataset	4	
Ri	ihlios	ranhv		5	

List of Figures

List of Tables

Listings

Chapter 1

Introduction

Chapter 2

Background

2.1	Artificial	Intelli	igence
-----	------------	---------	--------

- 2.2 Machine Learning
- 2.2.1 Linear Regression
- 2.2.2 Multi Layer Perceptron
- 2.2.3 Neural Networks

Linear Layers

Activation functions

Loss functions

- 2.2.4 Backpropagation
- 2.2.5 Supervised and unsupervised learning
- 2.3 Graphs
- 2.3.1 Nodes and Edges
- 2.3.2 Directed Acyclic Graphs
- 2.4 Graph Neural Networks
- 2.4.1 The Convolution Layer

Chapter 3

Project methodology and setup

3.1 The Geauvadis Dataset

Bibliography