



Capturing Long-Term Dependencies in Neural Regulatory Networks

DIPLOMA THESIS

submitted in partial fulfillment of the requirements for the degree of

Diplom-Ingenieur

in

Computer Engineering

by

Hannes Brantner, BSc

Registration Number 01614466

to the Faculty of Informatics

at the TU Wien

Advisor: Univ.-Prof. Dipl.-Ing. Dr.rer.nat. Radu Grosu, BSc

Assistance: Dipl.-Ing. Mathias Lechner, BSc

Vienna, 31st January, 2021

Hannes Brantner

Radu Grosu

Declaration of Authorship

Hannes Brantner, BSc

I hereby declare that I have written this Doctoral Thesis independently, that I have completely specified the utilized sources and resources and that I have definitely marked all parts of the work - including tables, maps and figures - which belong to other works or to the internet, literally or extracted, by referencing the source as borrowed.

Vienna, 31st January, 2021

Hannes Brantner

Acknowledgements

Abstract

Contents

Abstract	vii
Contents	ix
1 Introduction	1
1.1 Problem Statement	1
1.2 Aim of the Work	1
1.3 Methodological Approach	1
1.4 State of the Art	1
2 Architecture	3
2.1 Continuous Flip-Flop	3
2.2 Memory Layer	3
2.3 Transformer with Memory Layer	3
3 Evaluation	5
4 Summary	7
List of Figures	9
List of Tables	11
Bibliography	13

CHAPTER 1



Introduction

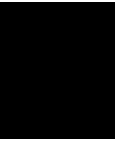
- 1.1 Problem Statement
- 1.2 Aim of the Work
- 1.3 Methodological Approach
- 1.4 State of the Art

CHAPTER 2

Architecture

- 2.1 Continuous Flip-Flop
- 2.2 Memory Layer
- 2.3 Transformer with Memory Layer

CHAPTER 3



Evaluation

CHAPTER 4



Summary

List of Figures

List of Tables

Bibliography