Università degli Studi di Napoli Federico II Dipartimento di Ingegneria Elettrica e delle Tecnologie dell'Informazione



Neuro BackPropagation Lab

Giuliano Aiello

2025

Contents

I	Fi	rst part
		olusion
	1.1	Goal
		Software Stack
	1.3	Project Structure

iv CONTENTS

Part I First part

Chapter 1

Prolusion

1.1 Goal

This report provides a comprehensive overview of a Python project whose goal is to develop and compare different adaptive backpropagation techniques involved in a machine learning process, as Rprop (Resilient backpropagation).

The project follows the "Empirical evaluation of the improved Rprop learning algorithms" article by Christian Igel and Michel Hüsken (2001).

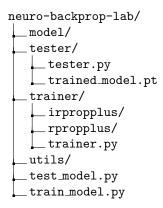
1.2 Software Stack

- Python 3.9.6
- \bullet PyTorch 2.6.0

The project is equipped with a requirements.txt file which allows for seamless installation of dependencies, by executing pip install -r requirements.txt.

5

1.3 Project Structure



- model includes the neural network model architecture.
- tester handles the testing flow of the ready-to-use trained_model.pt.
- trainer handles the examined backpropagation techniques and the training flow of the model, saving it as trained_model.pt.
- \bullet utils offers utility functions designed to support the root project scripts.

Acronyms

Rprop Resilient backpropagation 3