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Neuro BackPropagation Lab

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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
- 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`.

1.3 Project Structure

```
neuro-backprop-lab/  
├── model/  
├── tester/  
│   ├── tester.py  
│   └── trained_model.pt  
├── trainer/  
│   ├── irpropplus/  
│   ├── rpropminus/  
│   ├── rpropplus/  
│   └── trainer.py  
├── utils/  
├── test_model.py  
└── train_model.py
```

- `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`.
- `utils` offers utility functions designed to support the root project scripts.

Acronyms

Rprop Resilient backpropagation 3