

Road Sign Detection – Road Ragers

Deep Neural Networks Project

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This project implements and compares several neural network architectures (SimpleCNN, DeepFFN3, AdamNet, SimpleFFN) for detecting and classifying German traffic signs using the GTSRB dataset. All models are implemented from scratch in NumPy, with manual training loops, optimizers, and evaluation.

Project Structure

```
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├── Models – Codes
│   ├── Models/
│   │   ├── SimpleFFN.py
│   │   ├── DeepFFN3.py
│   │   ├── AdamNet.py
│   │   └── SimpleCNN.py
├── Results – Jupyter Notebooks – contains the results – executed code
│   ├── Models/
│   │   ├── SimpleFFN.ipynb
│   │   ├── DeepFFN3.ipynb
│   │   ├── AdamNet.ipynb
│   │   └── SimpleCNN.ipynb
├── Road Ragers Report.pdf
└── Dataset/
    ├── Dataset.zip
```

Dataset/Train/: Contains 43 subfolders (0–42), each with images for that class.

Each *model_name.py: Script for a specific model.

Each .ipynb: Contains the Neural Network models executed with results

Each script includes:

- Data loading and preprocessing
- Model definition
- Training and validation with hyperparameter tuning

- Accuracy/loss plotting

Usage

1. **Prepare the dataset:**
Download the GTSRB dataset.
Place the training images in **Dataset/Train/0, Dataset/Train/1, ..., Dataset/Train/42**.
2. **Install requirements:**
`bash pip install numpy scikit-learn matplotlib pillow opencv-python`
3. **Run a model script:** `bash python SimpleCNN.py`
4. **View results:** Training and validation accuracy/loss will be printed and plotted.