

YZV303(2)E Deep Learning

2024 Fall

Assignment 3

GENERAL INSTRUCTIONS

- Please write your own codes, copying code parts from books, websites or any other source including your friends is considered plagiarism. All parties involved in sharing or copying the solutions will automatically get 0.
- Copy-paste LLM or chatbot-generated answers will be graded 0.
- Do not upload your codes to any public platform (e.g. Github) until we fully finish the evaluation and announce the grades for the assignment.
- Do not forget to add comments to your code.
- Submit your source codes on Ninova before the deadline, late submissions and submissions via e-mail will not be accepted.
- Feel free to check blog posts, Stanford's CS231N and Coursera Deep Learning notes to understand these basics. However, DO NOT COPY codes from anywhere. We want you to add your comments to your implementations. Codes without any comments will not be graded.
- If you have any questions, you can contact me via site21@itu.edu.tr
- Distribution of this assignment (in any form including GitHub and such) WITH and WITHOUT your solutions to this homework is strictly prohibited. Penalties for cheating and plagiarism range from a 0 or F on a particular assignment, through an FF grade for the course, to disciplinary action and expulsion from the university. For more information read the page: ITU Ethics in University:
<https://www.sis.itu.edu.tr/TR/mevzuat/akademik-onur-sozu-esaslar.php#>

PROBLEM DESCRIPTION

Q1 (10 pts): You will implement Recurrent Neural Network (RNN) and Long-Short Term Memory (LSTM) components. You can use Numpy (np.mean, np.sum etc) library functions but not Pytorch functions in this question. We provide a skeleton code on which to build your own architecture. **You should modify and fill in the code under DL/layer/recurrent_layers.py.** Please follow the "RNN-LSTM.ipynb" notebook for instructions. You can run this part of the homework in your local machine.

Q2 (60 pts): You will implement a denoising autoencoder and a variational autoencoder model. Please follow the “Autoencoders.ipynb” notebook for instructions. You should use “Google Colab” for this question.

Q3 (40 pts): You will implement five different models for “Time Series Prediction” task using “IBB Traffic Density Dataset”. Please follow the “Traffic Prediction.ipynb” notebook for instructions. You should use “Google Colab” for this question.

PLATFORM

- Use Python 3.8+ or later version in this homework.
- In order to install required packages, download the Homework zip or archived file from Ninova, then unzip it, and inside the HW folder, use the command:

```
pip3 install -r requirements.txt
```

- In the folder where your homework files are unzipped, use the command:

```
jupyter-notebook
```

or you can use VS Code with jupyter extension installed.

- You must not change the layout jupyter-notebook, erase questions or convert it to a py script.

SUBMISSION

In order to collect your assignments, zip again all the folder contents. In other words, what we give you as homework files, you will fill them in and zip them all and send back to us. If you are a Linux/MacOS user, in the outer folder where your homework files reside, you can run:

```
zip -r STUDENT_NO.zip ./
```

To sum up, you zip everything including all .ipynb files and DL folder, in the same form as you received them. Please do not share your datasets.