

# **ECE 8870 Project 2**

**Qazi Zarif Ul Islam**

Pawprint: qzic2d

University of Missouri-columbia

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# 1 Technical Description

In this project, an RNN and an LSTM were implemented using pytorch. The broader goal of this project was to understand the working principles of RNNs and LSTMs and gain a comparative understanding of the two neural network architectures.

In the following sections, first the basic components of an RNN and an LSTM are introduced as well as an explanation of how backpropagation occurs in an RNN. This explanation will be more qualitative than mathematically rigorous. A more extensive treatment of backpropagation in RNNs can be found in —. After that, the experiments and results shall be demonstrated and discussed before a final conclusion section that talks about what more can be done to understand RNNs and LSTMs and the deficiencies of this project.

## 1.1 Recurrent Neural Networks

Recurrent Neural Networks are neural neural networks that store the hidden layer's output at the current time step so that it can influence the output of the hidden layer at the next time step. Qualitatively, this is commonly thought of as information being passed to the next time step.

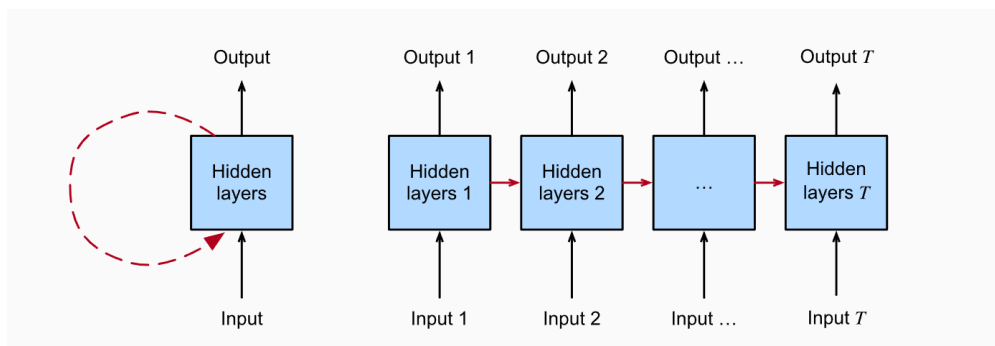


Figure 1: Fig 1: On the left recurrent connections are depicted via cyclic edges. On the right, we unfold the RNN over time steps. Here, recurrent edges span adjacent time steps, while conventional connections are computed synchronously