**SOME NOTES :**

This paper compares different types of recurrent neural networks (RNNs), focusing on gated RNNs like Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU), against traditional RNNs .

**LSTM (Long Short-Term Memory)**: This structure allows it to maintain and manipulate information over long sequences, though it has more parameters, making it computationally expensive.

 This model has a memory cell that stores information over time and three gates:

* **Input gate**: Decides what new information to add to the memory.
* **Forget gate**: Decides what old information to discard.
* **Output gate**: Decides what to output based on the memory. These gates allow LSTM to selectively remember or forget information, making it effective for long sequences.

**GRU (Gated Recurrent Unit)**: A streamlined version of LSTM with two gates (update and reset). It achieves similar capabilities to LSTM but with fewer parameters, making it faster and less resource-intensive.

 A simpler alternative to LSTM, GRU uses two gates:

* **Update gate**: Combines the roles of the input and forget gates, controlling how much of the past information to keep and how much new information to add.
* **Reset gate**: Determines how much of the past information to ignore when computing the new hidden state. Unlike LSTM, GRU doesn’t have a separate memory cell, merging the hidden state and memory into one structure, which reduces complexity.

**After some Experiments they found:**

Both LSTM and GRU outperform the standard RNN, and the difference between LSTM and GRU is minimal, with GRU offering faster training due to its efficiency.

**Conclusion:**

 GRU offers performance comparable to LSTM but with fewer parameters and faster training, making it an attractive option.

 The choice between LSTM and GRU may depend on the task, but both are effective.