

# Review of Last Lesson

Part 1/7: Introduction & Review



## Recurrent Neural Networks

RNNs process sequential data by maintaining **hidden states** that carry information across time



## Hidden States

Hidden states act as **memory**, carrying contextual information from previous time steps to future



## Gradient Challenges

**Vanishing/exploding gradients** make it difficult to learn long-term dependencies in sequences



## LSTM & GRU Solutions

**LSTM and GRU** architectures use gates to mitigate gradient problems and capture long-term patterns



## Gate Control Flow

Gates control information flow: **forget gate** (what to discard), **input gate** (what to add), **output gate**



## Key Applications

RNNs excel at: **language modeling**, **time series prediction**, and **speech recognition**