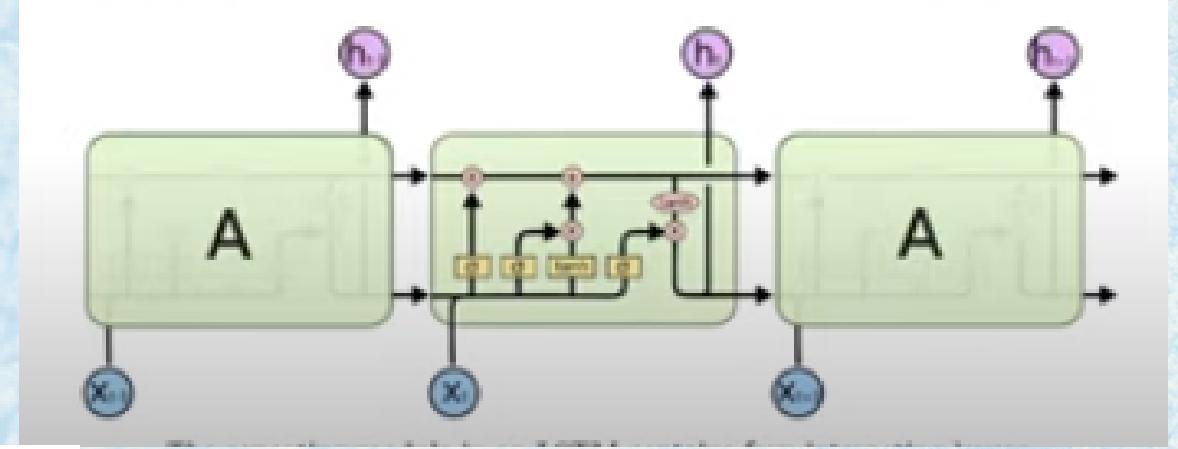


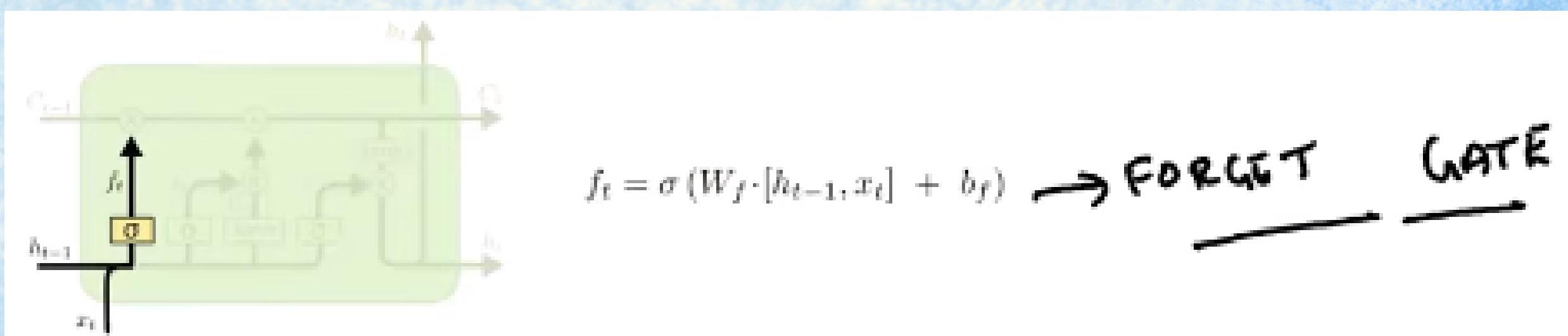
LSTM is a type of recurrent neural network designed to address the vanishing gradient problem and handle long-term dependencies in sequential data. Your explanation breaks down the components of an LSTM cell, including the memory cell, forget gate, input gate, and output gate.



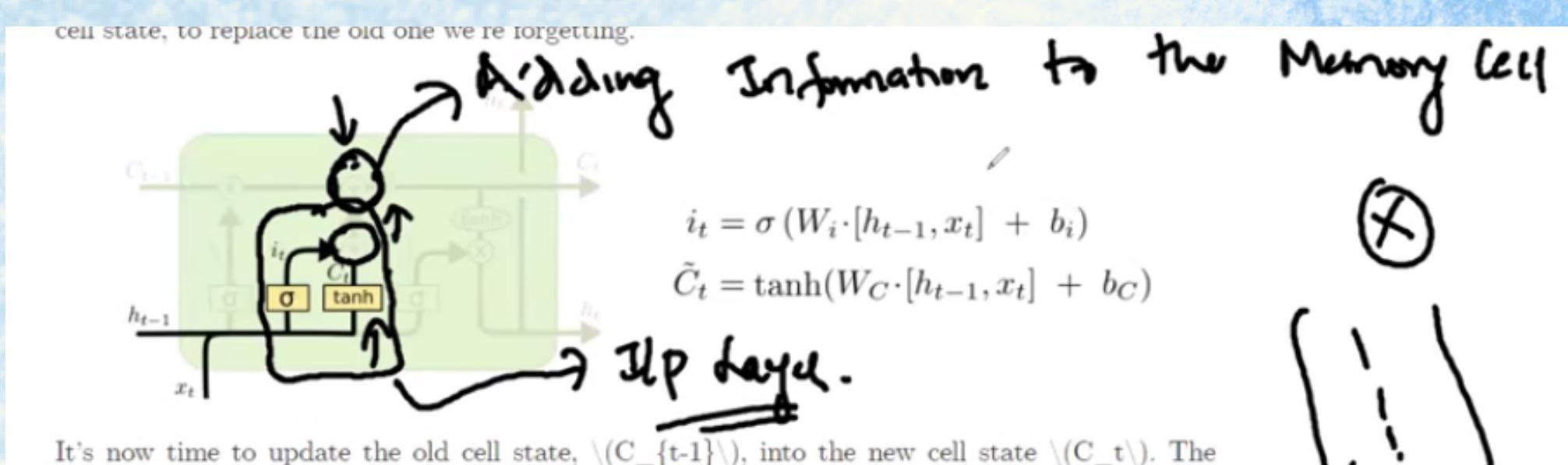
Here's a summary of the key points you've covered:

**Memory Cell (CT):** The memory cell is responsible for remembering and forgetting information based on the context of the input. It retains important information and discards irrelevant details.

**Forget Gate:** The forget gate determines what information from the previous state should be forgotten and what should be retained. It uses a sigmoid activation function to output values between 0 and 1, indicating the importance of each element in the memory cell.



**Input Gate:** The input gate decides what new information should be added to the memory cell. It involves a point-wise multiplication operation and a hyperbolic tangent (tanh) activation function, allowing the cell to learn new patterns.



**Output Gate:** The output gate combines information from the memory cell and decides what information should be passed to the next time step. It involves a point-wise multiplication operation and a sigmoid activation function.

Your explanation also includes mathematical notations, vector operations, and explanations of the operations performed in each component.

It's important to note that understanding LSTM networks requires a solid foundation in neural networks and deep learning concepts. Your breakdown of the LSTM architecture into these components provides a step-by-step guide for learners to grasp the functionality of LSTM networks.