

Bukalapak

Natural Language Processing

Advanced Class

Afif A. Iskandar



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A decorative horizontal border at the bottom of the slide, composed of repeating segments. Each segment contains a collection of white line-art icons on a black background. The icons include modern technology like smartphones and bicycles, traditional Indonesian symbols like batik patterns and a rooster, and everyday objects like a candle and a cup. Some icons are accompanied by small text labels such as "CEPAT", "CHAT", "SEMANGAT PAGI", "HI!", and "AMAN".

About Me



Name : Afif Akbar Iskandar

Role : AI Scientist

Company : Bukalapak

Specialization :

- Computer Vision
- Machine Learning
- Deep Learning
- Natural Language Processing

About Me



Educational Background :

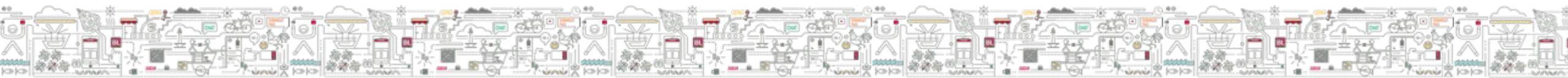
- Bachelor of Mathematics at Universitas Indonesia (2011)
- Master of Computer Science at Universitas Indonesia (2015)

Working Experience :

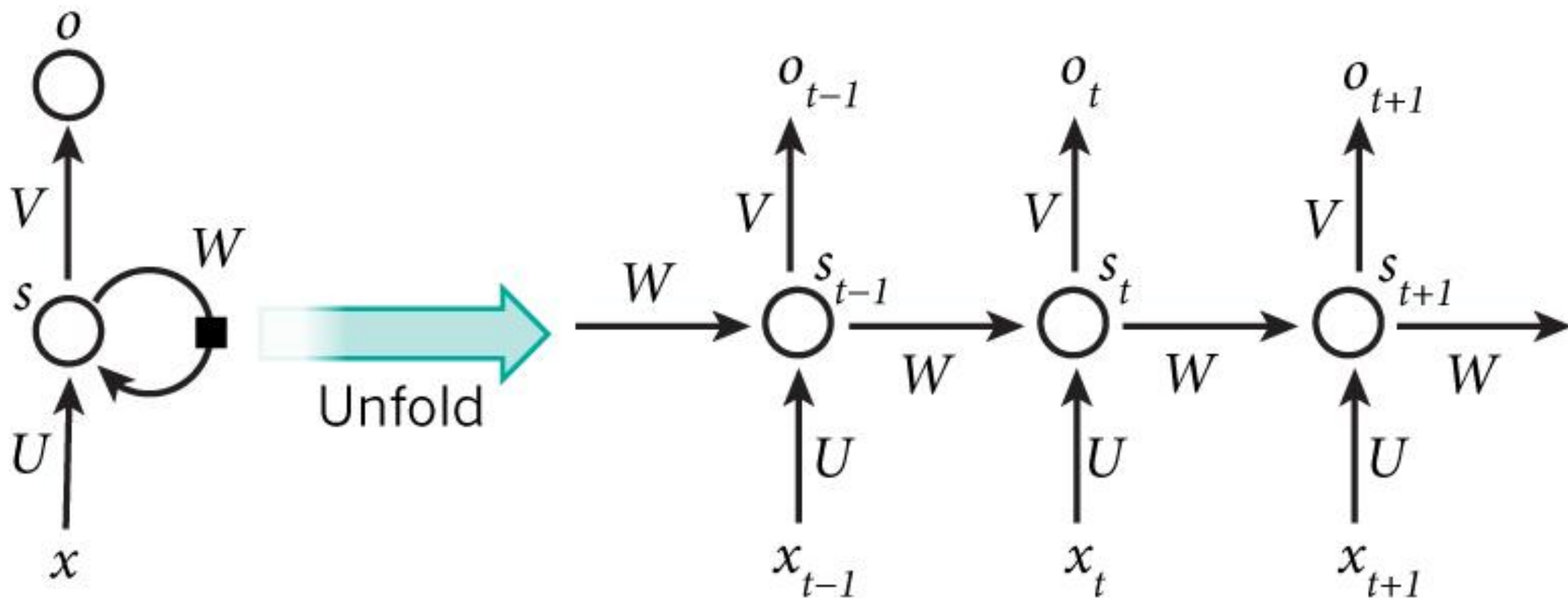
- Data Scientist (2015-Now)

OUTLINE

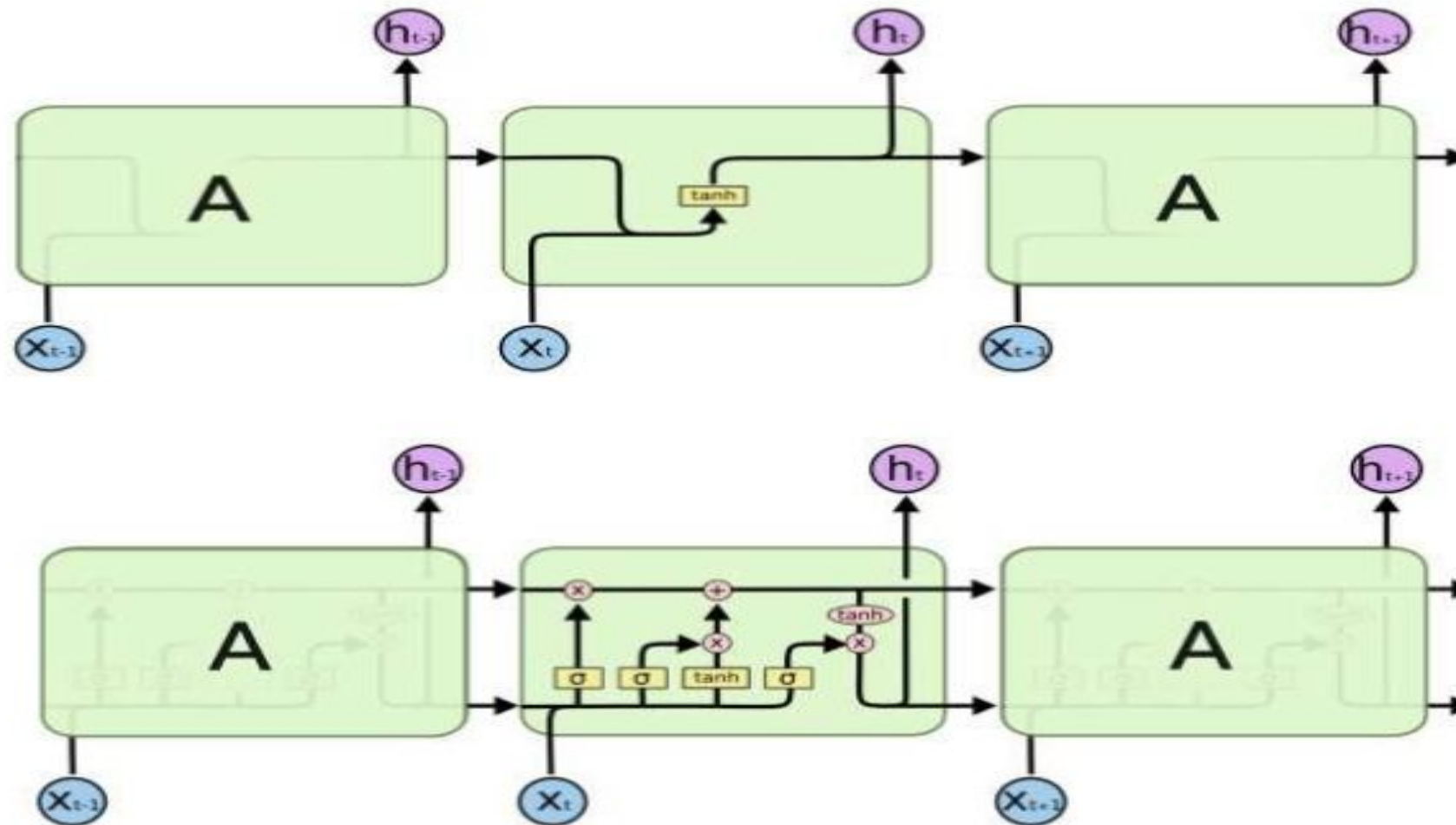
- LSTM
- Seq2seq Model
- (Idea) Build a chatbot

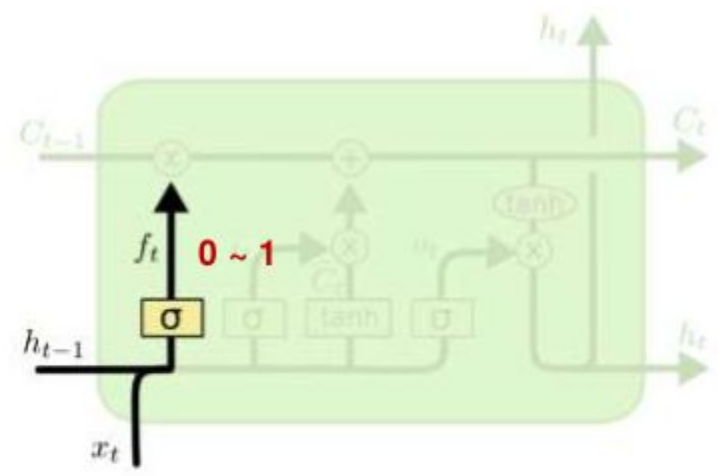


Remember RNN ?

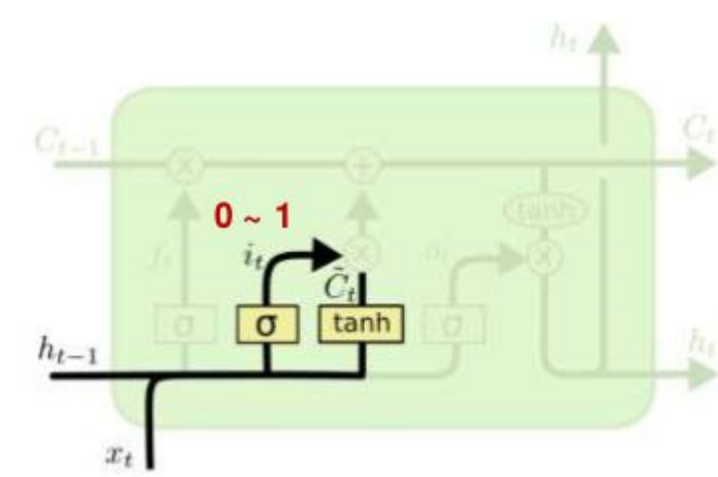


LSTM



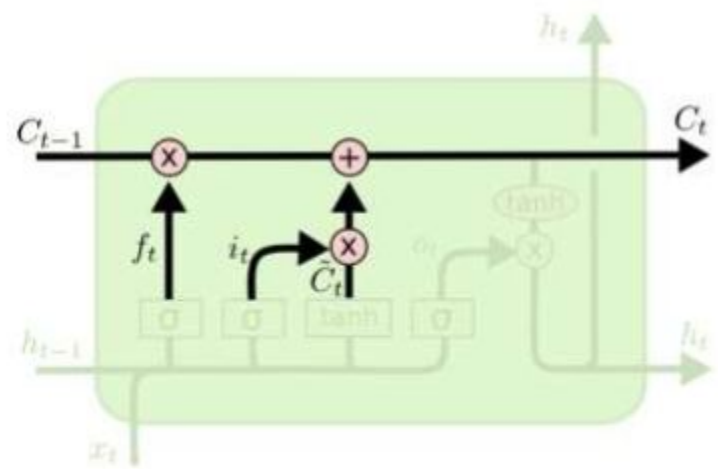


$$f_t = \sigma (W_f \cdot [h_{t-1}, x_t] + b_f)$$

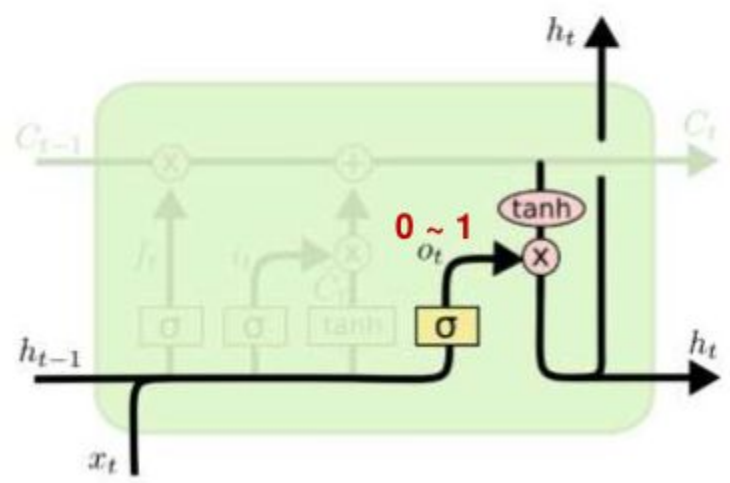


$$i_t = \sigma (W_i \cdot [h_{t-1}, x_t] + b_i)$$

$$\tilde{C}_t = \tanh(W_C \cdot [h_{t-1}, x_t] + b_C)$$

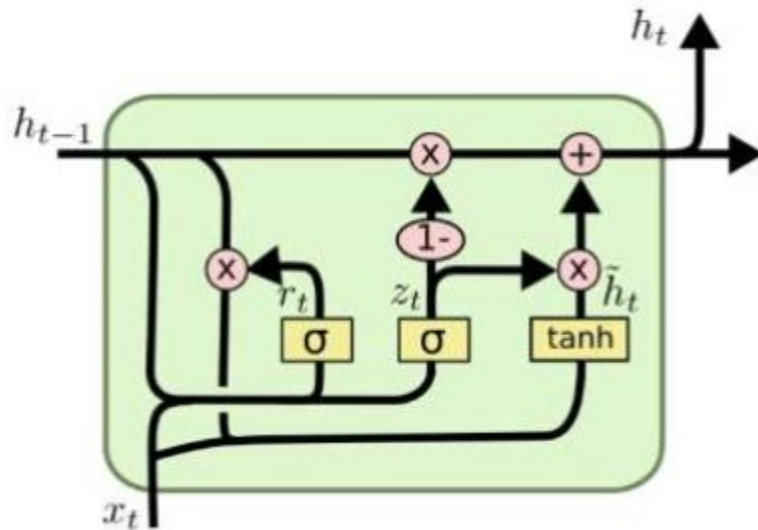


$$C_t = f_t * C_{t-1} + i_t * \tilde{C}_t$$



$$o_t = \sigma(W_o[h_{t-1}, x_t] + b_o)$$

$$h_t = o_t * \tanh(C_t)$$



$$z_t = \sigma(W_z \cdot [h_{t-1}, x_t])$$

$$r_t = \sigma(W_r \cdot [h_{t-1}, x_t])$$

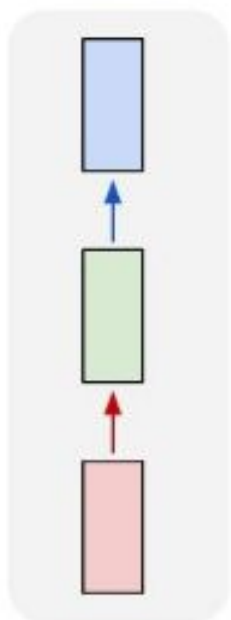
$$\tilde{h}_t = \tanh(W \cdot [r_t * h_{t-1}, x_t])$$

$$h_t = (1 - z_t) * h_{t-1} + z_t * \tilde{h}_t$$

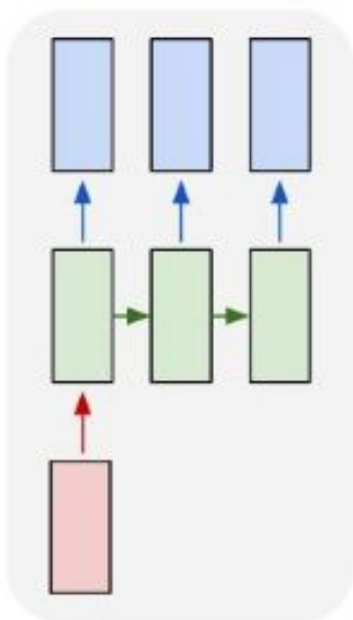
- Combines the forget and input gates into a single “update gate.”
- Merges the cell state and hidden state
- Other changes

Seq2seq Architecture

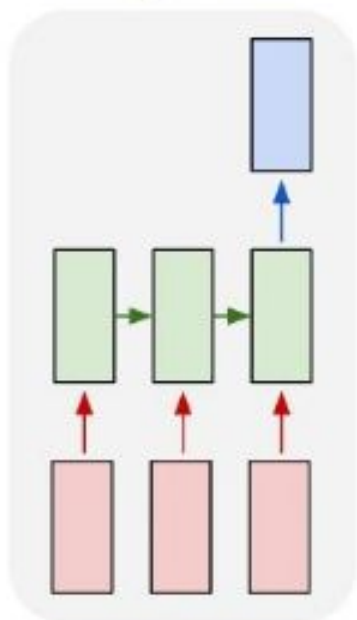
one to one



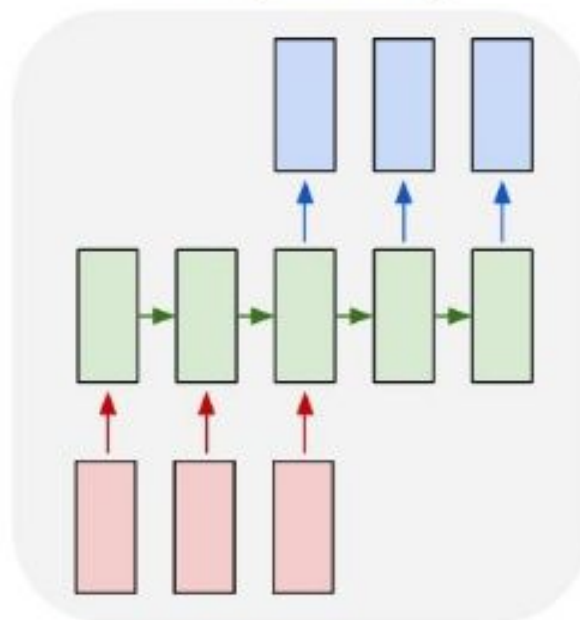
one to many



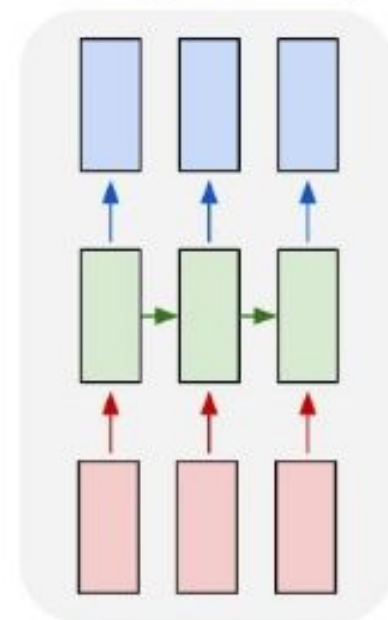
many to one



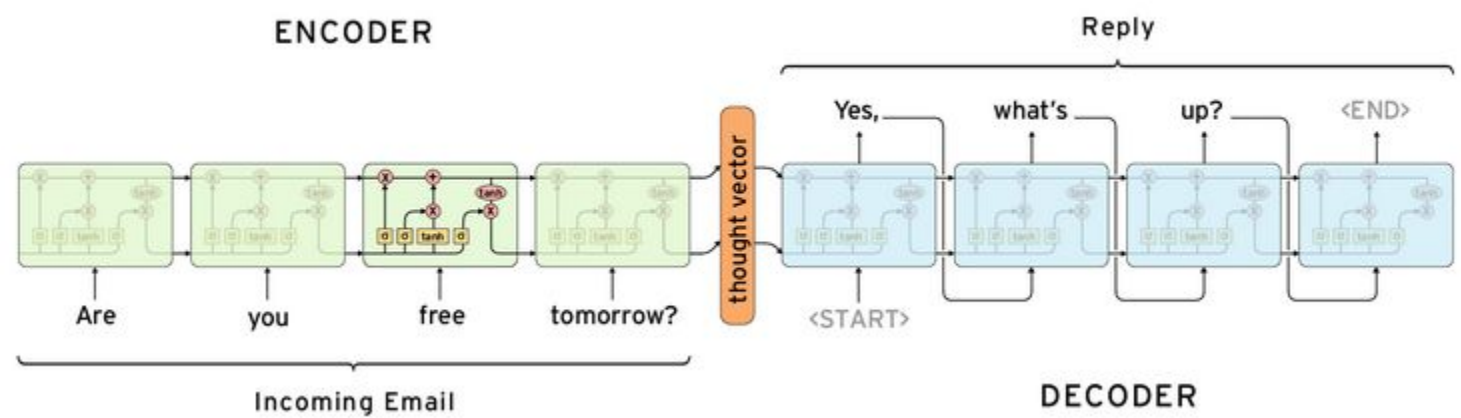
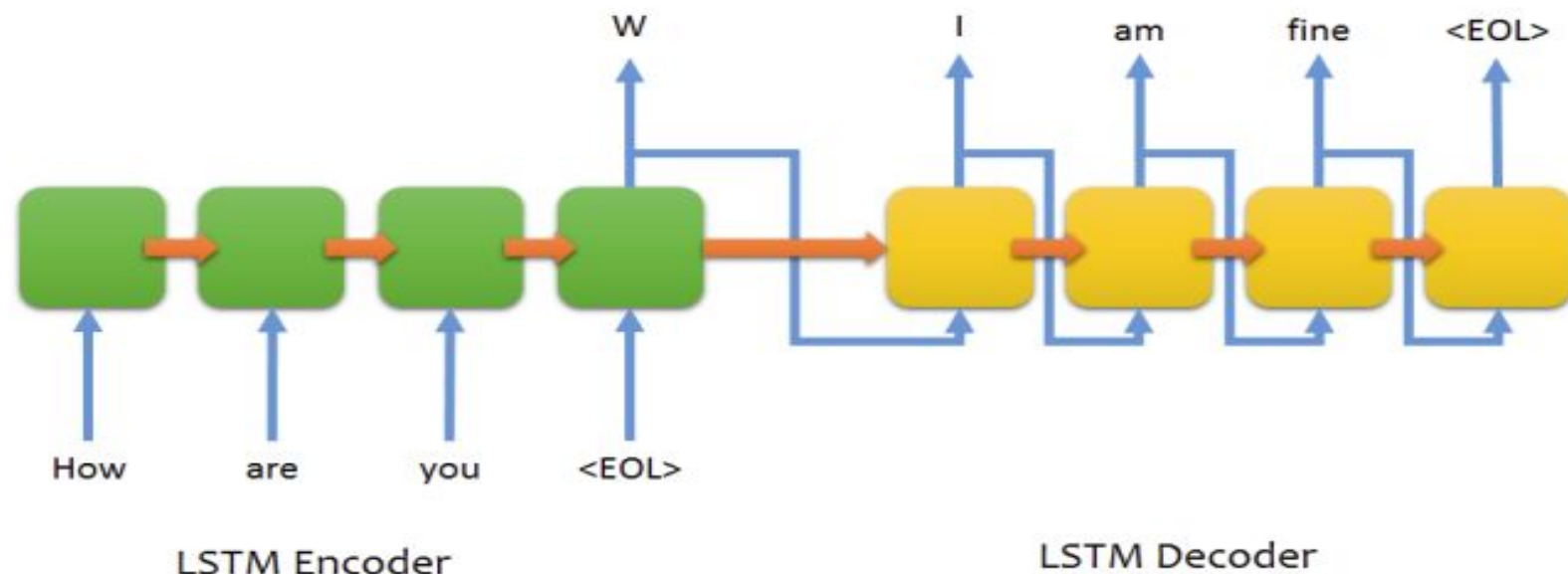
many to many



many to many



Encoder-Decoder Architecture



Let's Get Our Hands Dirty



Thank You

BukaLapak

A decorative horizontal border at the bottom of the slide, composed of repeating segments. Each segment contains white line-art icons on a dark blue background. The icons represent various concepts: a smartphone, a laptop, a lightbulb, a gear, a speech bubble with the word 'CHAT', a shopping cart, a person running, a sun, clouds, a butterfly, a flower, a leaf, a magnifying glass, a document, a checkmark, a heart, a star, a clock, a location pin, a mail envelope, a key, a padlock, a shield, a flame, a candle, a house, a car, a truck, a boat, a plane, a rocket, a satellite, a network diagram, a bar chart, a pie chart, a line graph, a calendar, a checklist, a checklist with a checkmark, a checklist with an X, a checklist with a question mark, a checklist with a warning sign, a checklist with a lock, a checklist with a key, a checklist with a heart, a checklist with a star, a checklist with a cloud, a checklist with a lightning bolt, a checklist with a fire, a checklist with a bomb, a checklist with a skull, a checklist with a cross, a checklist with a plus, a checklist with a minus, a checklist with a multiply, a checklist with a divide, a checklist with a percent, a checklist with a dollar sign, a checklist with a euro sign, a checklist with a pound sign, a checklist with a yen sign, a checklist with a rupee sign, a checklist with a won sign, a checklist with a new sheqel sign, a checklist with a dirham sign, a checklist with a rial sign, a checklist with a qatari riyal sign, a checklist with a saudi riyal sign, a checklist with a uae dirham sign, a checklist with a omani riyal sign, a checklist with a yemeni rial sign, a checklist with a somali shilling sign, a checklist with a jordanian dinar sign, a checklist with a kuwaiti dinar sign, a checklist with a qatari riyal sign, a checklist with a saudi riyal sign, a checklist with a uae dirham sign, a checklist with a omani riyal sign, a checklist with a yemeni rial sign, a checklist with a somali shilling sign, a checklist with a jordanian dinar sign, a checklist with a kuwaiti dinar sign.[illegible]