GENERATIVE DEEP LEARNING

DEEP WRITING: GENERATION OF TWEETS

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MACHINE LEARNING - SUMMER SEMESTER 2020

OUTLINE

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AIM OF THE PROJECT

What we aim to achieve with this project is to learn how to use generative deep learning algorithm applied to **textual data** (deep writing).

In particular we try to **generate (fake) tweets** by feeding the algorithm with certain data from the Twitter Social Network.
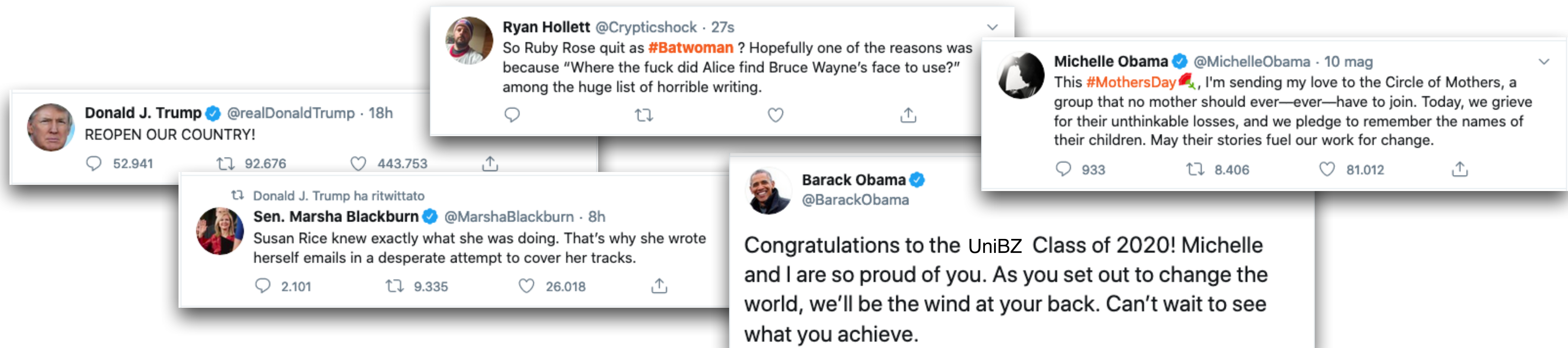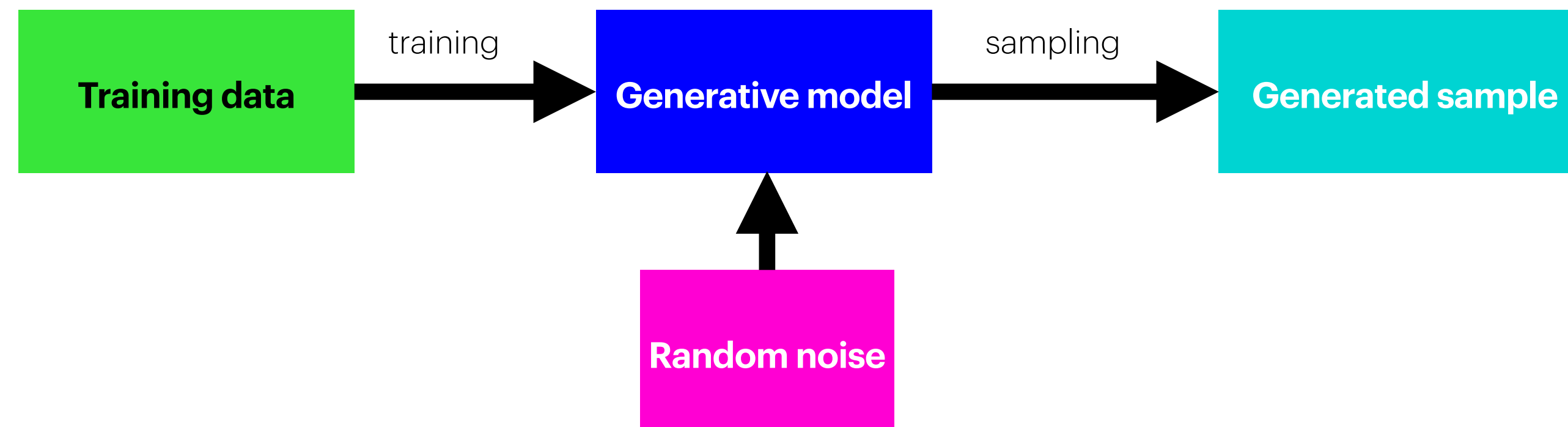
WHAT IS GENERATIVE MODELLING?

We see that deep learning can be a tool to classify and determine data.

What if we want to generate new data?

Generative deep learning take care of it.

```
┌─────────────────┐   training   ┌──────────────────┐  sampling  ┌─────────────────────┐
│  Training data  │ ───────────▶ │ Generative model │ ─────────▶ │  Generated sample   │
└─────────────────┘              └──────────────────┘            └─────────────────────┘
                                          ▲
                                          │
                                 ┌─────────────────┐
                                 │  Random noise   │
                                 └─────────────────┘
```

We can have different types of generative modelling:

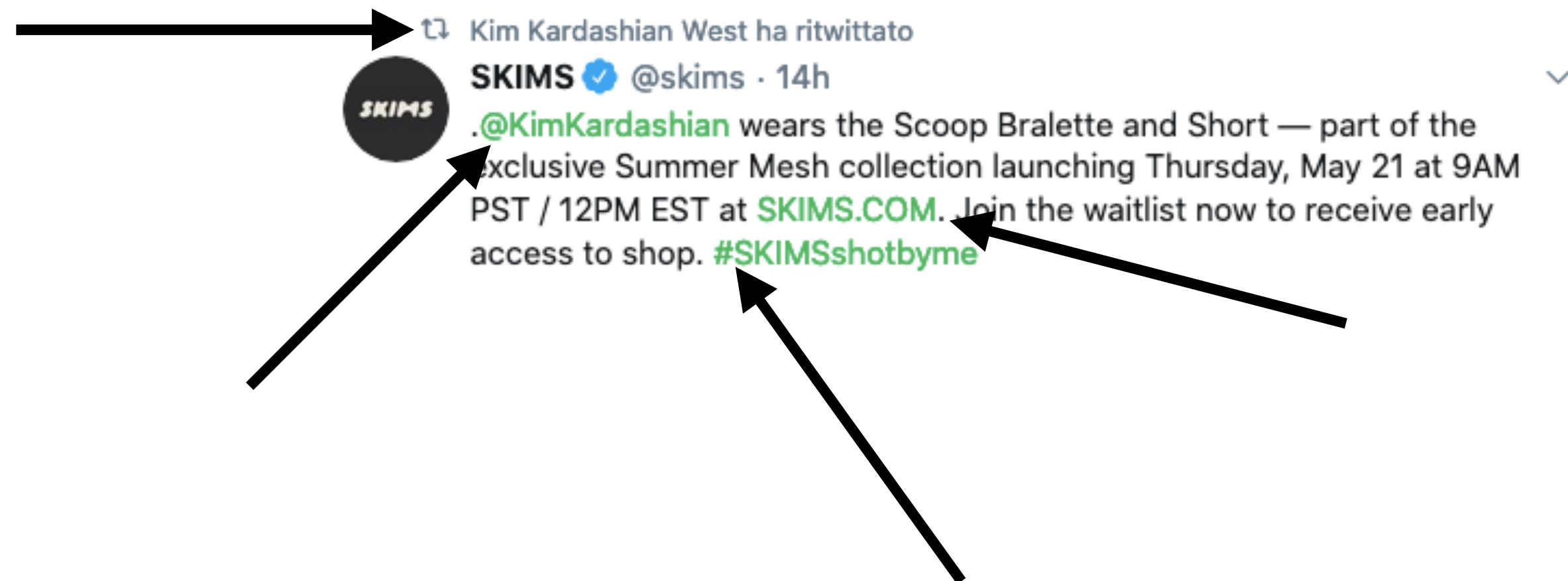- Paint

- Compose

- Write

IMPLEMENTATION

OUTLINE

1. Clean the tweets

2. Create the model

    1. RNNs

    2. LSTM

    3. Our model

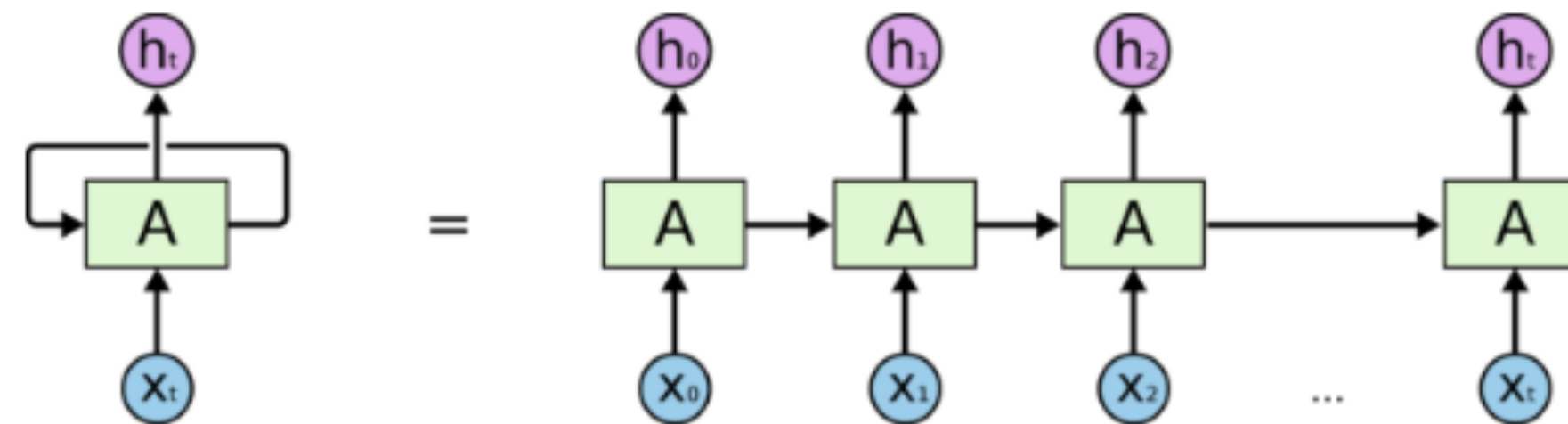3. Generate the tweets

1. CLEAN THE TWEETS

Once cleaned we add the '|' as a symbol for the algorithm to recognise the beginning and the end of a tweet.
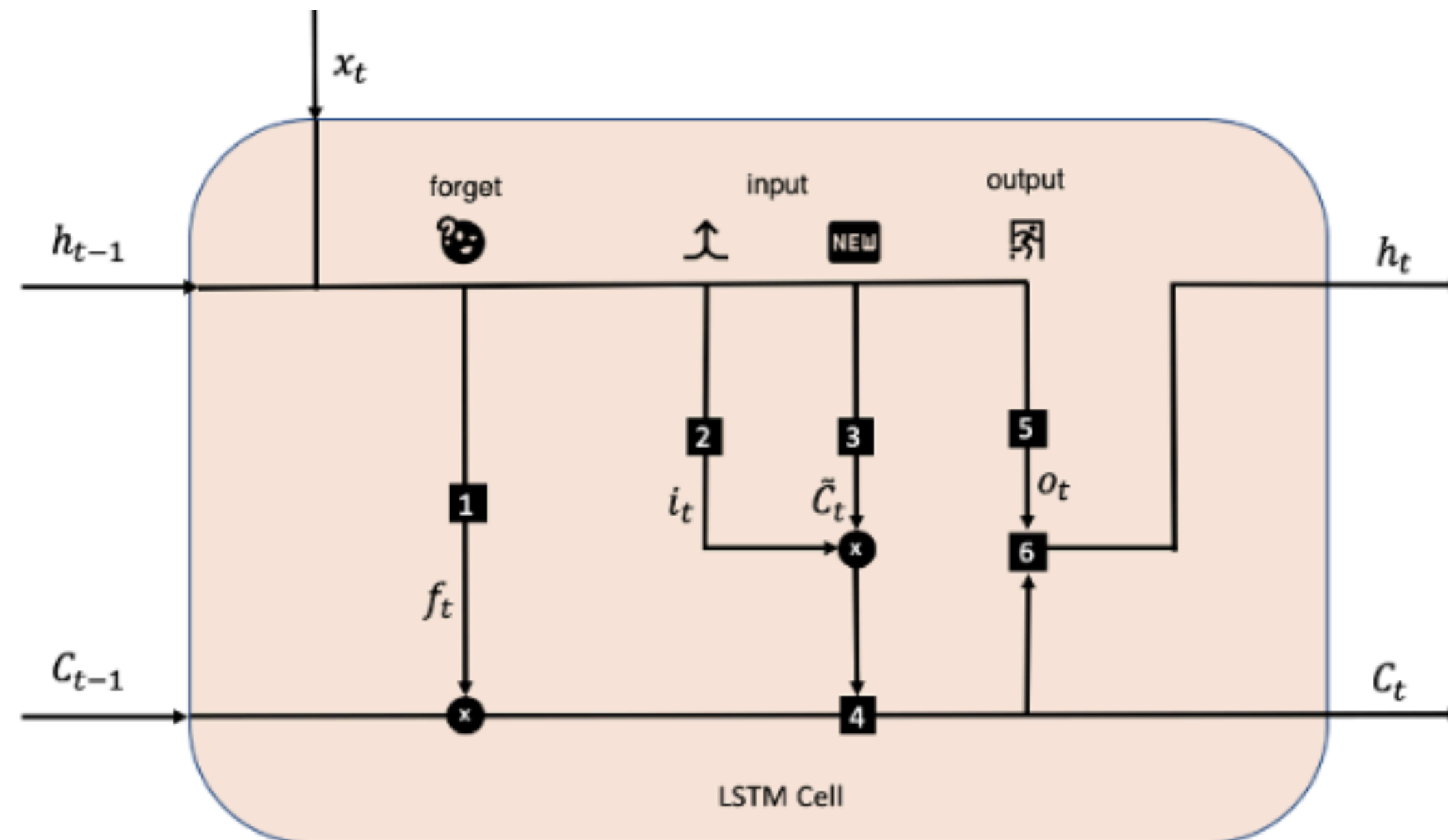
2. CREATE THE MODEL

RECURRENT NEURAL NETWORKS

$$Yt = Why * \tanh(WhhHt–1 + WxhXt)$$

2. CREATE THE MODEL

LONG SHORT TERM MEMORY

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

$$2 \quad i_t = \sigma\left(W_i \cdot [h_{t-1}, x_t] + b_i\right)$$

$$3 \quad \tilde{C}_t = \tanh(W_C \cdot [h_{t-1}, x_t] + b_C)$$

$$4 \quad C_t = f_t * C_{t-1} + i_t * \tilde{C}_t$$

$$5 \quad o_t = \sigma\left(W_o\,[h_{t-1}, x_t] + b_o\right)$$

$$6 \quad h_t = o_t * \tanh(C_t)$$

2. CREATE THE MODEL

OUR MODEL

Here are some of the parameters we decided to used:

LSTM: 3 with 516,256,128 units

Dropout: 0.2, 0.5, 0.8

Optimizer: Adam or RMSprop

Learning rate: from 0.1 to 0.001

RESULTS

The following tweets are the one the algorithm have generated, we added punctuation and some fixes.

- Poll shows his president!
- Great leading! Would #votetrump more #imwithyou
- Loved Iowa
- Thank many! While news rule, you 39% beats dishonest in gop!
- thank gop 2 good!
- thanks, press!

THE STATE OF ART

Bonus: Eurovision this year have done the first competition based on AI generated song.

Website that include all the AI generated data https://aiartists.org/ai-generated-art-tools

THANK YOU!