

CAPSTONE PROJECT: AUTOMATION SYSTEM FOR EMAIL RESPONSE

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Project Link: <https://github.com/syhAnna/CapstoneProject.git>



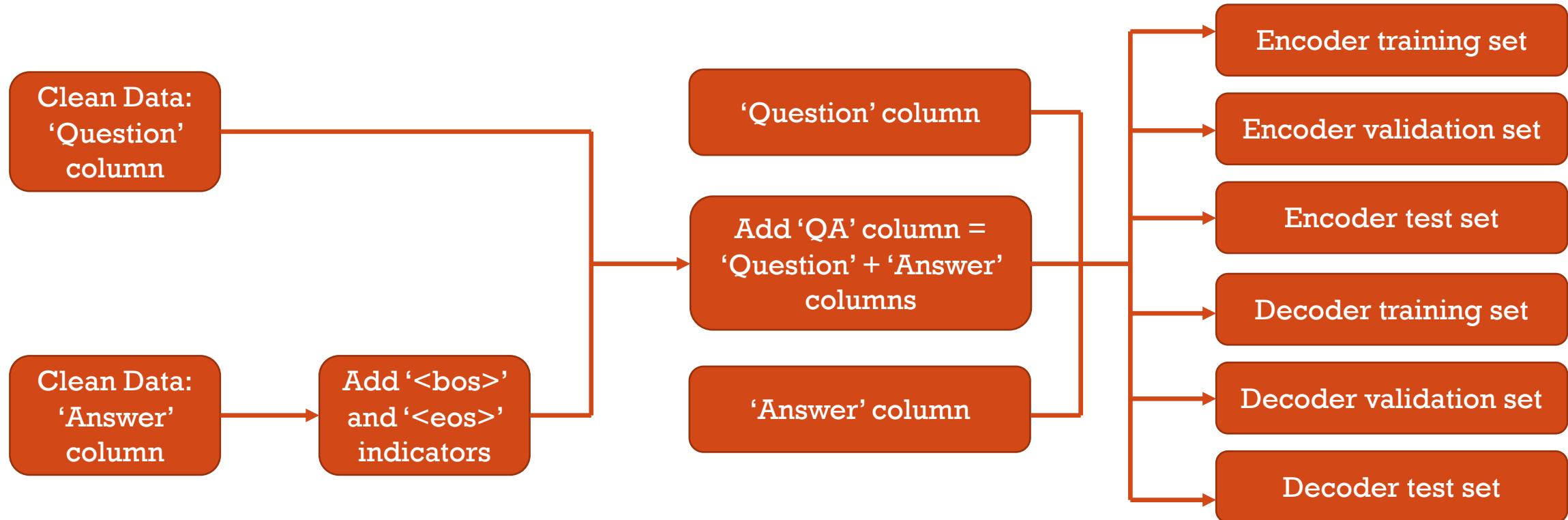
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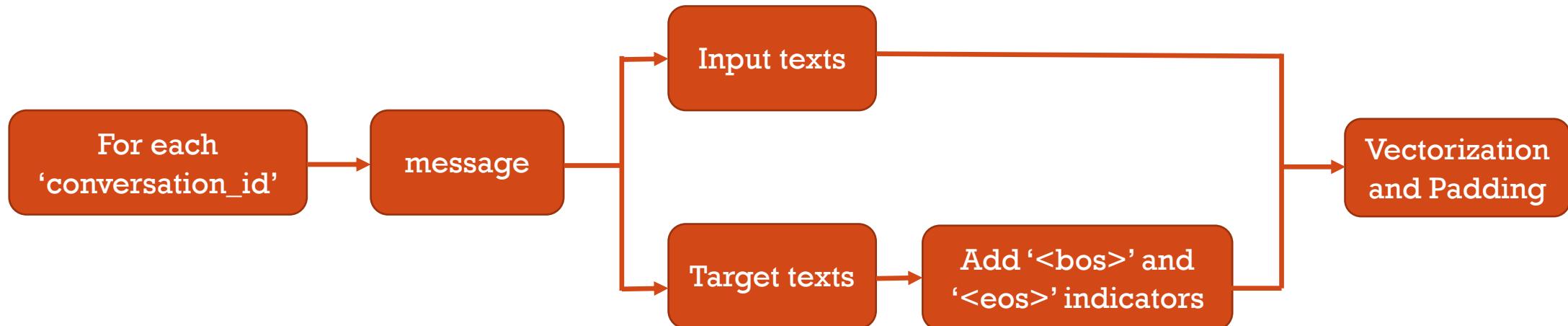
DATA PREPROCESSING: BASELINE MODEL

- Amazon Question/Answer Dataset: <https://www.kaggle.com/datasets/praneshmukhopadhyay/amazon-questionanswer-dataset>



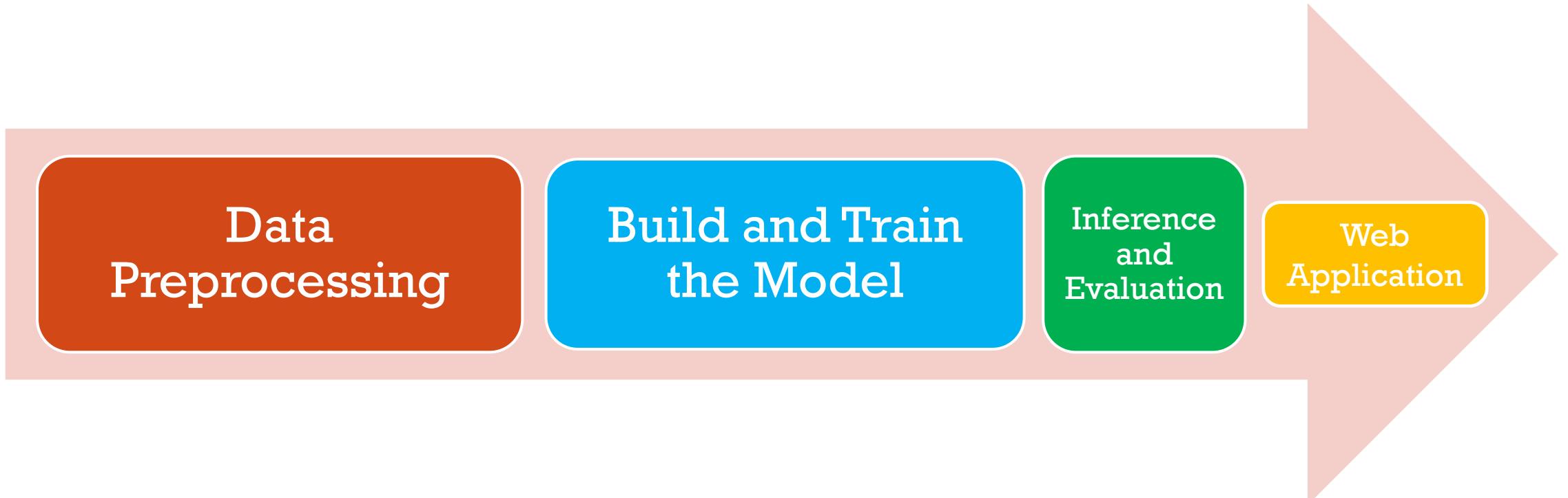
DATA PREPROCESSING : NEW MODEL

- Chatbot Dataset Topical Chat: <https://www.kaggle.com/datasets/arnavsharmaas/chatbot-dataset-topical-chat>



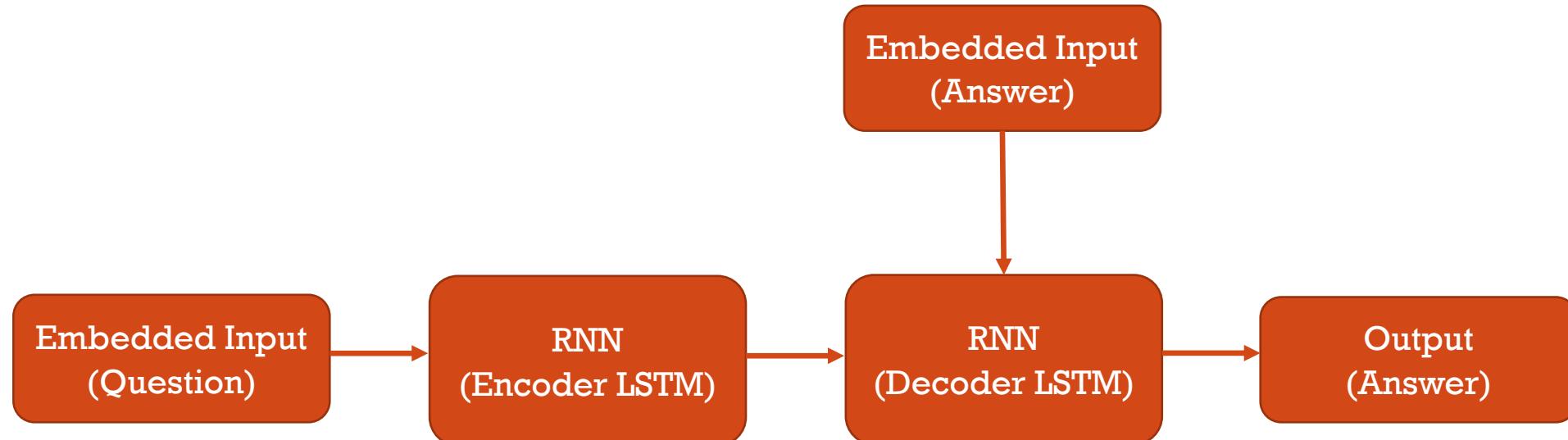
MODEL CONSTRUCTION

- **Baseline Model:** LSTM + Beam Search
- **New Model:** DBSCAN Clustering + LSTM



MODEL CONSTRUCTION: BASELINE MODEL

- Encoder-Decoder LSTMs

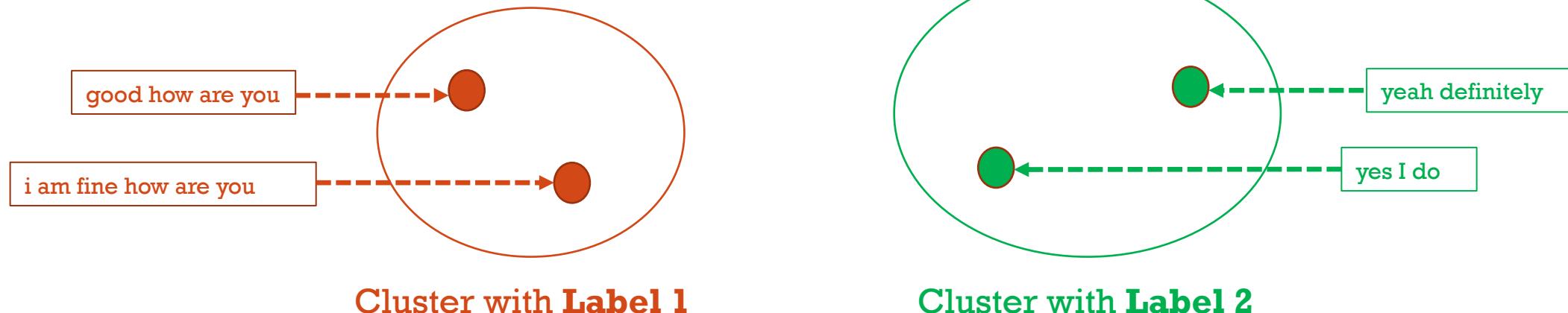


MODEL CONSTRUCTION: NEW MODEL

- New model DBSCAN clustering process

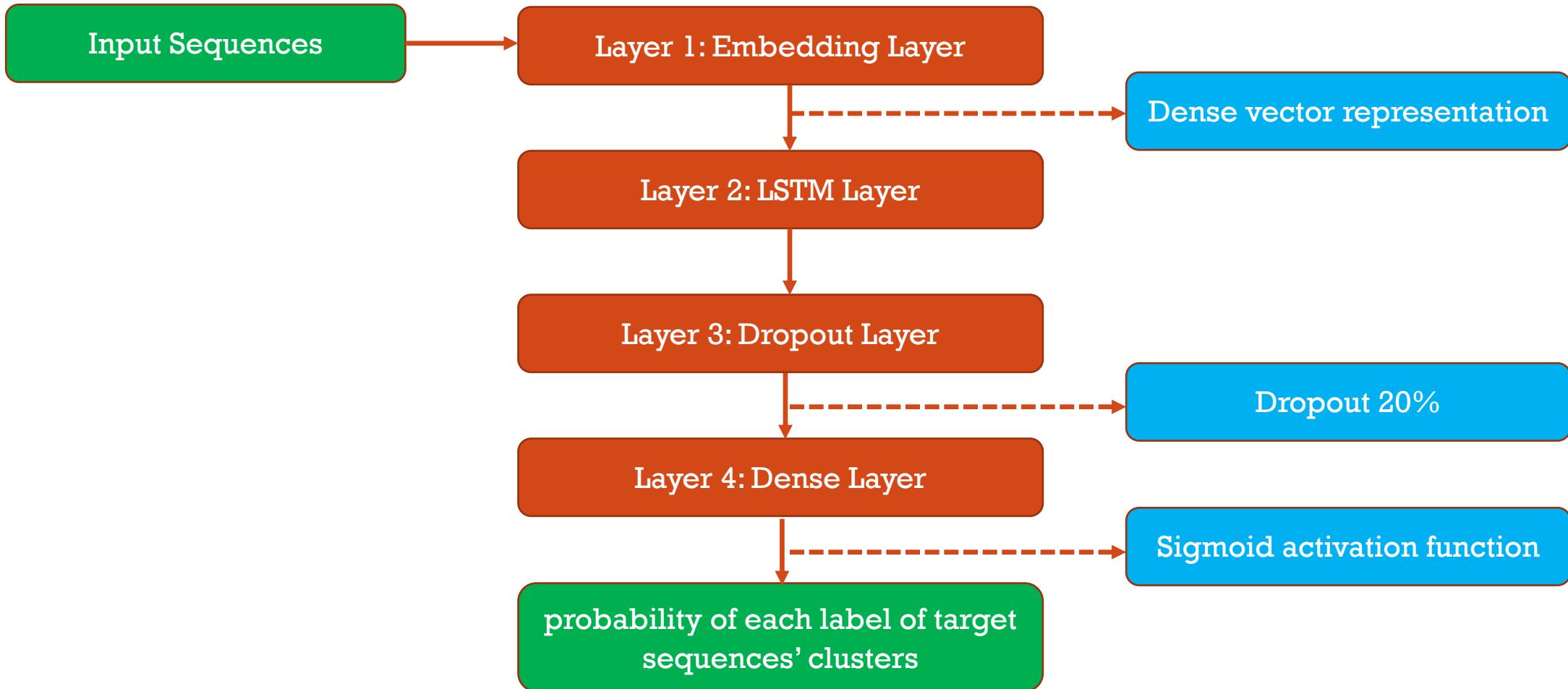


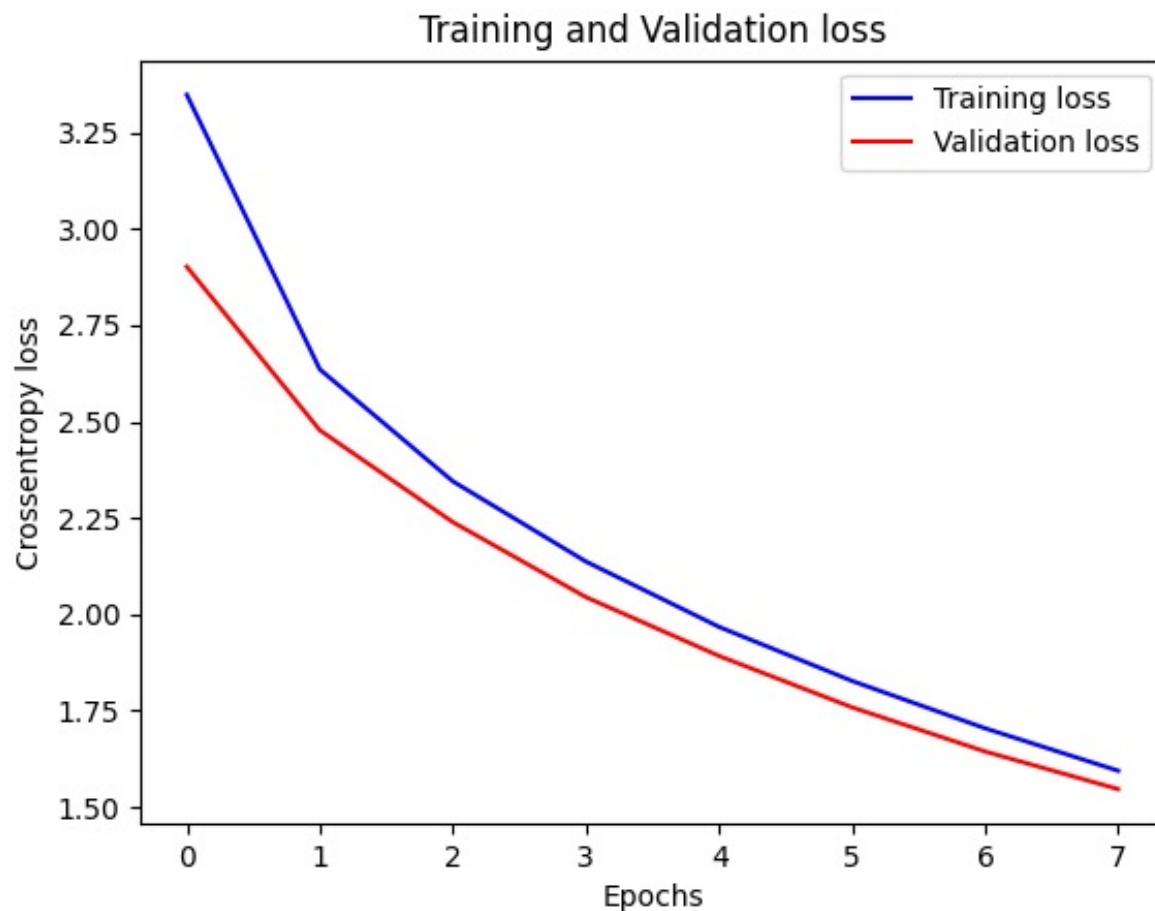
- **NOTE:** only need to cluster the target sequences



MODEL CONSTRUCTION: NEW MODEL

- New model architecture implemented by Keras



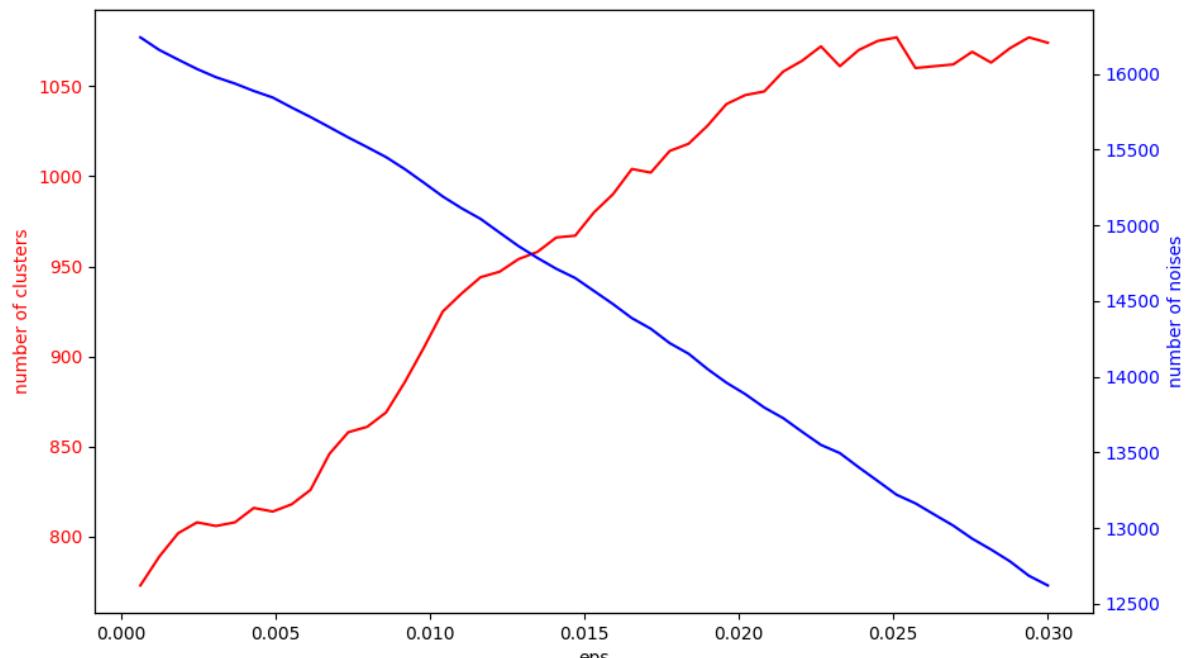


INFERENCE AND EVALUATION: BASELINE MODEL

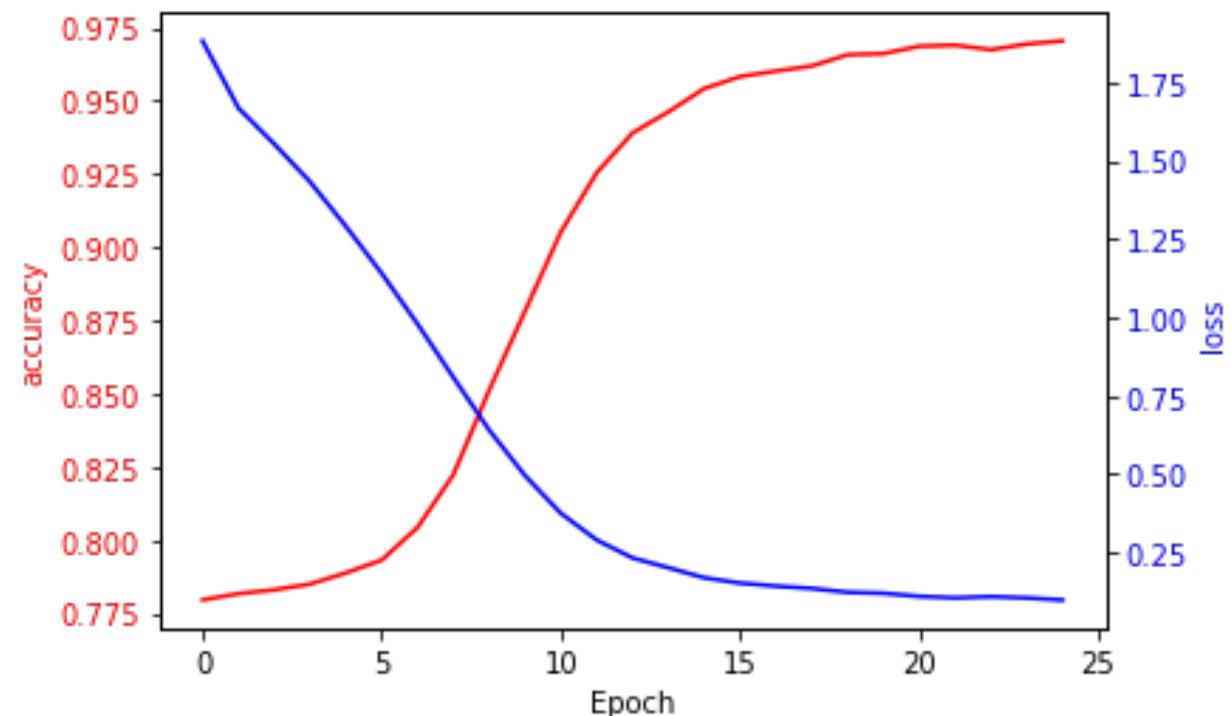
Training loss V.S. validation loss
(8 epochs)



- DBSCAN clustering:
eps V.S. (#cluster, #noises)



- Model training: (25 epochs)
Training loss V.S. Accuracy



MODEL INFERENCE AND EVALUATION: NEW MODEL



```
Initializing ReplySuggest ...
Type "bye" or "quit" or "exit" to end chat
```

```
ReplySuggest >> Hey! Nice to meet you. Please type in your message.
User      >> hi how are you
Suggestion[1]: that is long do you like kim kardashian
Suggestion[2]: i am great how are you
Suggestion[3]: fine what about you
Suggestion[4]: i am doing great how are you doing tonight
Suggestion[5]: good how are you
ReplySuggest >> If there is NO desired suggestions, RETYPE again!
Otherwise, type in new message.
User      >> do you like comic books
Suggestion[1]: lol i was thinking the same thing
Suggestion[2]: yeap they sure did
Suggestion[3]: yeah definitely
Suggestion[4]: i do do you
Suggestion[5]: yes i do
ReplySuggest >> If there is NO desired suggestions, RETYPE again!
Otherwise, type in new message.
User      >> have a good evening
Suggestion[1]: you too thanks
Suggestion[2]: you too
Suggestion[3]: thanks you too
Suggestion[4]: you as well
Suggestion[5]: yes he did
ReplySuggest >> If there is NO desired suggestions, RETYPE again!
Otherwise, type in new message.
User      >> bye
ReplySuggest >> See you soon! Bye!
```

```
Quitting ReplySuggest ...
```

Smart REPLY Suggestion

Talk! (User: Green / Suggestion: White)

????? 123

Please type in text message!

hi how are you

Suggestion[1]: have u ever been to any concerts
Suggestion[2]: i am great how are you
Suggestion[3]: fine what about you
Suggestion[4]: i am doing great how are you doing tonight
Suggestion[5]: good how are you

< If there is NO desired suggestions, RETYPE again! Otherwise, type in new message. >

have a good evening

Suggestion[1]: you too thanks
Suggestion[2]: you too
Suggestion[3]: thanks you too
Suggestion[4]: you as well
Suggestion[5]: not really do you like to read

Enter Message Clear

NEW MODEL RESULT PREVIEW

- **Left-Hand-Side:** Terminal Output Preview
- **Right-Hand-Side:** Web Application Display



