

# Metric Learning

And common dialogue engines approaches  
Boris Zubarev

 @bobazooba

# Chatbot Tasks

Goal-Oriented

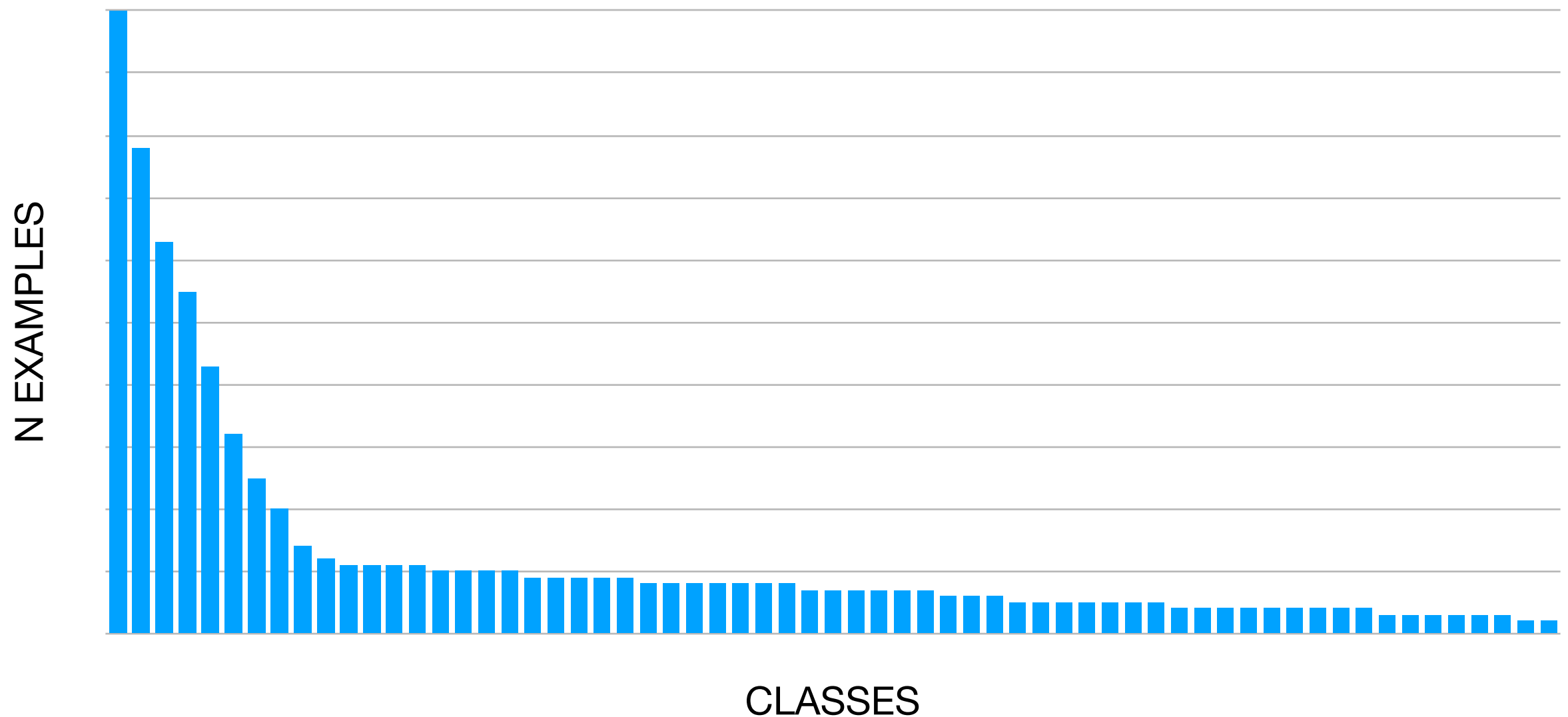
Chit Chat

# Typical Goal Oriented Chatbot Task

- Too many classes
- High imbalance
- Too few examples for each class

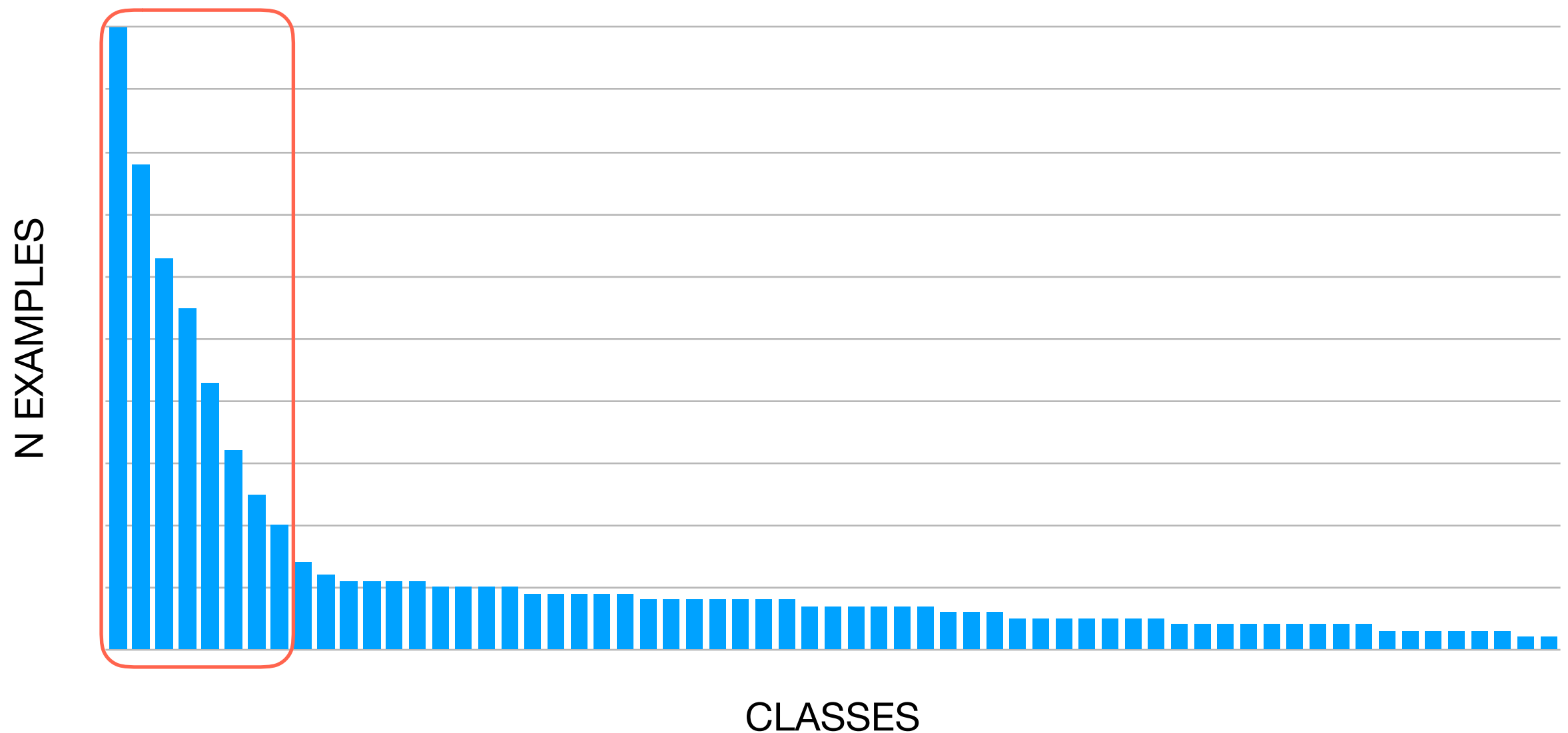
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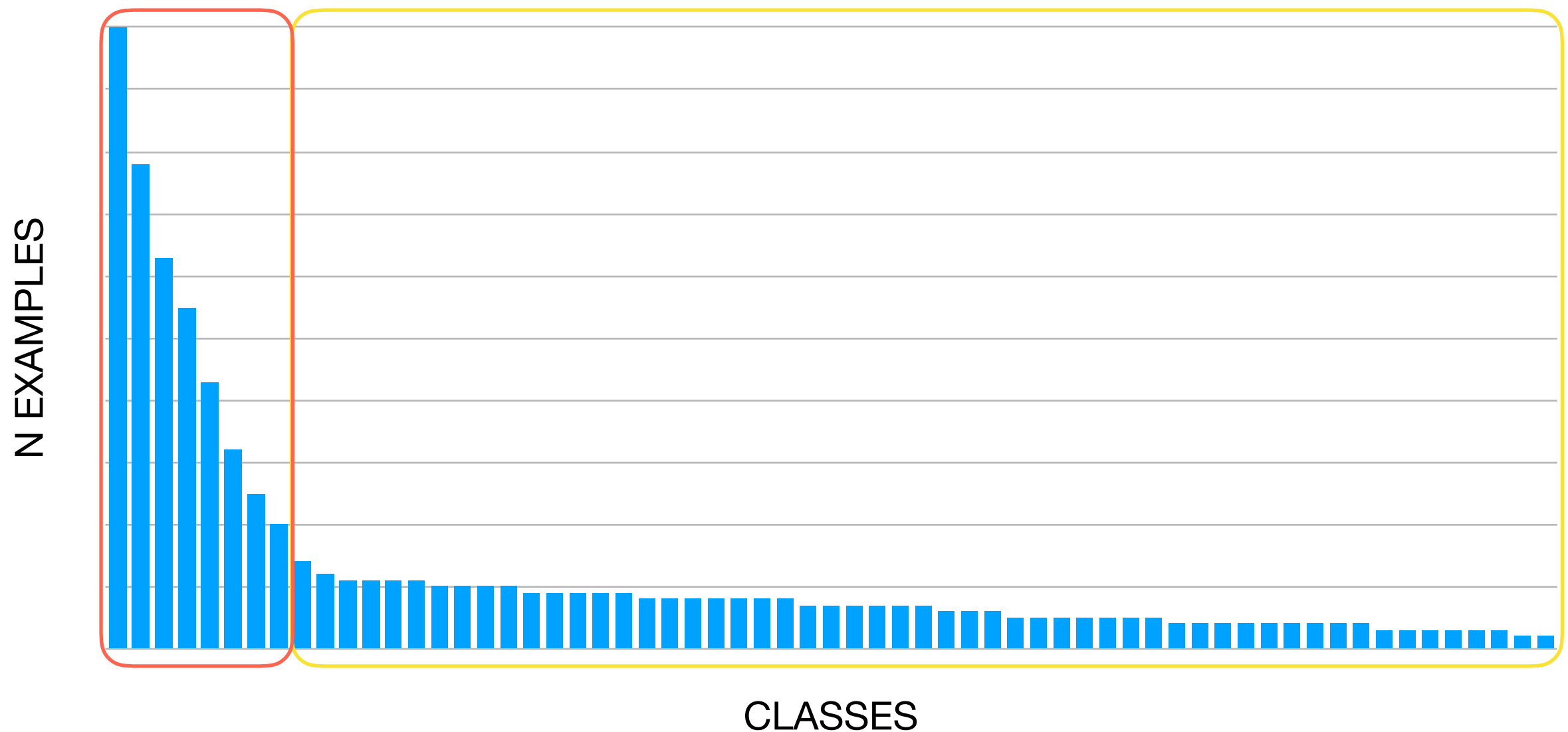
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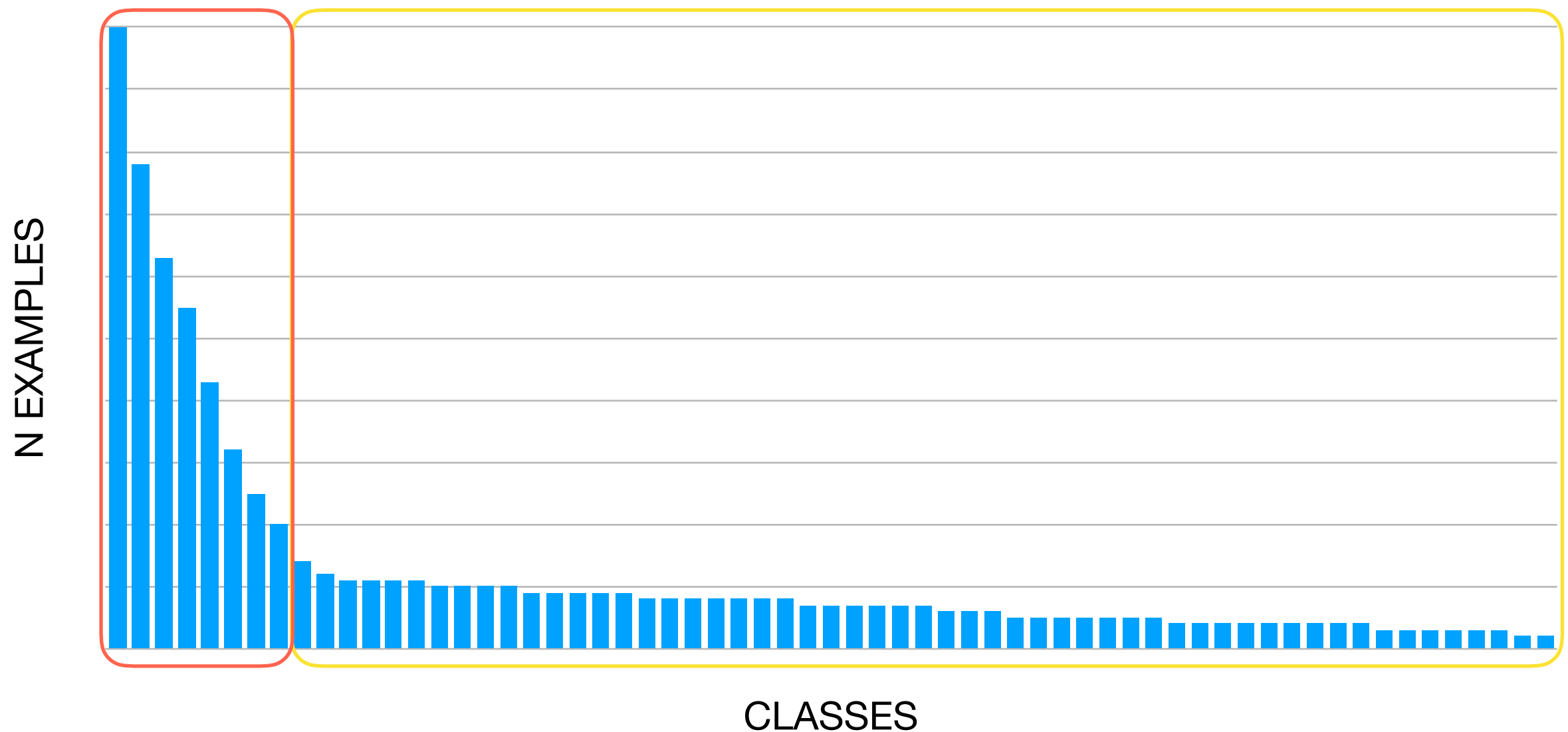
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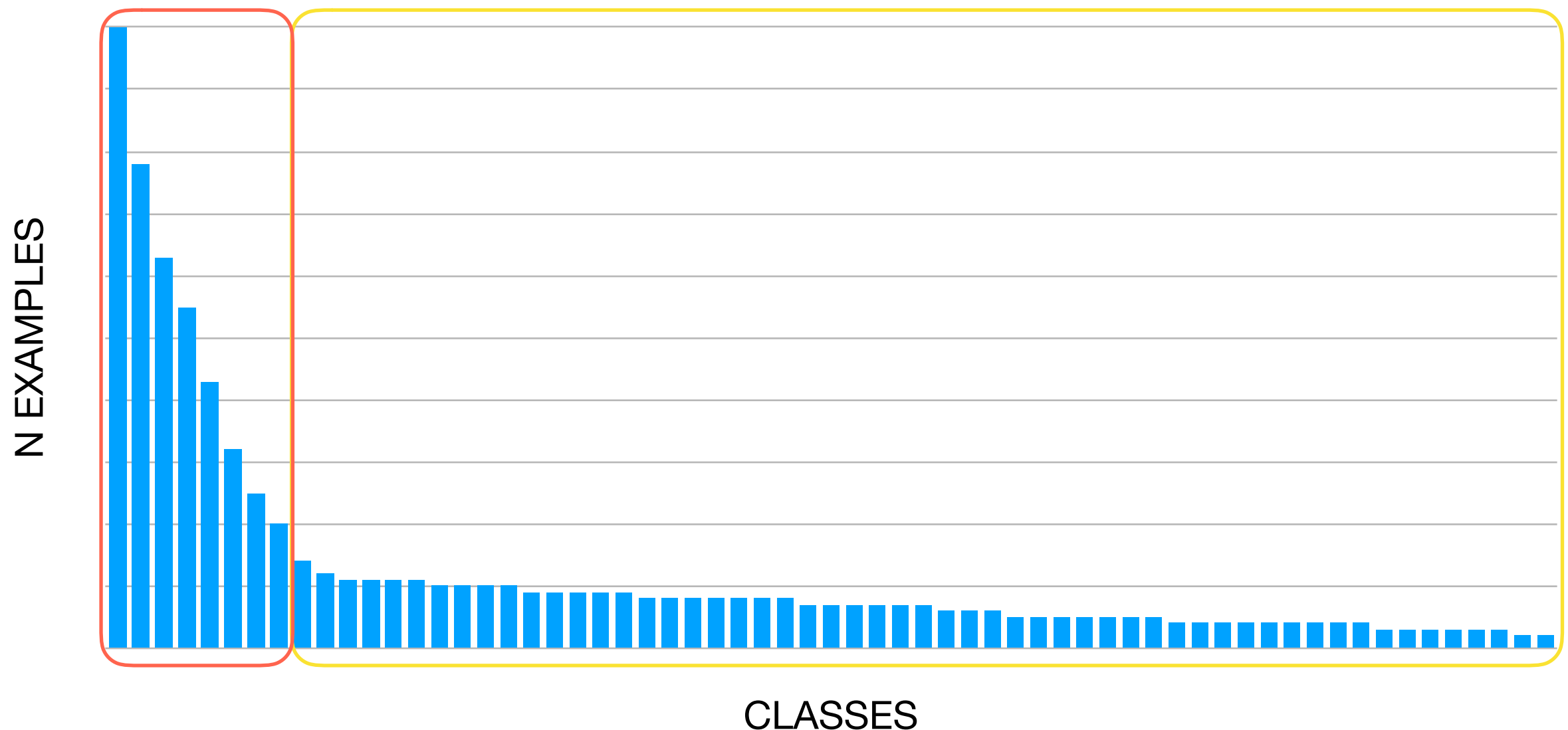
# Typical Goal Oriented Chatbot Task

- We probably won't be able to use the usual classification approach



# Typical Goal Oriented Chatbot Task

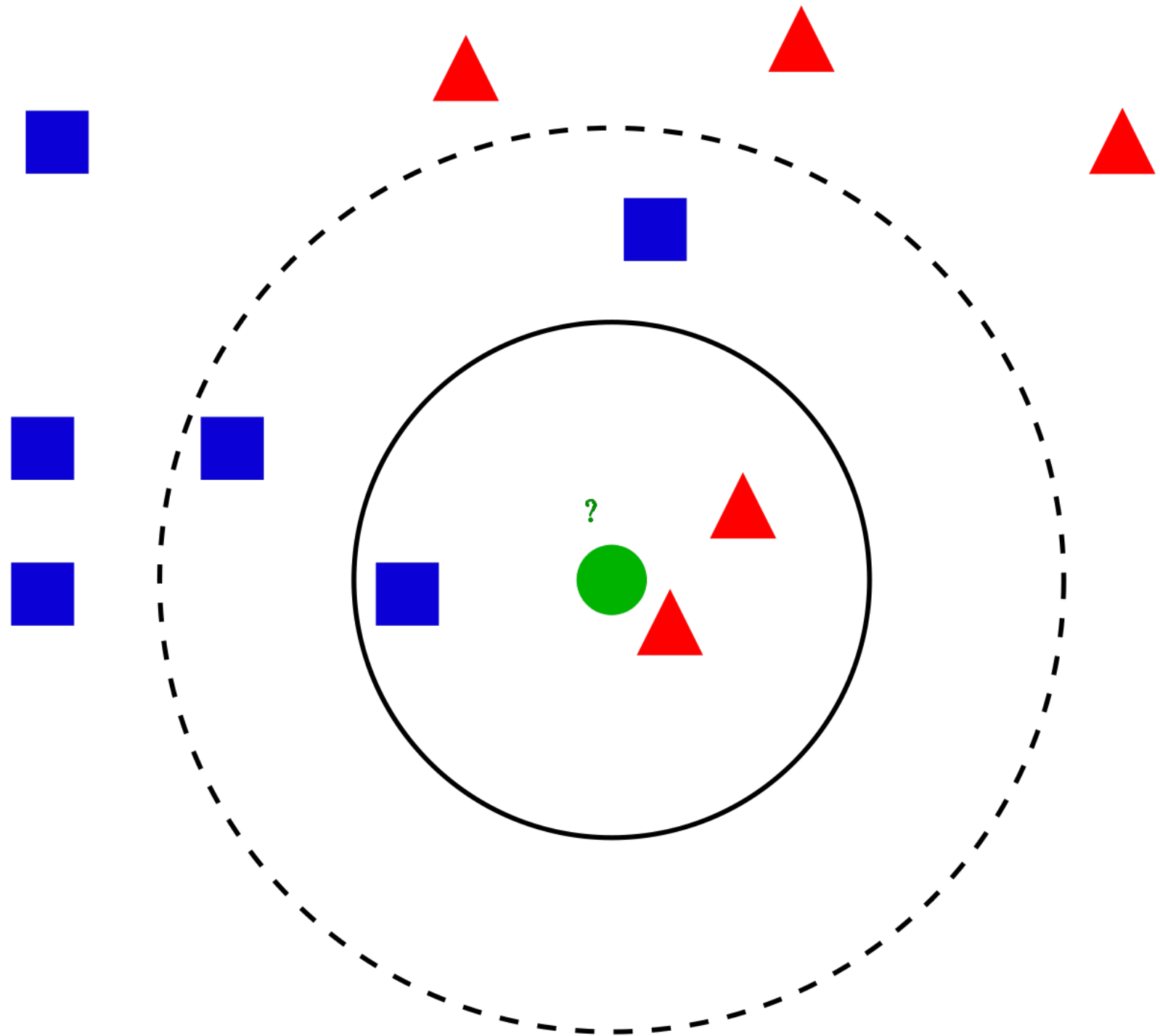
- We probably won't be able to use the usual classification approach
- Use kNN





# Typical Goal Oriented Chatbot Task

- We probably won't be able to use the usual classification approach
- Use kNN

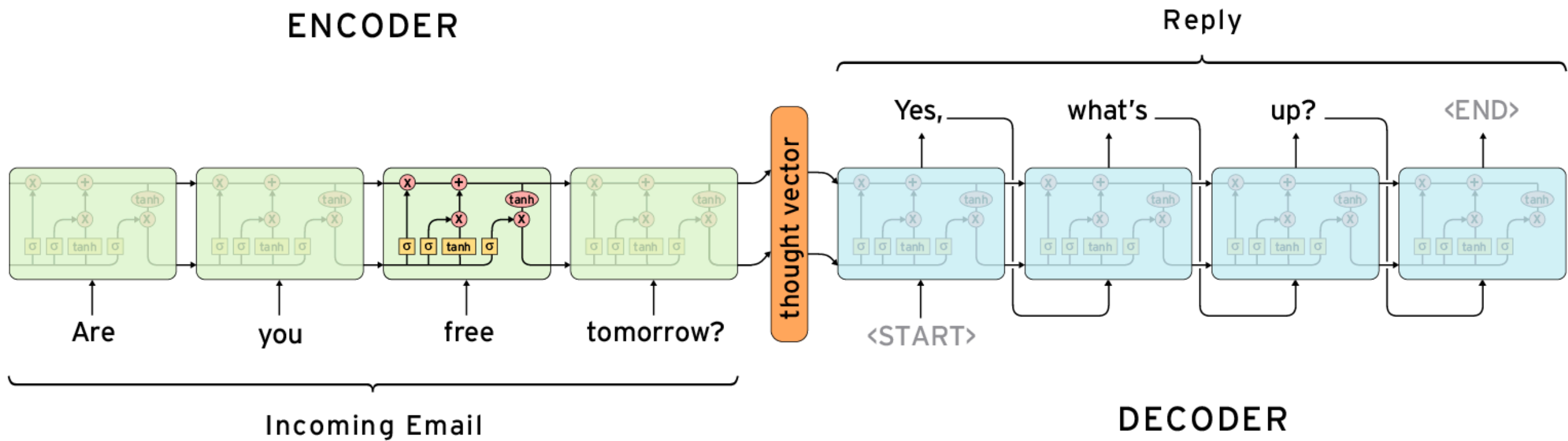


# Chatbot Tasks

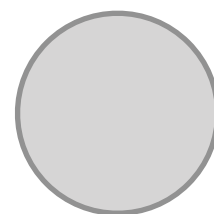
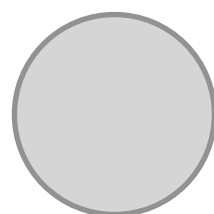
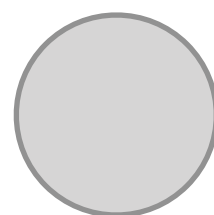
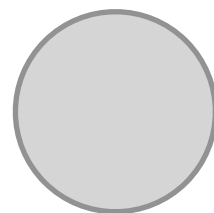
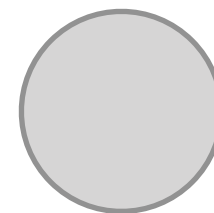
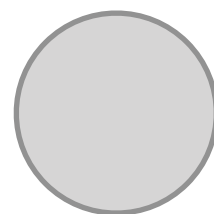
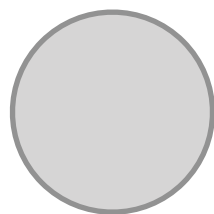
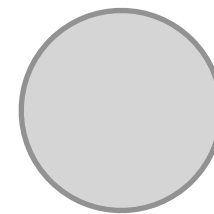
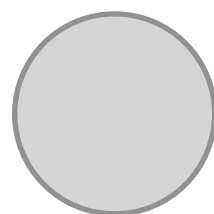
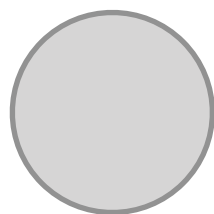
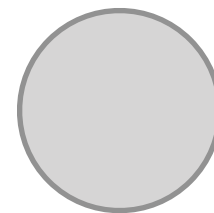
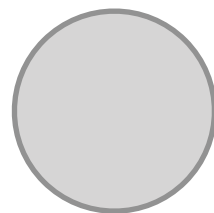
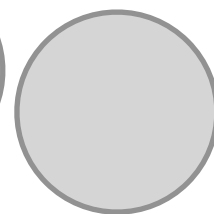
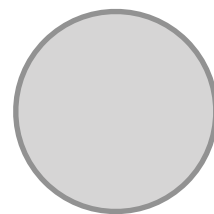
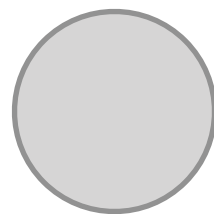
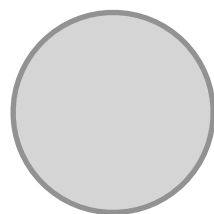
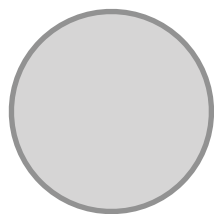
Goal-Oriented

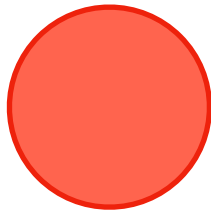
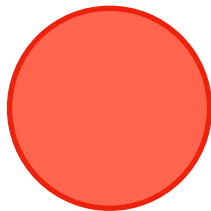
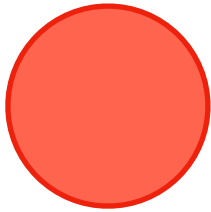
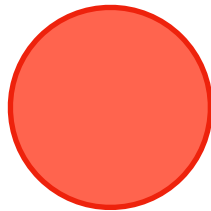
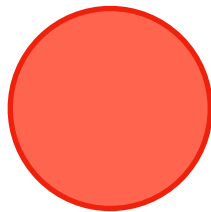
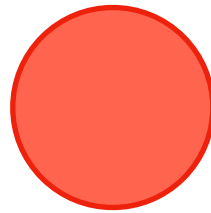
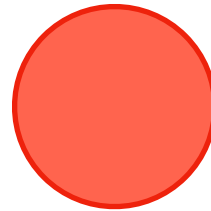
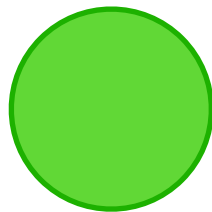
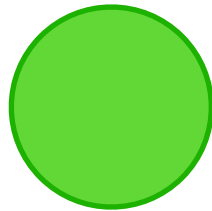
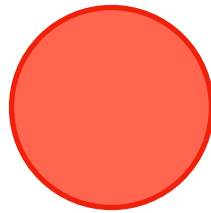
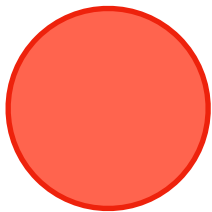
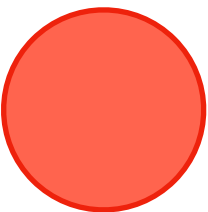
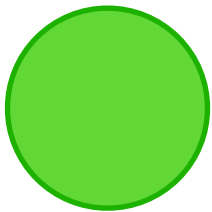
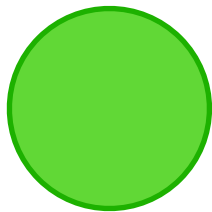
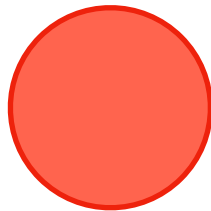
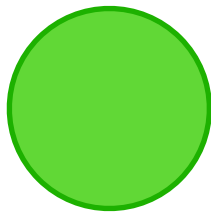
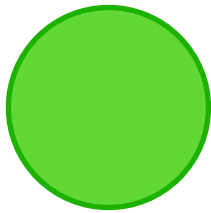
Chit Chat

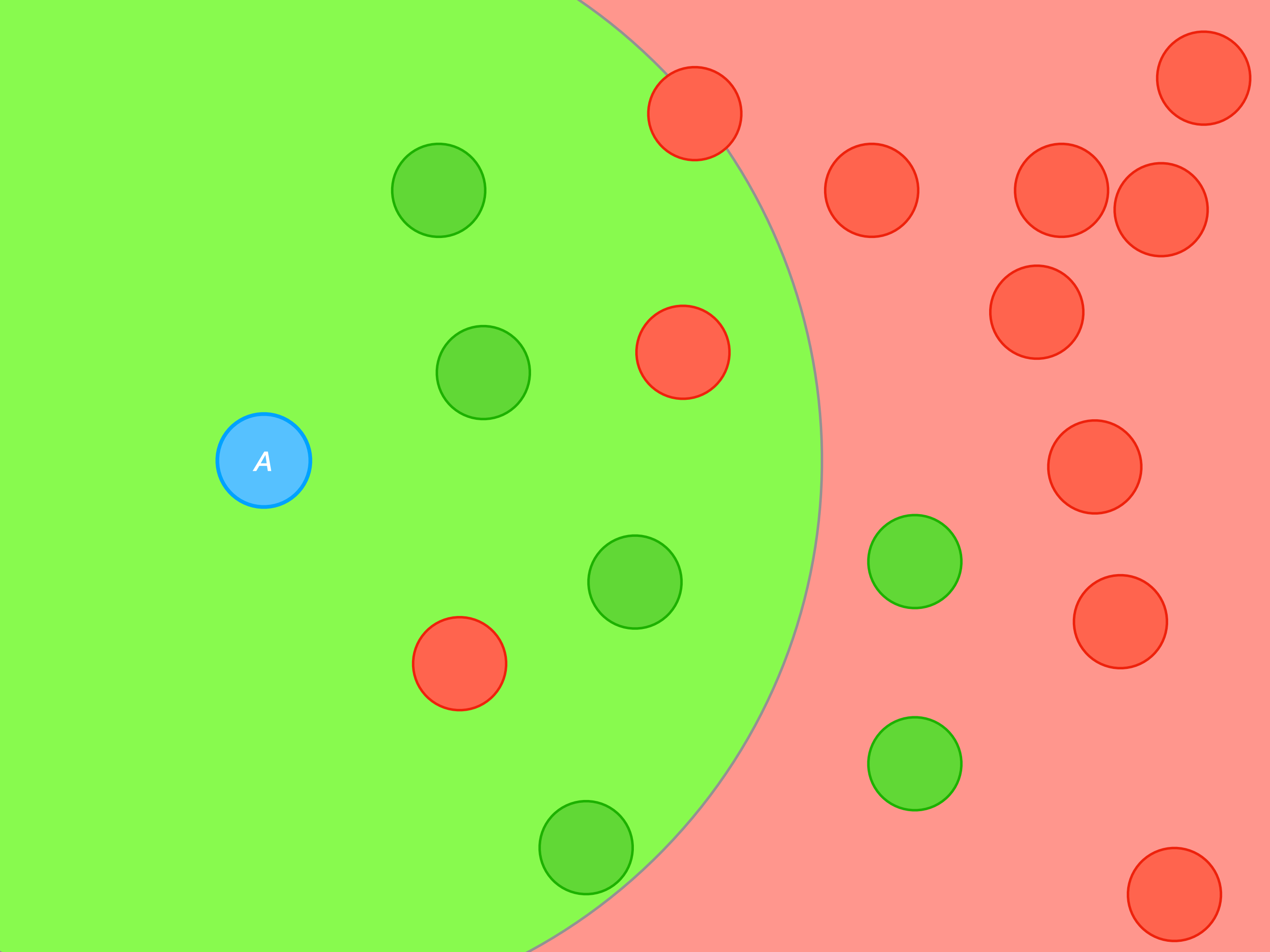
# Generative Chatbot



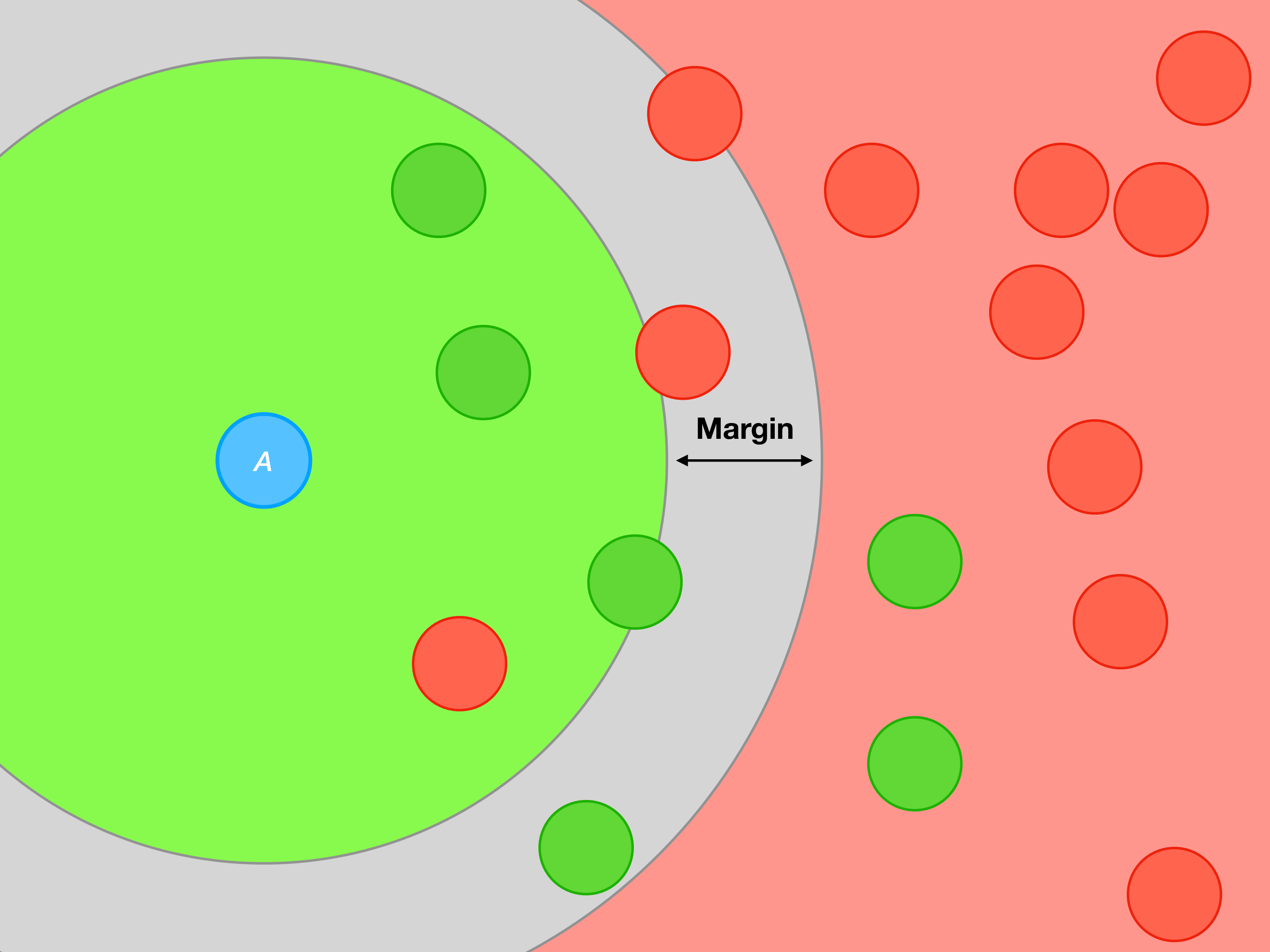




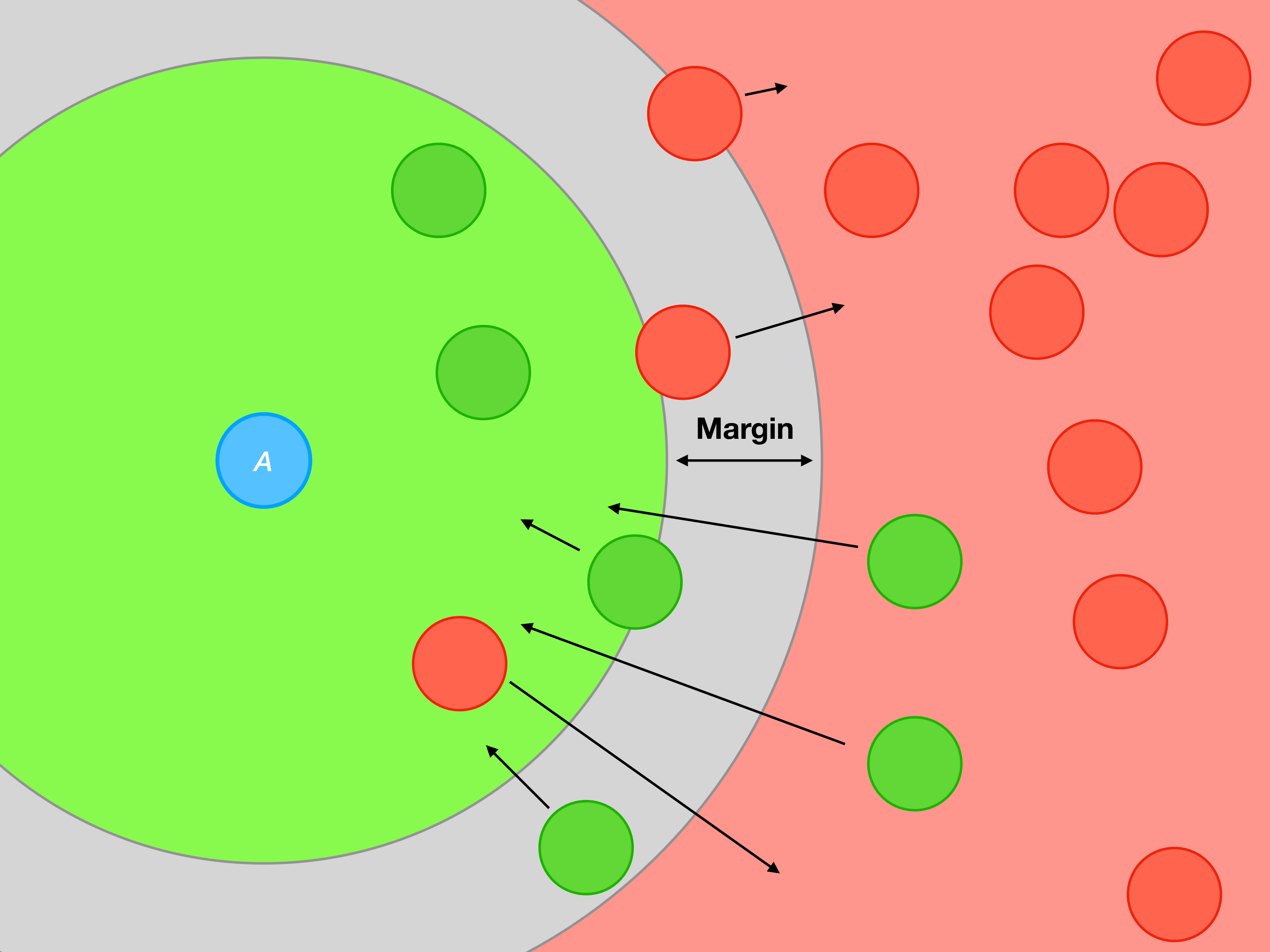




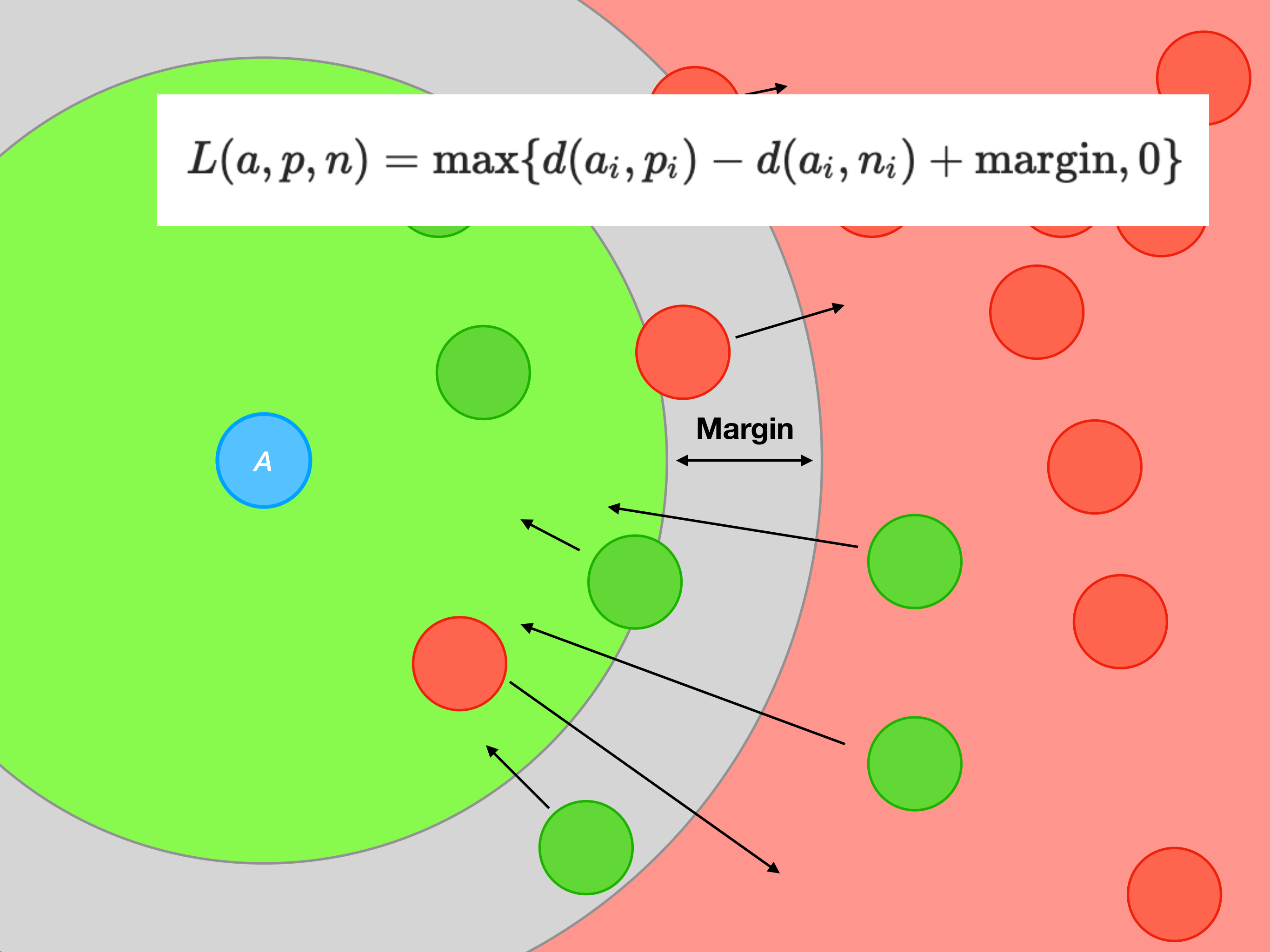
A



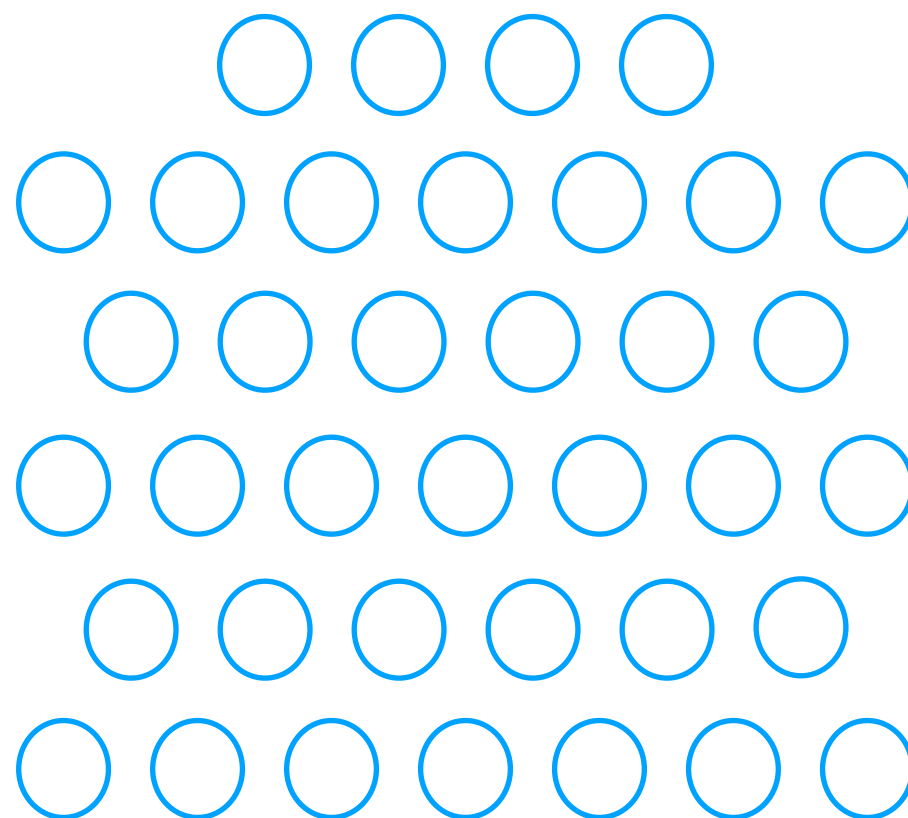




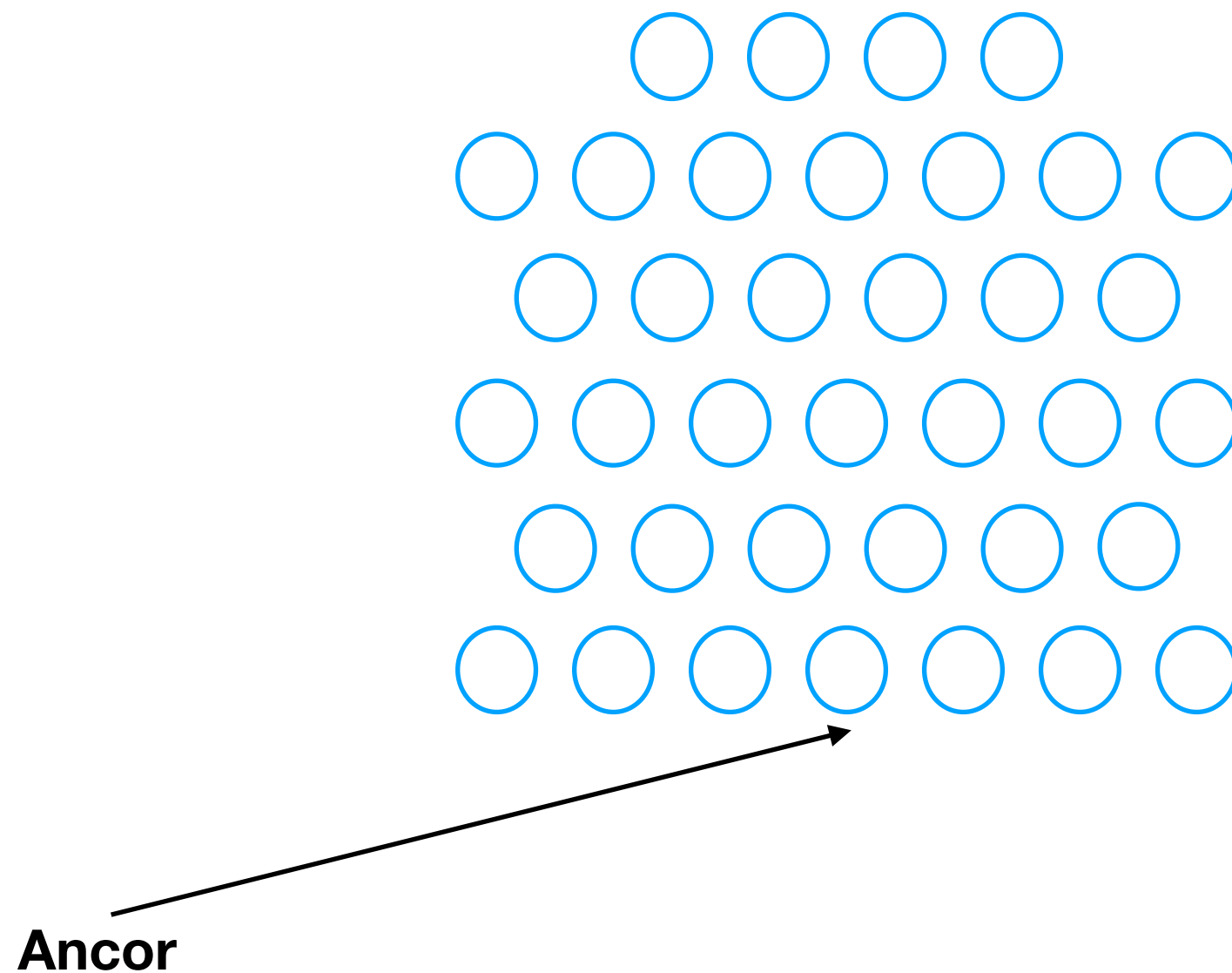
$$L(a, p, n) = \max\{d(a_i, p_i) - d(a_i, n_i) + \text{margin}, 0\}$$



# Triplet Loss

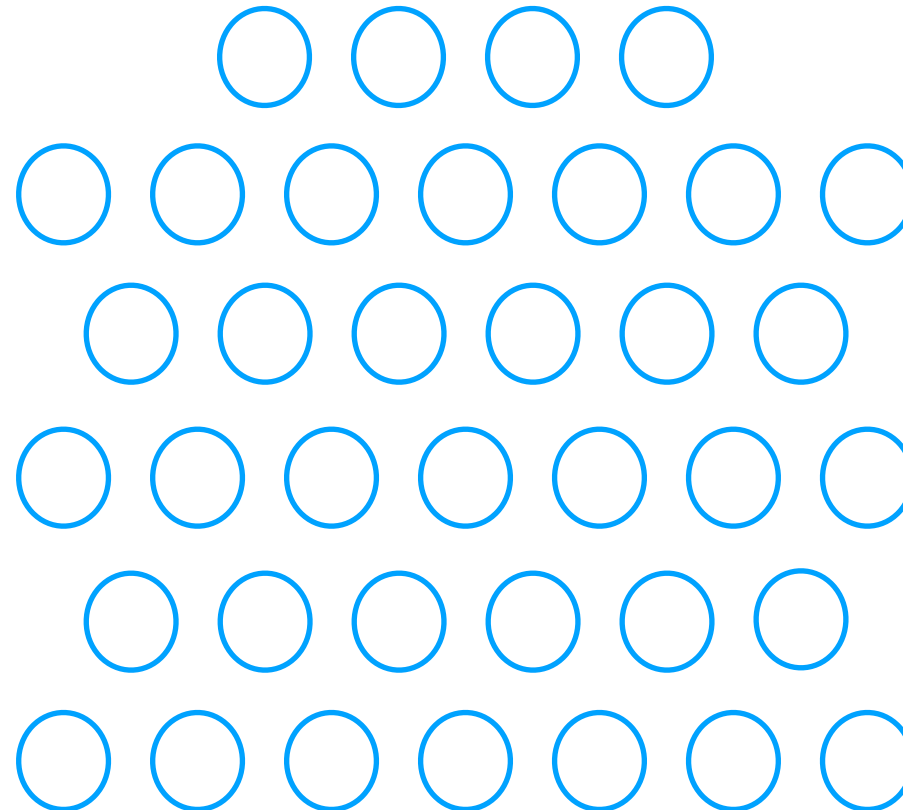
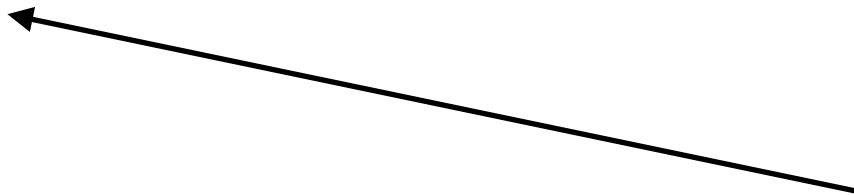


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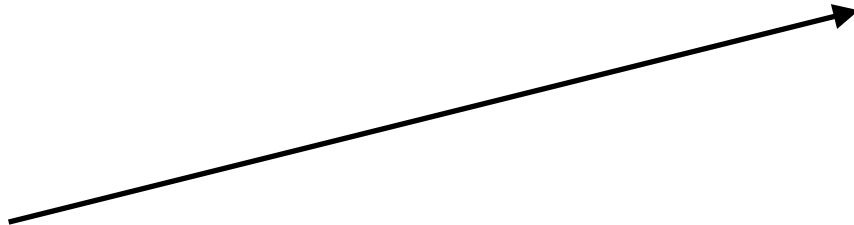


# Triplet Loss

**M(Ancor)**

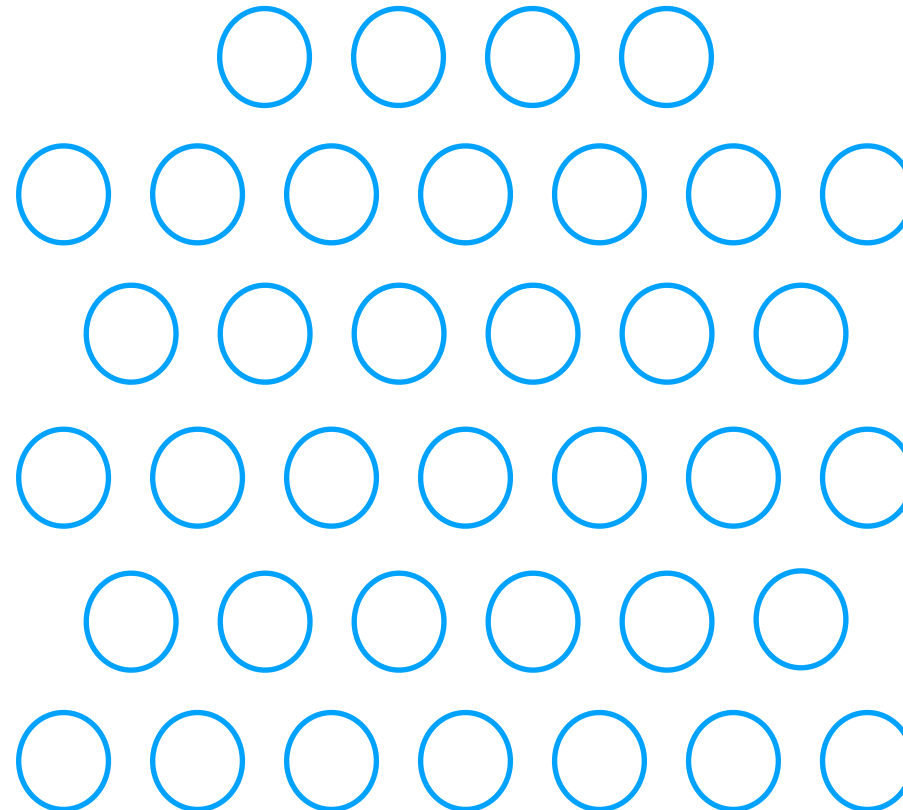
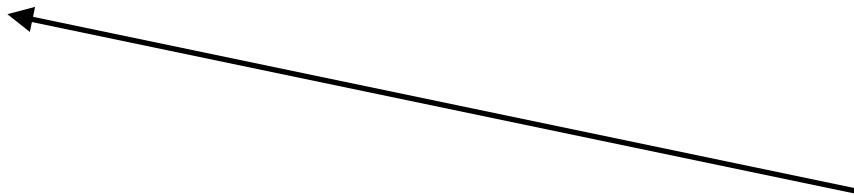


**Ancor**

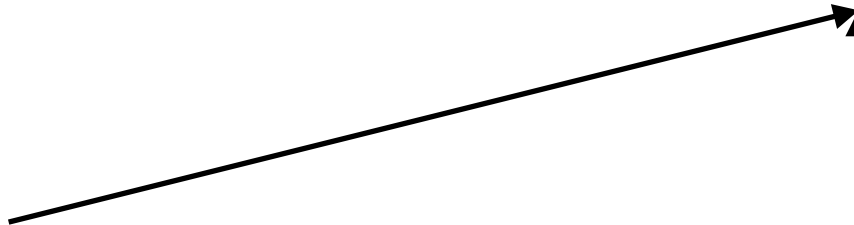


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**M(Ancor)**



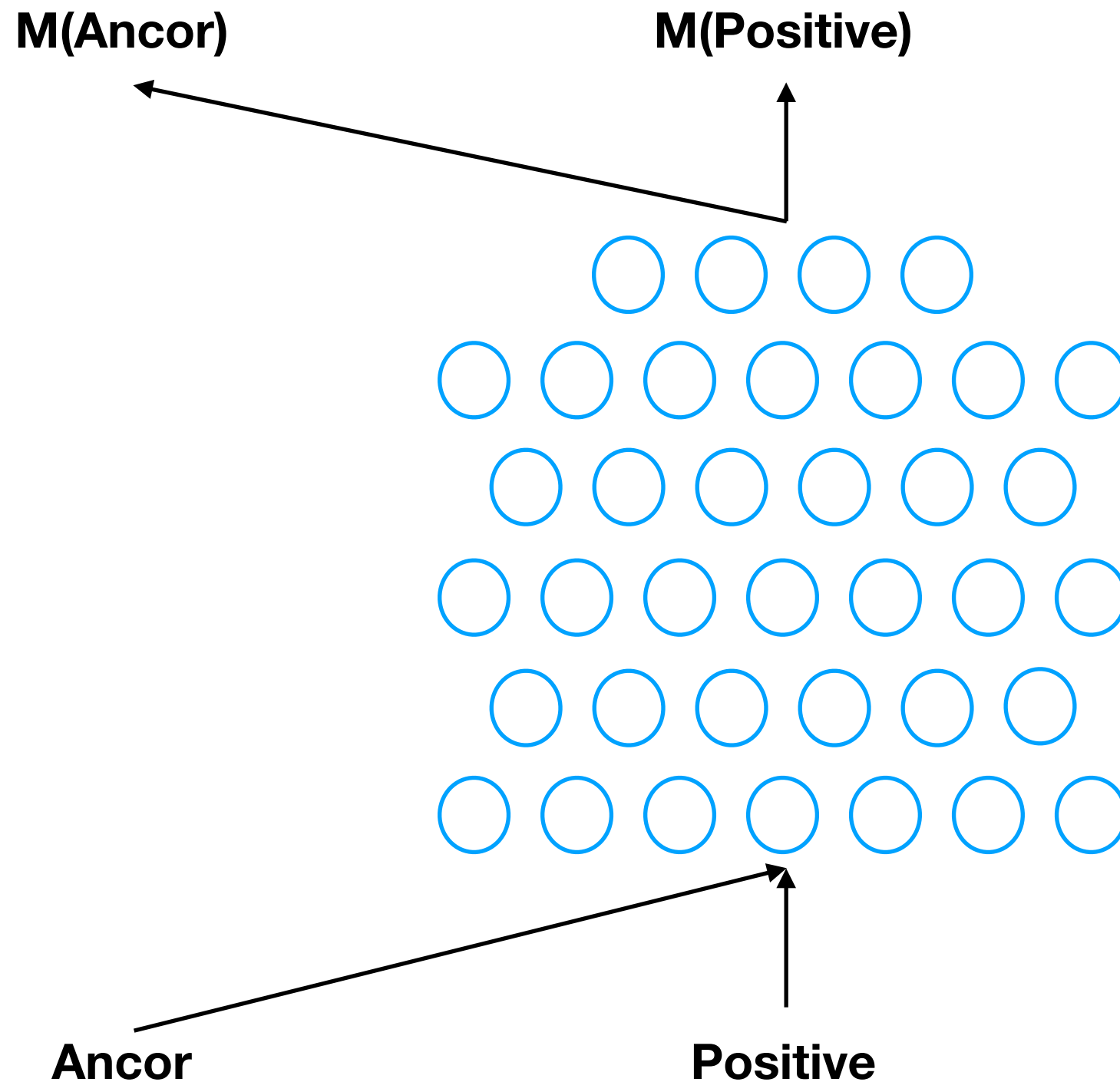
**Ancor**



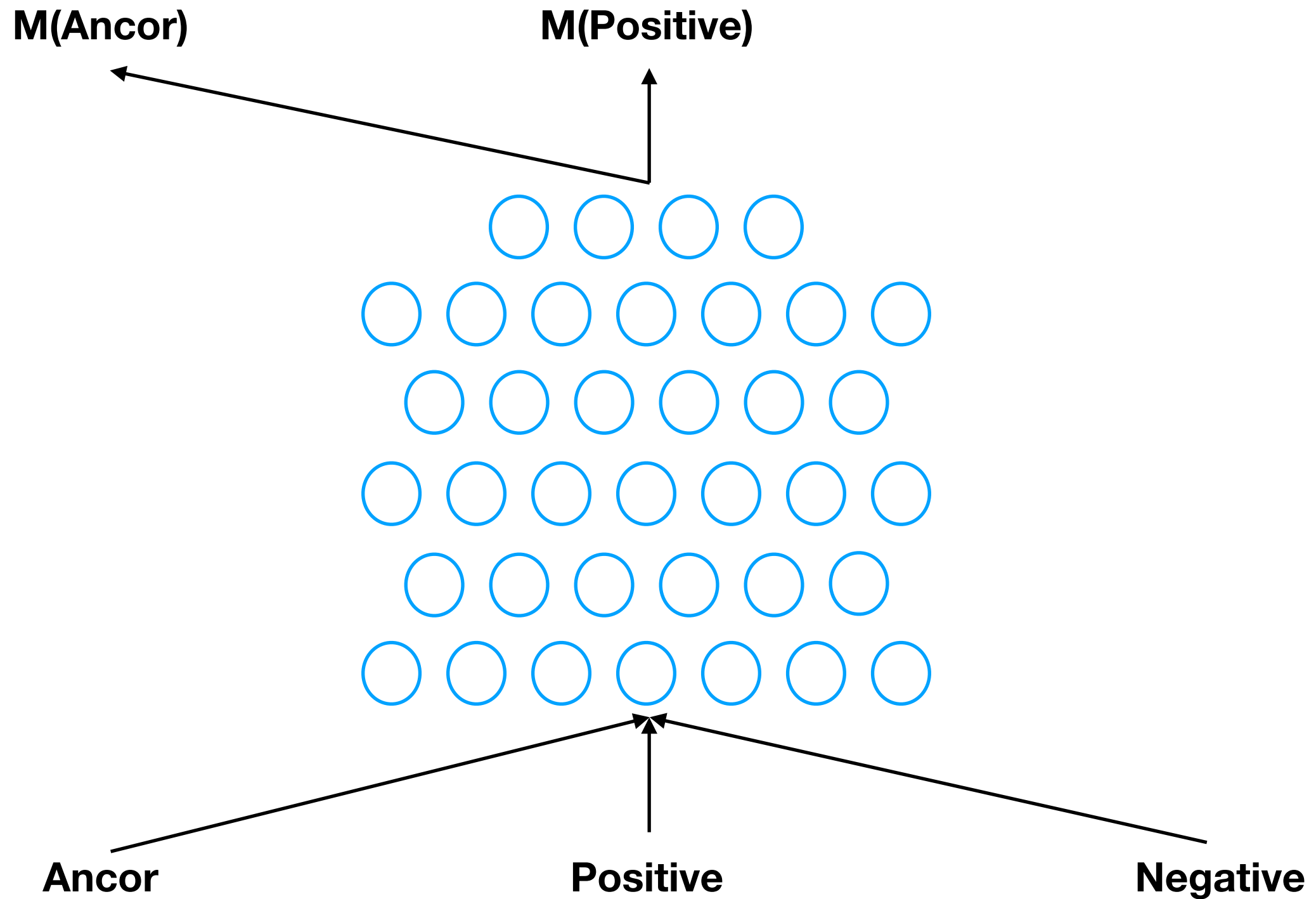
**Positive**



# Triplet Loss

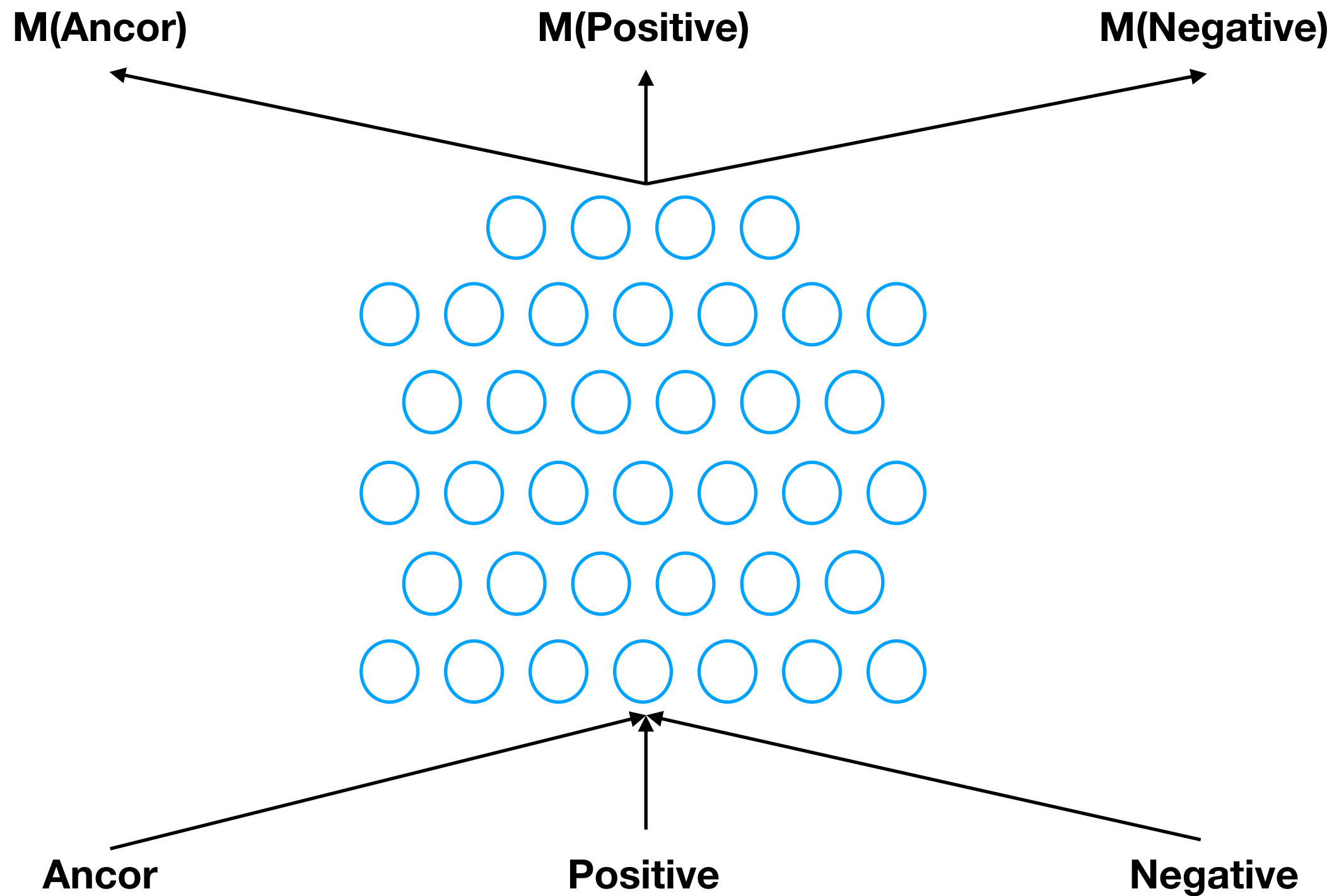


# Triplet Loss

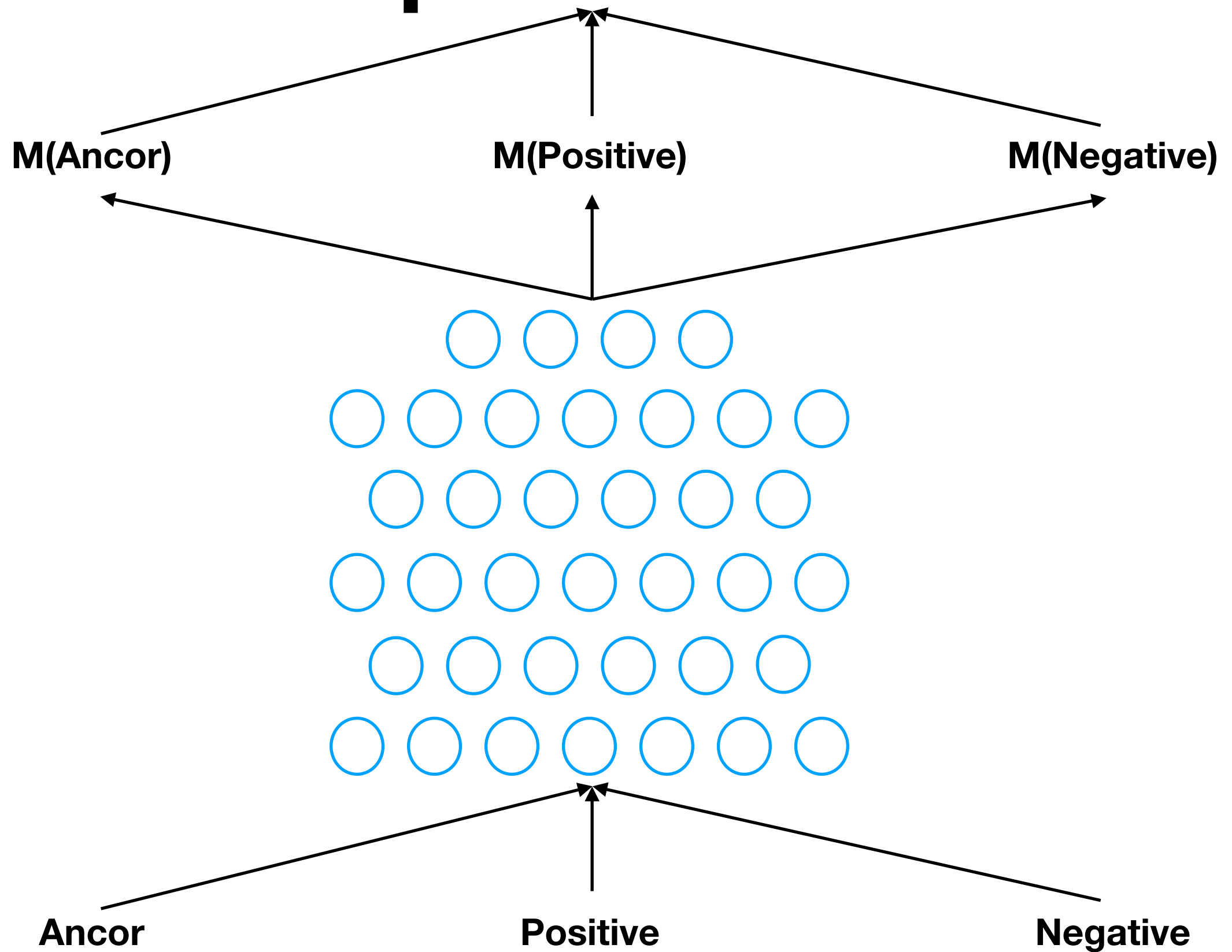




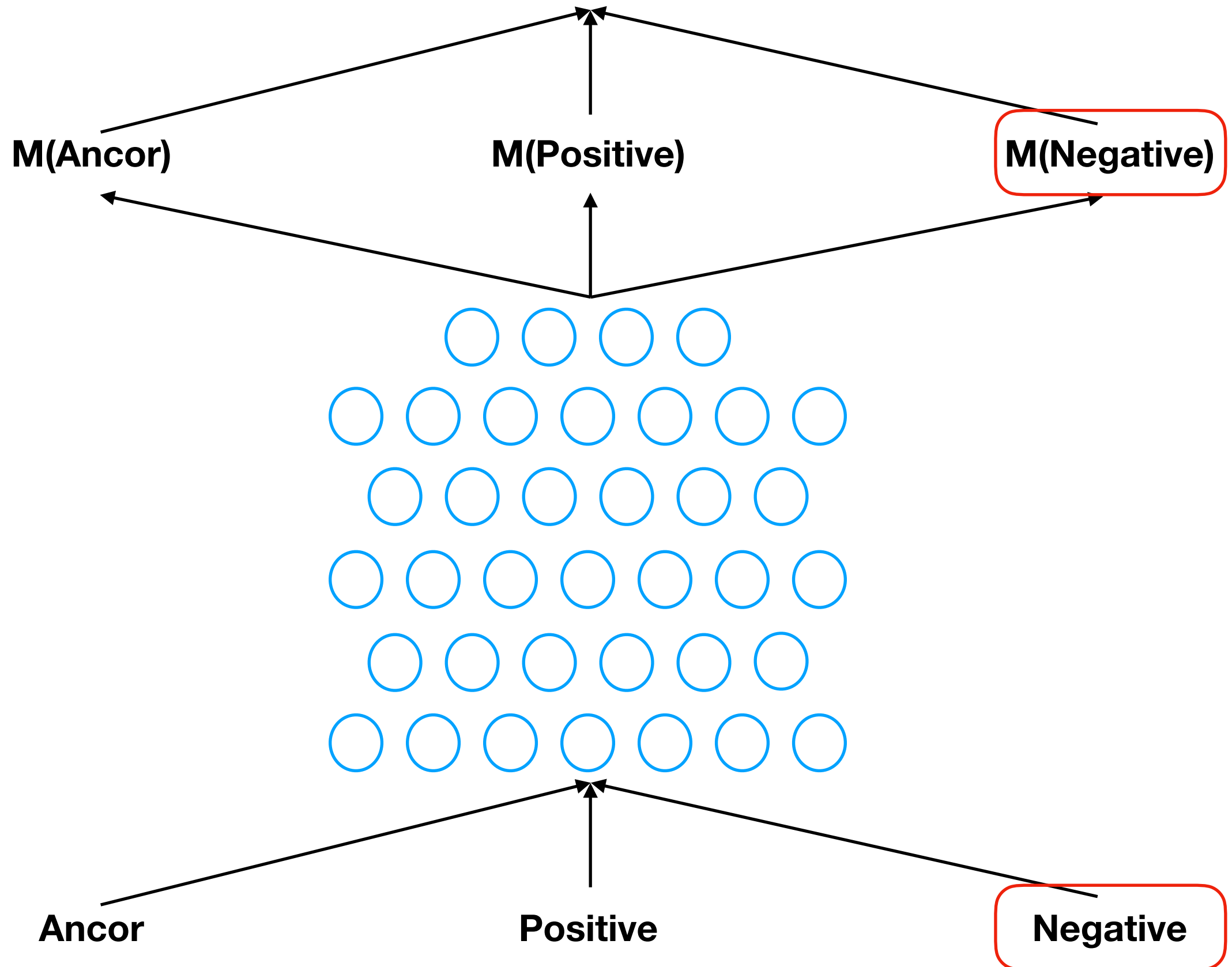
# Triplet Loss



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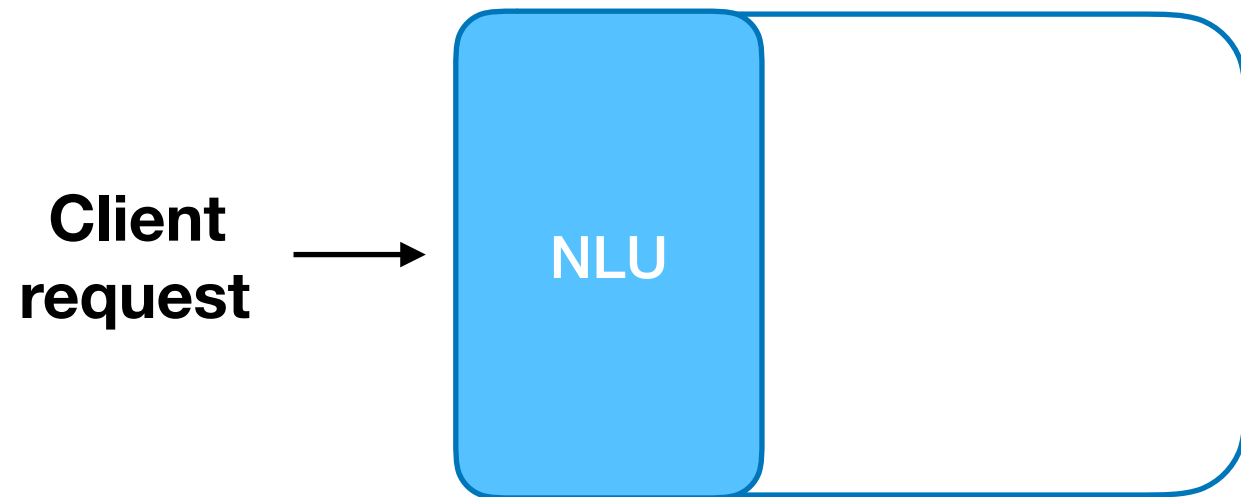
# Where can we find negatives?



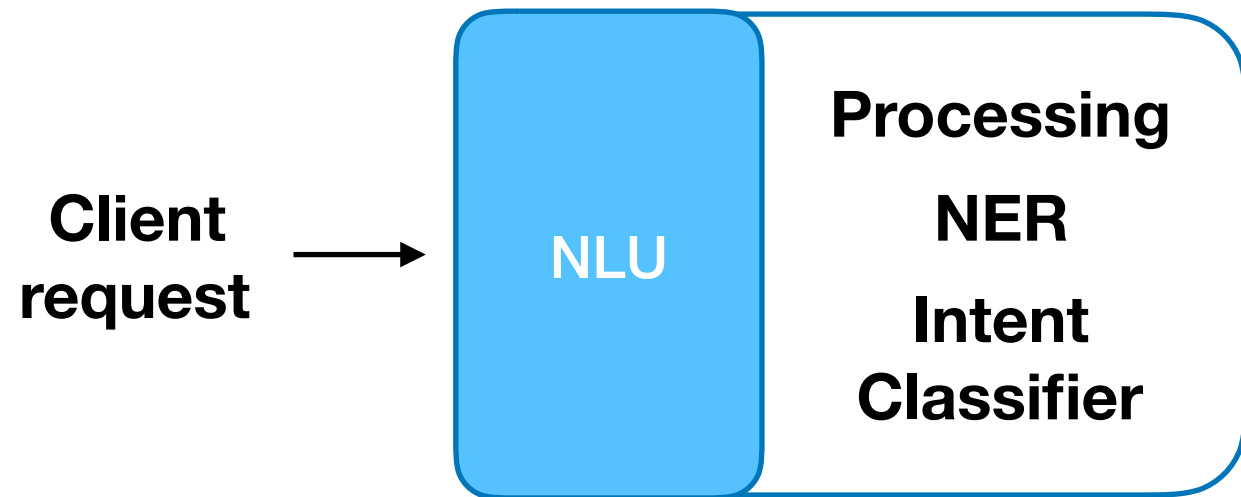
# Typical Dialogue Engine

**Client  
request**

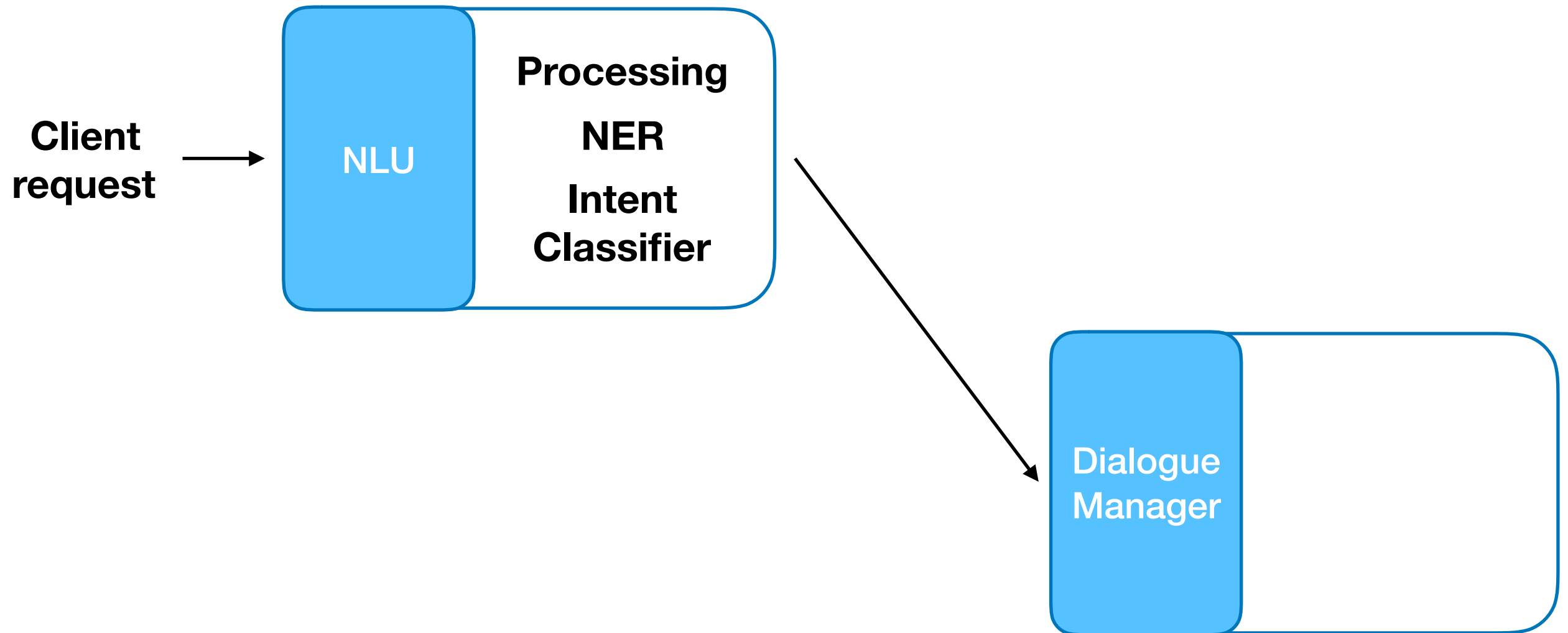
# Typical Dialogue Engine



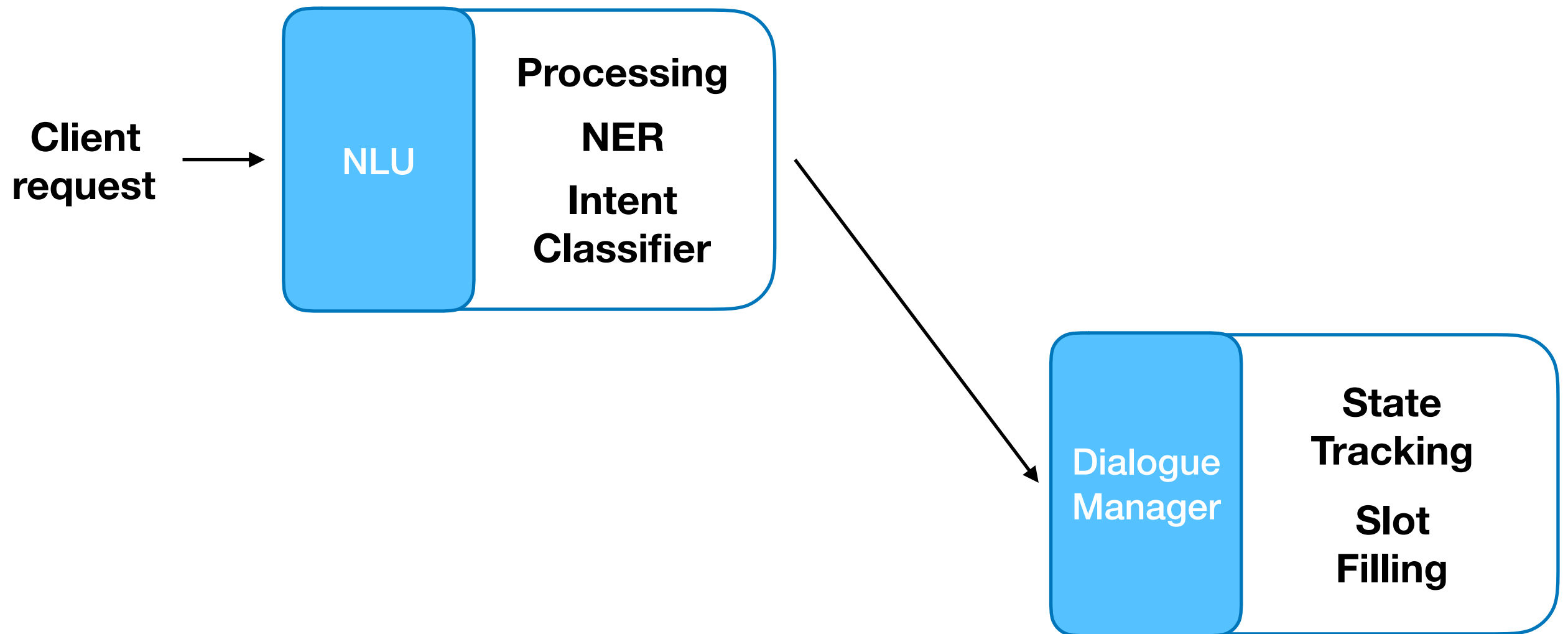
# Typical Dialogue Engine



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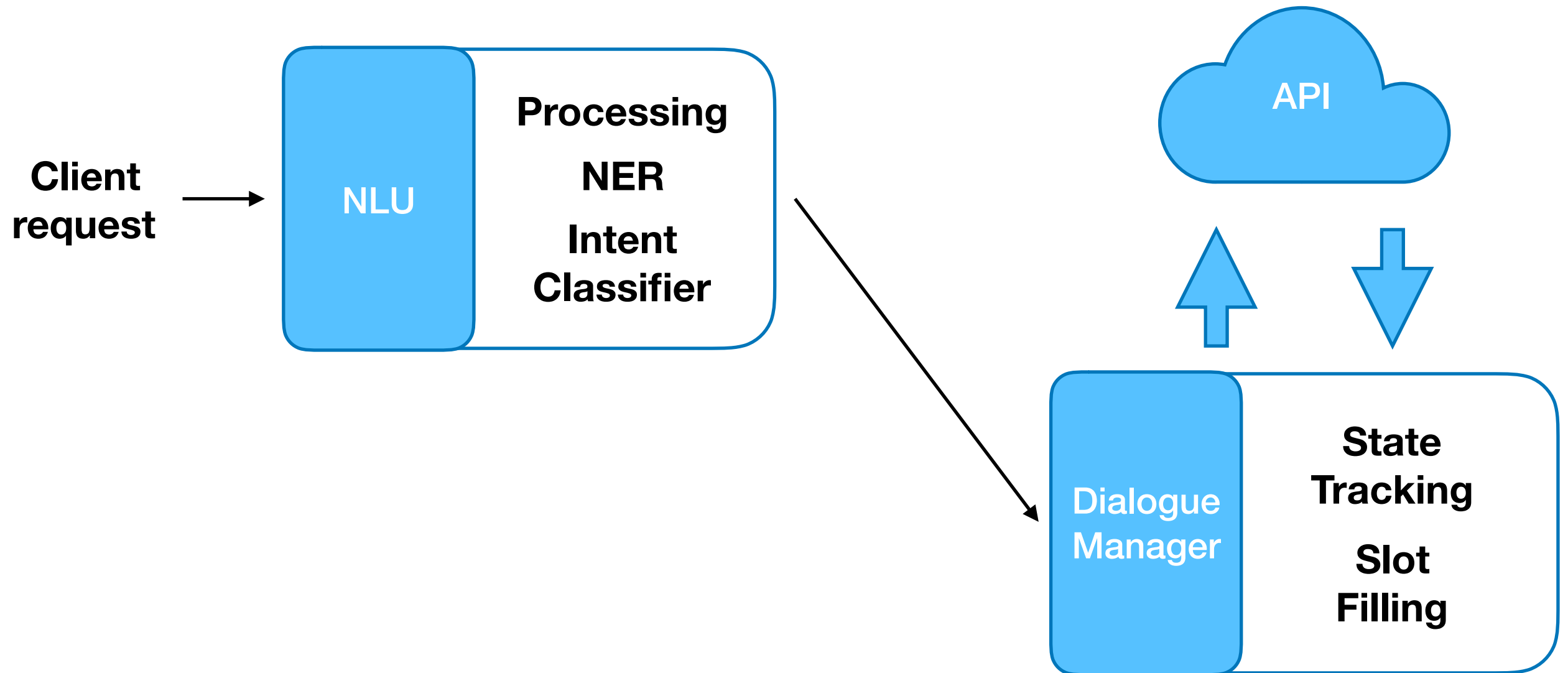


# Typical Dialogue Engine

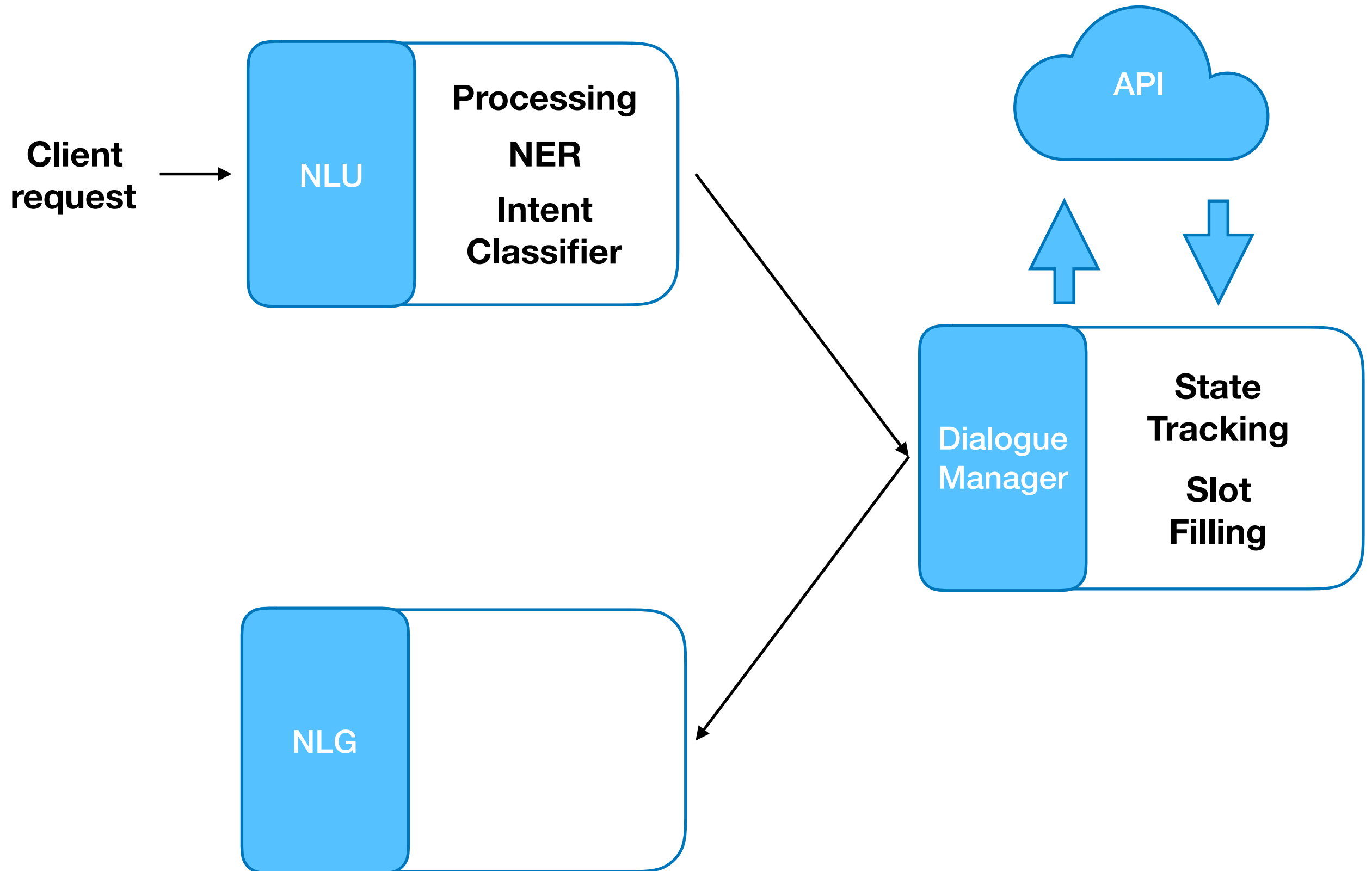




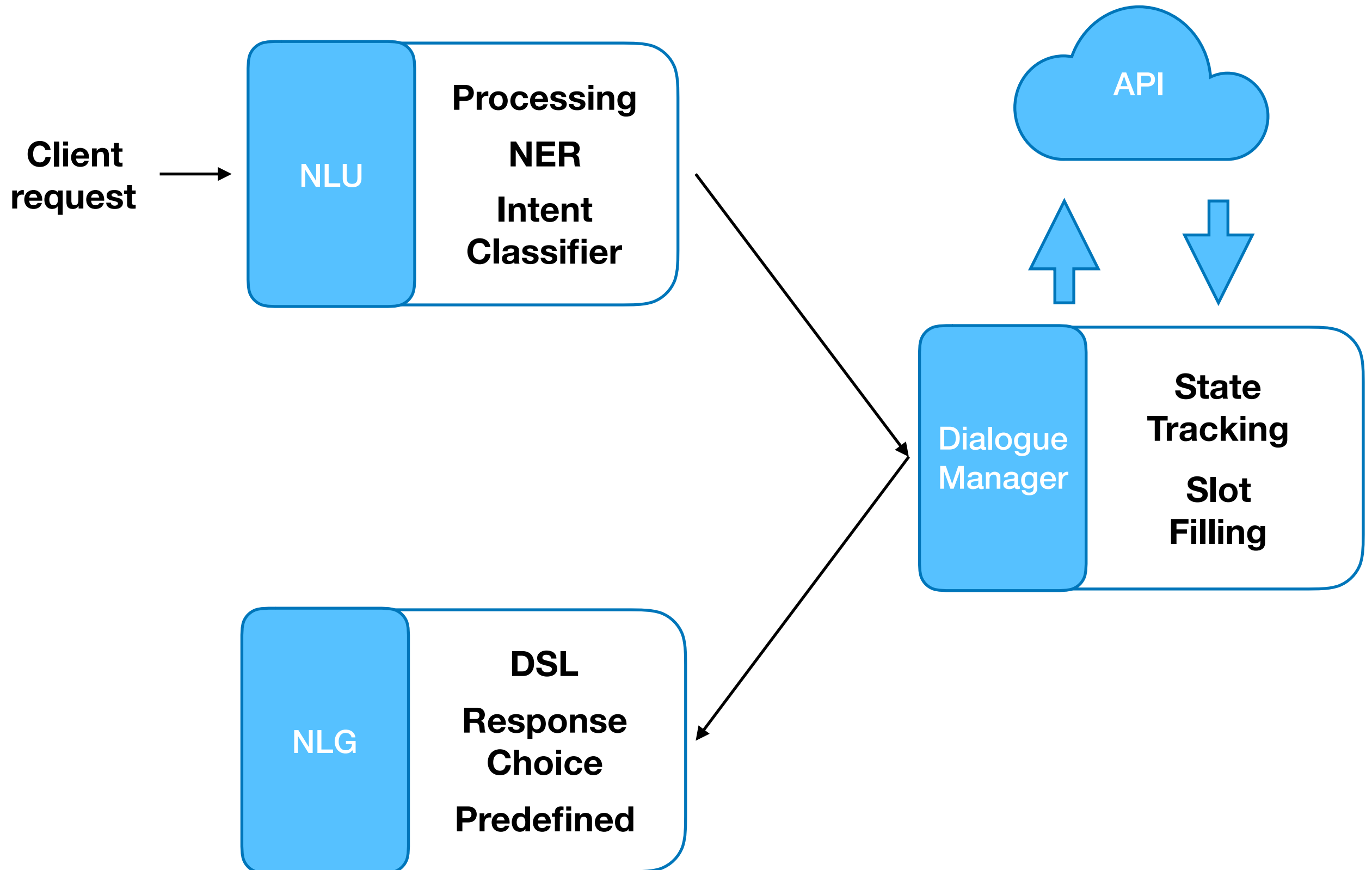
# Typical Dialogue Engine



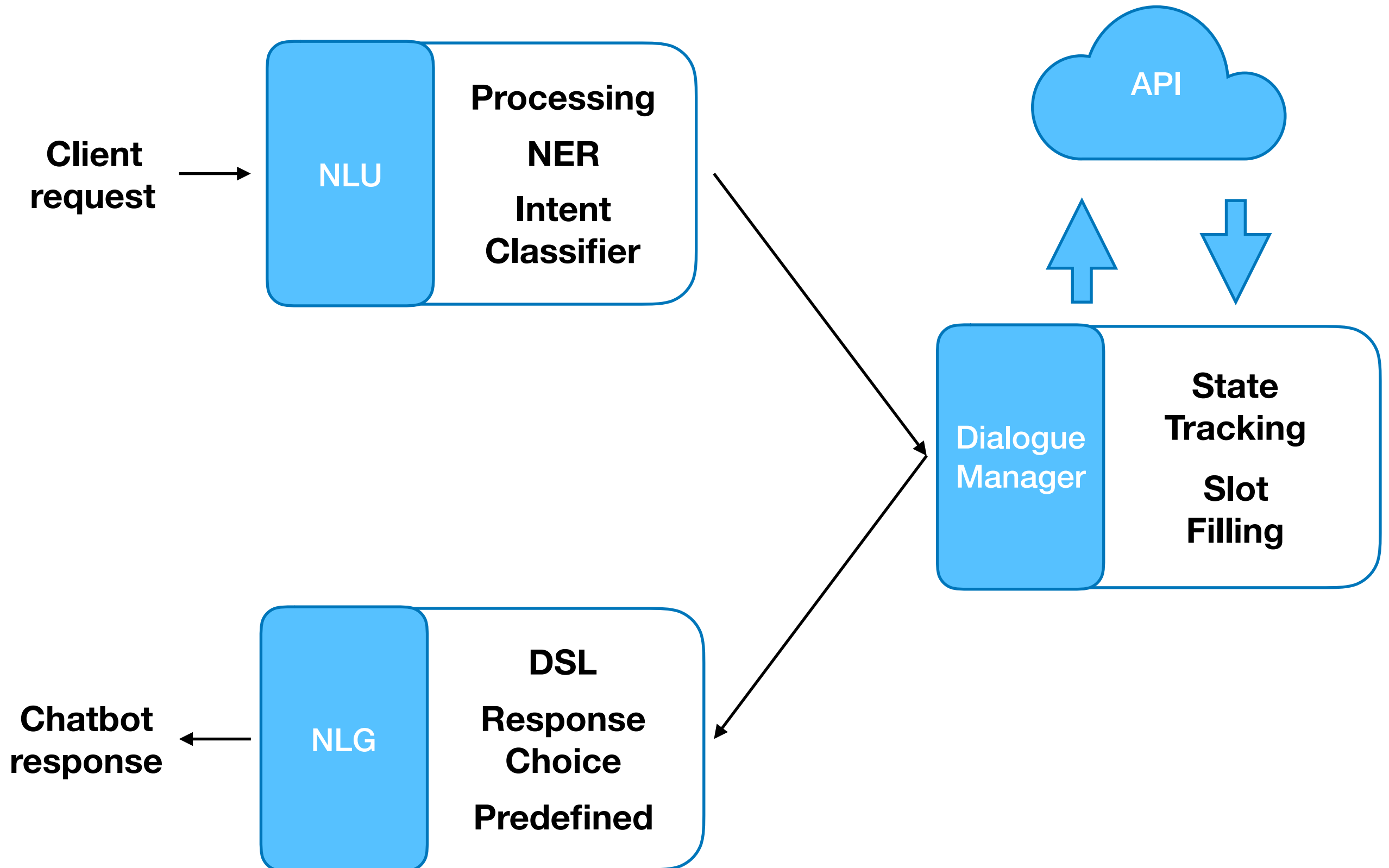
# Typical Dialogue Engine



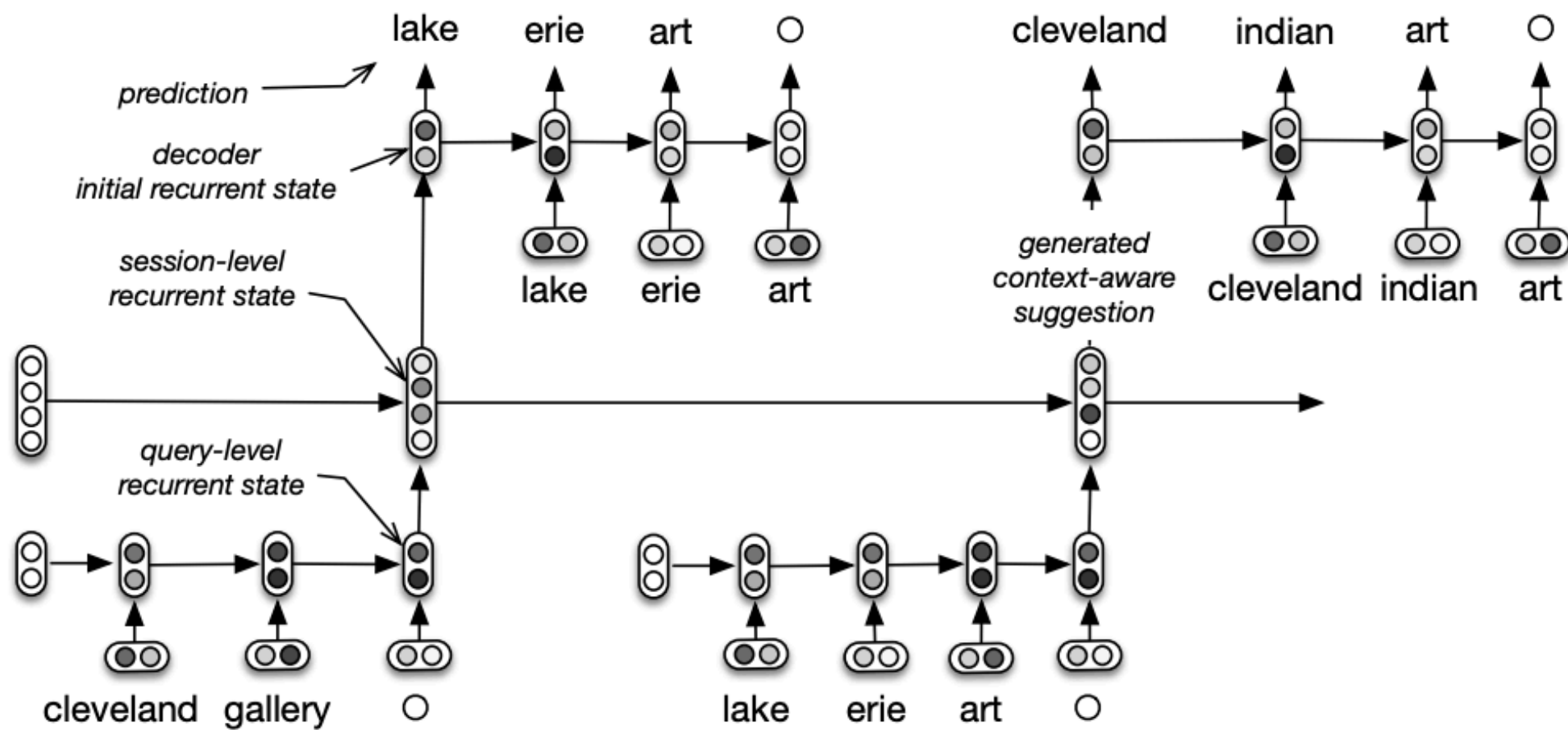
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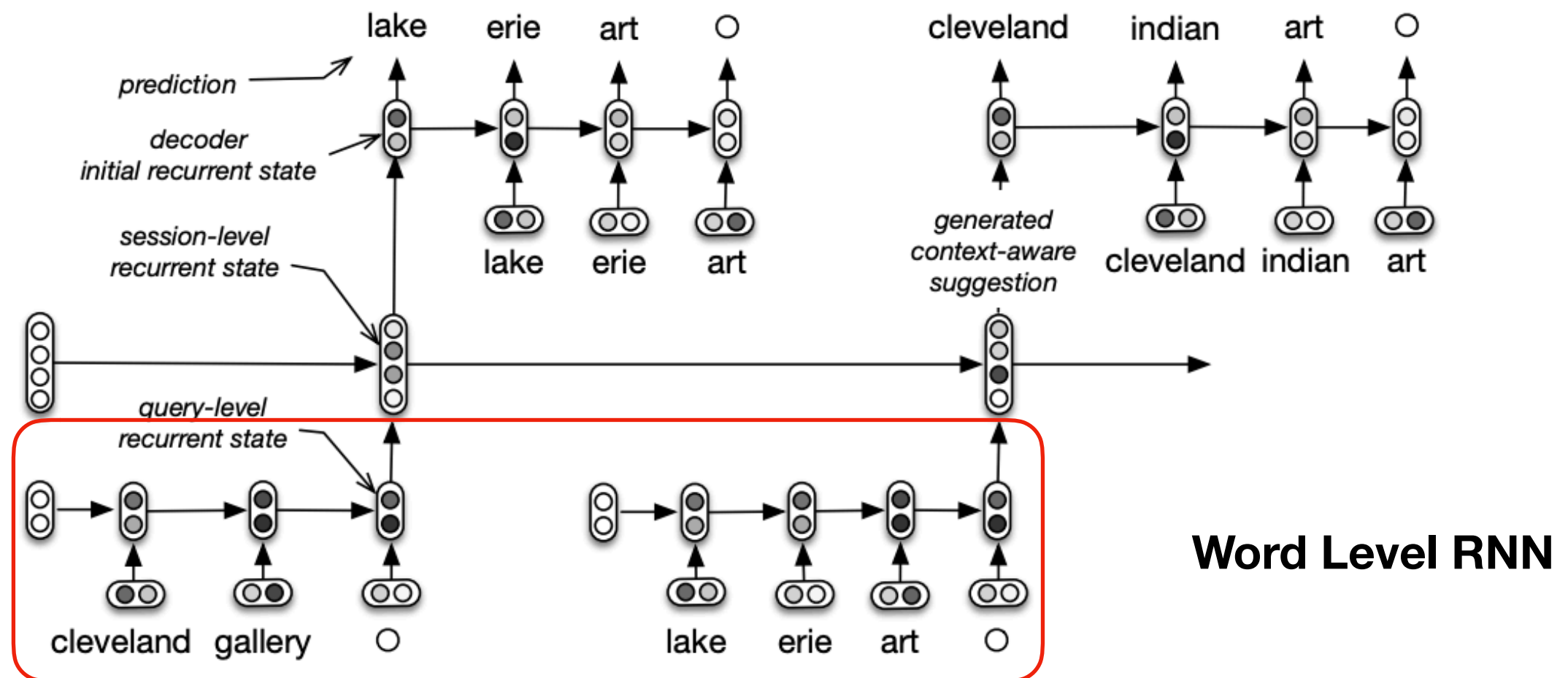
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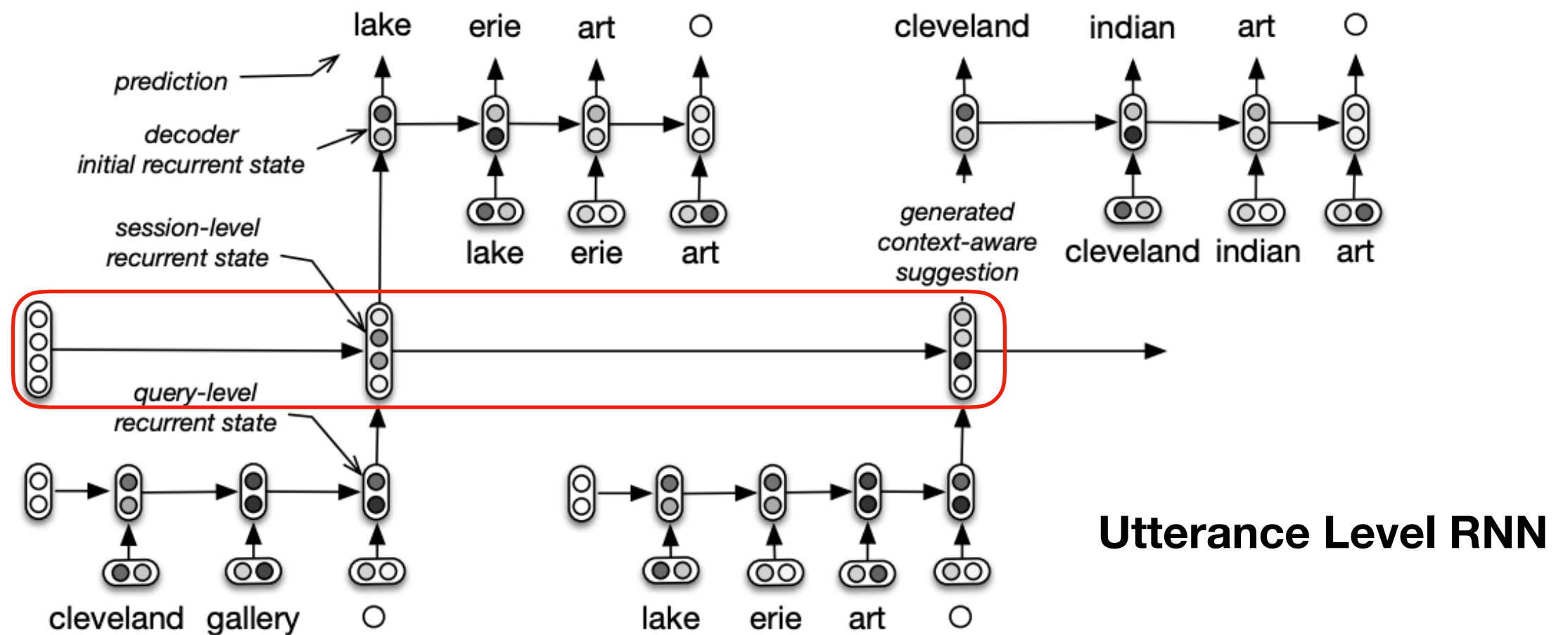
# Hierarchical Recurrent Encoder-Decoder



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# Hierarchical Recurrent Encoder-Decoder



# Thanks for your Attention!

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