

# Predicting Latent Narrative Mood using Audio and Physiologic Data

Tuka Alhanai and Mohammad Ghassemi

Wednesday February 8<sup>th</sup>, 2017

AAAI-17



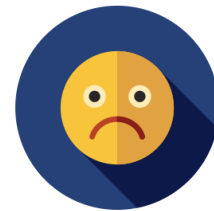




Experiment: Tell us a story



or



# Participants



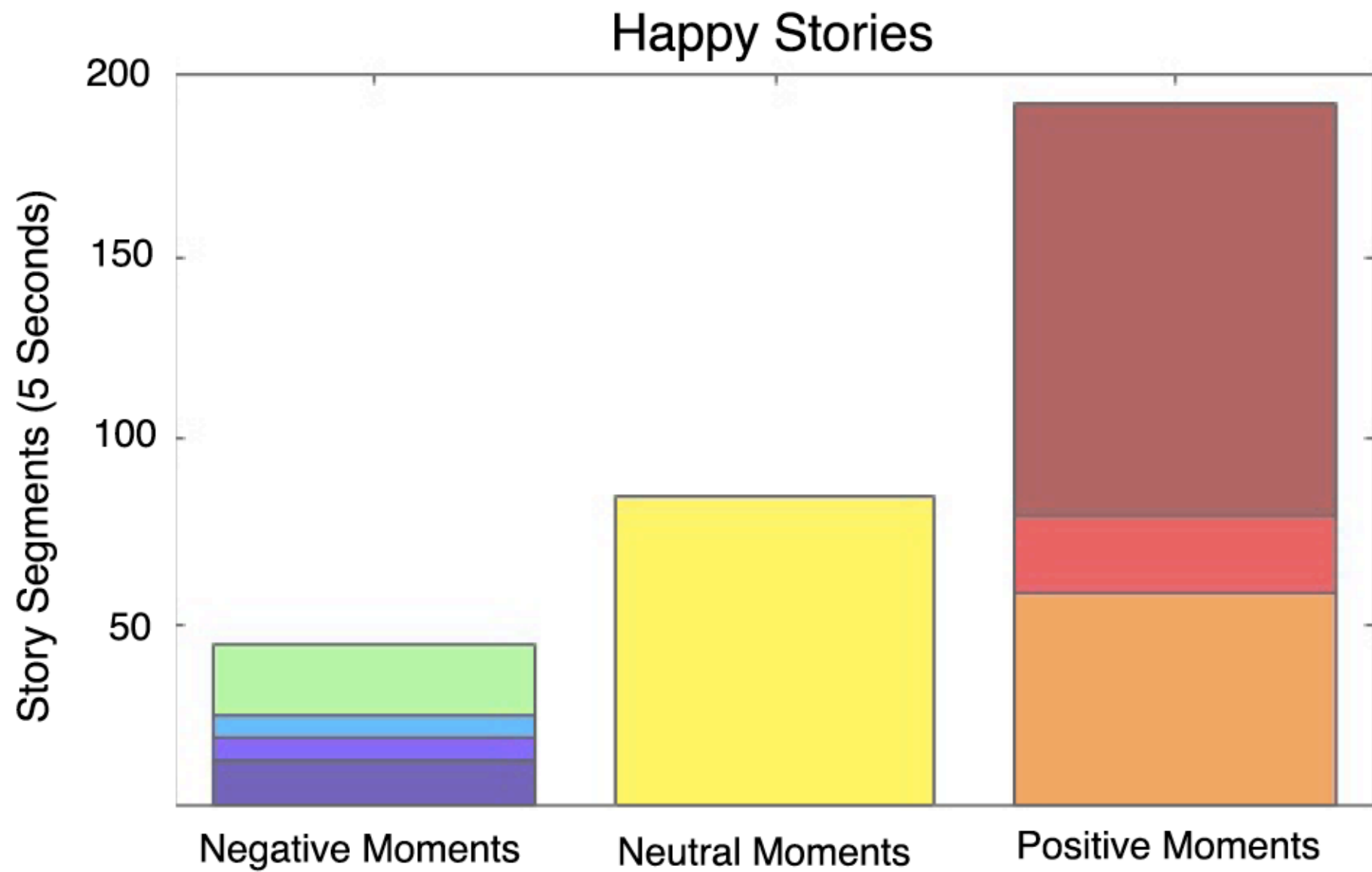
x6



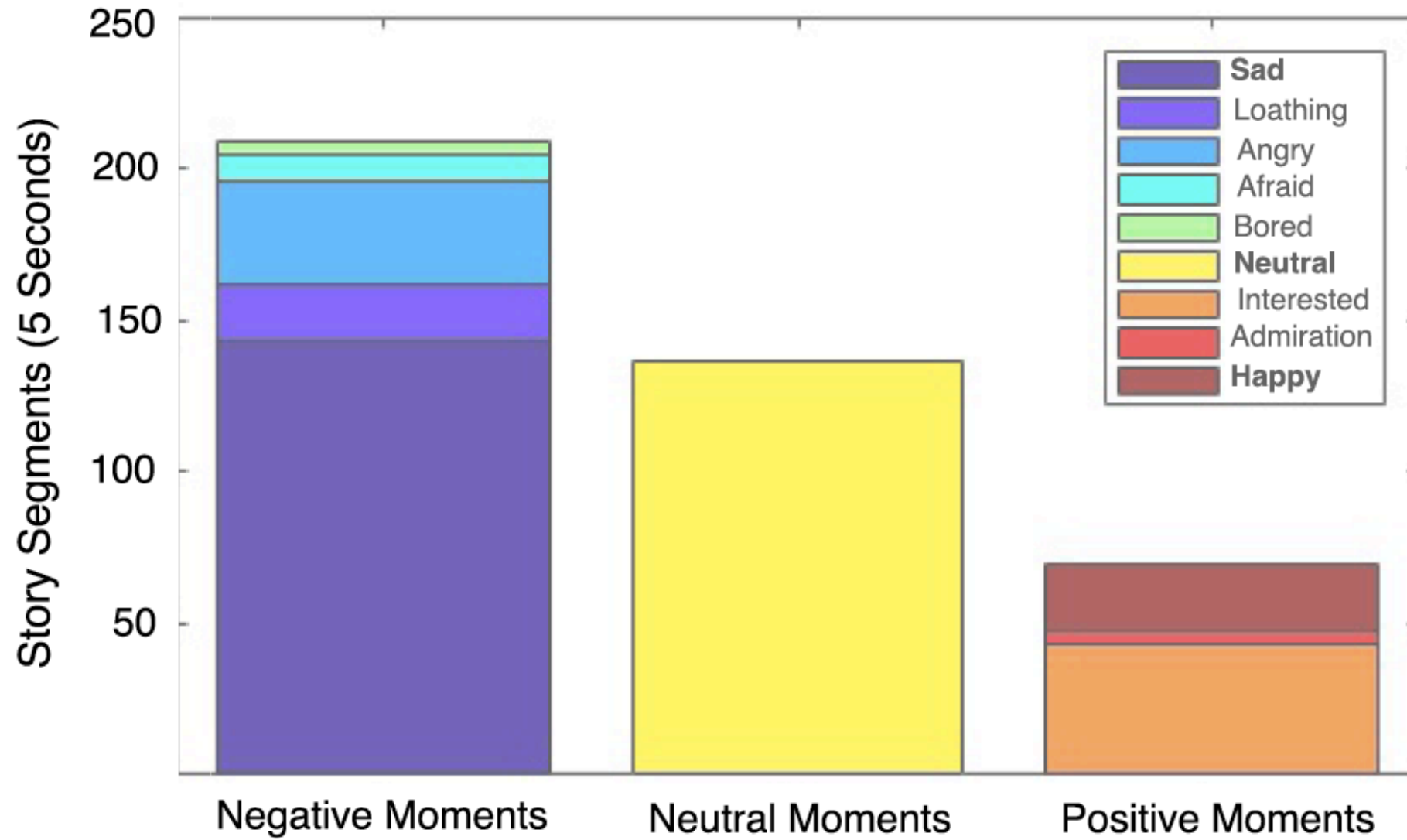
x4

# Modalities

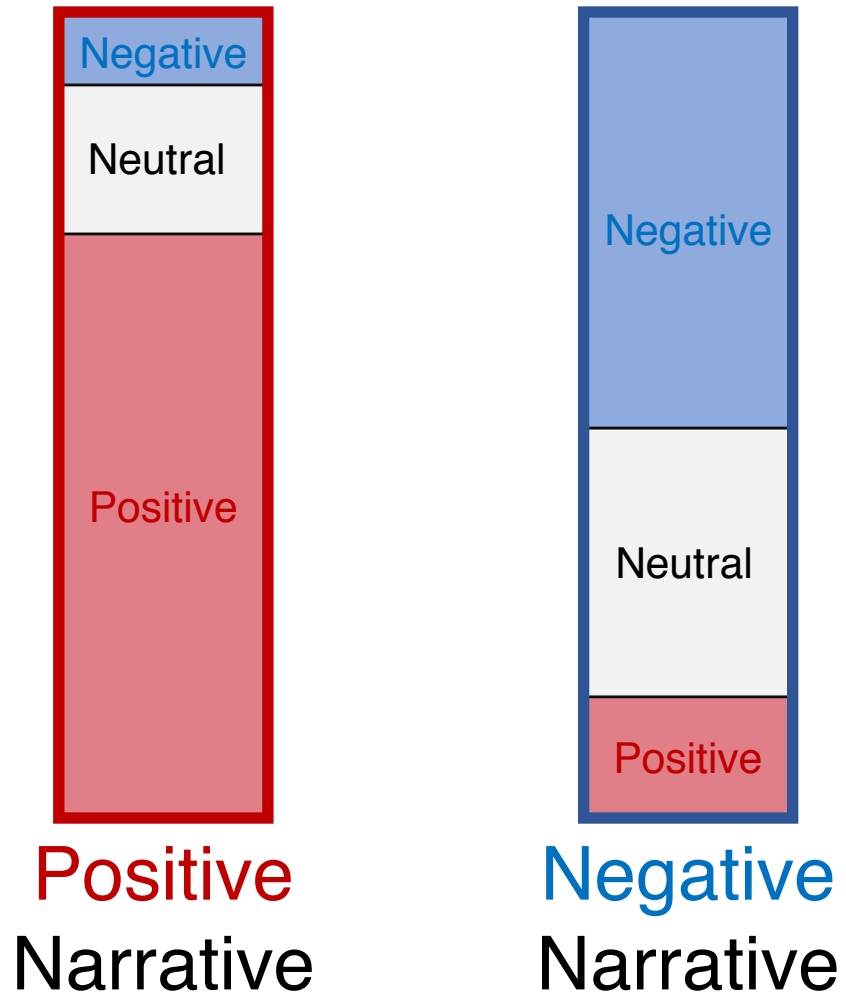




## Sad Stories

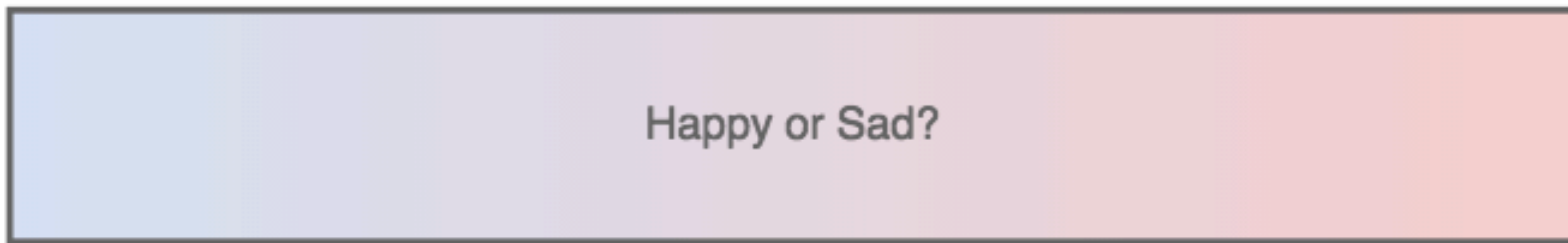


# Emotional Content

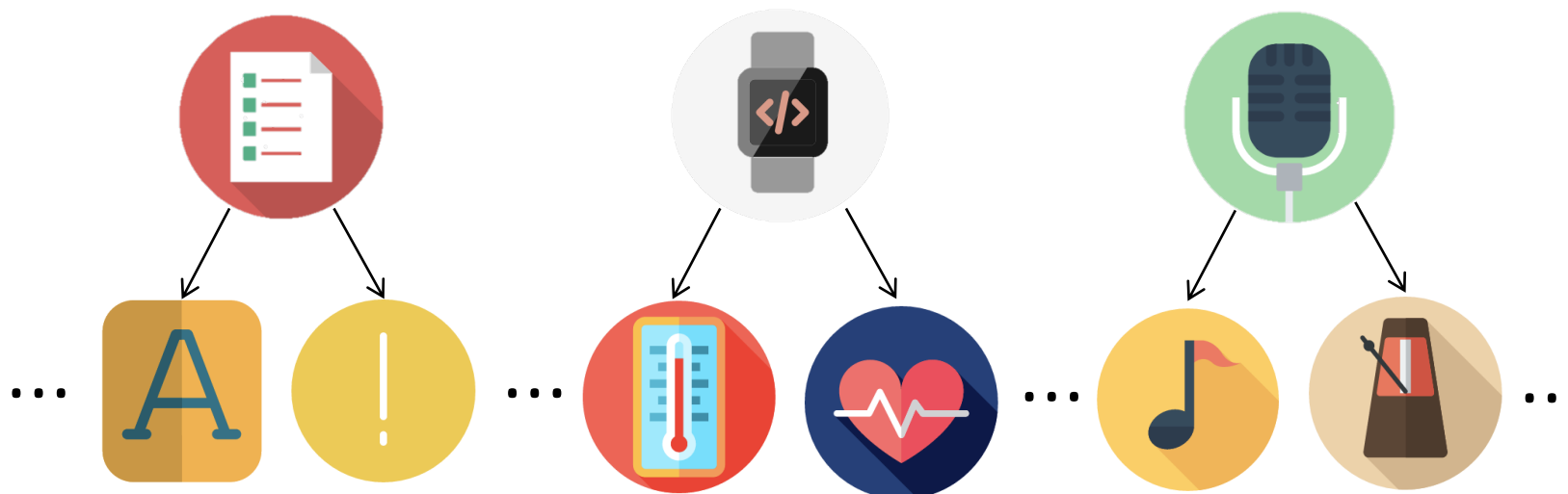




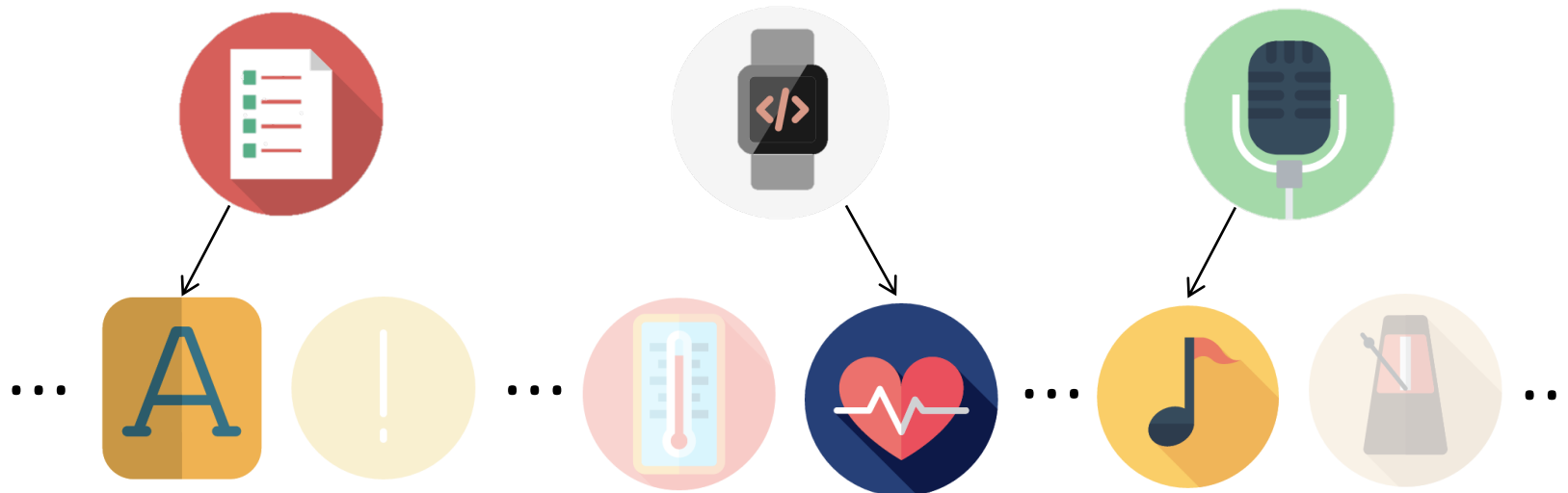
# Conversation score



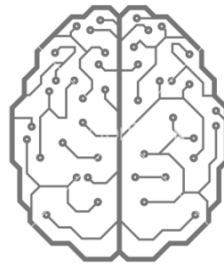
There are many things we can look at



Want to use the most important



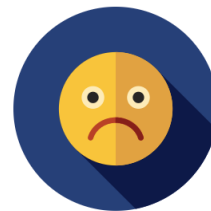
# Forward Feature Selection



Logistic Regression Model



or



Conversation Mood





70%



or



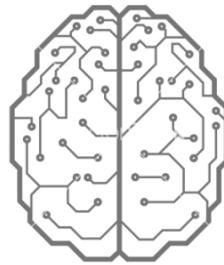
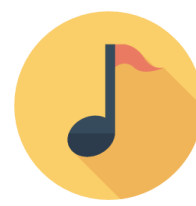
70%



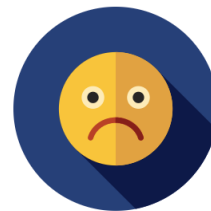
...



...



or



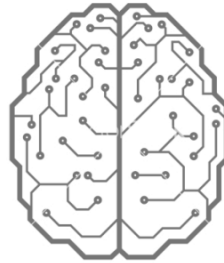
70%



...



...



60%



or



70%

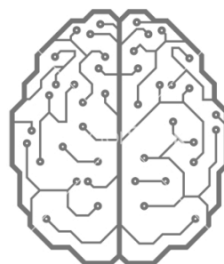
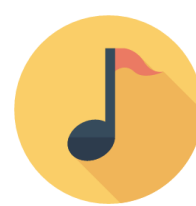
60%



...



...



or



70%



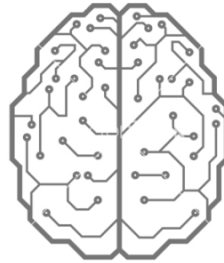
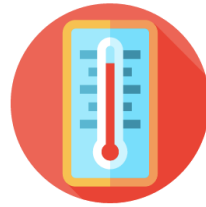
60%



...



...



90%



or





70%

60%

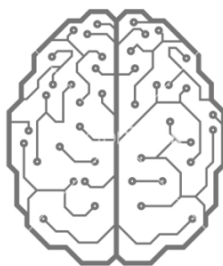
90%



...



...



or



70%



60%

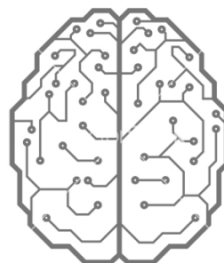
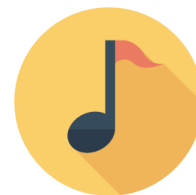


...

90%



...



80%



or



70%



60%



...

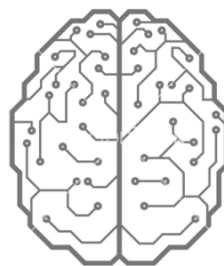
90%



80%



...



or



70%



60%



...

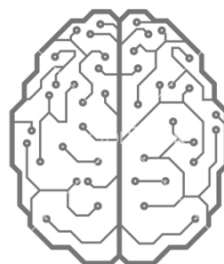
90%



80%



...



75%



or



70%



60%



...

90%

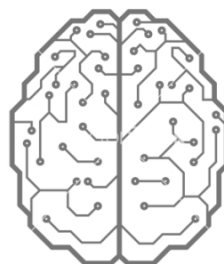


80%

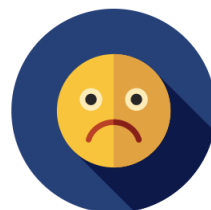


...

75%



or





70%



60%



...

90%

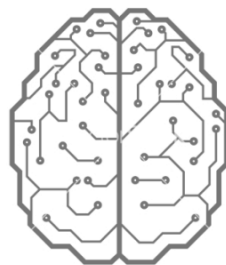


80%



...

75%



65%



or



70%



60%



...

90%



80%

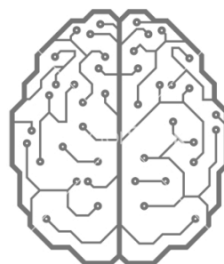


...

75%



65%



or



70%



60%



...

90%



80%



...

75%

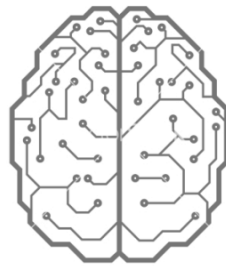


65%

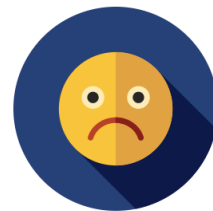


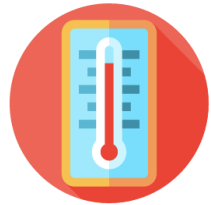
or





or





92%



or





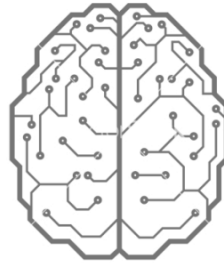
92%



...



...



or



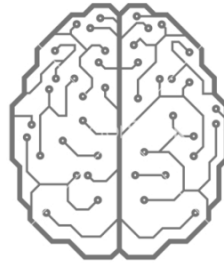
92%



...



...



91%



or



92%

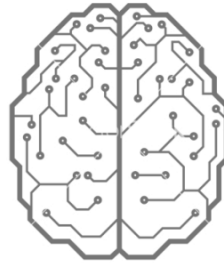
91%



...

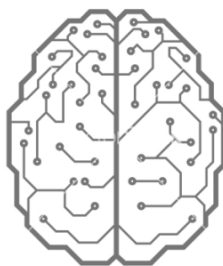
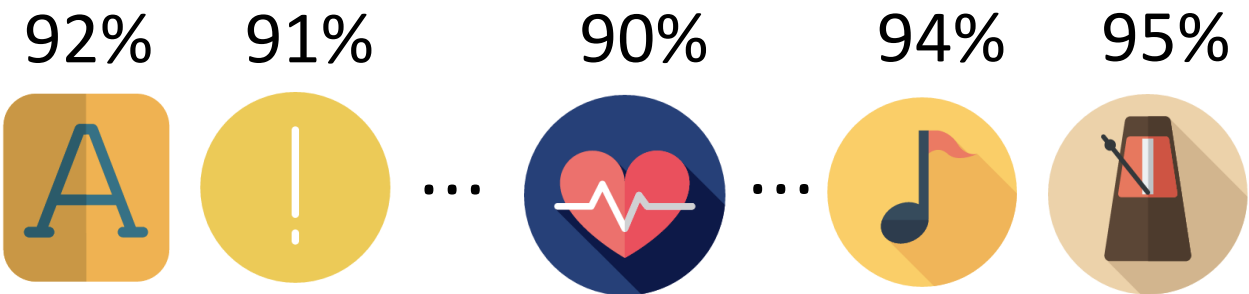


...



or





or



92%



91%



...

90%



...

94%

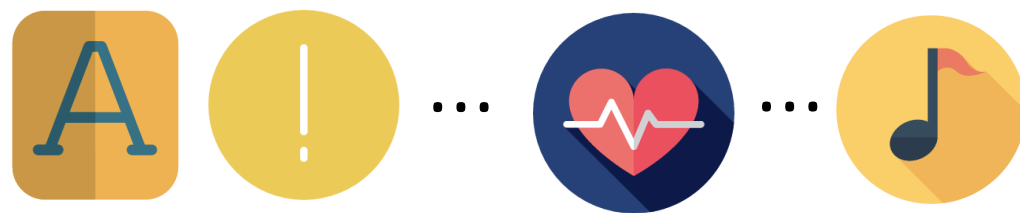


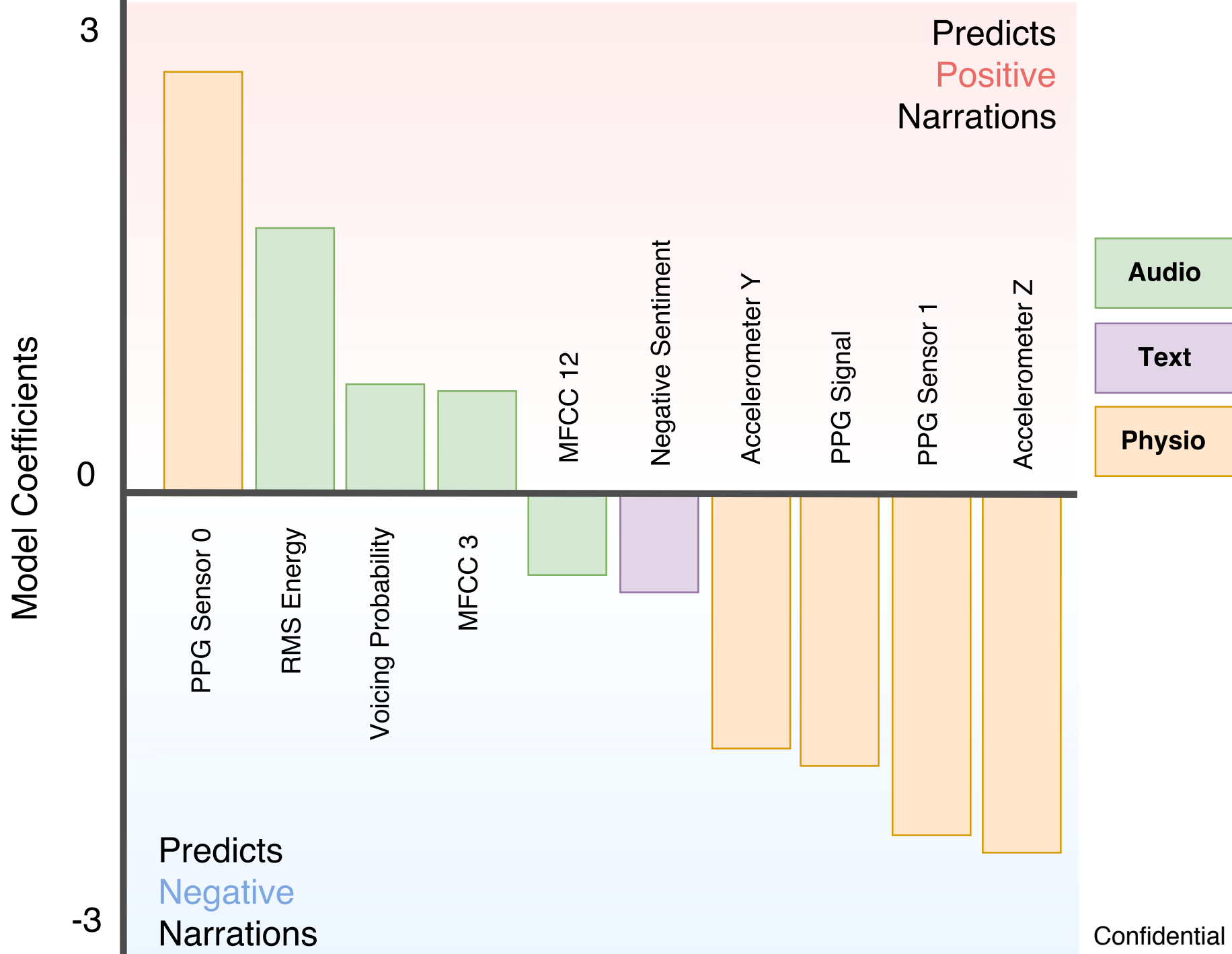
95%

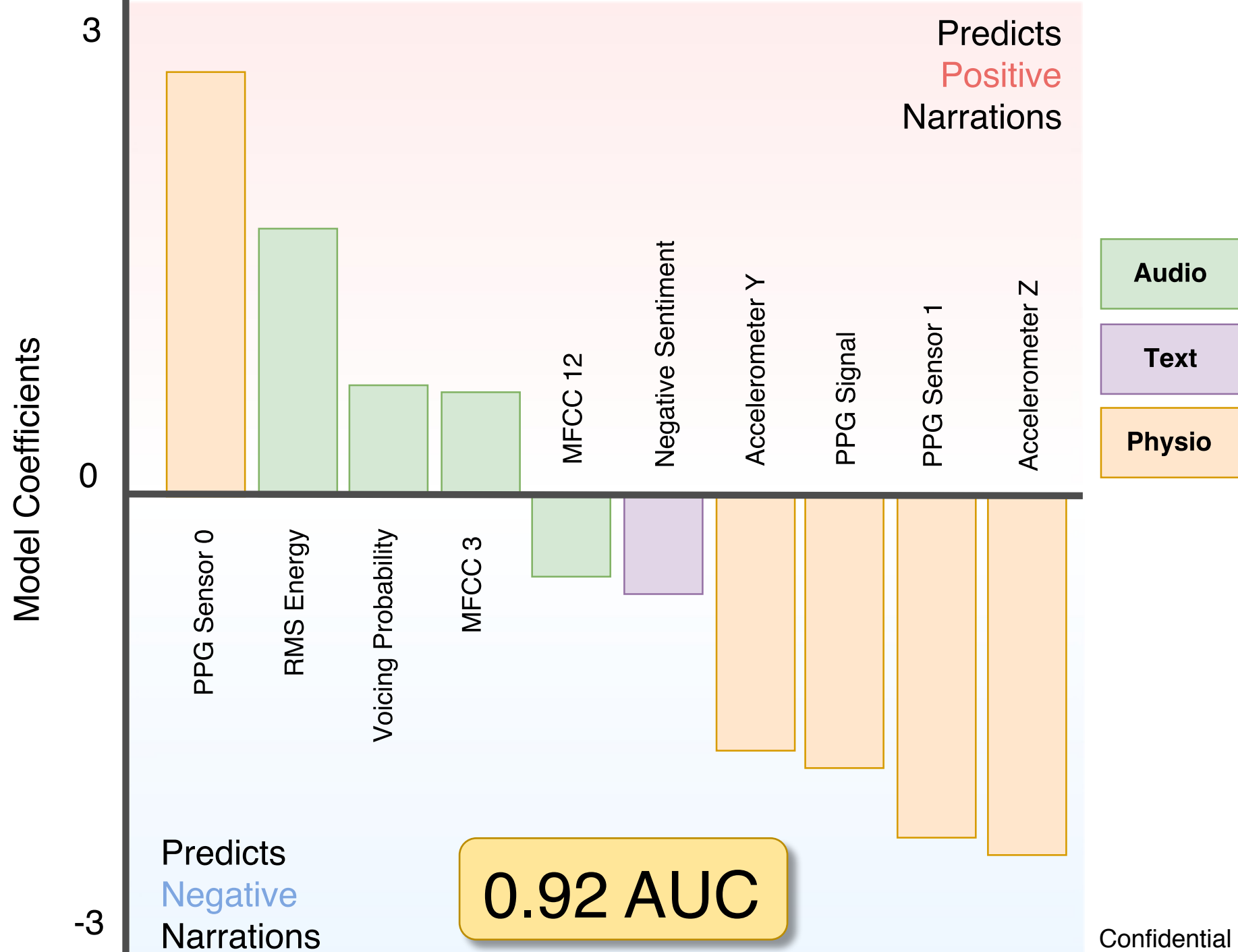


or



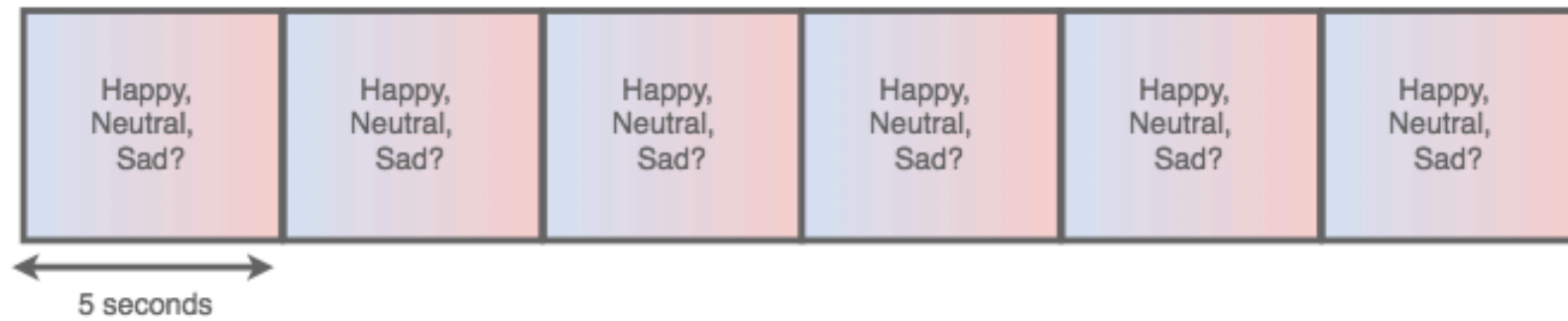






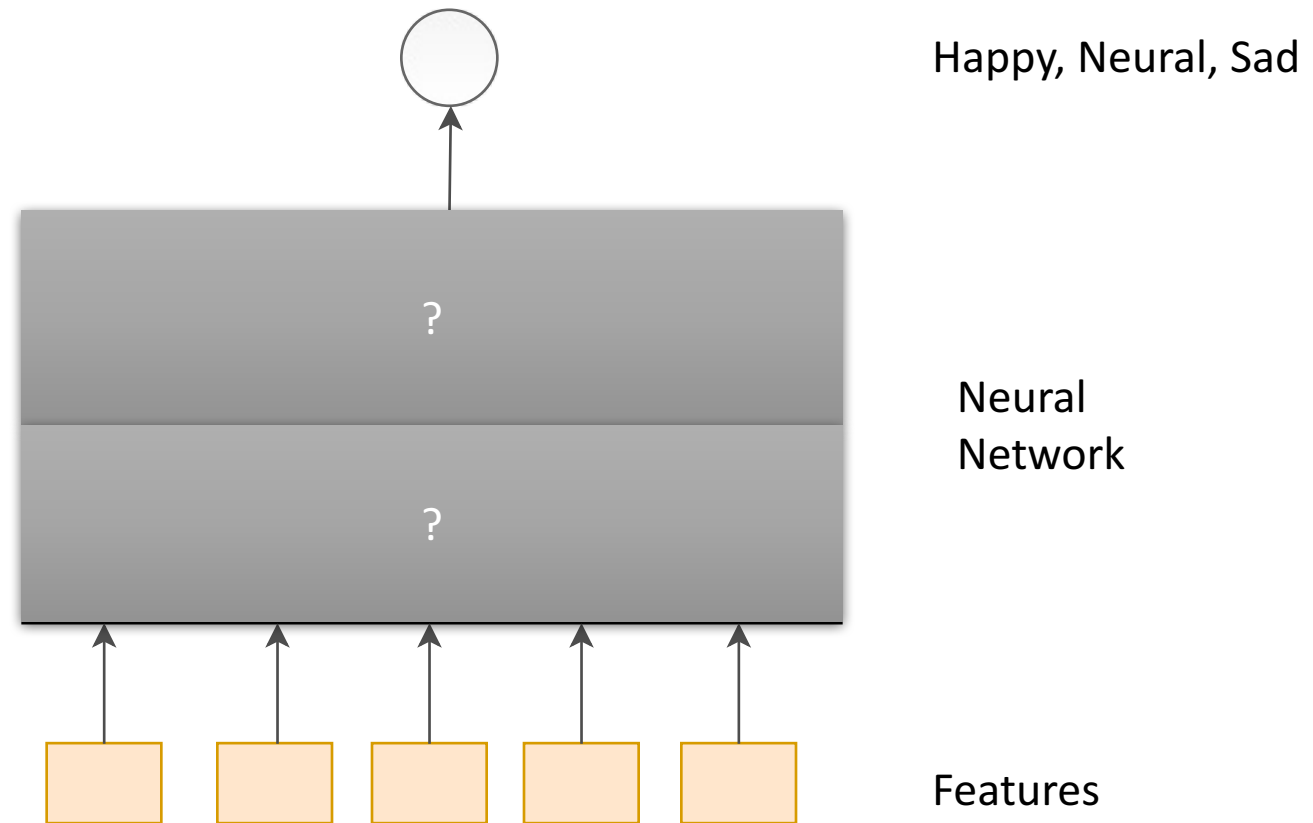


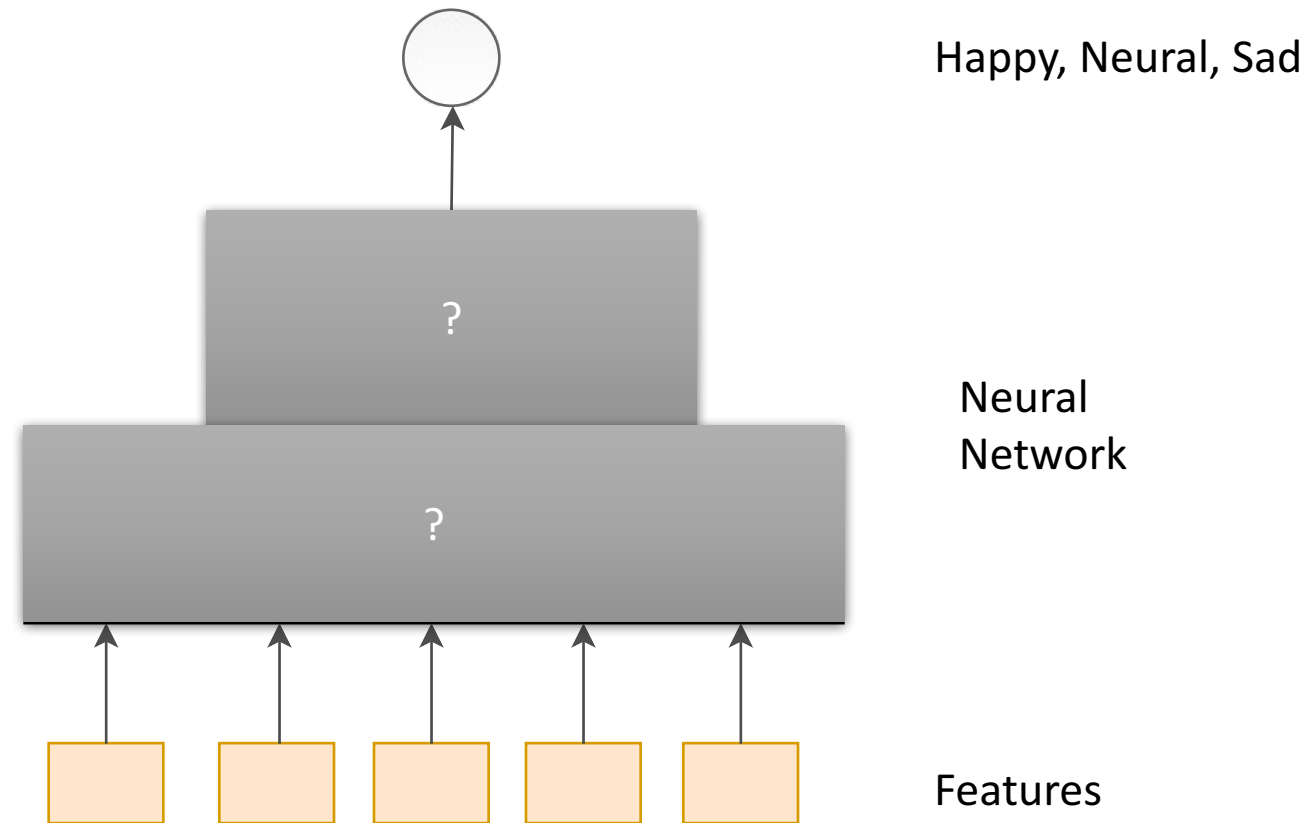
# Segment score

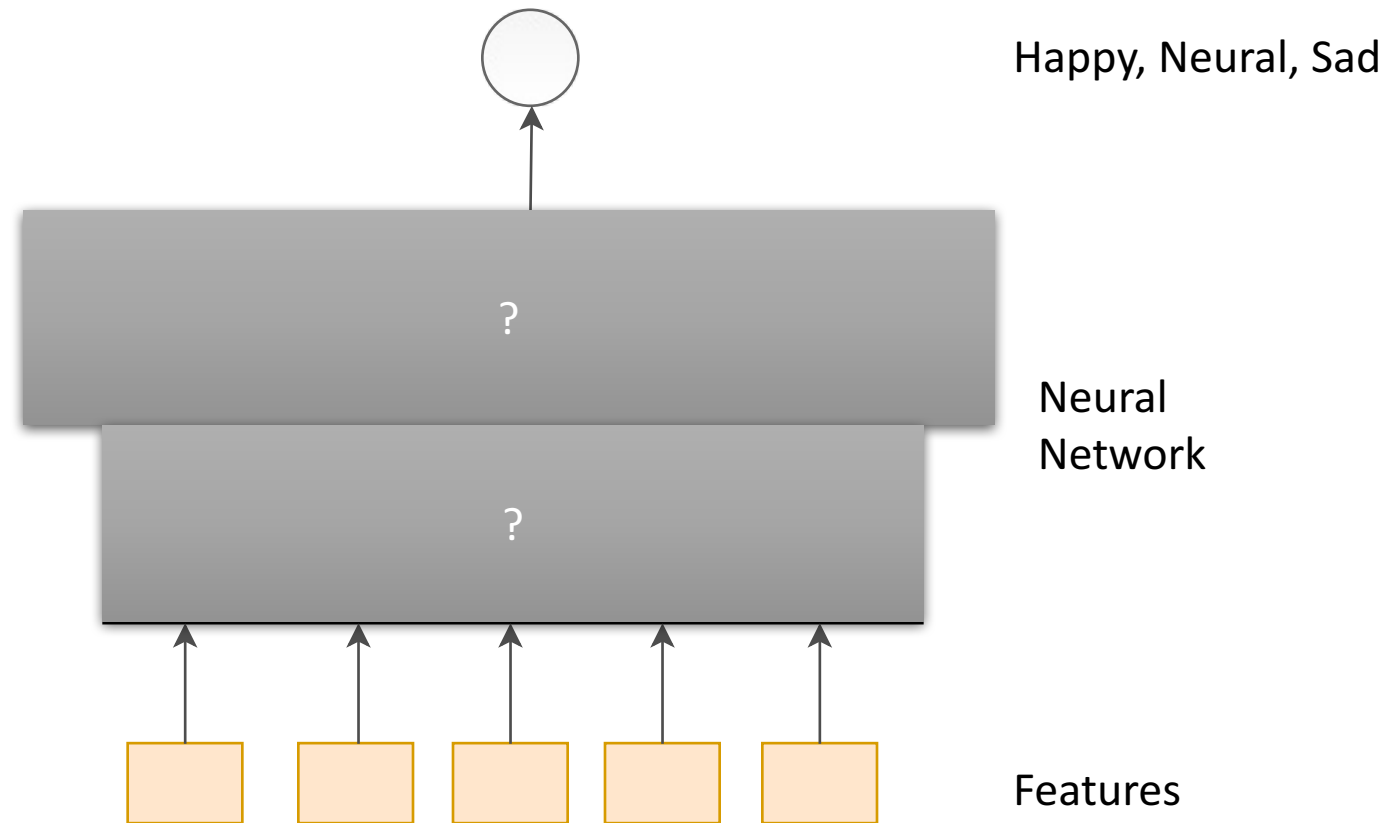


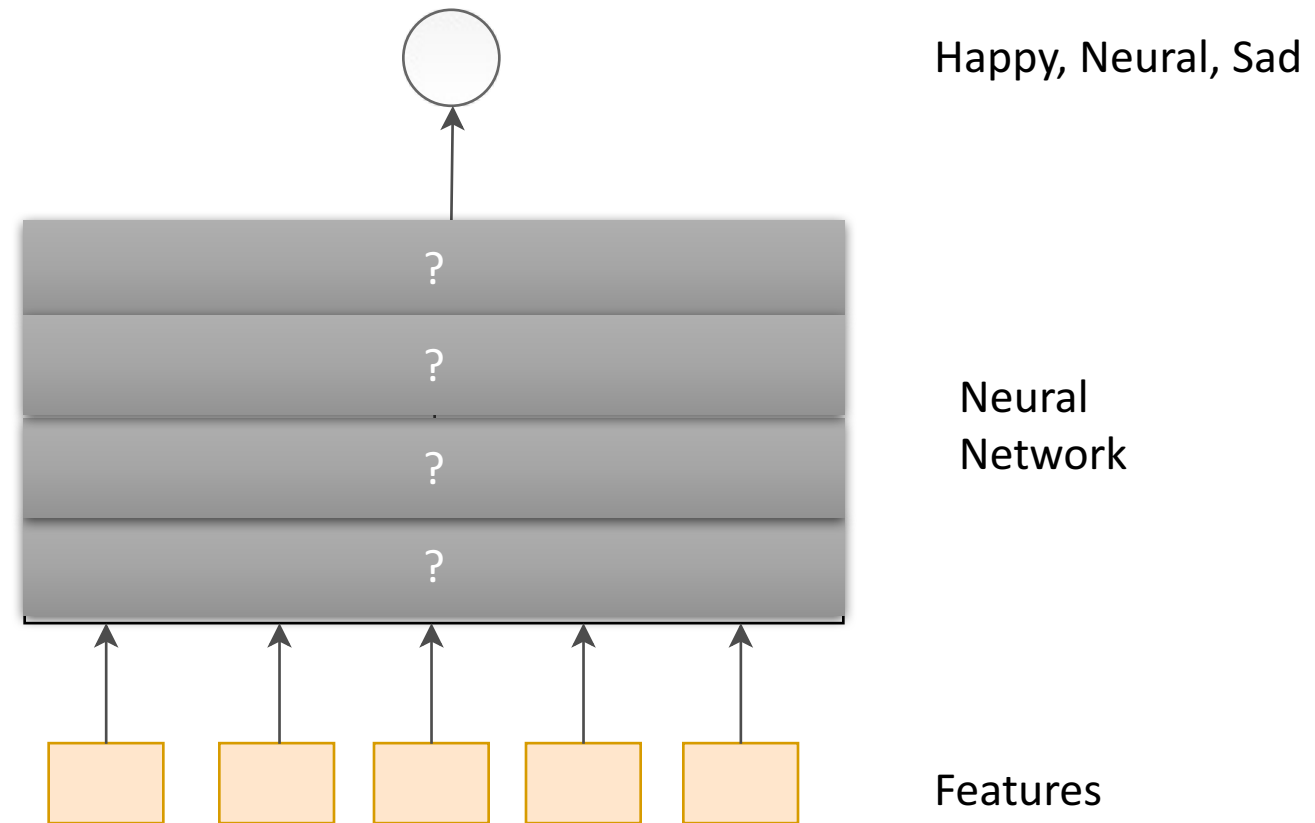
Neural networks are a powerful solution

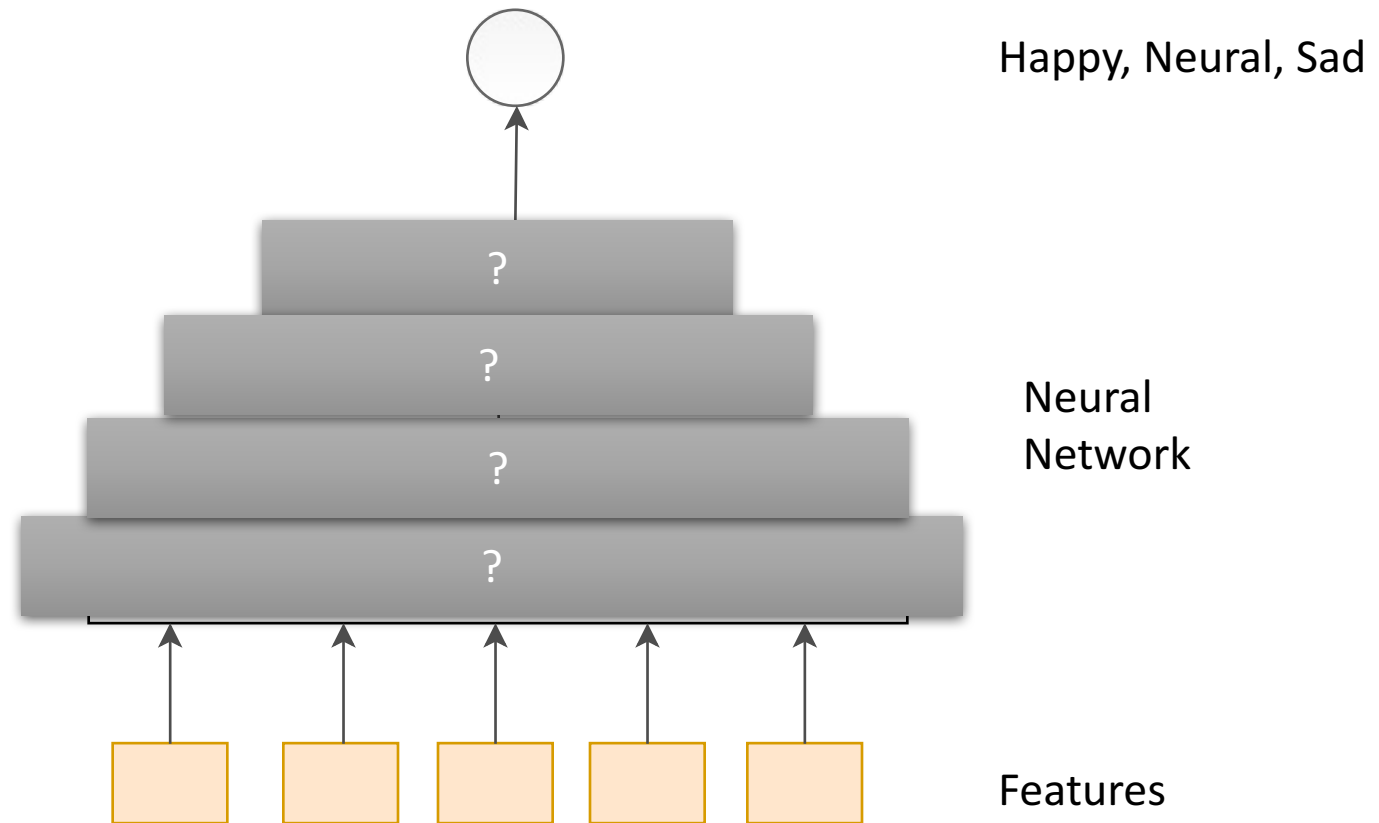
But can be difficult to use



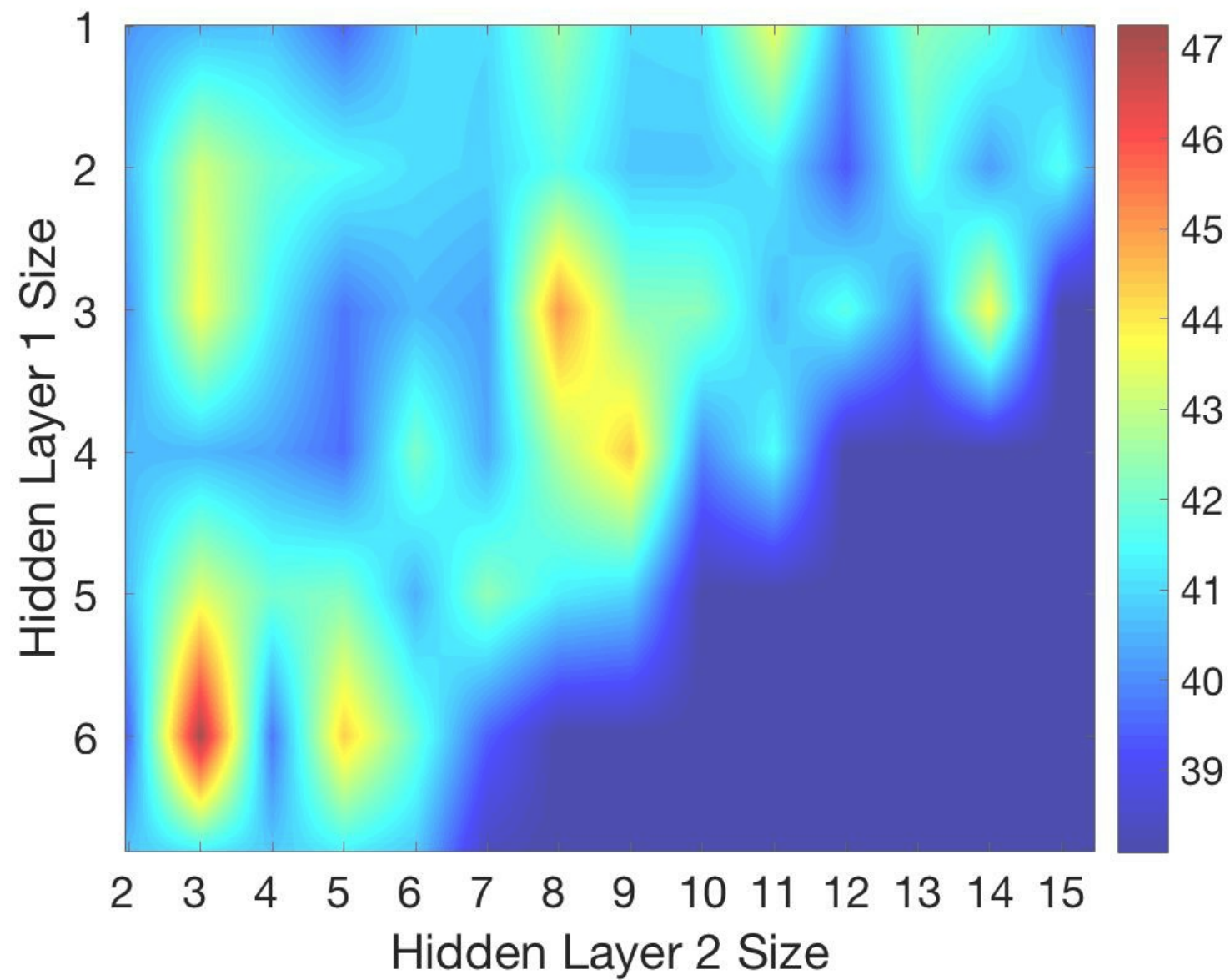


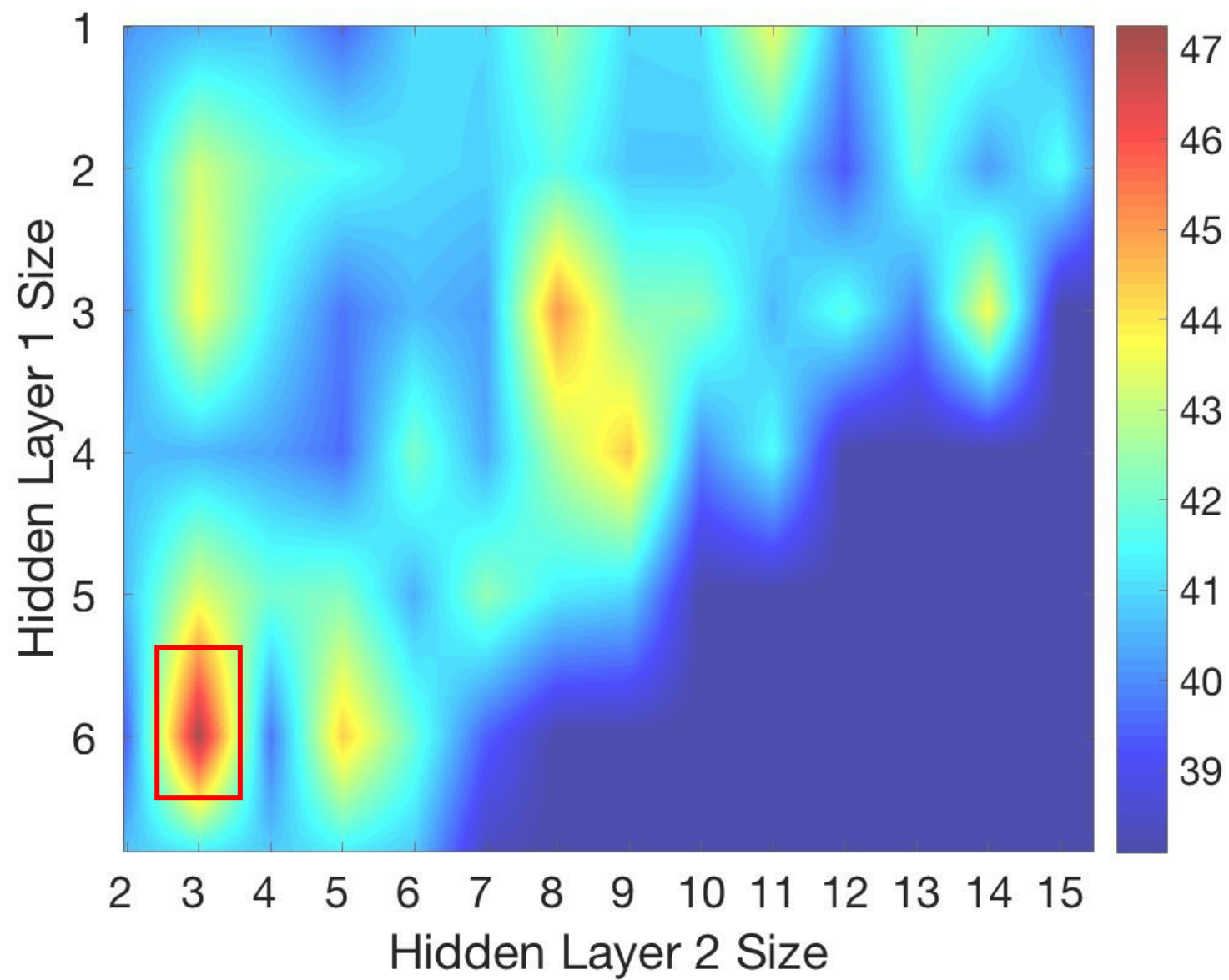


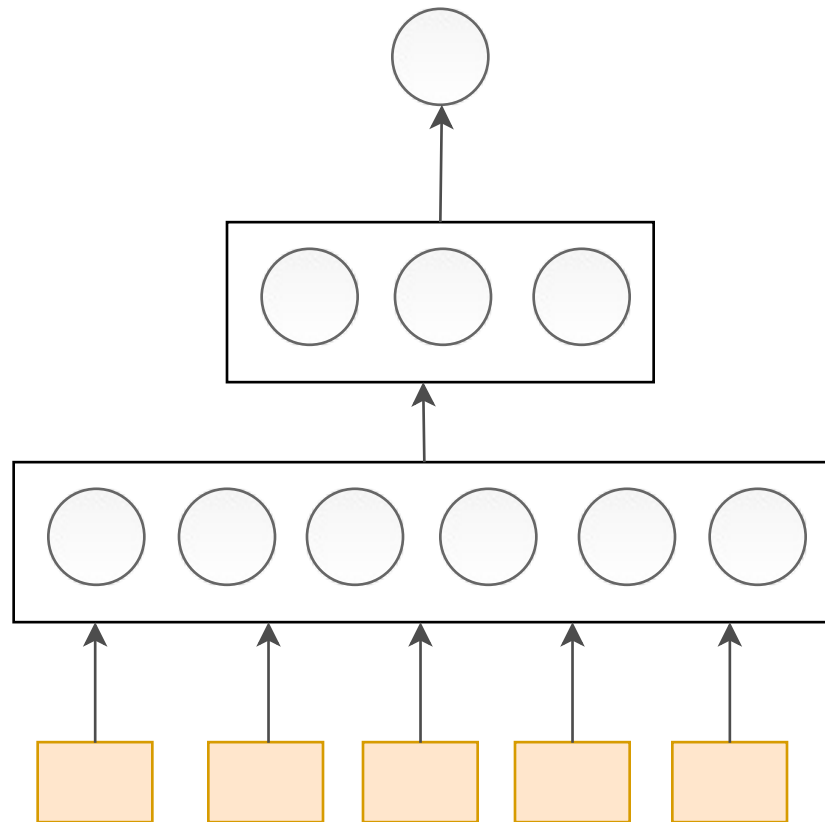






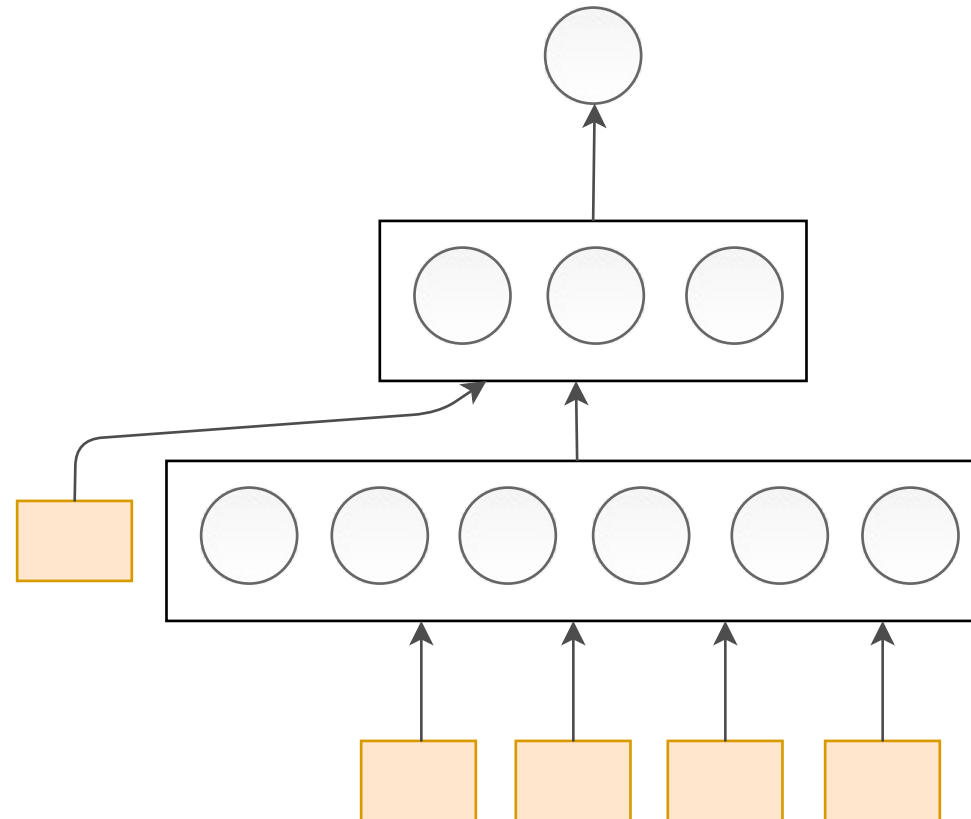




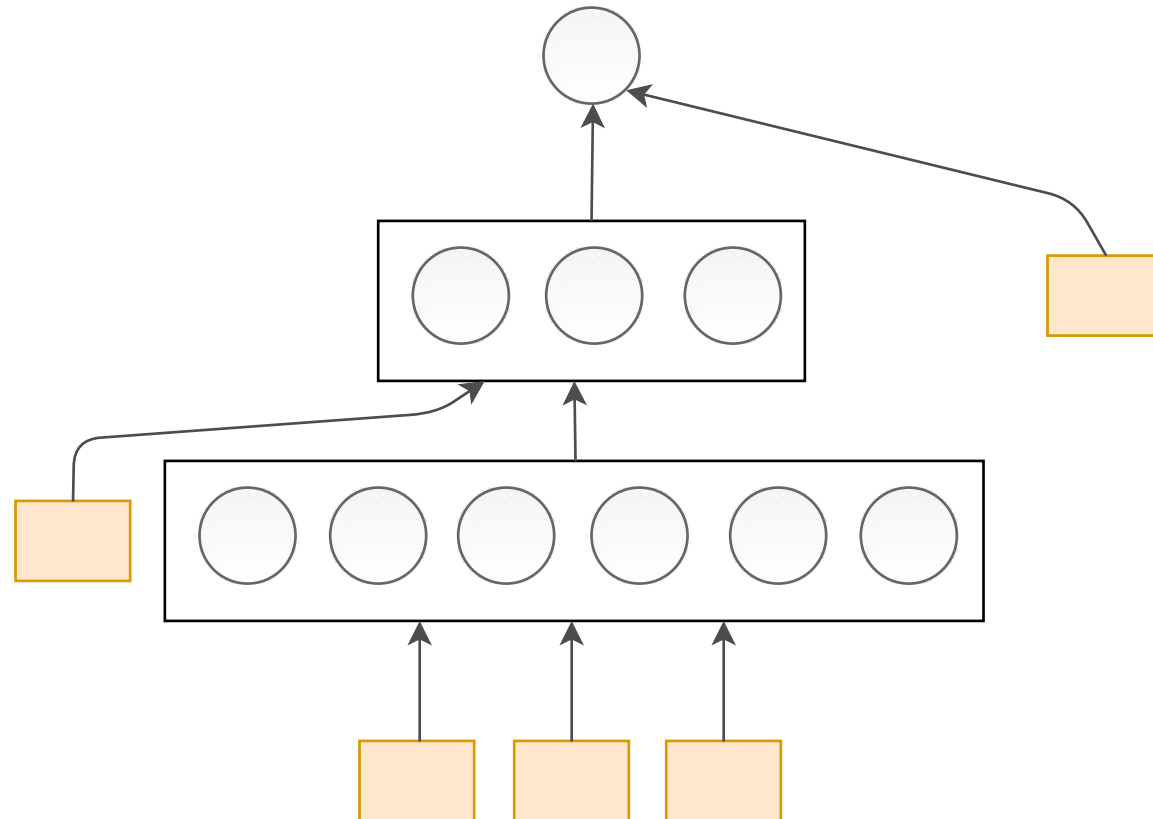


But there is yet more optimization

# Feature Insertion

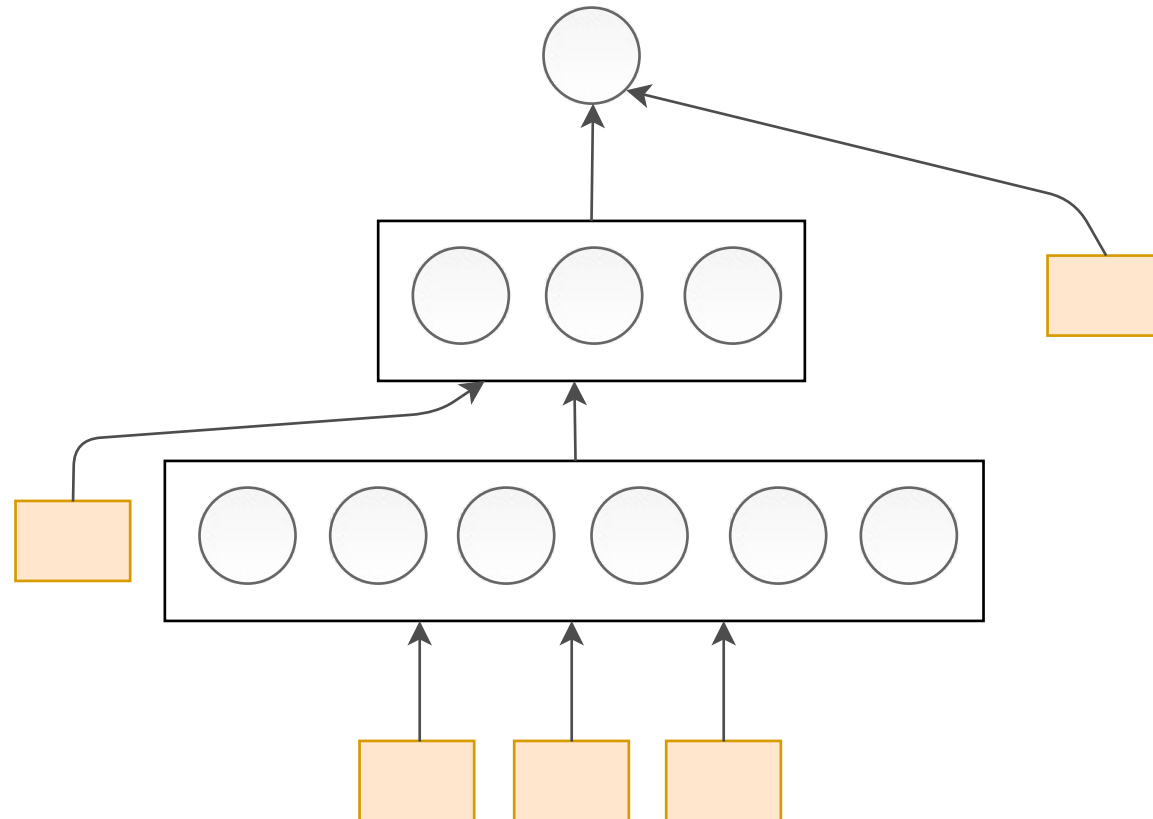


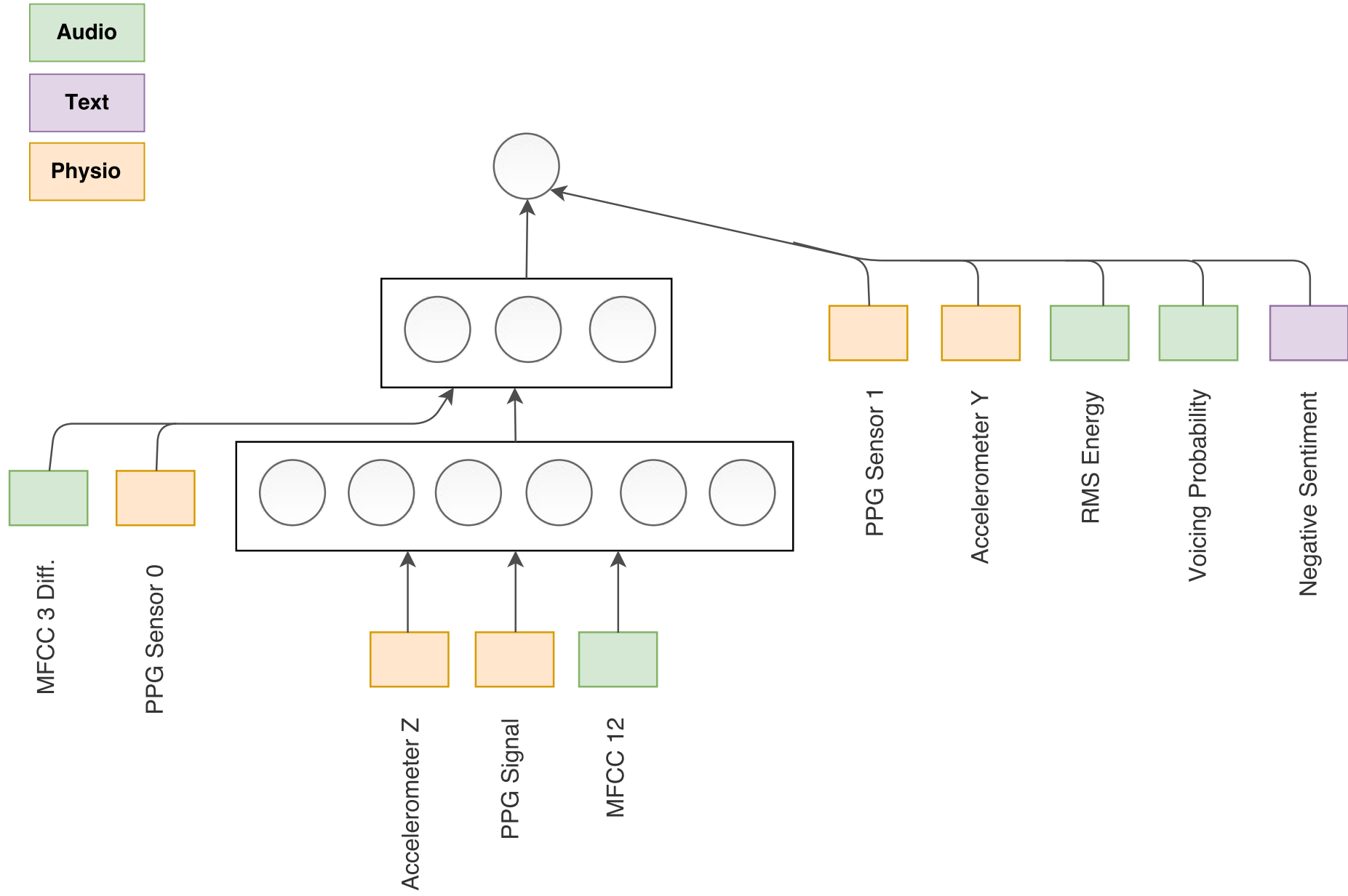
# Feature Insertion



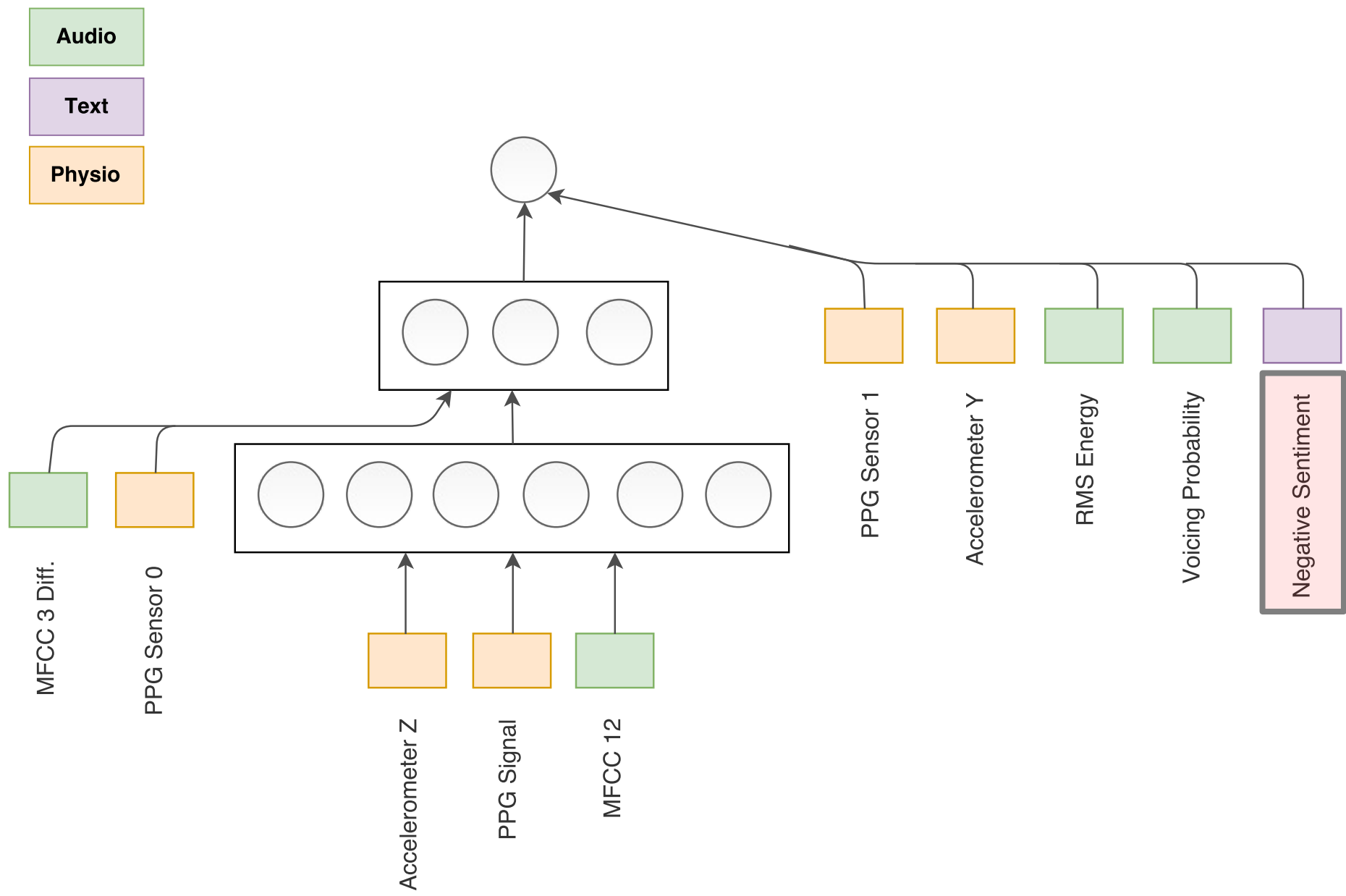
# Feature Insertion

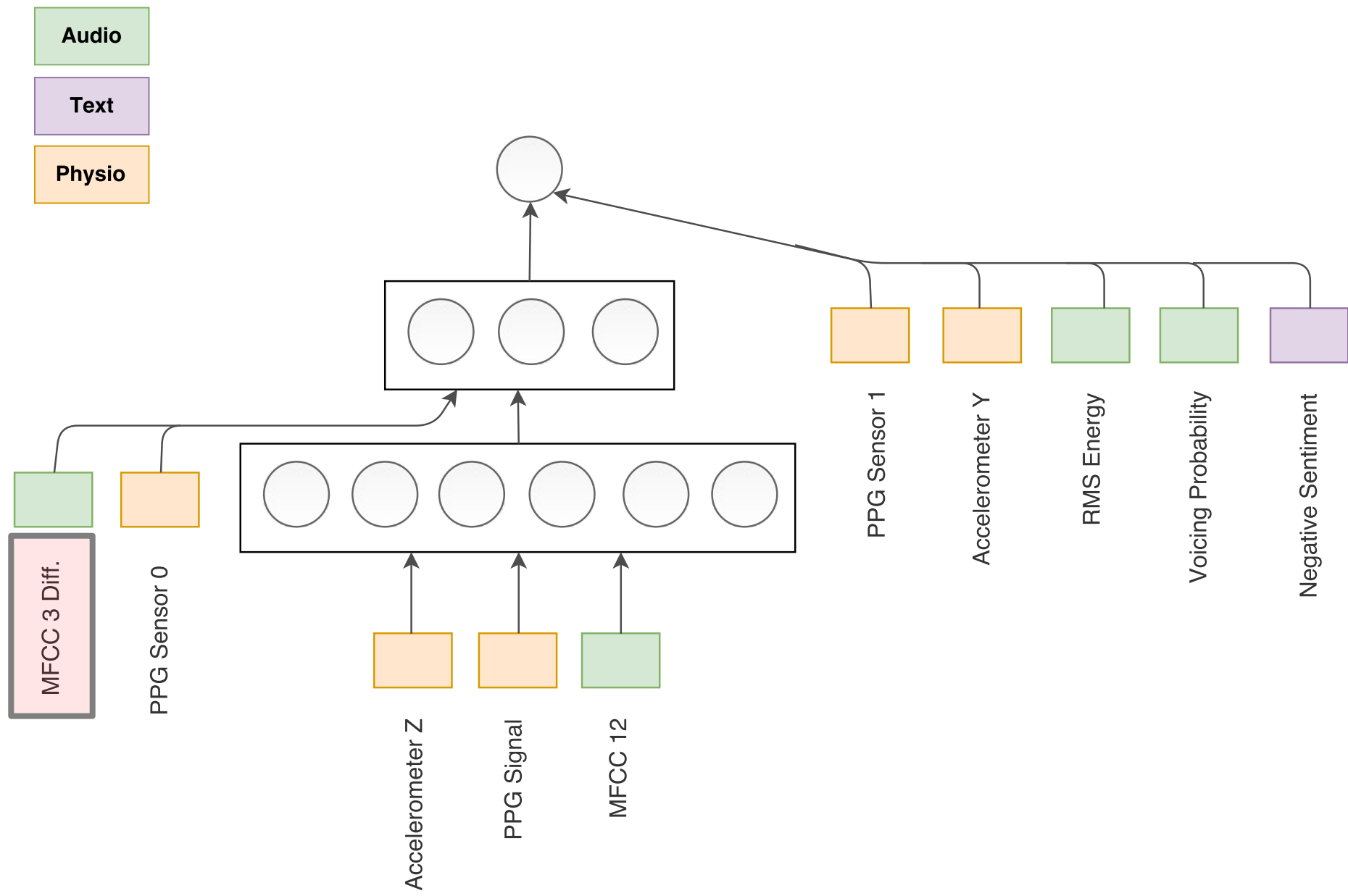
- $3^{10}$  possible configurations
- Explored random 10% the space

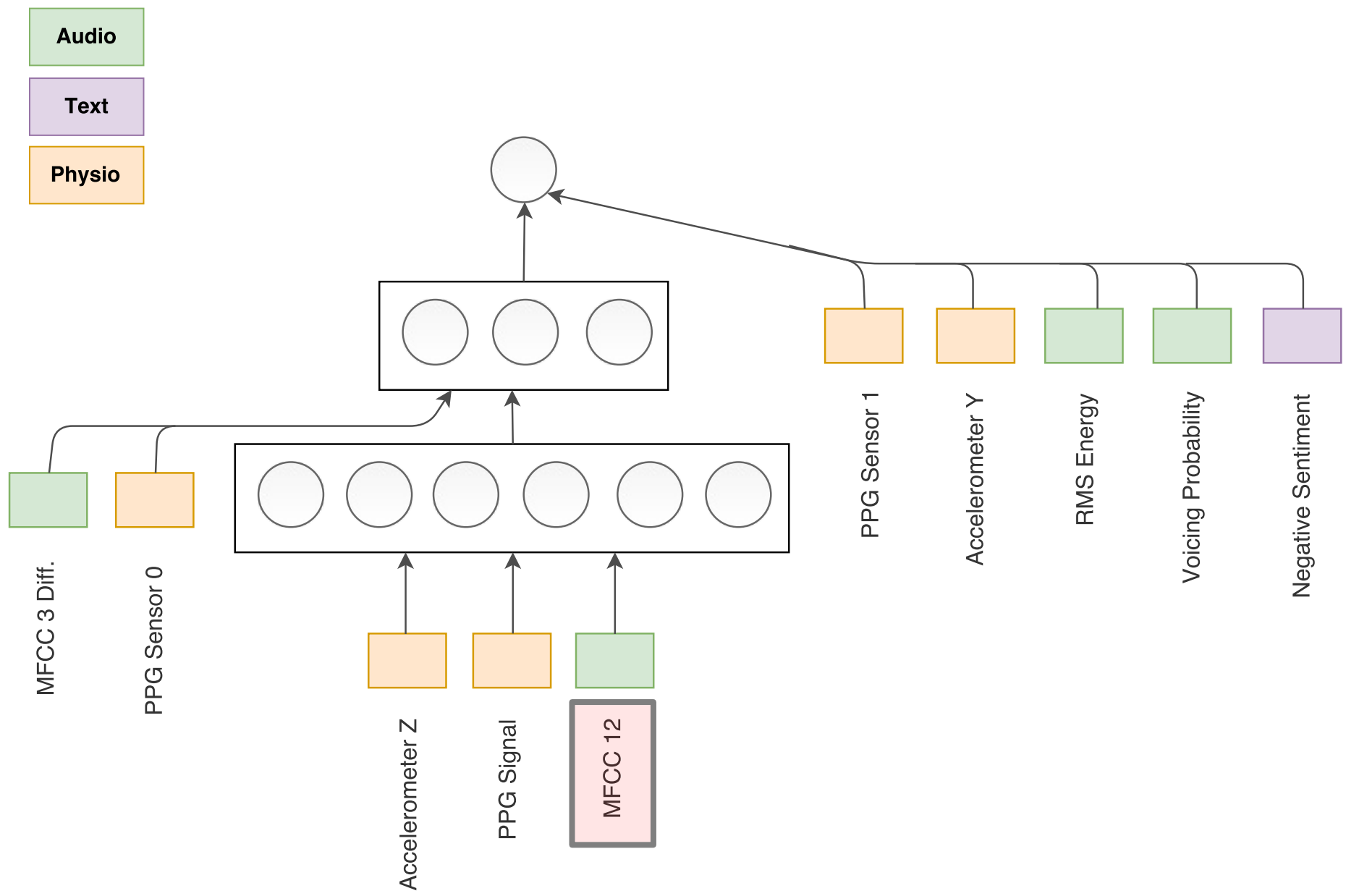












# Segment-Level Classification

| <b>Model</b>                  | <b>Accuracy (%)</b><br>( $\mu$ ) | <b>Accuracy (%)</b><br>( $\sigma$ ) | <b>Percentile</b><br>[25 <sup>th</sup> 75 <sup>th</sup> ] |
|-------------------------------|----------------------------------|-------------------------------------|---|
| Random                        | 33.3                             | -                                   | -   |
| Multinomial Logistic Reg.     | 40.8                             | 7.36                                | [34.1 46.0]   |
| NN (2L-6x3N)                  | 45.3                             | 8.10                                | [38.5 49.0]   |
| <b>+ Feature Optimization</b> | <b>47.3</b>                      | <b>8.72</b>                         | <b>[39.9 55.1]</b>  |

