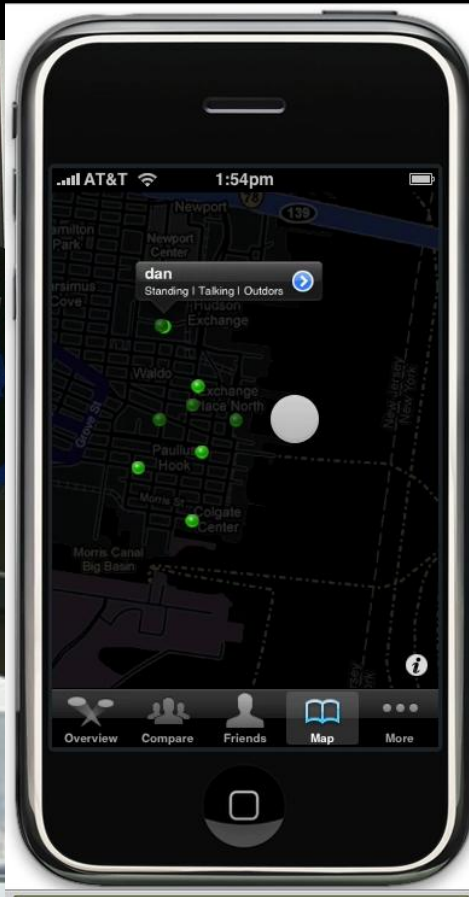
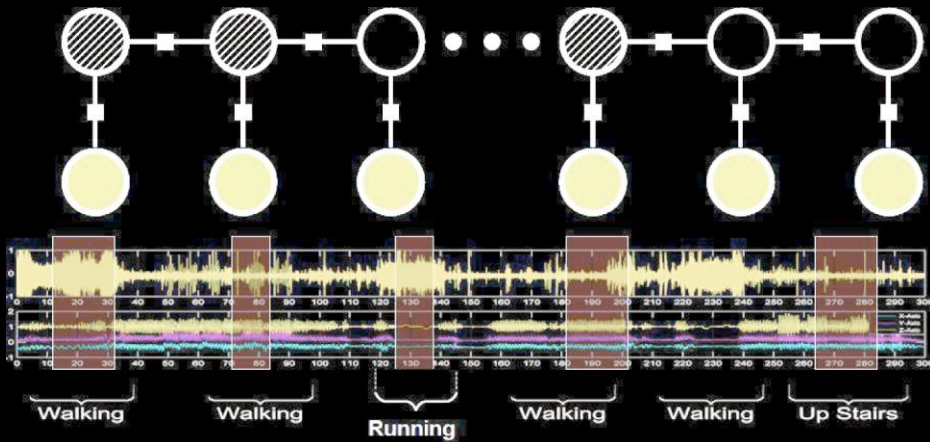


Empowering Users by Developing Transparent Context-Models

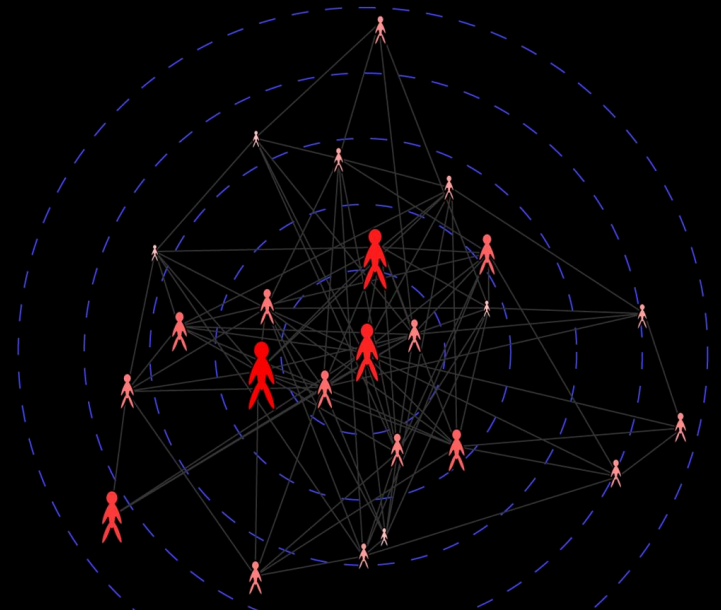
Tanzeem Choudhury
Computer Science
Dartmouth

Ubiquitous sensing of human behavior

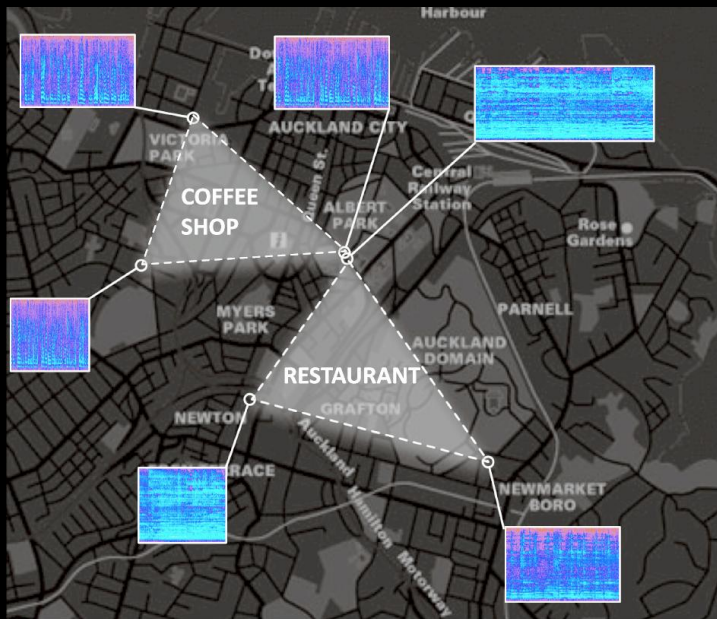




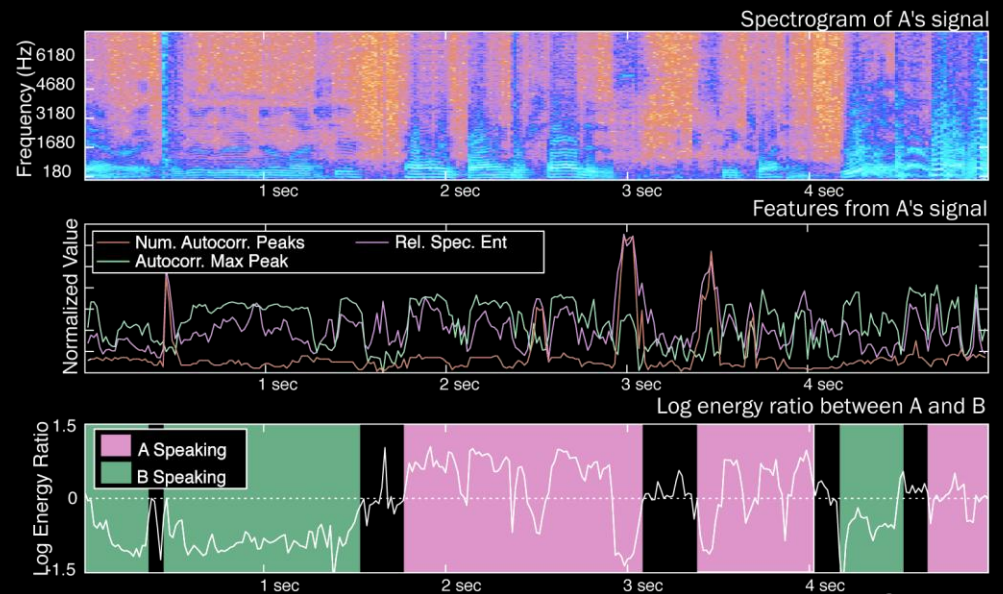
Activities



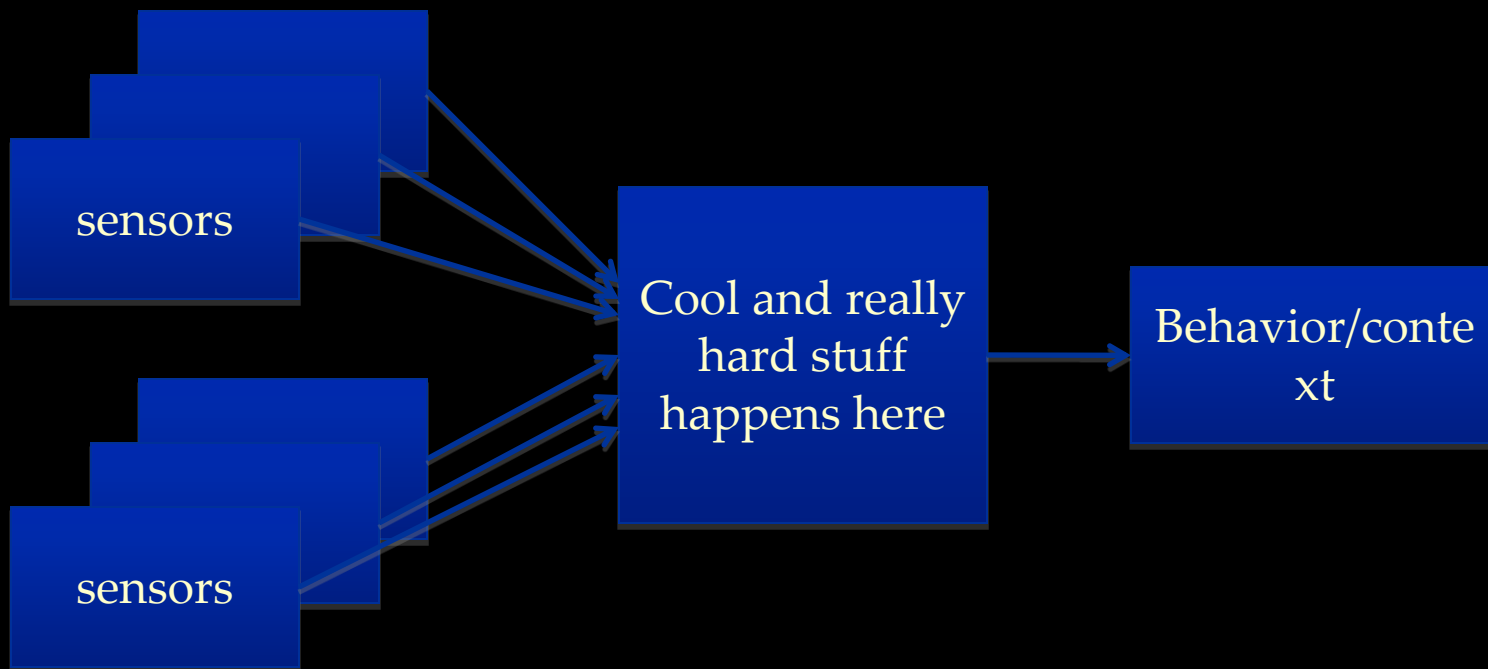
Social Networks

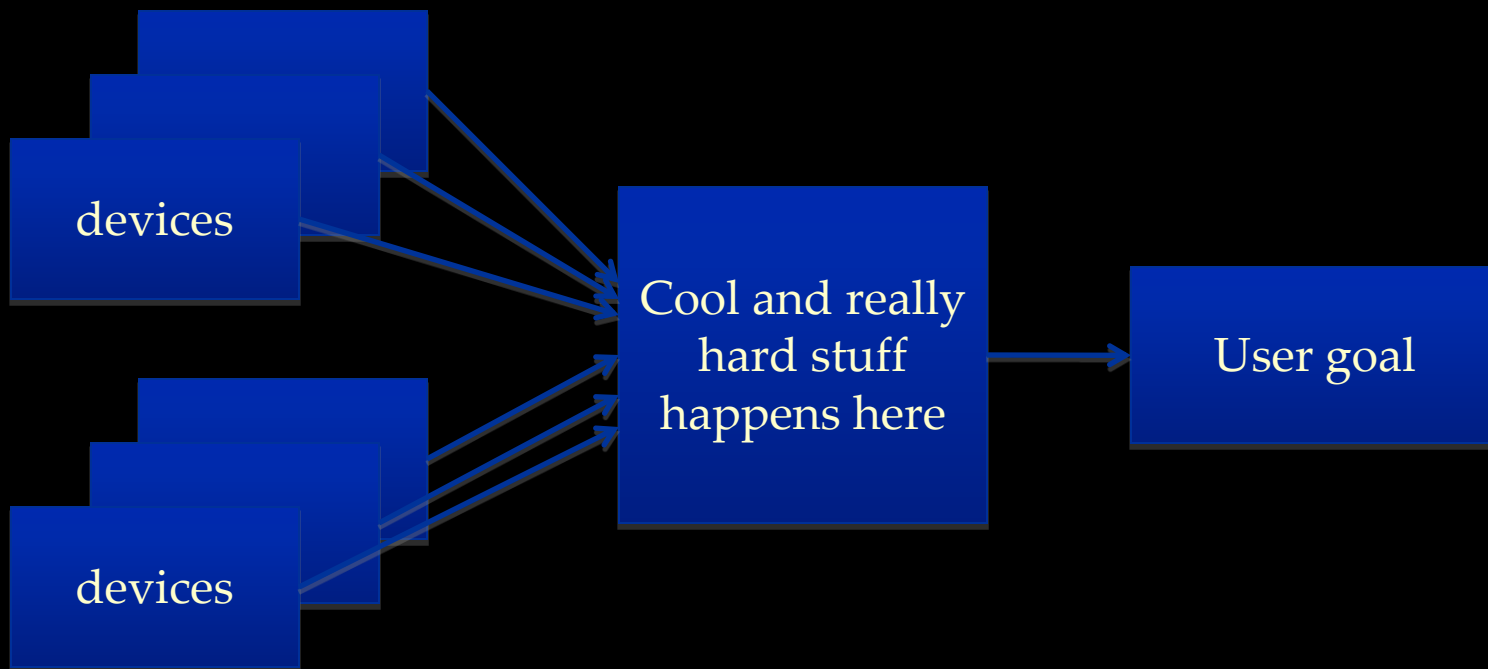


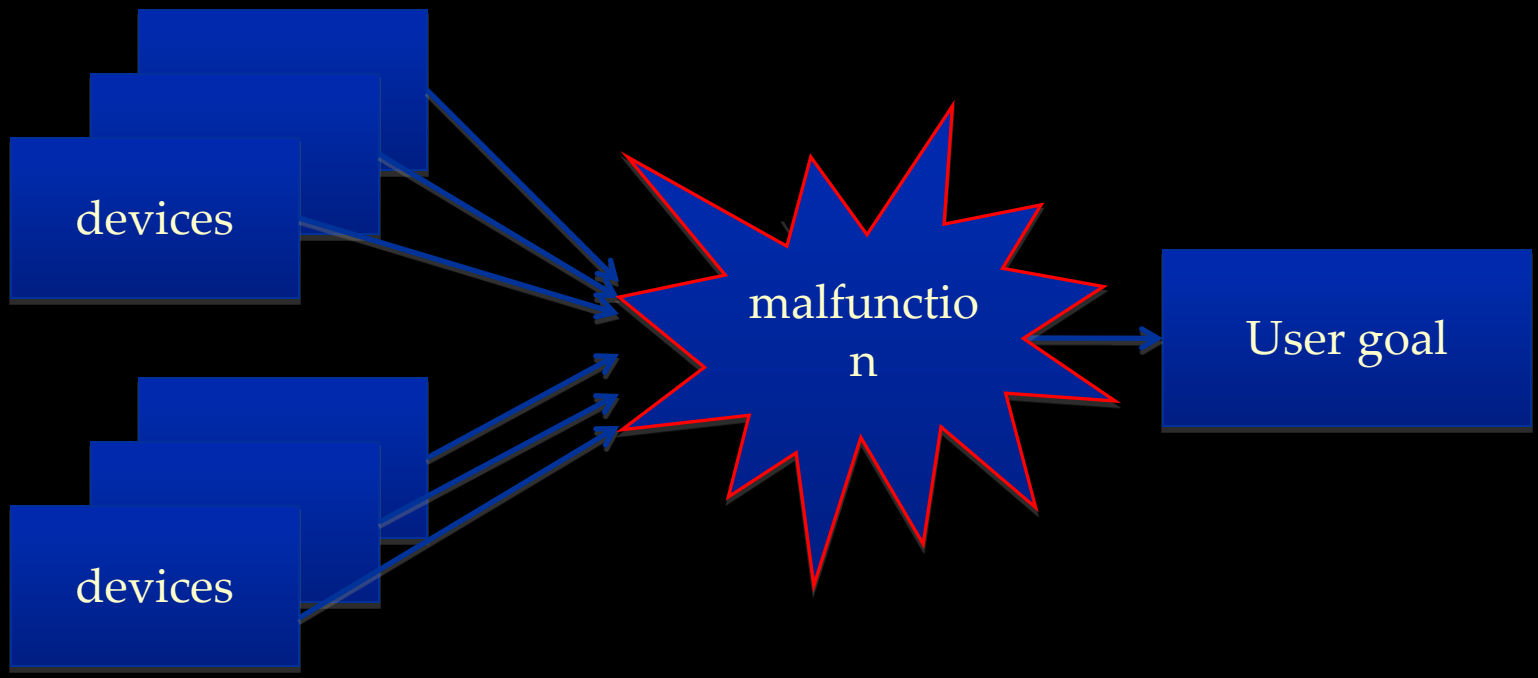
Places



Conversations







Different ways to deal with problems



Do it yourself. We can help



Bring it to us. We will fix it.

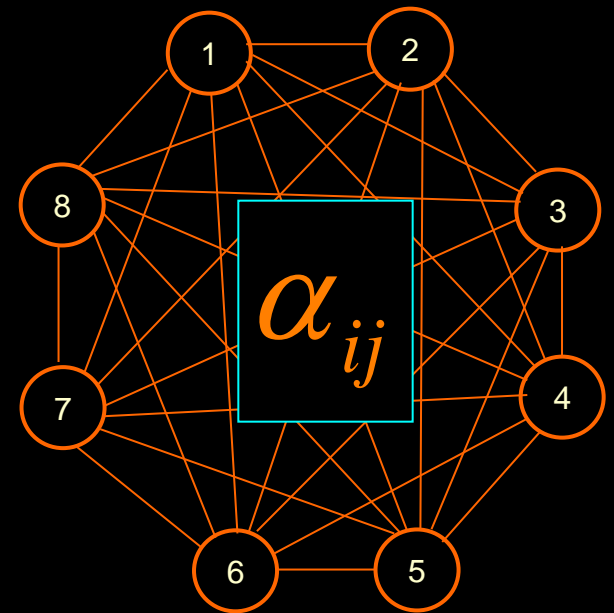
How can we help?

- Interpretation
 - can user understand how the system works?
- Intuition
 - how to incorporate user input
- User engagement
 - how should the system engage the user?

Interpretation

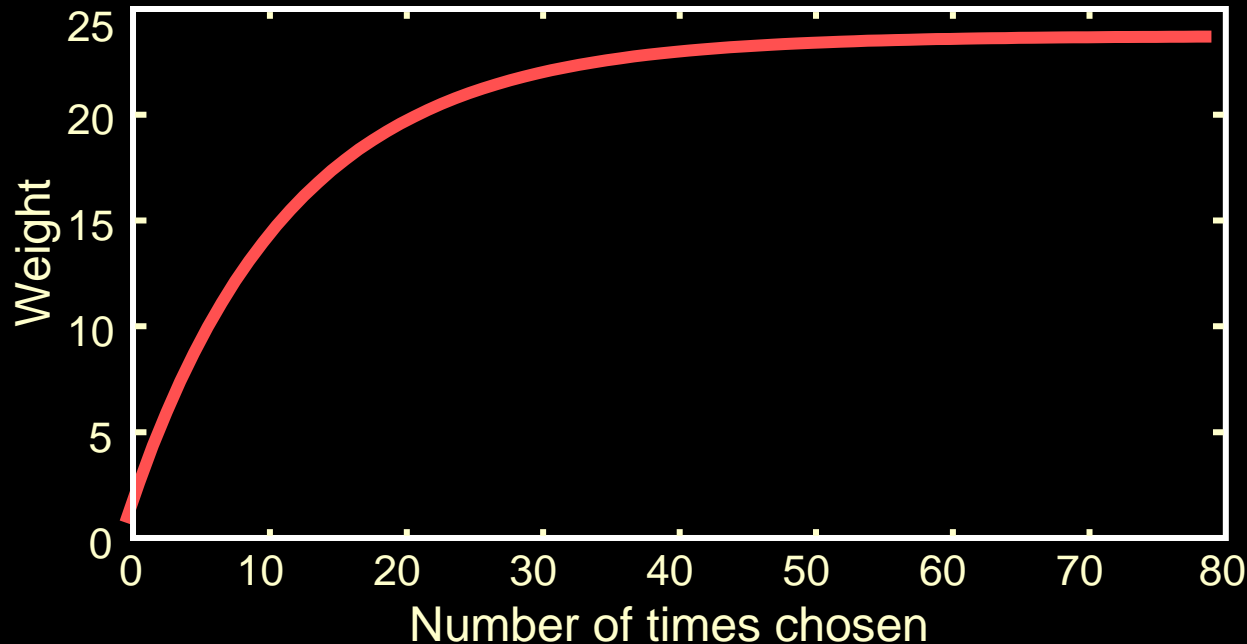
- Give the user feedback on how different parts of the system interact to produce final outcome

$$P(S_t^i | S_{t-1}^1, \dots, S_{t-1}^N) = \sum_j \alpha_{ij} P(S_t^i | S_{t-1}^j)$$



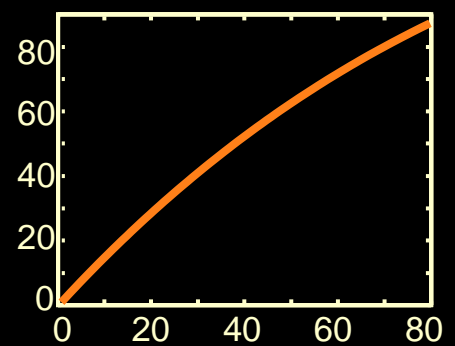
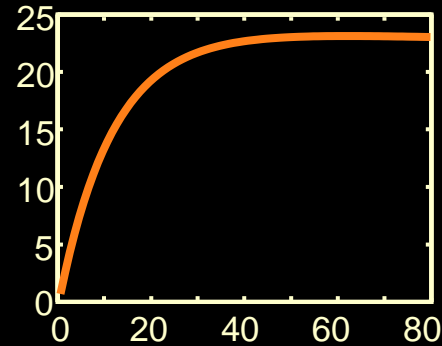
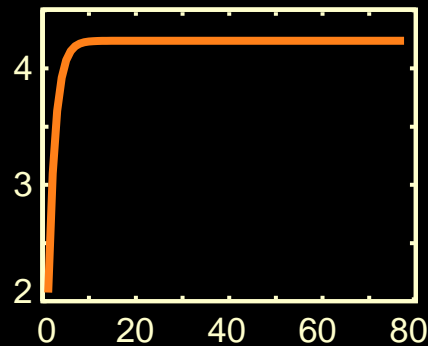
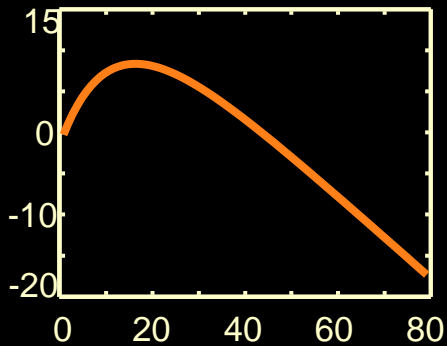
Intuition

- Design models that can incorporate human intuitions and expectations

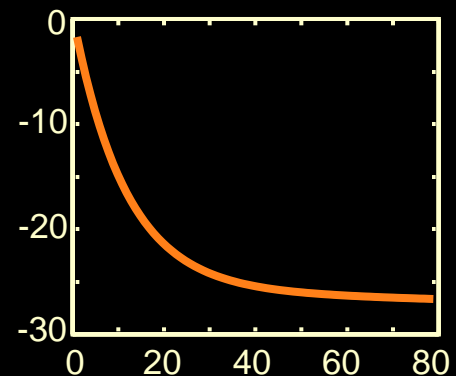
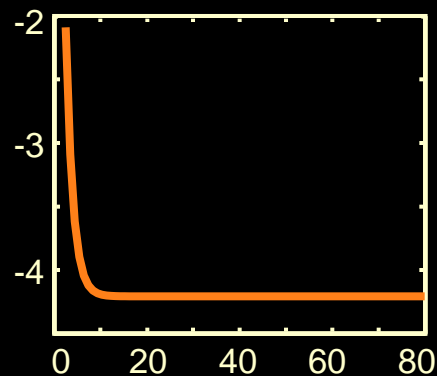
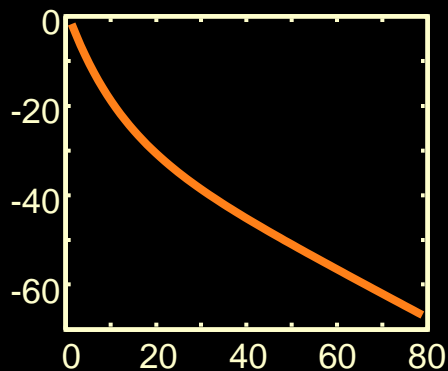


$$P(\mathbf{Y} = \mathbf{y}) = \frac{1}{Z} e^{\boldsymbol{\eta}(\boldsymbol{\theta})^\top \boldsymbol{\phi}(\mathbf{y})}$$

Many weight shapes

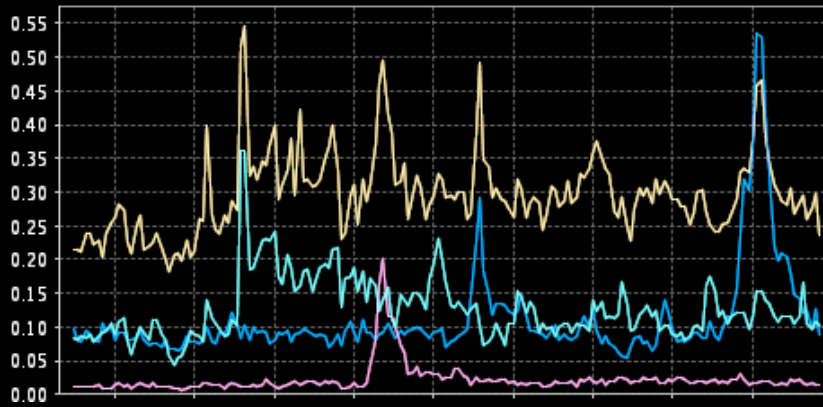


Negative multiplicative weight



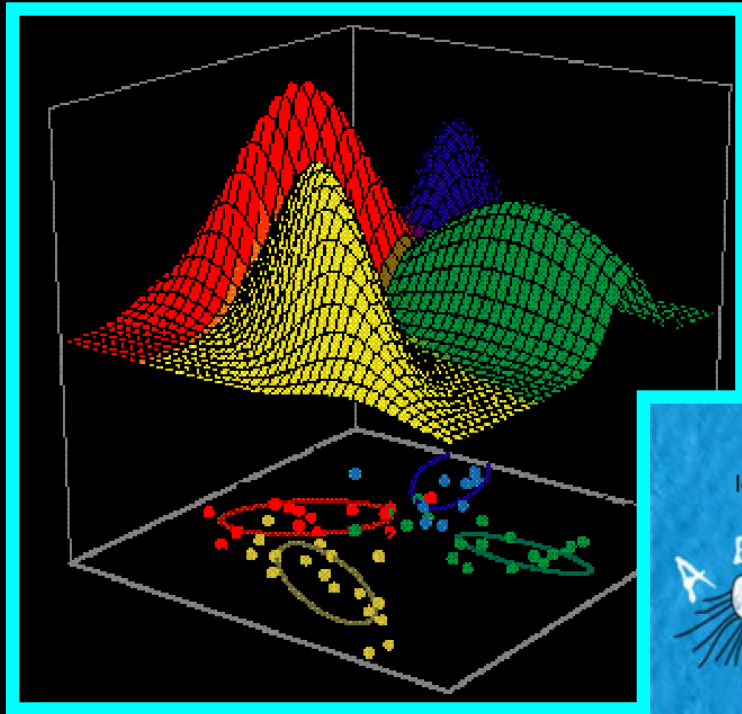
User engagement

- Conveying ambiguity



- Trade-off between accuracy and user cost

$$J = \lambda \odot U + (1 - \lambda) \bullet C$$



Machine-Learning



Usability



Human-in-the-loop