Empowering Users by Developing Transparent Context-Models

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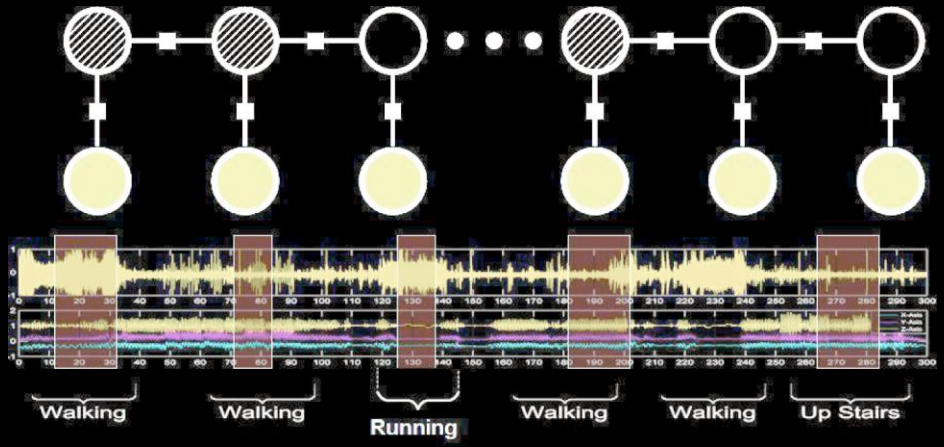
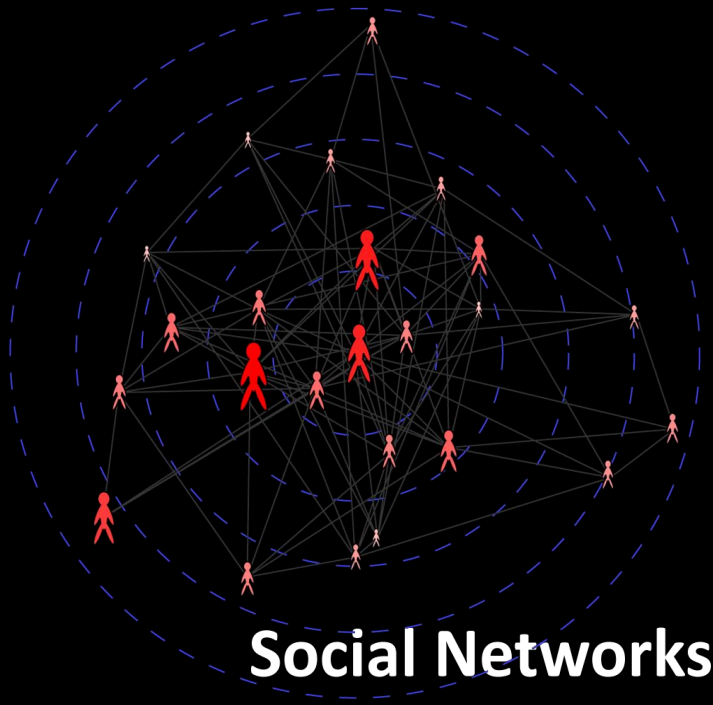
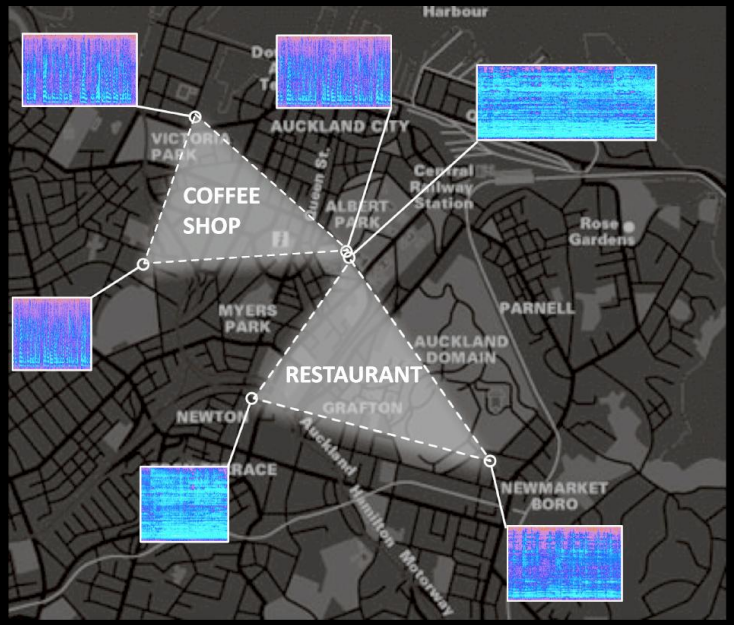
Ubiquitous sensing of human behavior



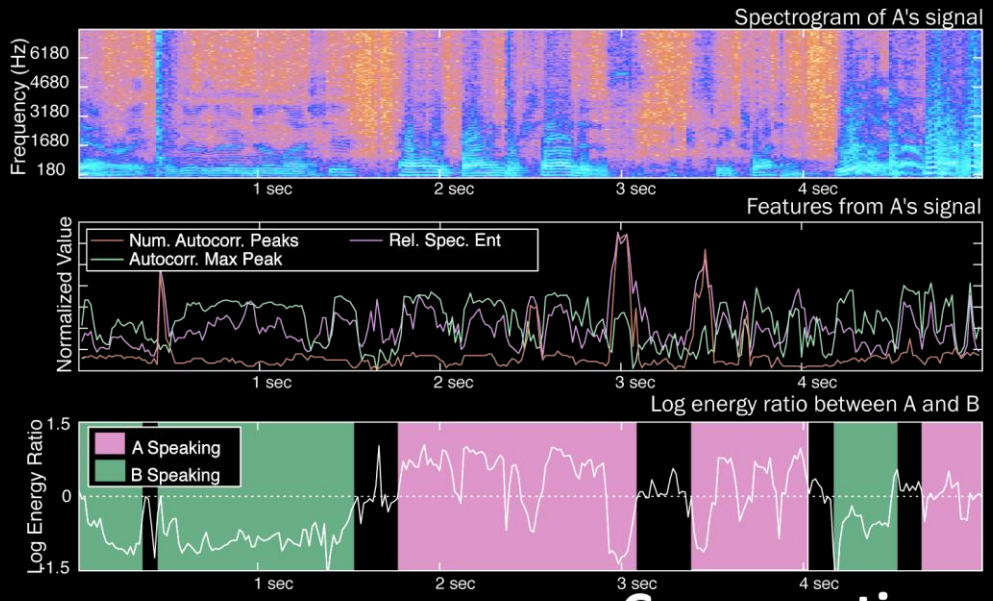
Activities



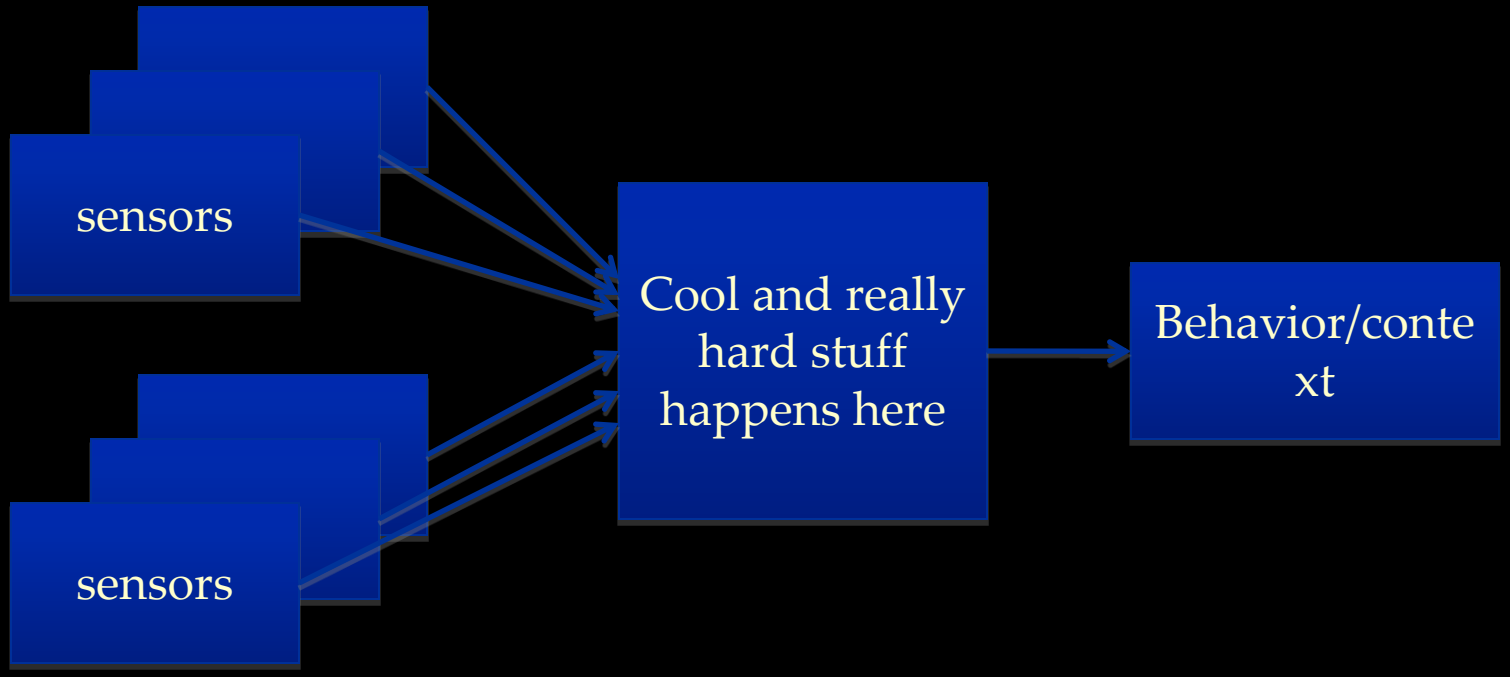
Social Networks

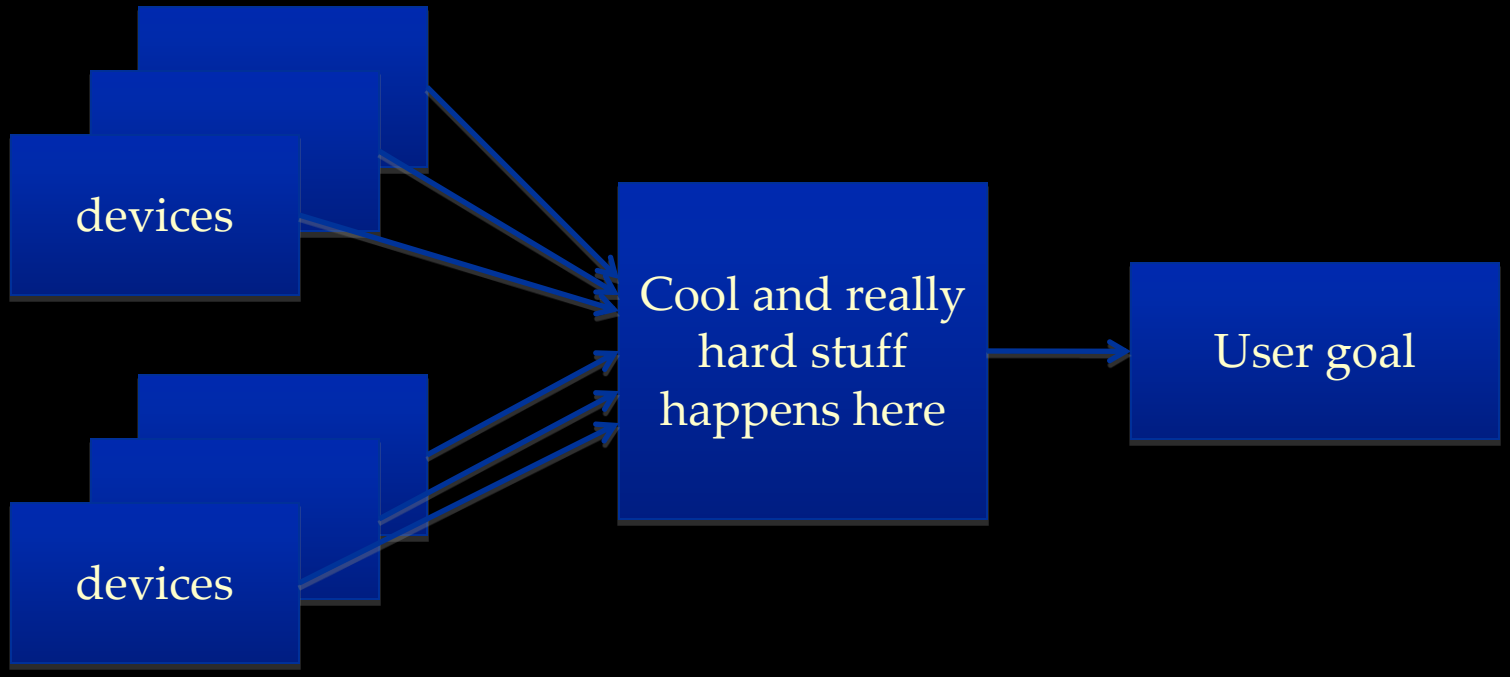


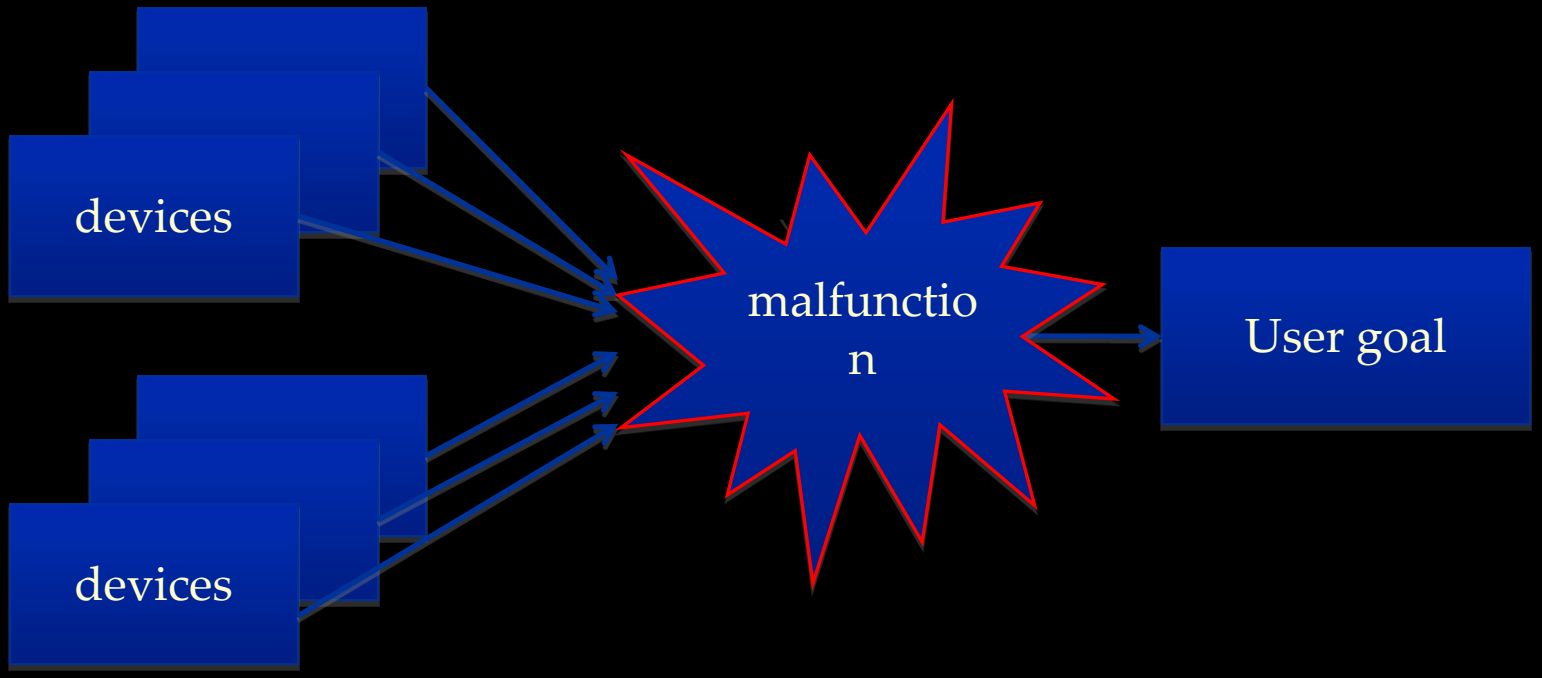
Places



Conversations


sensors
sensors
Cool and really hard stuff happens here
Behavior/conte xt


devices
devices
Cool and really hard stuff happens here
User goal


devices
devices
malfunctio
n
User goal

Different ways to deal with problems

Do it yourself. We can help

Bring it to us. We will fix it.

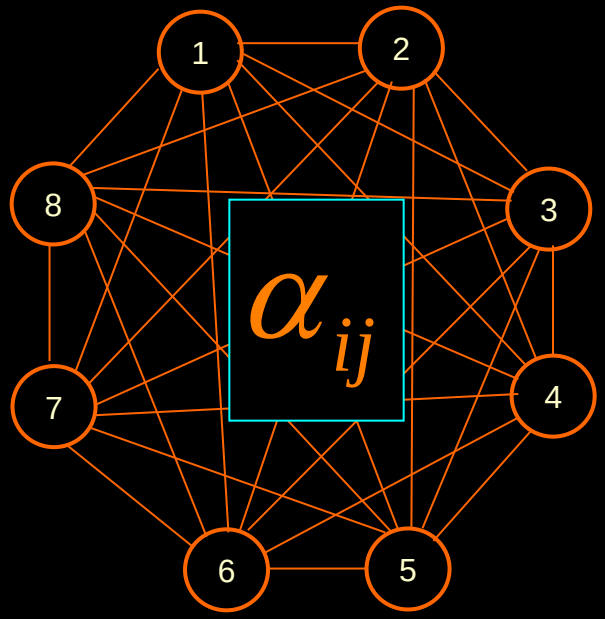
How can we help?

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

Interpretation

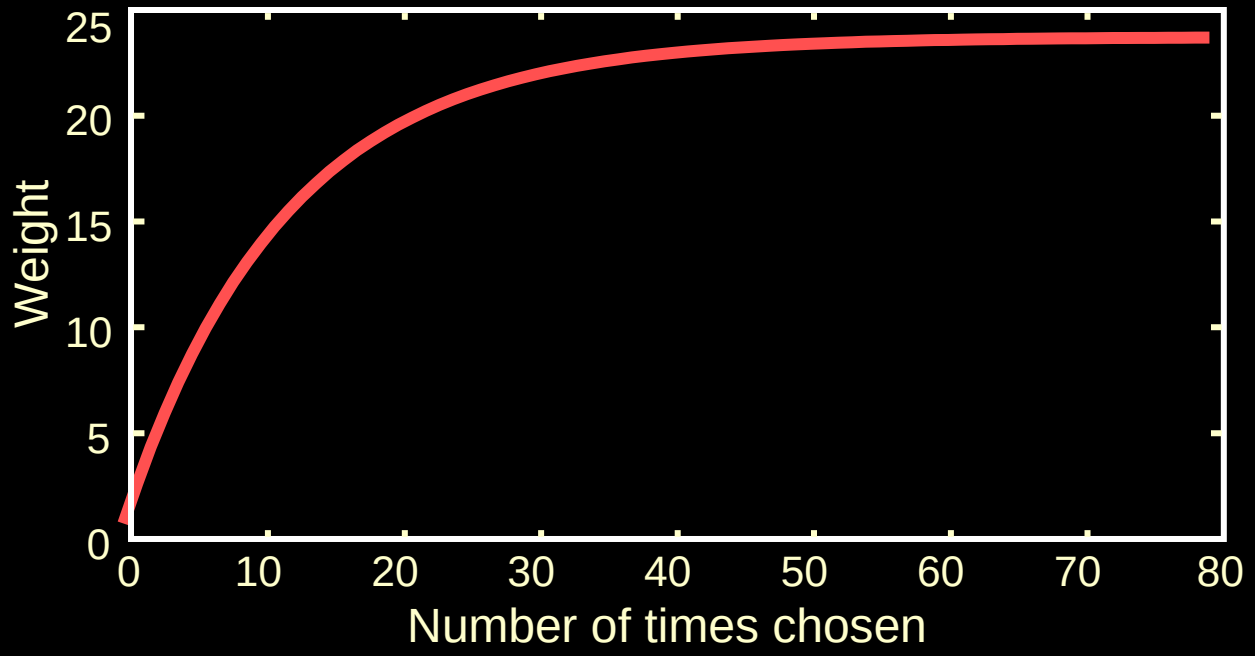
- Give the user feedback on how different parts of the system interact to produce final outcome

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



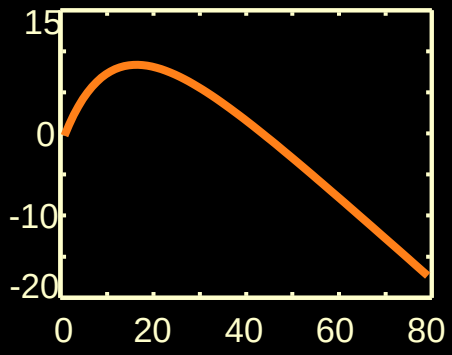
Intuition

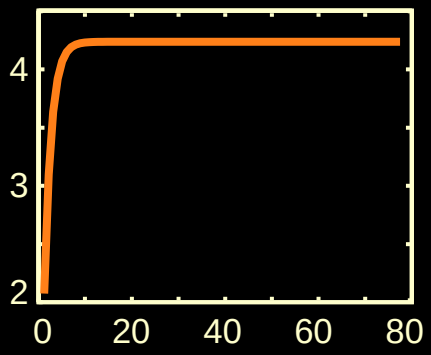
- Design models that can incorporate human intuitions and expectations

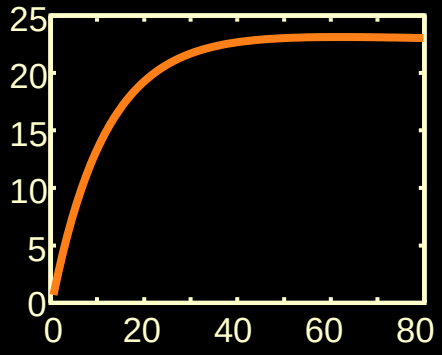


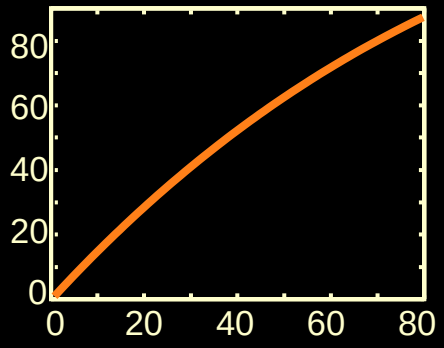
$$P(\mathbf{Y} = \mathbf{y}) = \frac{1}{Z} e^{\boldsymbol{\eta}(\boldsymbol{\theta})^\top \boldsymbol{\phi}(\mathbf{y})}$$

Many weight shapes

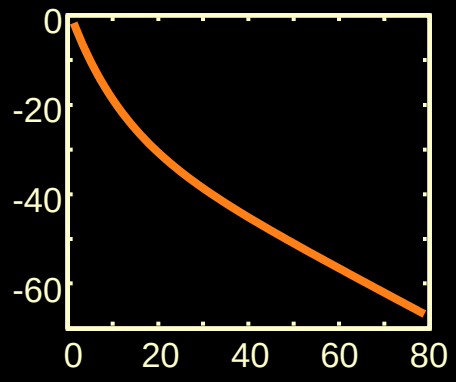


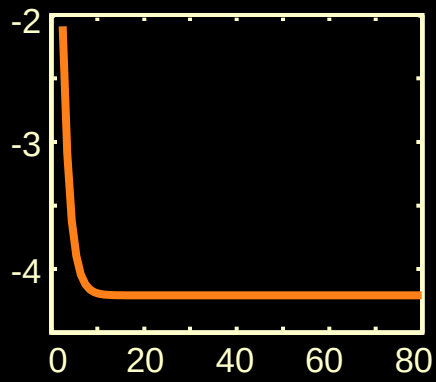


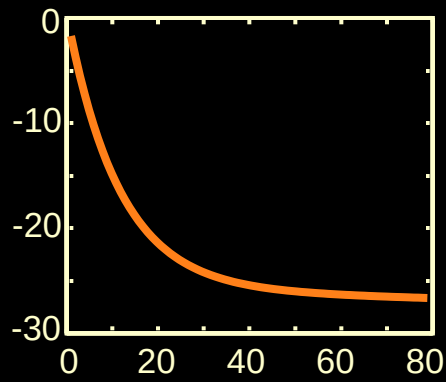




Negative multiplicative weight

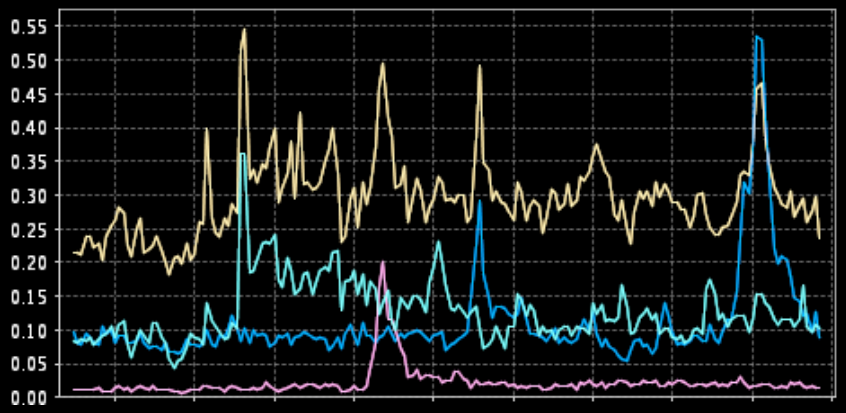






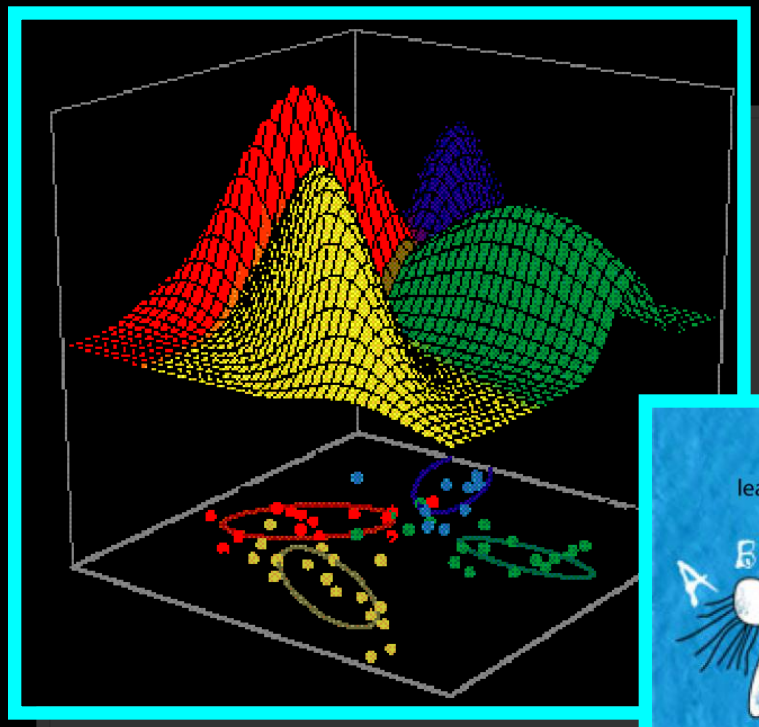
User engagement

- Conveying ambiguity



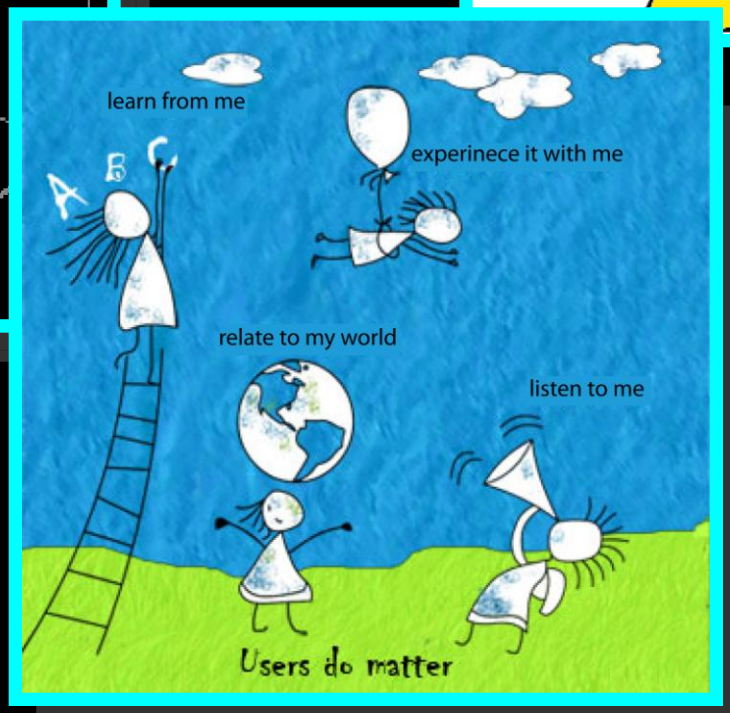
- Trade-off between accuracy and user cost

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



Machine-Learning

Usability



Human-in-the-loop