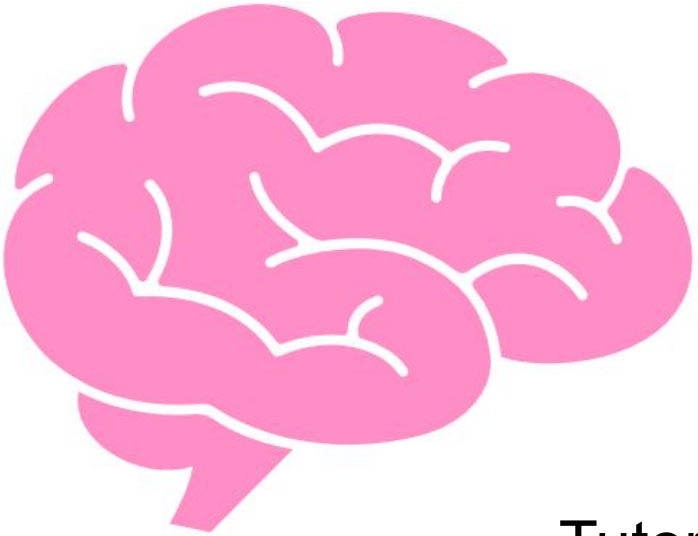
General Principles of Human and Machine Learning



Tutorial 10: Function learning


HAPPY NEW YEAR!!

On today’s agenda…

Going through some function learning experiments!

Flower categorization task

Mobile-friendly!
Click “See task” on the consent form, and try to find out what defines the category.

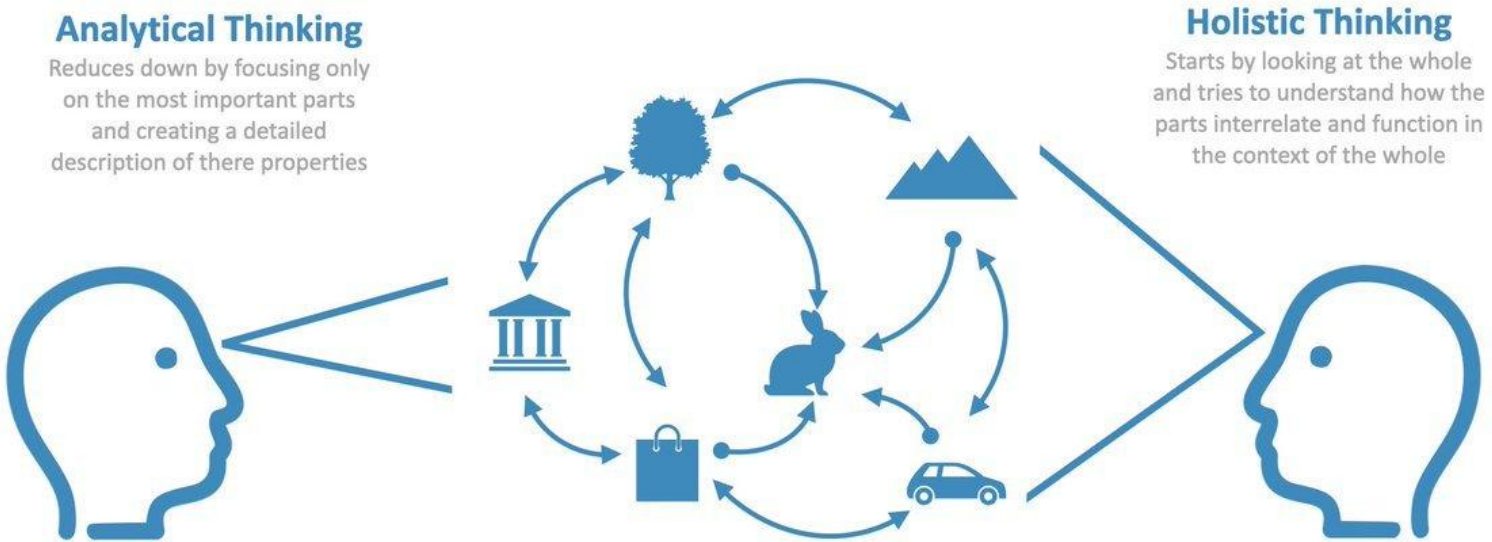
https://experiments.hmc-lab.com/ahProjectPilot/experiment.html

What defined the categories?

How did your representations of the categories change over time?

Discussion

The number of petals, the number of leaves, and the density of the seeds are drawn from N(2,1) for Category A and from N(4,1) for category B → Category B has more petals, leaves, and seeds



Gridsearch!

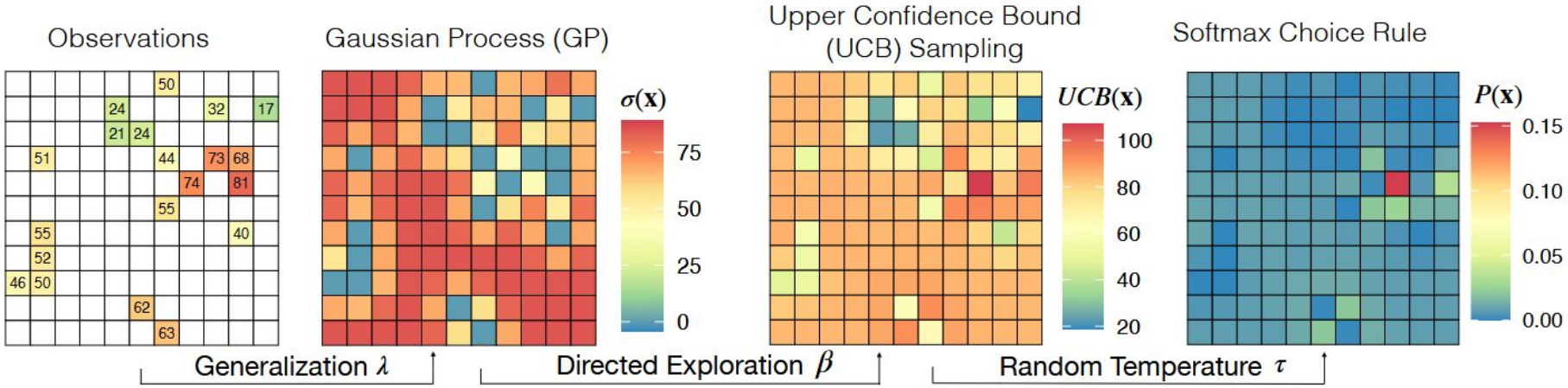
- Mobile-friendly (but needs to load as “Desktop version”?)
- Enter any participant ID
- Best performance (measured by stars at the end of the experiment) wins a prize from Charley!

https://experiments.hmc-lab.com/tsimane/gridExperiment.html

Discussion

- What strategies did you use to maximize reward?
- What informed how you extrapolated/interpolated?
- Beyond only function learning, did you use any other strategies?

Discussion


Observations
Gaussian Process (GP)
Upper Confidence Bound (UCB) Sampling
Softmax Choice Rule
σ(x)
75
50
25
0
UCB(x)
100
80
60
40
20
P(x)
0.15
0.10
0.05
0.00
Generalization λ
Directed Exploration β
Random Temperature τ

Monster memory

Keyboard only – anyone wanna play on laptop, or should we do it on collaboratively on my laptop?

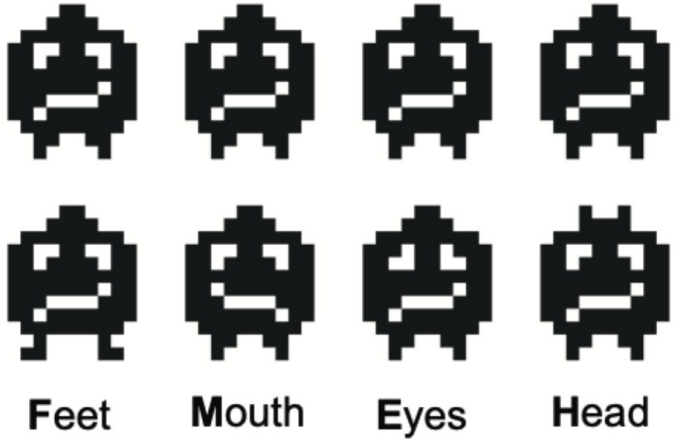
https://experiments.hmc-lab.com/MonsterMemory_Learning_only/experiment.html?PROLIFIC_PID=tutorial_testusr01&STUDY_ID=tutorial_testing&SESSION_ID=tutorial_testing

Discussion

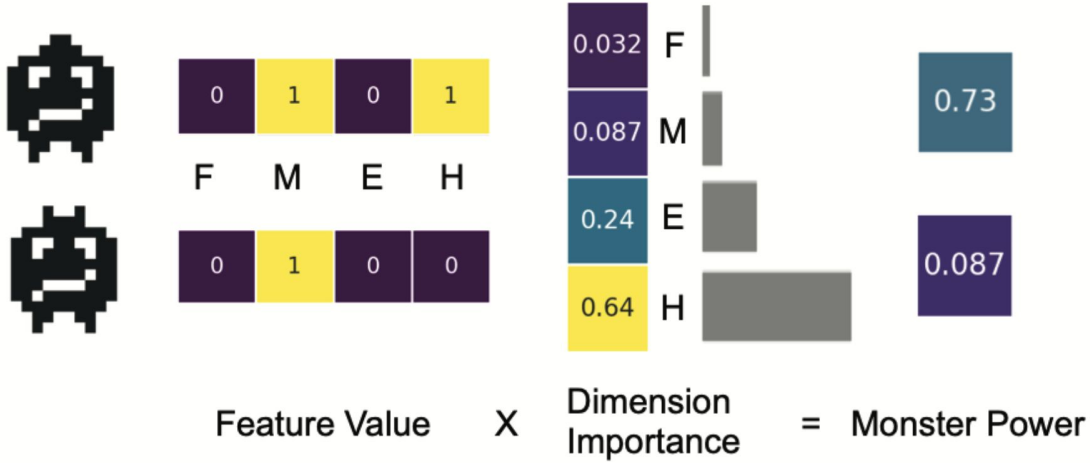
- How is the task different from the spatial bandit task?
  - Do spatial representations make it easier to use similarity-based mechanisms?

- Are you treating this as a category learning or function learning task?
  - E.g., it could be treated as a category learning task by learning which are good vs. bad features

Discussion



(designed to test whether people would remember high value features better)



Social transitive inference

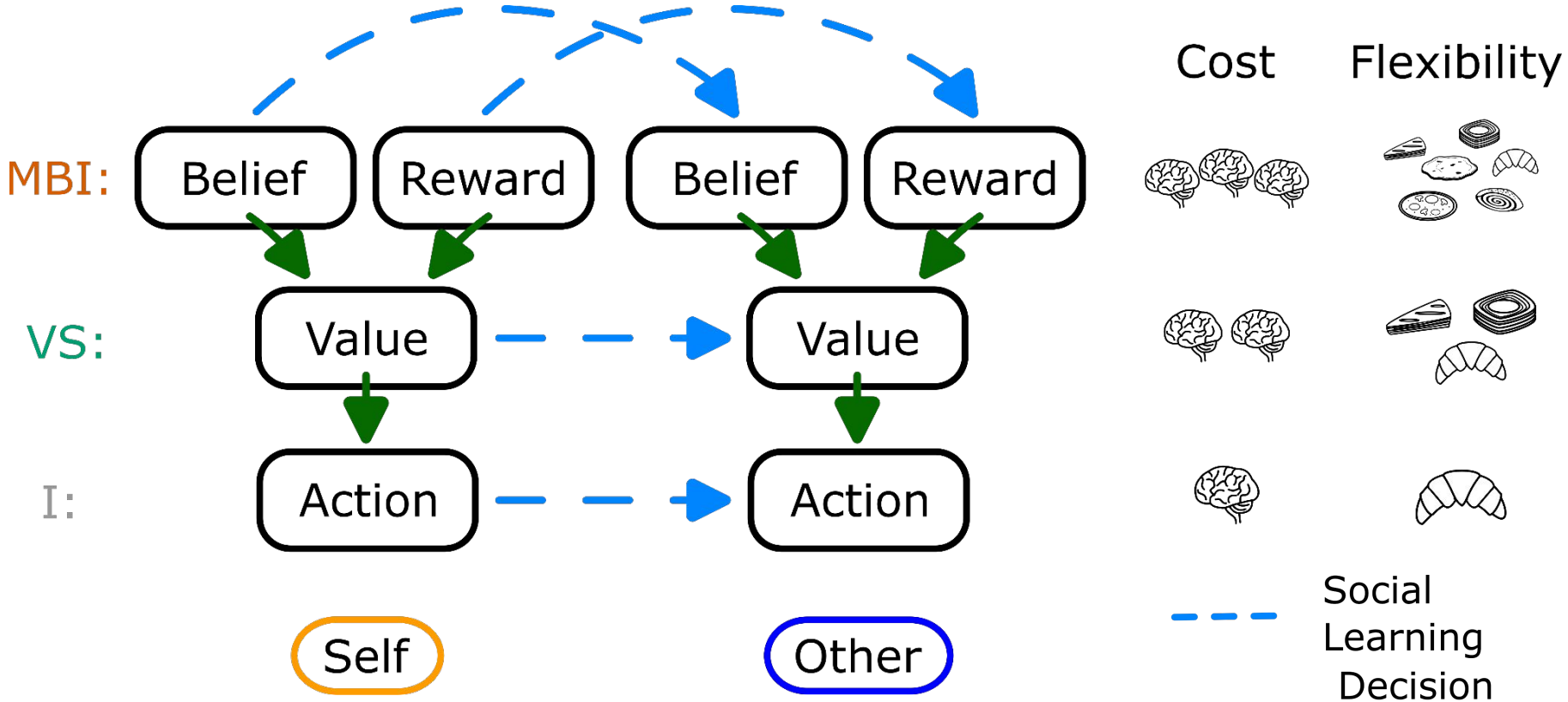
Keyboard only again

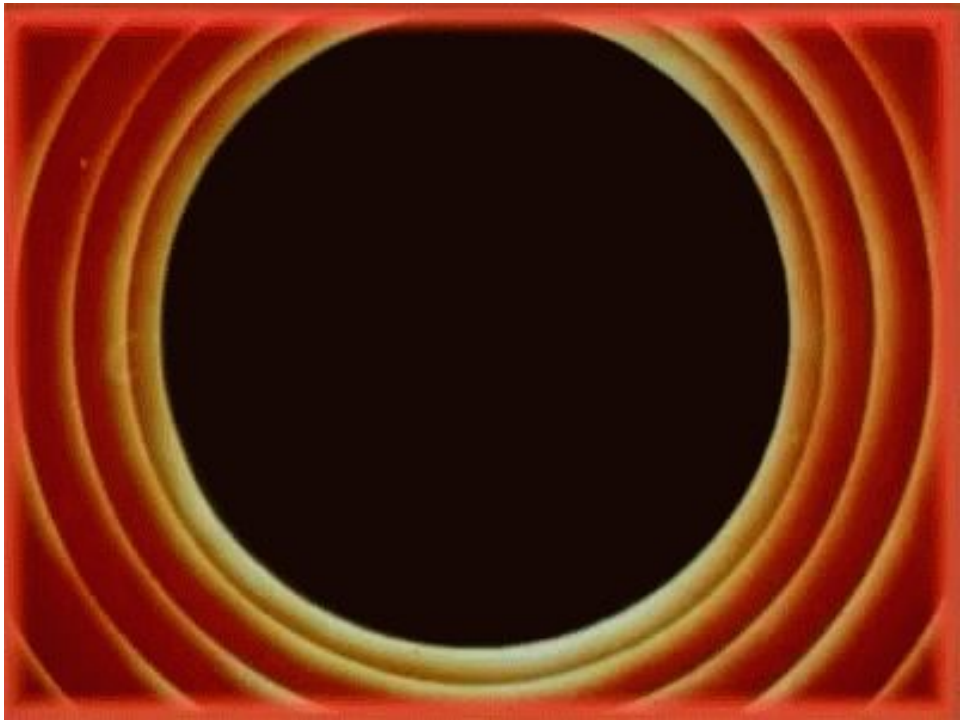
https://experiments.hmc-lab.com/soCard/experiment.html

Discussion

- Did you treat this as a function learning task? Why? Why not?
- What other forms of structure can you learn to help you acquire reward?

Discussion


MBI:
Belief
Reward
Belief
Reward
VS:
Value
Value
I:
Action
Action
Self
Other
Cost
Flexibility
Social Learning
Decision Making



Enjoy the rest of the course! :) (and good luck on the exam, too!!)