Motivation: Computational design in the wild

“I wish I was better at cooking, but I don’t know where to start.”

An AI recipe-design system that will stimulate a user’s curiosity, motivating them to cook more.
Motivation: Specific and diversive curiosity

Diversive curiosity
undirected surprise-seeking

Specific curiosity
focused on a discovery

Expectation → Surprise → Curiosity → Synthesis

Deep Representation Learning
We use deep learning to estimate the likelihood of feature combinations occurring together. If you’ve only ever seen ginger used in sweet dishes, then:

\[ P(\text{ginger} \mid \text{sweet dish}) \approx 0 \]
\[ P(\text{ginger} \mid \text{sweet dish}) \approx 1 \]

Surprise: the ratio of a feature’s conditional likelihood in context to its marginal likelihood over the whole dataset.
A computational design system that simulates and stimulates curiosity.

How can deep learning efficiently estimate conditional likelihoods?

How can deep learning evaluate the similarity of curious stimuli?