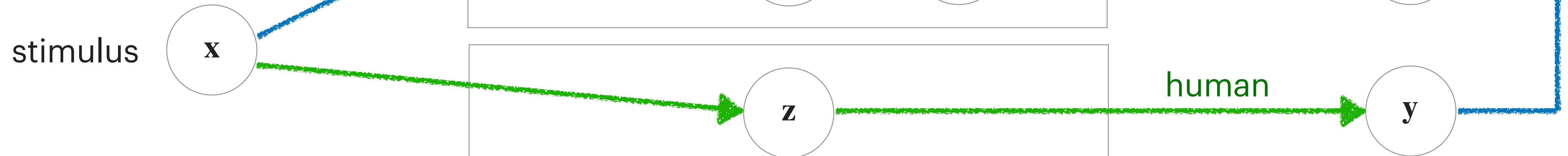
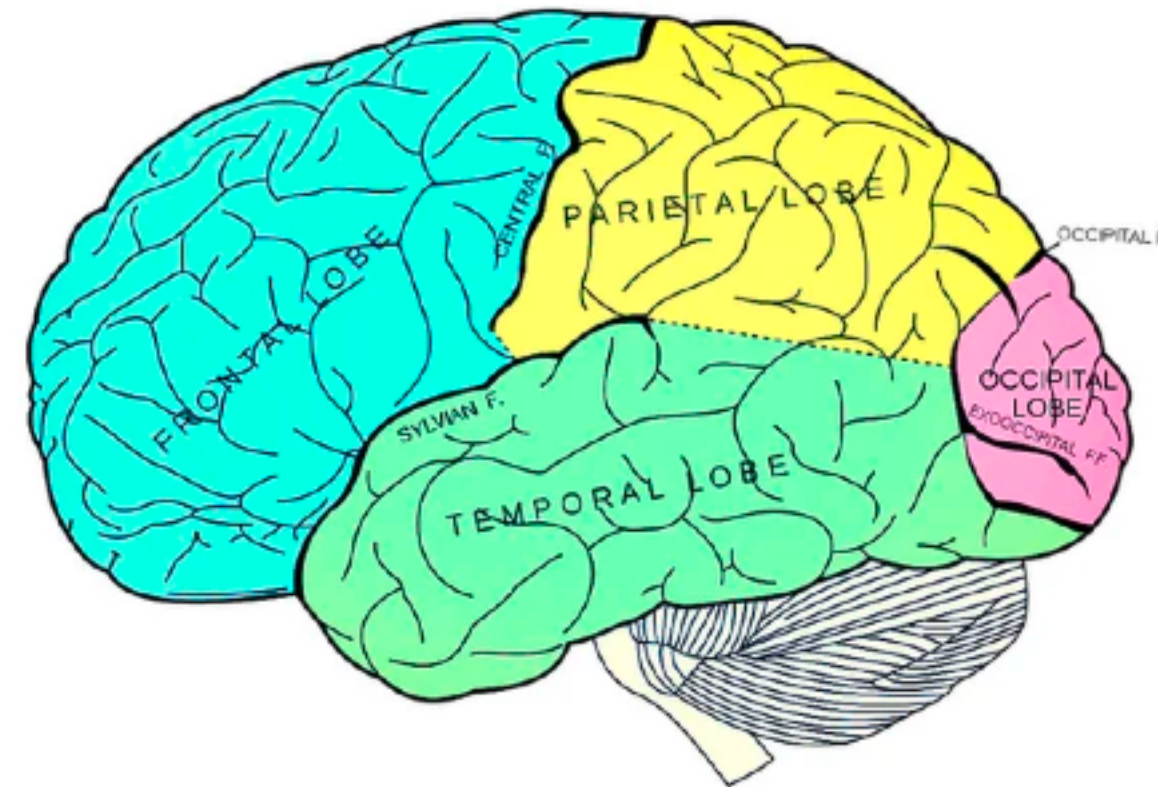


The machine learning approach

At a high level, machine learning is set of techniques, or *machinery*, that is designed to automatically learn complex relationships between random variables. Typically there is some output that we are interested in predicting, and there are inputs that we hypothesize affect that output. The goal is accurately model real world phenomena.



In the case of NLP, the underlying data generating process lies in the realm of human cognition, which practically speaking is a black box.



unobserved hidden state

Real world systems

- Information retrieval and web search
- Semantic search with images
- Machine translation
- Recommender systems
- Various classification tasks (e.g., spam filtering)
- Speech recognition (aka ASR aka STT)
- Speech synthesis (aka TTS)
- Conversational assistants

