

Uncertainty

Chapter 13

Uncertainty

Let action A_t = leave for airport t minutes before flight

Will A_t get me there on time?

Problems:

1. partial observability (road state, other drivers' plans, etc.)
2. noisy sensors (traffic reports)
3. uncertainty in action outcomes (flat tire, etc.)
4. immense complexity of modeling and predicting traffic

Hence a purely logical approach either

1. risks falsehood: " A_{25} will get me there on time", or
2. leads to conclusions that are too weak for decision making:

" A_{25} will get me there on time if there's no accident on the bridge and it doesn't rain and my tires remain intact etc etc."

(A_{1440} might reasonably be said to get me there on time but I'd have to stay overnight in the airport ...)

Probability to the Rescue

- Probability

- Model agent's degree of **belief**, given the available evidence.
- A_{25} will get me there on time with probability 0.04

Probability in AI models our **ignorance**, not the true state of the world.

The statement “With probability 0.7 I have a cavity” means: I either have a cavity or not, but I don't have all the necessary information to know this for sure.