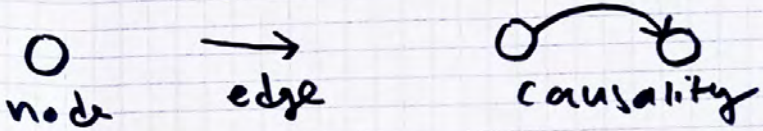
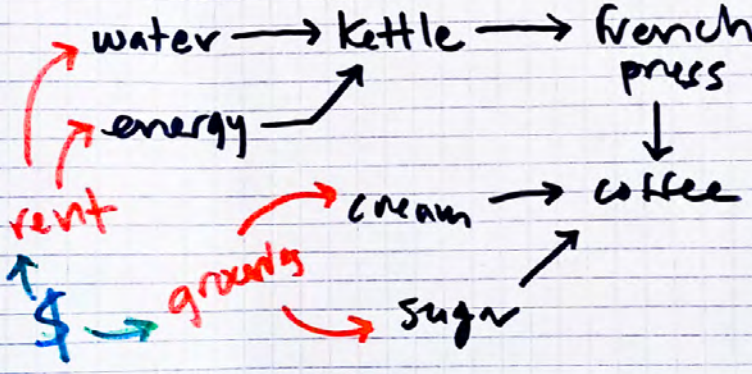
COGS 300 State 03 Feb 24/26

warm up: Network diagrams + causal inference



draw a "complex" set of causal connections, or processes.



Are there higher level "causes"?

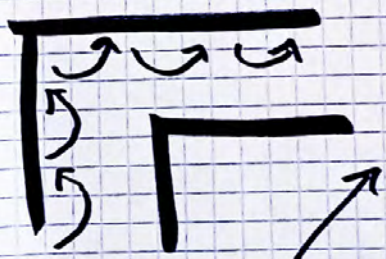
$$P(A|B) = \frac{P(B|A)\,P(A)}{P(B)}$$

sensor model

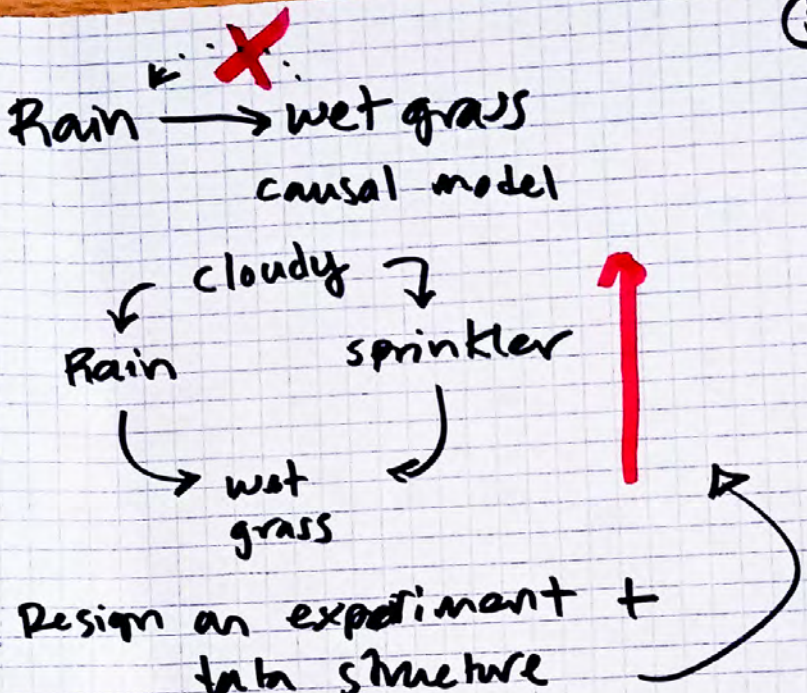
A - state $\in$ { history, sensors, prior ... }

Belief in a machine → probability of a state.

if (cond) then do x

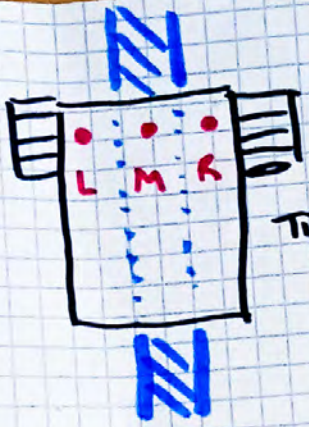


$$P(A,B,C) = P(A|BC)\,P(B|C)\,P(C)$$



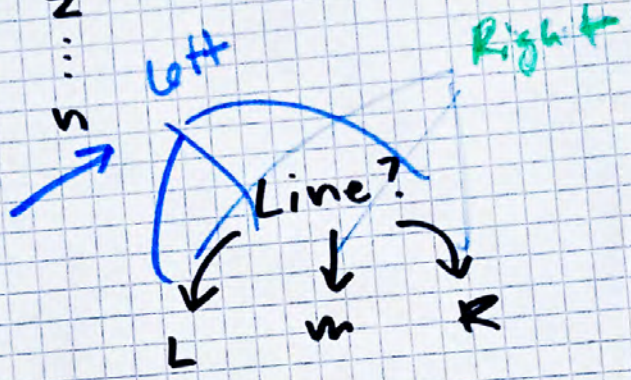
☆ Design an experiment + data structure (Excel)

day	Rain?	sprinkler?	cloudy?	wet grass?
1	✓	✗	✗	✓
2	✗	✓	✗	✗
⋮	⋮	⋮	⋮	⋮
100	✓	✓	✓	✓



★ Design experiment
↳ causal model

Time	Line?	L	M	R
1	Y	N	Y	N
2				
⋮				
n				

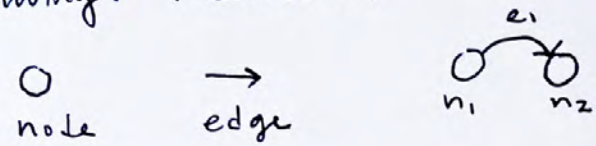


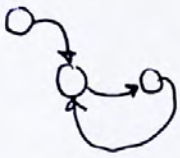
★ Design a more useful causal model + exp.

Time	Observations: Left	Observations: Right	Sensors → (5) L1	M1	R1	L2	M2
1	✓	×	×	×	✓	×	✓
2	✓	×	×	×	×		
3							
4							
5							
6							
⋮							

State 03

Drawing: Networks.





model a process.

Announce DL. + TA meetings.

Before break: Bayes theory
Bayes filter

This week: Bayes Net
Bayes classifier

} ML 101

Next: Emergence.

↓

thinking about intelligences in the world w/ our tools. wtf comp.

↑ everything you need for tournament

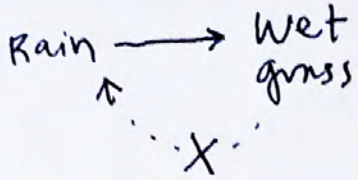
Low → High level.

★ Robot beliefs have to resolve to probabilities. But are human beliefs resolvable like that? How real is the network?

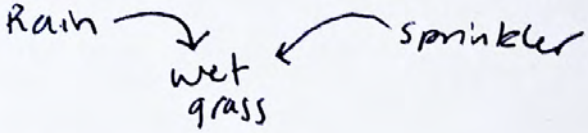
$$P(A, B, C) = P(A|BC)\,P(B|C)\,P(C)$$

Chain rule → network

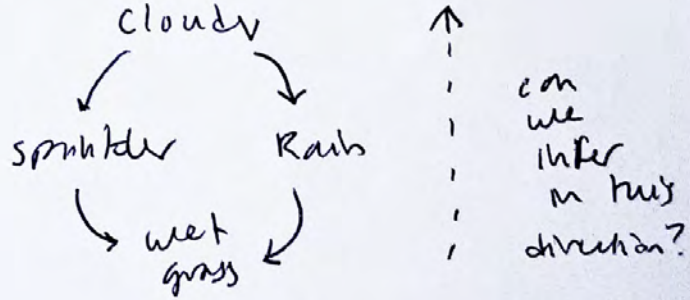
causal links:



But wait... rain only cause?



more levels:



★ Design experiment → real data.

★ Demo Bayes net. online.

your robot:

like following

☆ Design experiment

Time	Like	Left	middle	Right
1	yes	no	yes	no
2				
3				
4				
5				
⋮				

On like / correct → you define.

make data in Excel ~30 lines. 100

☆ Design causal model.

☆ import data. + run (demo)

↳ show excel selection.

☆ Design more useful beliefs.

↳ How to define?

→ How to observe?

↳ causal model?

→ simple data.