



Exercises for the Lecture

Techniques in Artificial Intelligence

4.2.2013 - Sheet 4

1) Markov processes I

Show that each second-order Markov process can be re-written as a first-order Markov process with a modified set of state variables. Does the number of parameters in the transition model increase?

2) Decision trees I

Consider the following table of 3 binary input attributes and one binary output.

Example	A1	A2	A3	Output y
x1	1	0	0	0
x2	1	0	1	0
x3	0	1	0	0
x4	1	1	1	1
x5	1	1	0	1

Construct a decision tree using these data.

3) Decision trees II

Develop a decision tree for the following data assuming you want to decide whether to play tennis based on the weather forecast in the morning.

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No