582 2013-01-23

Note Title 2014-01-23

Coherency; Dutch Book example [AIMA-3]

Stuart Russell & Peter Norvig. Artificial Intelligence: A Modern Approach, 3rd ed. Prentice Hall, 2010. (Russell & Norvig) Section 13.2.3

Agent 1 assigns these probabilities:

$P(a) = 0.4$, $P(b) = 0.3$, $P(a \vee b) = 0.8$,

where $a \wedge b = \{\}$, so the probabilities

are not proper (do not satisfy the

axioms of Kolmogorov).

Then, Agent 1 will always lose to Agent 2 who bets in the following way:

4/6 on a (pay 6 to Agent 2 if a occurs), 3/7 (pay 3 to Agent 2 if b occurs) and 2/8 (pay 8 to agent 2 if $\neg(a \vee b)$ occurs).

The following table shows the payoff to

Agent 1; this payoff is always negative:

	$a \wedge b$	$a \wedge \neg b$	$\neg a \wedge b$	$\neg a \wedge \neg b$
a	-6	-6	4	4
b	-7	3	-7	3
$a \vee b$	2	2	2	-8
	-11	-1	-1	-1