Christian Schindelhauer Freiburg, 15 Jan 2007
Due until 17 Jan 2007

Exercises of lecture

Wireless Sensor Networks
Winter 2006/2007
Sheet 9

SECTION 1:
Interpretation

1. Consider a mobile beacon that moves around a sensor node. The node uses data available to it for calculating its probable located using Bayes theorem. The node could be located among four equal size squares namely A1, A2, A3 and A4. Following data is available to the node using local measurements.

Probability that node in a square $x$ is ($P(A_x)$):
- $P(A_1) = 0.2$
- $P(A_2) = 0.3$
- $P(A_3) = 0.35$
- $P(A_4) = 0.15$

Probability that RSSI is equal to ”k” if node is in square $x$: $P(B|A_x)$:
- $P(B|A_1) = 0.1$
- $P(B|A_2) = 0.3$
- $P(B|A_3) = 0.25$
- $P(B|A_4) = 0.35$

In what square the node could be located with highest probability? What is the probability of node being located in square A1?

Solution:

$$P(A_1|B) + P(A_2|B) + P(A_3|B) + P(A_4|B) = 1$$
$$0.02 + 0.09 + 0.0875 + 0.0525 = 0.25$$

The node will be located in square $A_2$ with highest probability i.e $0.09/0.25 = 0.36$

The probability that node will be located in square $A_1$ is equal to $0.02/0.25 = 0.08$