Week 8 Lab Agenda

- Question Discussion Sequence (3 > 1 > 2 > 4):

1. Begin with Question 3 first
2. Question-1
3. Question-2
4. Question-4

Basic/Theory of Probability

- range of probability to be the real numbers from 0 to 1.Negative probabilities are not allowed [*Lecture 8 – Slide 32*]

Probability Values express in decimal fraction:

Percentage Expression	Decimal Expression
100%	1.00 or 1
50%	0.50
35%	0.35
6%	0.06
0%	0.00 or 0

Joint Probability Notation

- P(A ∩ B) can also be expressed as P(A,B)

A = Rain
B = Sky is dark

- Probability of Event A & B happened at the same time.
- Probability that It Rain AND Sky is Dark

Conditional Probability Notation

- P(A | B)

Event B already happened/given

A = Rain
B = Sky is dark

- Can be expressed as:

1. The probability that event A happens given that event B has already occurred
2. The probability that It Rain given that the Sky is Dark

Multiplicative Law

$P(A \cap B) = P(B \mid A) \cdot P(A)$

$P(A \cap B) = P(B \mid A) \times P(A)$

Reference:
1. Lecture 8 – Slide 32

1) How to calculate Joint Probability

1) Determine the joint probability of P(A , B)

$$P(A , B) = P(B \mid A) \cdot P(A)$$
$$= 0.50 \cdot 0.20$$
$$= 0.10$$

Given (Random value):

- P(A) = 0.20
- P(B|A) = 0.50

2) How to calculate Probability of an event

1) Calculate P(B)

$$P(B) = P(A,B) + P(A',B)$$
$$= 0.10 + 0.30$$
$$= 0.40$$

Given Joint Probability (Example with Random value):

- P(A,B) = 0.10
- P(A,B') = 0.20
- P(A',B) = 0.30
- P(A',B') = 0.30

3) How to calculate Posterior Probability

1) Find posterior probability of P(A | B)

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

$$= \frac{0.20}{0.50}$$

$$= 0.4$$

Given Information (Example with Random value):

- P(B) = 0.50
- P(A,B) = 0.20