

# Assignment 1

**AI1110: Probability and Random Variables**  
Indian Institute of Technology Hyderabad

Yasir Usmani\*  
AI22BTECH11031

**12.13.6.18: Question.** If  $\Pr(A | B) > \Pr(A)$ , then which of the following is correct :

- (A)  $\Pr(B | A) < \Pr(B)$
- (B)  $\Pr(AB) < \Pr(A) \cdot \Pr(B)$
- (C)  $\Pr(B | A) > \Pr(B)$
- (D)  $\Pr(B | A) = \Pr(B)$

**Answer:** (C)  $\Pr(B | A) > \Pr(B)$

**Solution:** Given:

$$\begin{aligned}
 &\Pr(A | B) > \Pr(A) \\
 \implies &\frac{\Pr(AB)}{\Pr(B)} > \Pr(A) \\
 \implies &\Pr(AB) > \Pr(A) \cdot \Pr(B) \\
 \implies &\frac{\Pr(AB)}{\Pr(A)} > \Pr(B) \tag{1}
 \end{aligned}$$

We know:

$$\Pr(B | A) = \frac{\Pr(AB)}{\Pr(A)}$$

from(1),

$$\implies \Pr(B | A) > \Pr(B) \dots\dots\dots \textbf{i.e.(C)}$$