Moodle Raw logs

Data Preprocessing & Clustering (Kmeans)

Current State S_t Vector

- C (Cluster ID)
- M (Module ID)
- P (Progess Level)
- Sc (Score range)
- Ph (Learning phase)
- E (Engagement metric)

AI Q-Learning Agent

Q-Table Look-up Q(S_t, A)

Action Selection Policy (ε - greedy)

Selected Action A_t

- Past
- Current
- Future

Q-Value Update (Bellman Equation)

Learning Enviroment Moodle/Simulation

Next state

Reward

$$R_{total} = R_{base} + R_{LO} + R_{bonus} - P_{penalty}$$