CS6046: Multi-Armed Bandits

Individual		Team		
Test I	- 20	Project	- 30	(2 per team)
Test II	- 20	Paper	- 15	(3 per team)
Coding Assignment	- 15	Reading		

Tools / Frameworks + Algorithm + Application

Math + coding

Paper Reading: 2 to 3 papers from a bucket (10 buckets)

Project: optimal batting / bowling strategies

5 players in a "cricket" Team

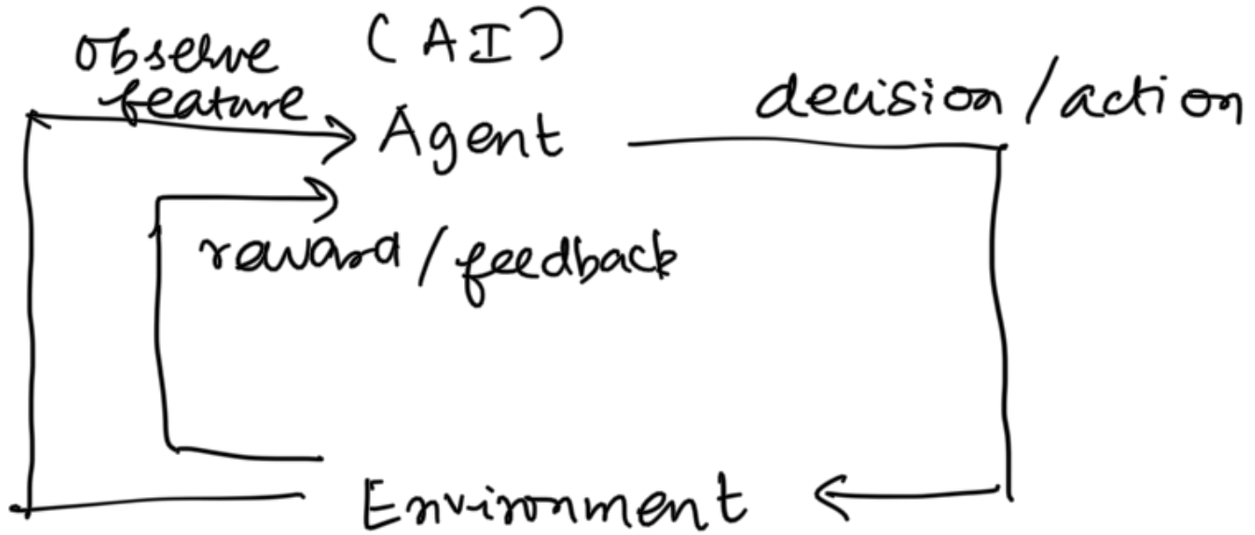
Book by Csaba Szepesvari and Tor Lattimore

Bandit Algorithms

Topic 1: Place "Multi-Armed Bandits" in the artificial intelligence (AI) / machine learning (ML) map

Define AI/ML :

Rational Agent Framework



internal state

Aim: max Total Reward

decision/action

Data: (observation$_t$, state$_t$, reward$_t$, action$_t$)

Task Categories

Descriptive

Predictive
- Static
- Dynamic

Prescriptive
- Static
- Dynamic

Descriptive = Data / Input Representation

* How many topics are there in the collection of documents?

* Given a noisy image, de-noise it.

* Given a bunch of features find out which is important

Prediction

(Static case) * What object is there in the image?
↳ understanding

(Dynamic case) * Predicting the sentence spoken by a human

Prescriptive Tasks (Control aspect)

(Static) * Which is a good position to display advertisement

in a web page

(Dynamic) * what would be the next best move in a game of Chess

Static vs Dynamic : Temporal connection between the internal states

Prediction vs Prescription / Control : Action or decision changes the state of the environment or influences the environment.