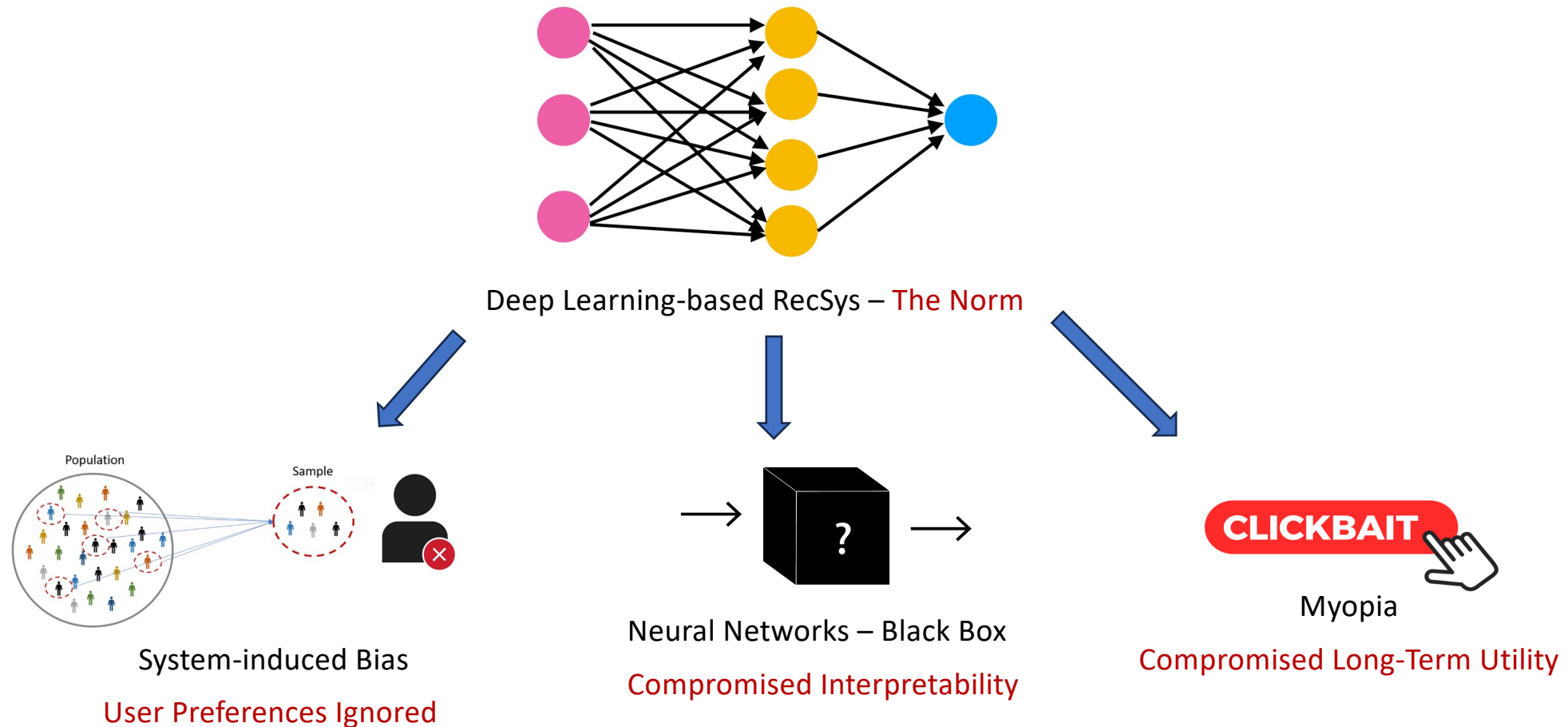


CSCI 566 – Deep Learning and its Applications

Reinforcement Learning for Recommender Systems – Environment Suite

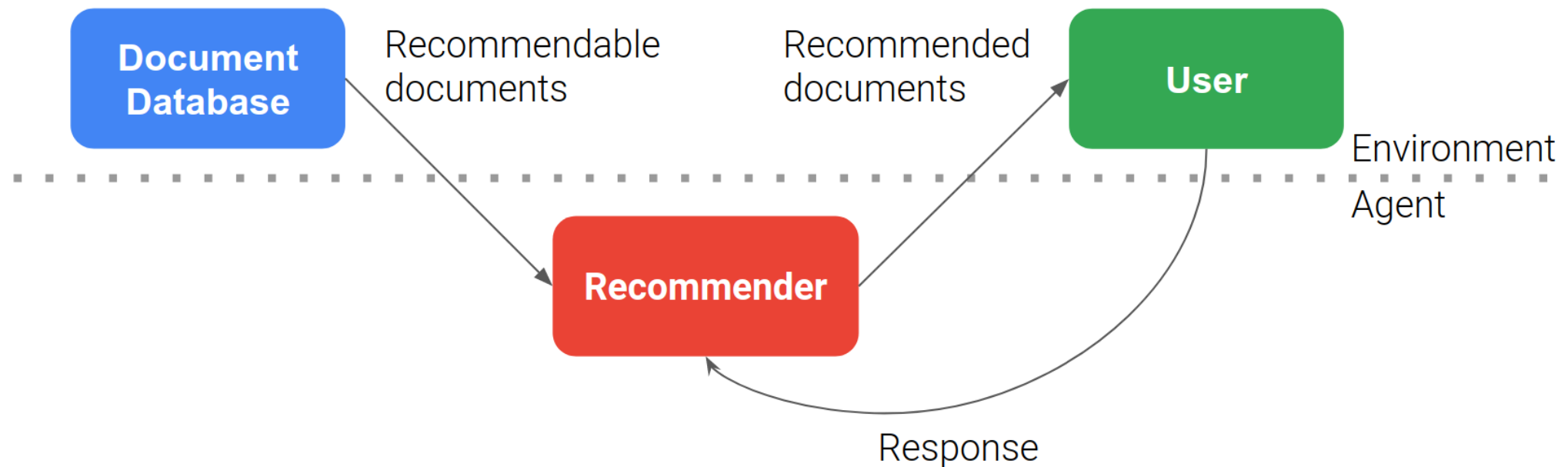
PRANAV PARNERKAR

RL-based RecSys – WHY?



Problem Statement

- Building an RL-RecSys Environment for Video Recommendations (Netflix/YouTube) – Using Google RecSim.
- Benchmarking simple RL agents on developed environment.
- Identifying relevant RL-RecSys challenges/future scope.



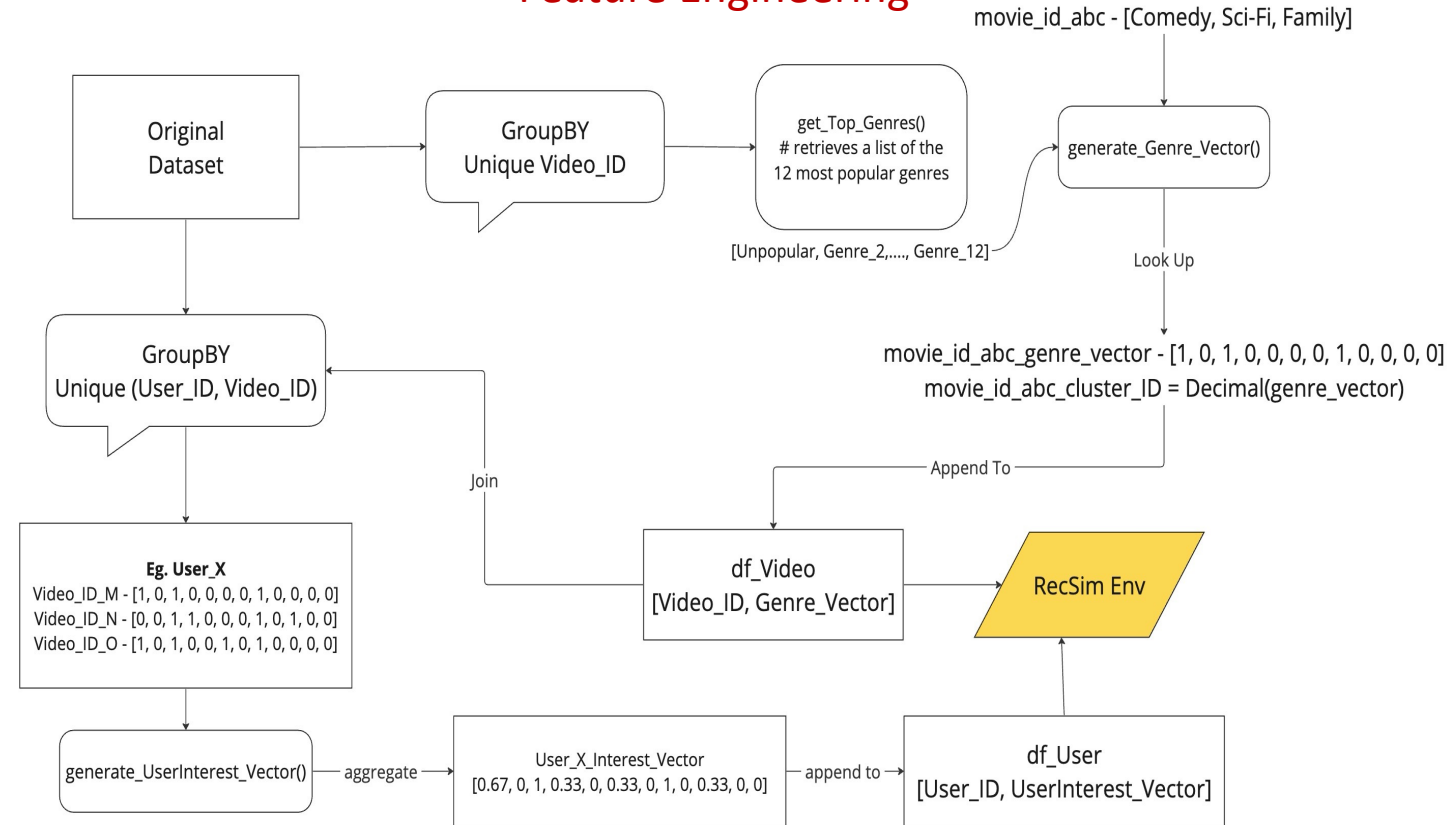
Dataset and Feature Engineering – Netflix Environment

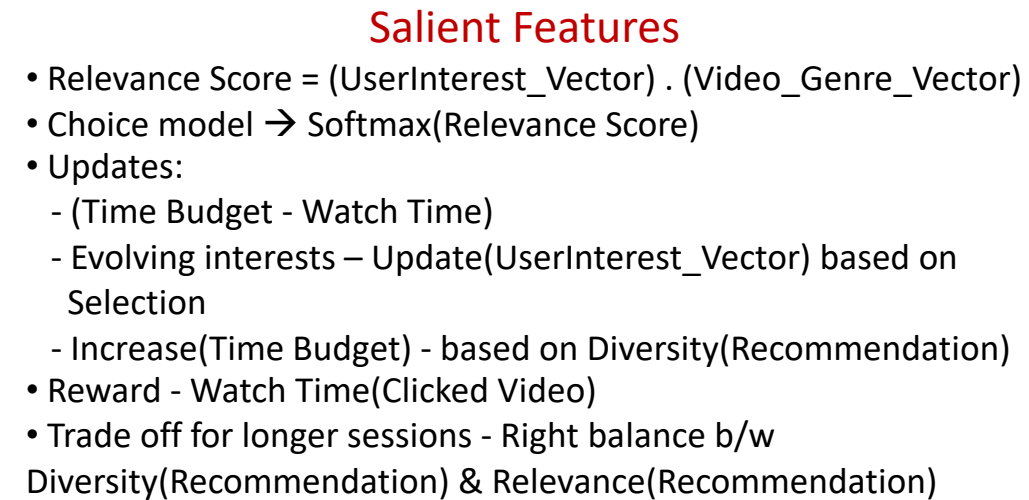
Dataset

		datetime	duration	title	genres	release_date	movie_id	user_id
1								
2	58773	1/1/17 1:15	0	Angus, Thongs and Perfect Snogging	Comedy, Drama, Romance	7/25/08 26bd5987e8	1dea19f6fe	
3	58774	1/1/17 13:56	0	The Curse of Sleeping Beauty	Fantasy, Horror, Mystery, Thriller	6/2/16 f26ed2675e	544dcbc510	
4	58775	1/1/17 15:17	10530	London Has Fallen	Action, Thriller	3/4/16 f77e500e7a	7cbcc791bf	
5	58776	1/1/17 16:04	49	Vendetta	Action, Drama	6/12/15 c74aec7673	ebf43c36b6	
6	58777	1/1/17 19:16	0	The SpongeBob SquarePants Movie	Animation, Action, Adventure, Comedy, Far	11/19/04 a80d6fc2aa	a57c992287	
7	58778	1/1/17 19:21	0	London Has Fallen	Action, Thriller	3/4/16 f77e500e7a	c5bf4f3f57	
8	58779	1/1/17 19:43	4903	The Water Diviner	Drama, History, War	12/26/14 7165c2fc94	8e1be40e32	
9	58780	1/1/17 19:44	0	Angel of Christmas	Comedy, Romance	11/29/15 b2f02f2689	892a51dee1	
10	58781	1/1/17 19:46	3845	Ratter	Drama, Horror, Thriller	2/12/16 c39aae36c3	cff8ea652a	
11	58782	1/1/17 20:27	0	The Book of Life	Animation, Adventure, Comedy, Family, Fa	10/17/14 97183b9136	bf53608c70	

Netflix Audience Behavior Dataset – UK movies
by Vod Clickstream et al. – Hosted on Kaggle
[<https://www.kaggle.com/datasets/vodclickstream/netflix-audience-behaviour-uk-movies>]

Feature Engineering



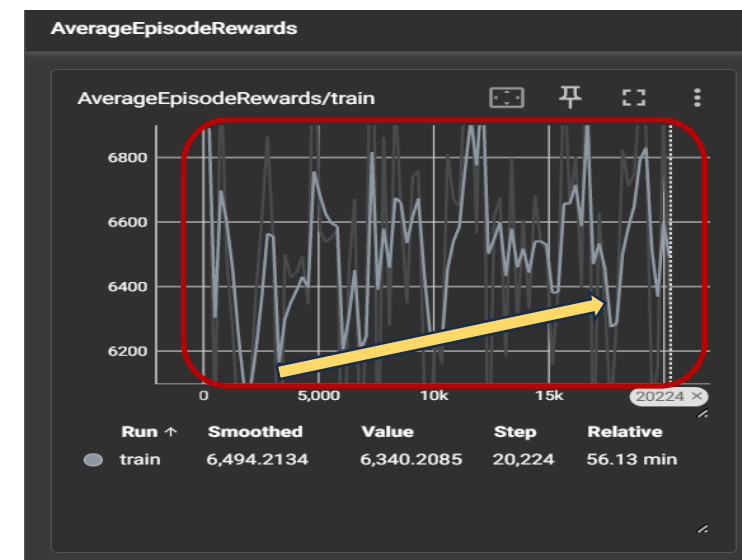
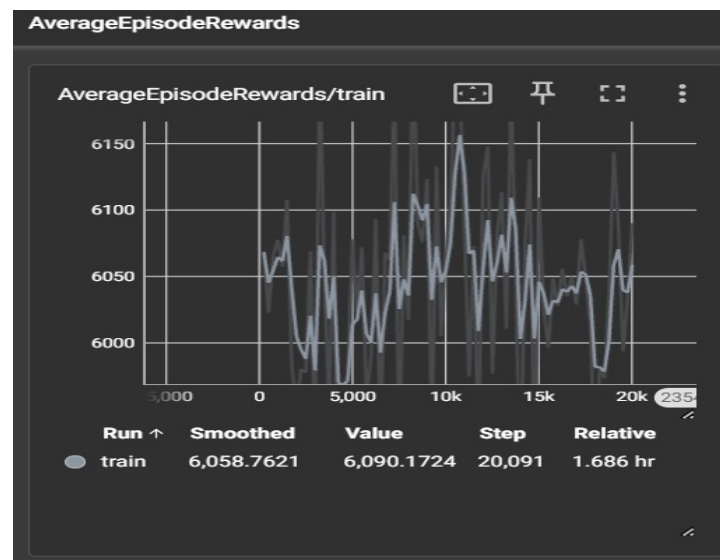
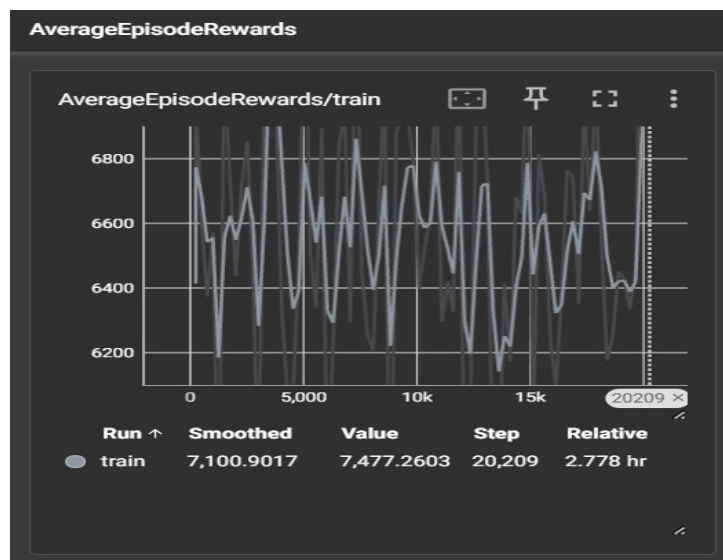
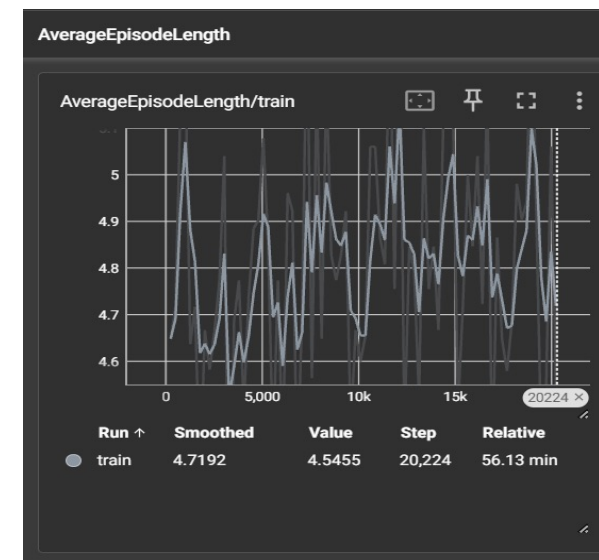
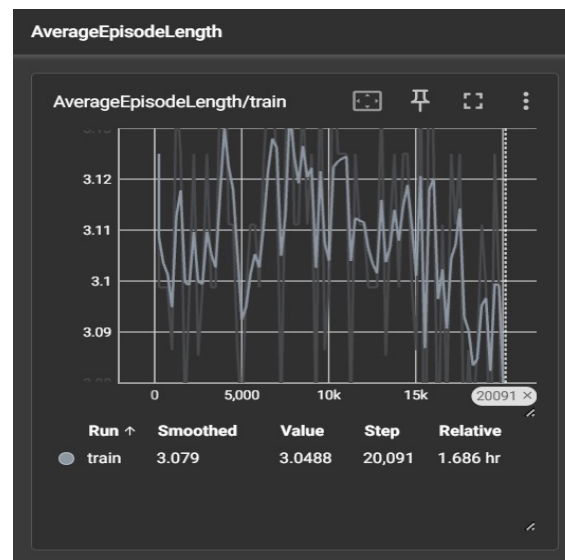
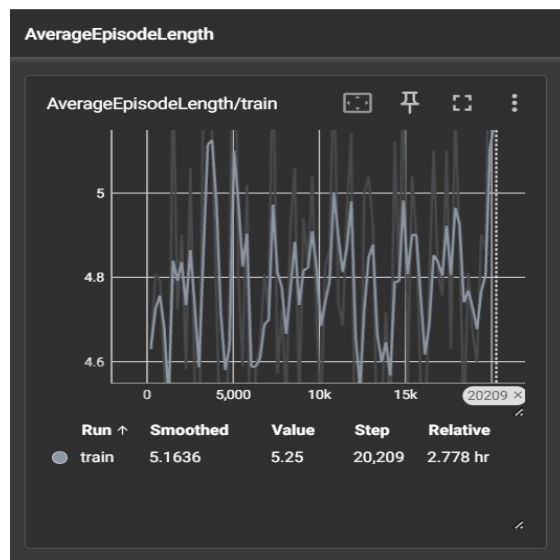


Benchmarking Agents – Random, Greedy, DQN

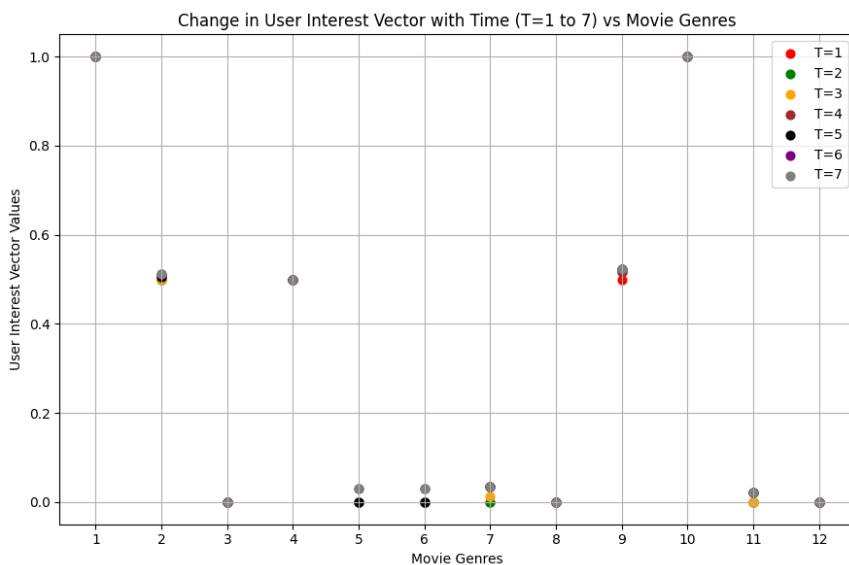
Random

Greedy

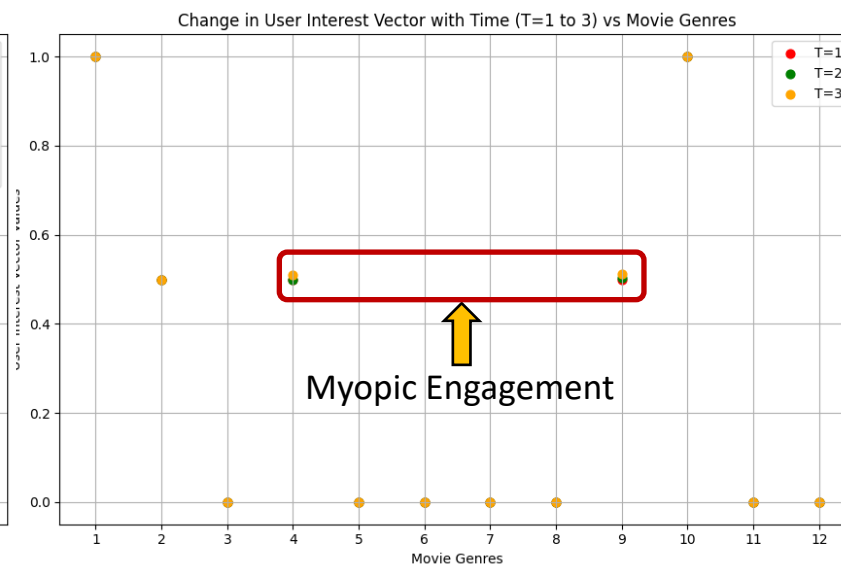
DQN



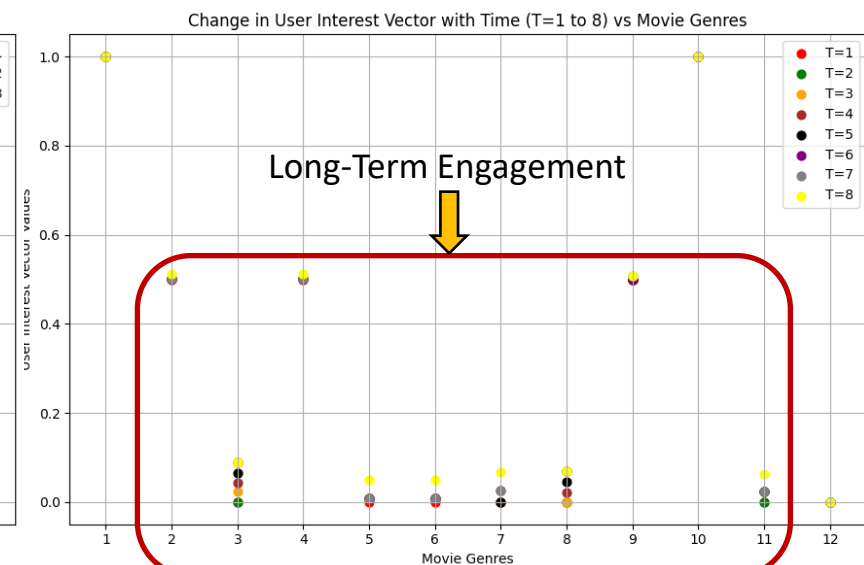
Benchmarking Agents – Random, Greedy, DQN



Random



Greedy



DQN

Challenges	Future Scope
a. Feature Ingestion	a. Development of data ingestion modules for RecSim.
b. Exploration vs Exploitation - Environment Design & Tuning	b. AutoRL-based Tuning
c. Scalability 1. Handling larger datasets/online data 2. Training - Time/Compute	c. Rapid evolution of formal libraries, offering enhanced plug-n-play functionalities. 1. Richer/Refined Data Sources 2. Matured GPU-enabled training infrastructure for RecSim.



**Thanks for
listening!**

Any Questions?

No?

SUPER!