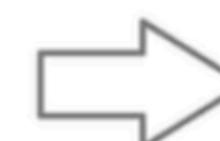
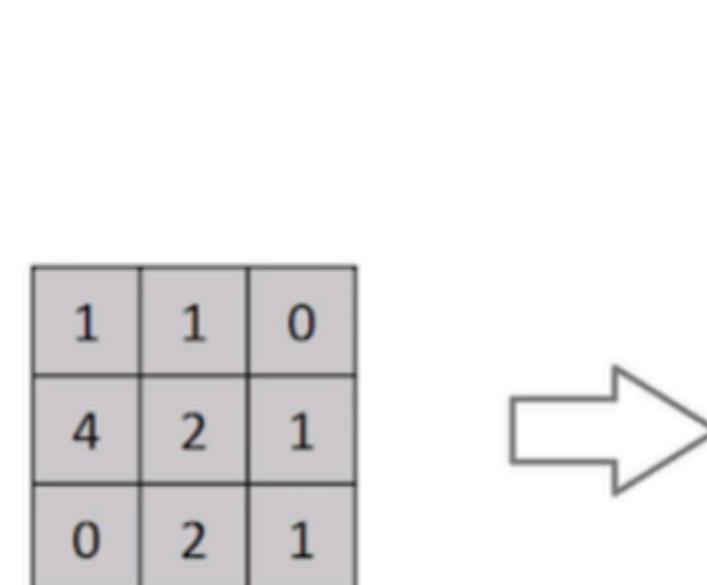


CNN based



1
1
0
4
2
1
0
2
1

JPG 260 X 194



260 X 194 X 3

8,11,0, 55,13,25,19

15,241,2,155,13,35,65

14,211,0,255,23,45,11

05,255,1,255,10,17,23

77,167,9,112,56,16,90

45,245,0,145,22,55,48



157	153	174	168	160	152	129	151	172	161	155	156
155	182	163	74	75	62	33	17	110	210	180	154
180	180	50	14	34	6	10	33	48	106	159	181
206	109	5	124	131	111	120	204	166	15	56	180
194	68	137	251	237	239	239	228	227	87	71	201
172	106	207	233	233	214	220	239	228	98	74	206
188	88	179	209	185	215	211	158	139	75	20	169
189	97	165	84	10	168	134	11	31	62	22	148
199	168	191	193	158	227	178	143	182	106	36	190
205	174	195	252	236	231	149	178	228	43	95	234
190	216	116	149	236	187	86	150	79	38	218	241
190	224	147	108	227	210	127	102	36	101	255	224
190	214	173	66	103	143	96	50	2	109	249	215
187	196	235	75	1	81	47	0	6	217	255	211
183	202	237	146	0	0	12	108	200	138	243	236
195	206	123	207	177	121	123	200	175	13	96	218

classification

Lincoln

0.8

Washington

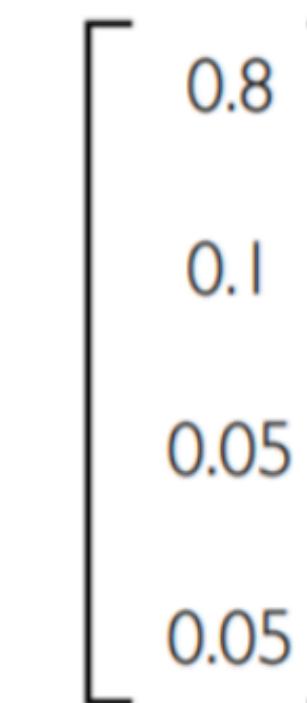
0.1

Jefferson

0.05

Obama

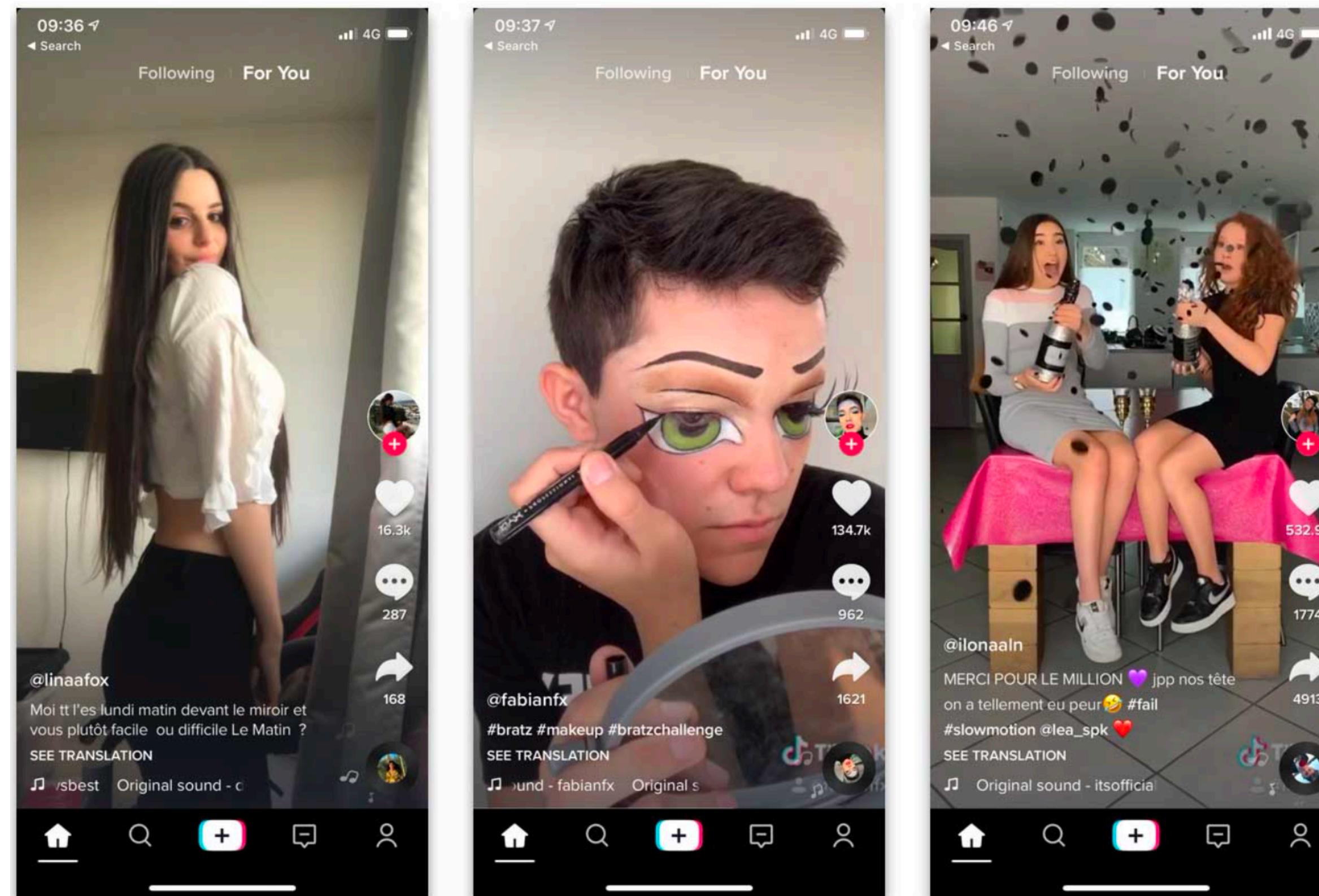
0.05



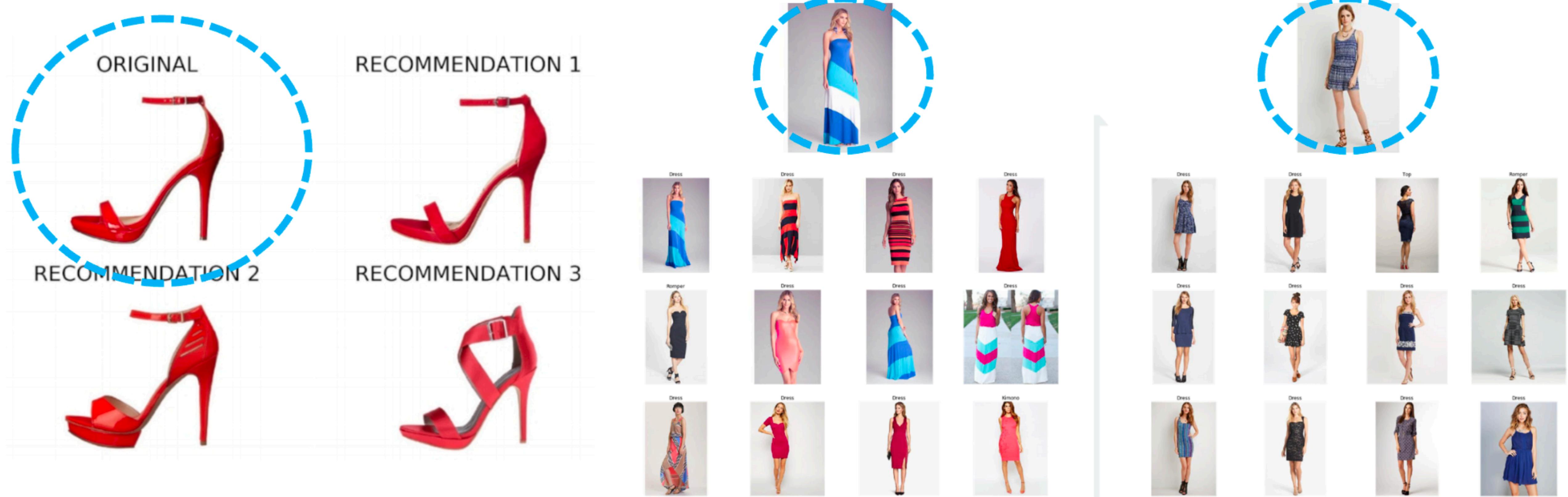
Pixel Representation

CNN based

- Feature Representation Learning with CNNs
- Integrating with CF or other paradigms



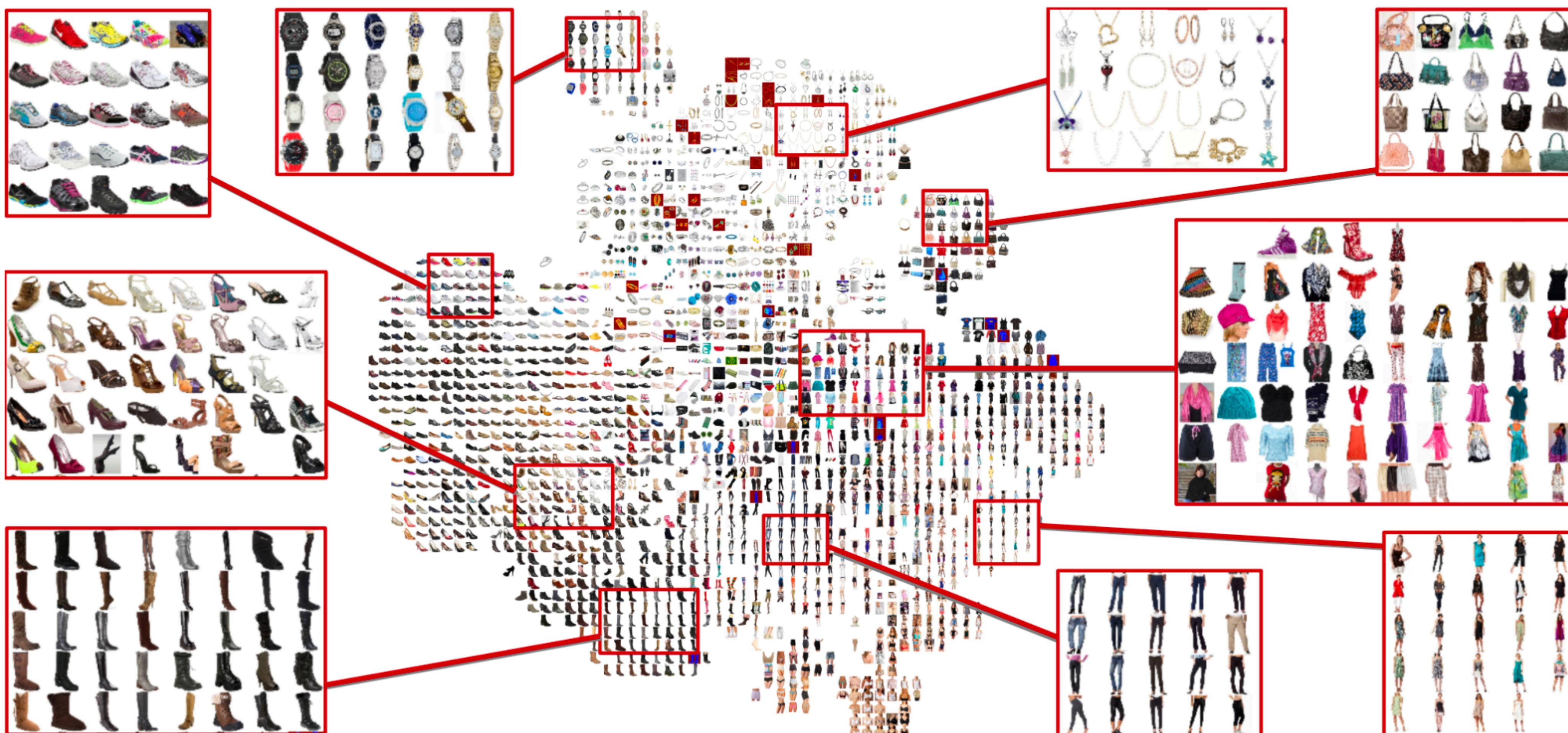
CNN based



CNN based VBPR

- Motivation: to incorporate the visual appearance of the items into the preference predictor
- Flow:
 - Incorporating visual features extracted from deep CNN neural network
 - Matrix Factorization approach that incorporates visual signals into predictors of people's opinions while scaling to large datasets.
 - Exploit Bayesian Personalized Ranking (BPR) based training procedure

CNN based VBPR

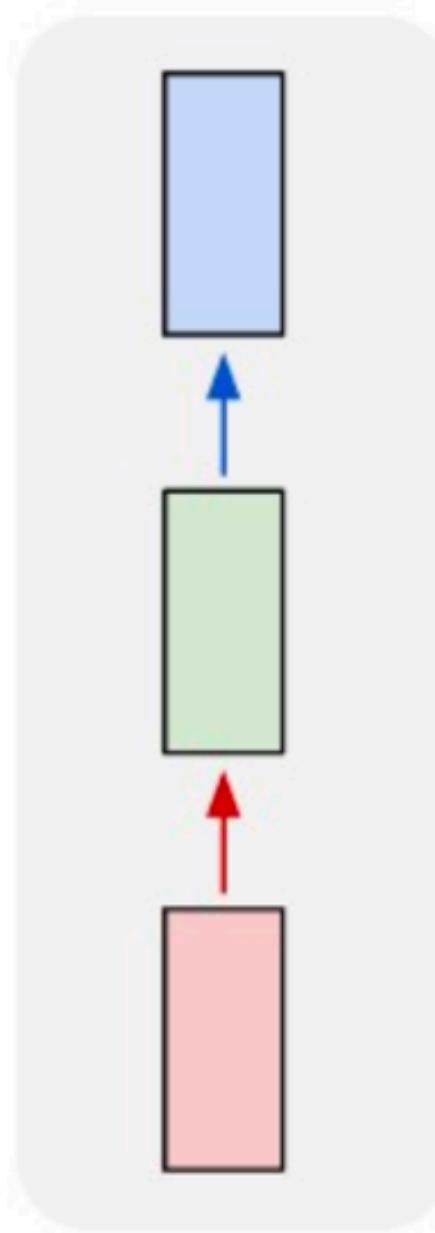


RNN based

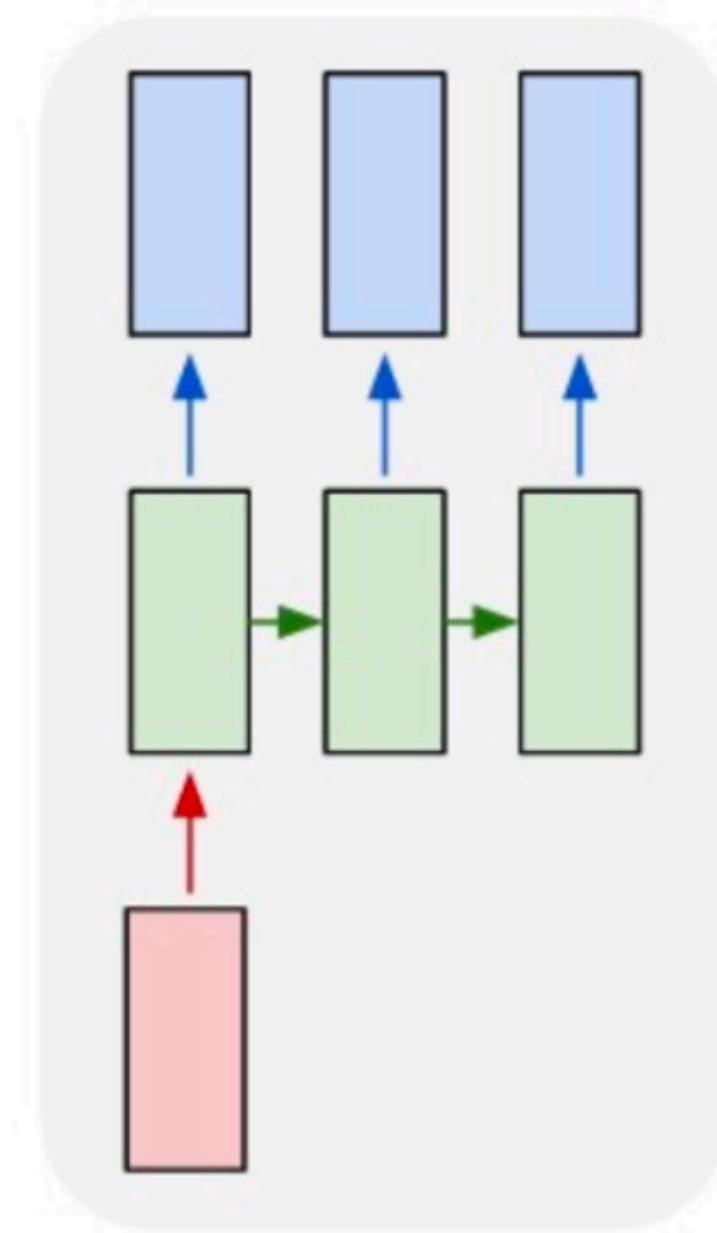
- We often wish to model data that is a sequence or trajectory through time
 - E.g., text (sequences of characters/words), audio signals, currency exchange rates, motion of a vehicle, stock market, climate etc.
- Applications: Sequential Recommendation, Machine Translation, Music Generation, Speech Recognition, Weather Forecast, etc.
- Other keywords: LTSM, GRU (e.g., GRU4Rec)

RNN based

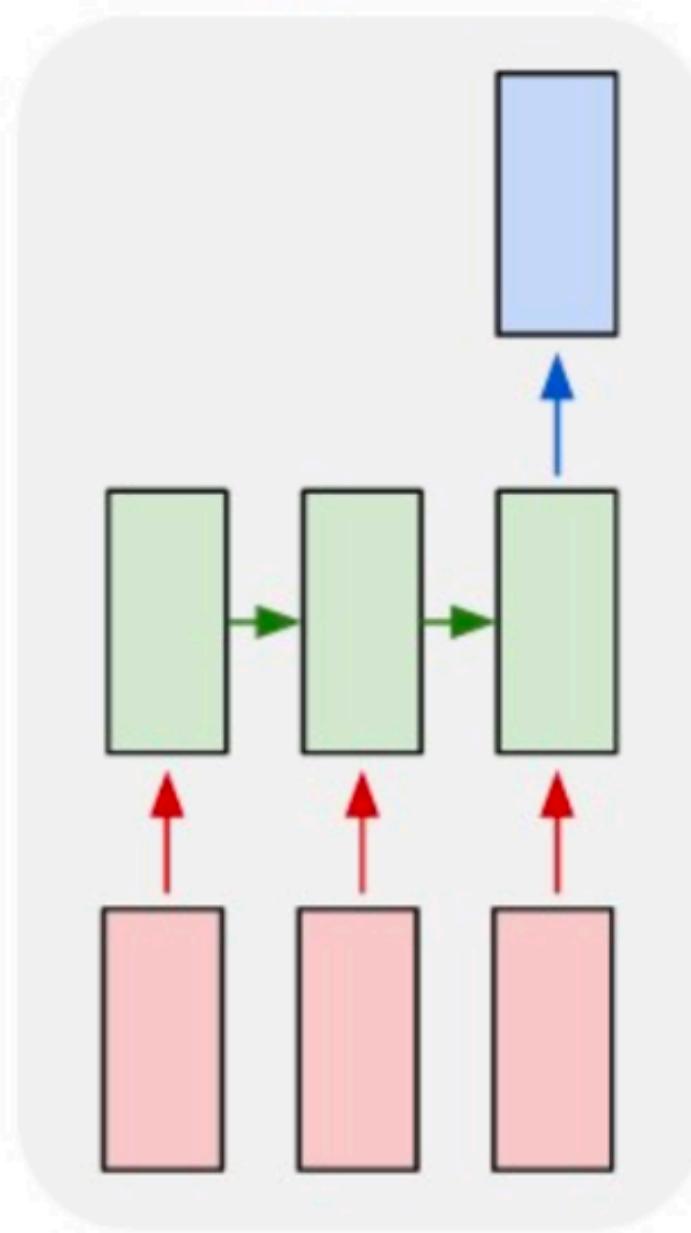
one to one



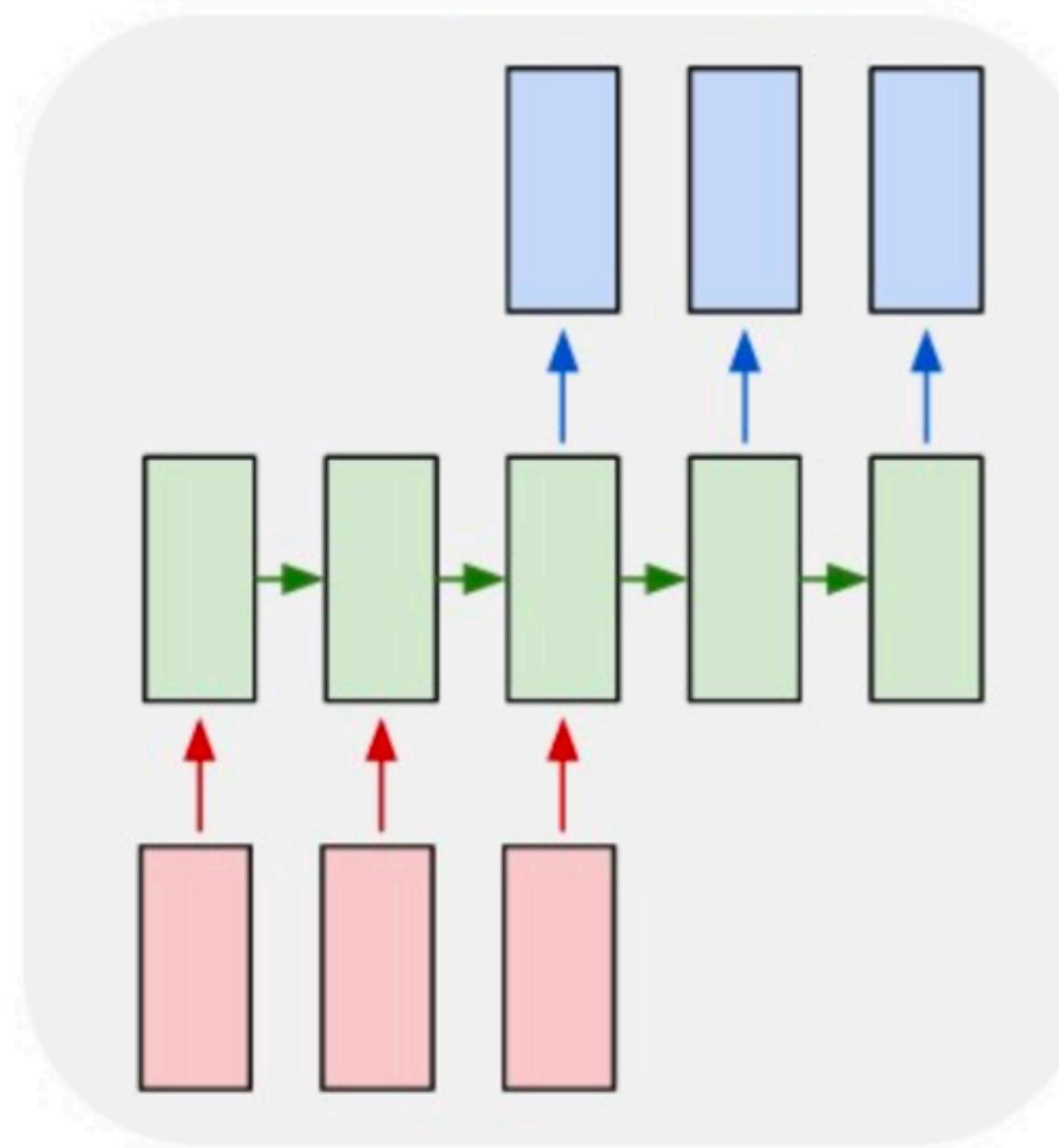
one to many



many to one



many to many



many to many

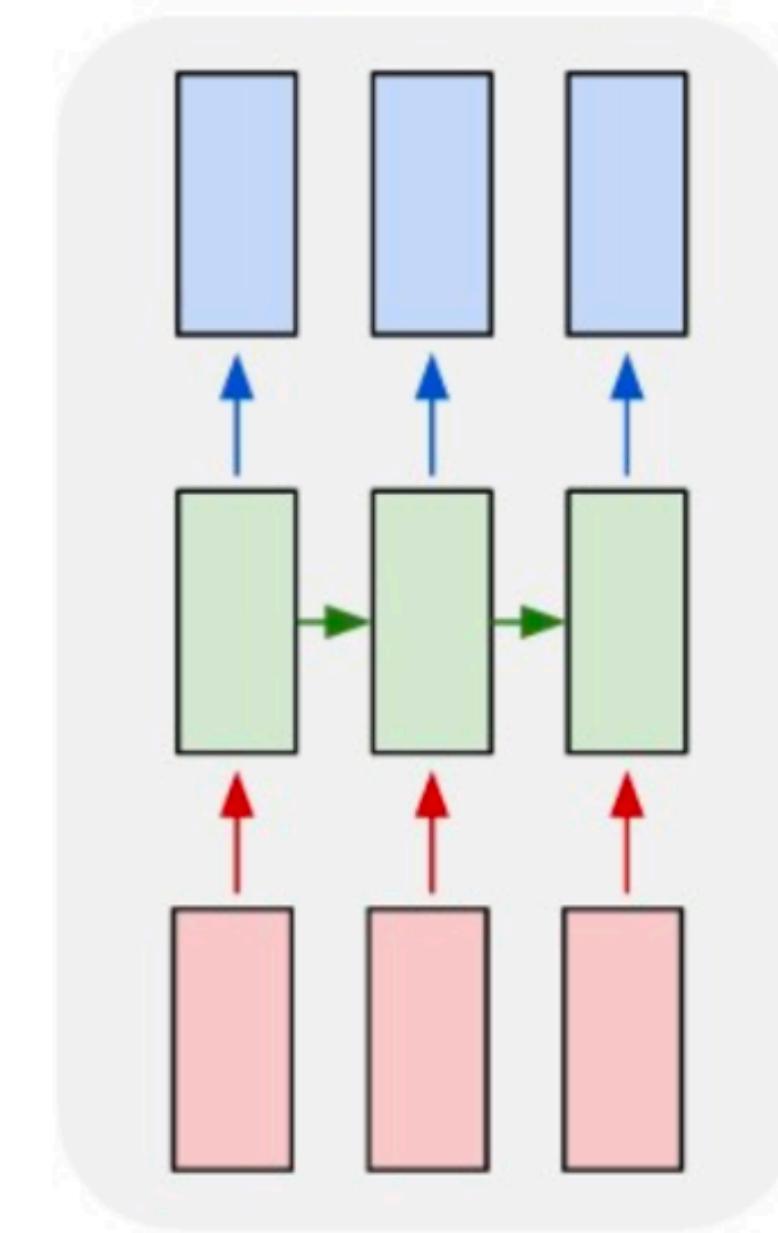


Image Classification

Image → Label

Image Captioning

Image → sequences of words

Video Processing (action recognition)

Sequence of video frames → Label

Machine Translation

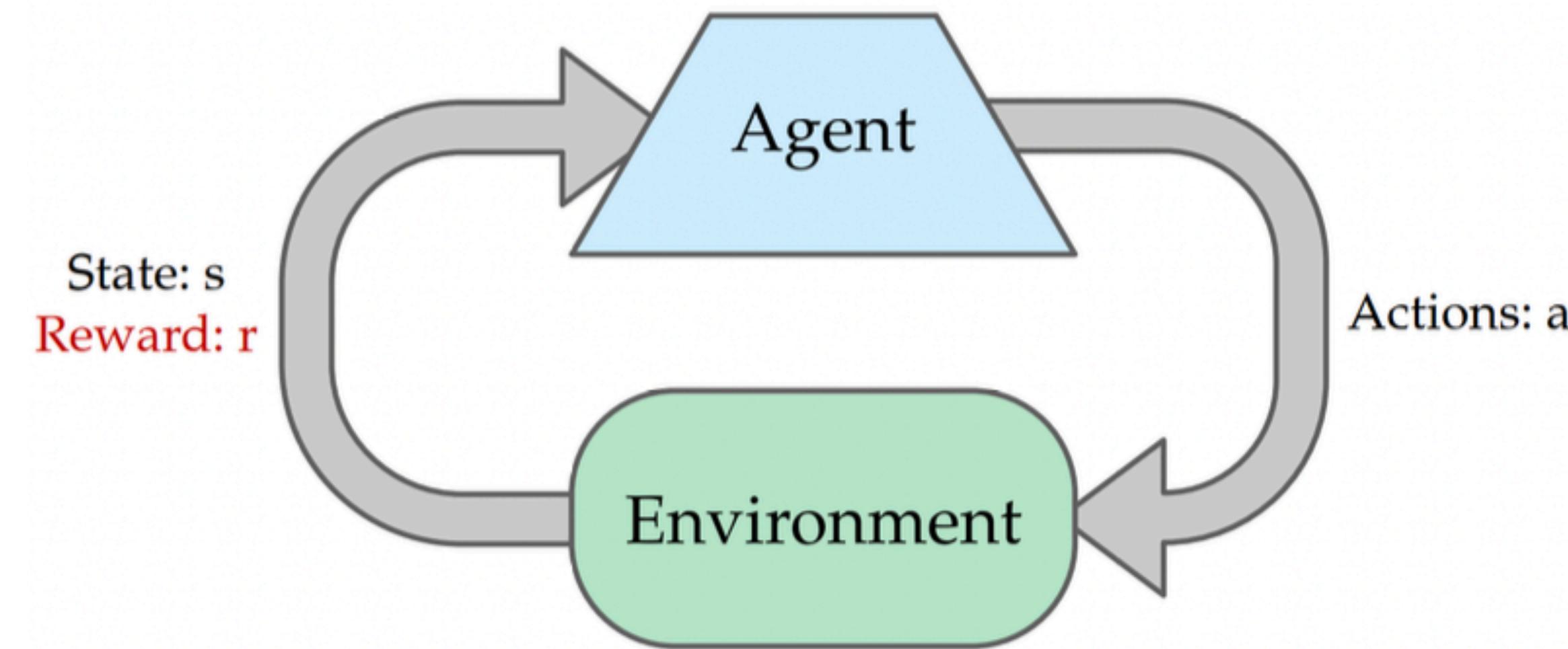
Sequences of words → Sequences of words

Pre-frame video classification

Sequences of images → Sequences of labels

Reinforcement Learning based

- Receive feedback in the form of rewards
- Agent's utility is defined by the reward function
- Must (learn to) act so as to maximize expected rewards
- All learning is based on observed samples of outcomes

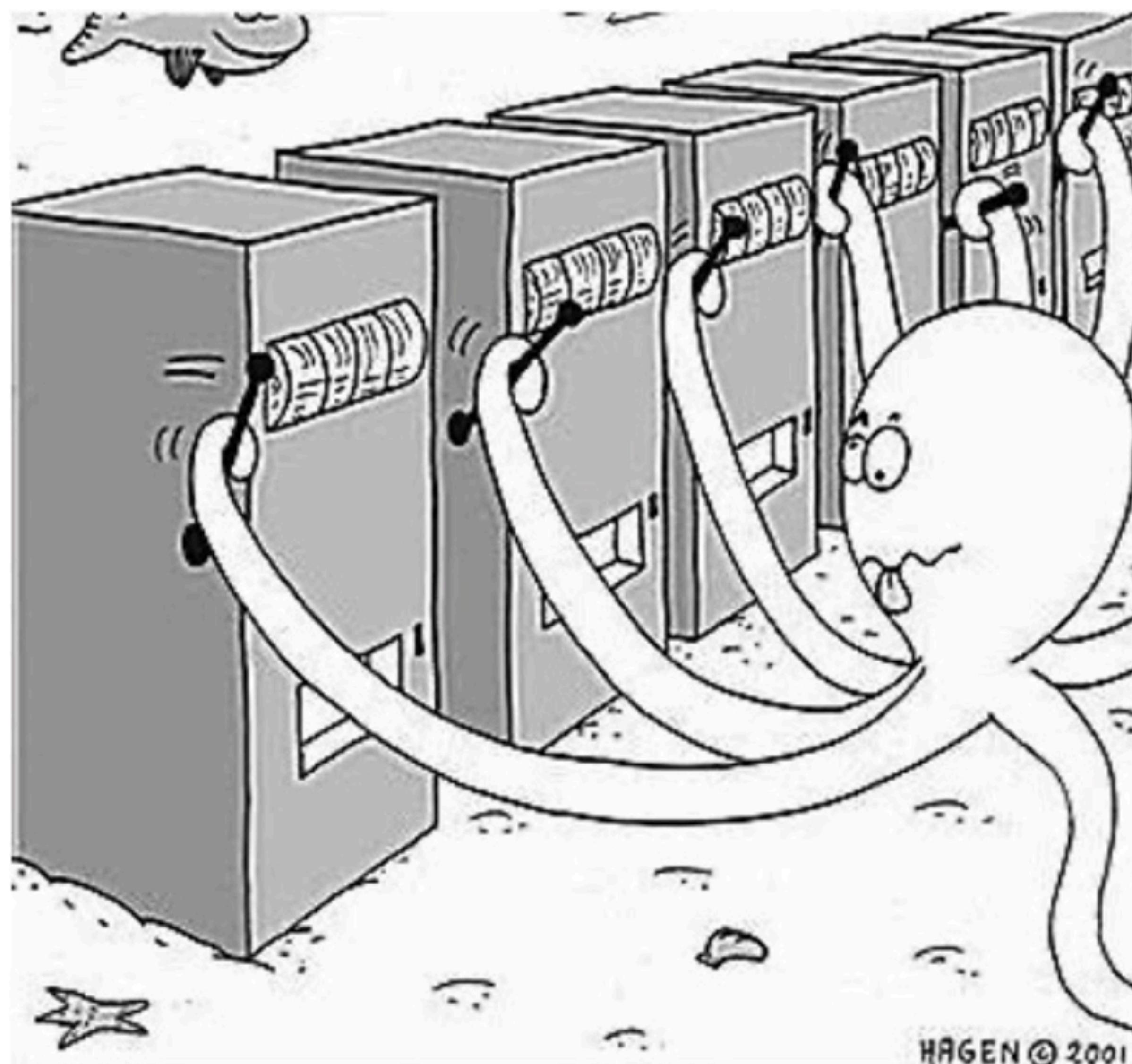


Reinforcement Learning based

- Exploration: you have to try unknown actions to get information
- Exploitation: eventually, you have to use what you know
- Sampling: you may need to repeat many times to get
- Generalization: what you learn in one state may apply to others too

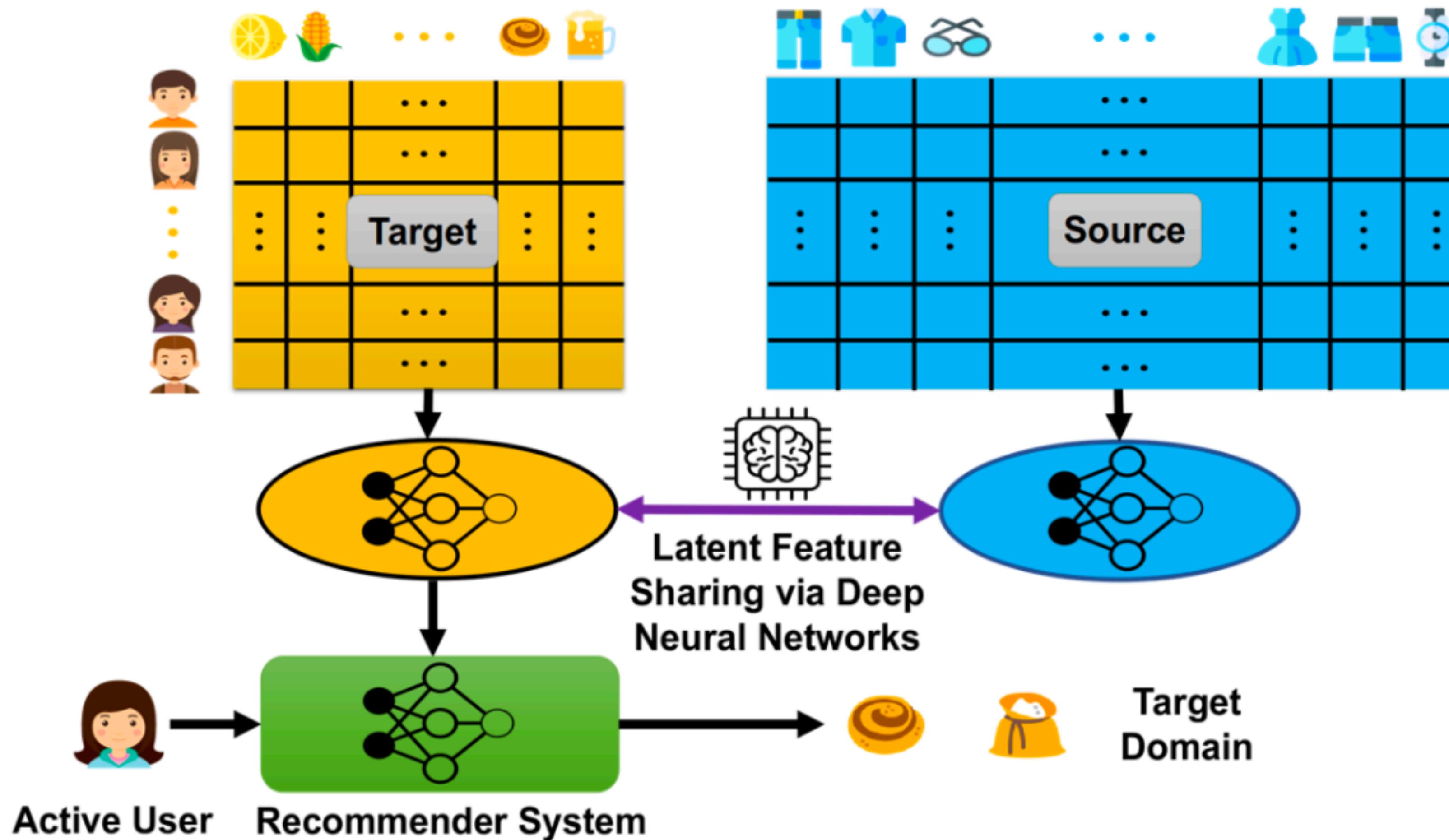


Multi-arm Bandit based



Others

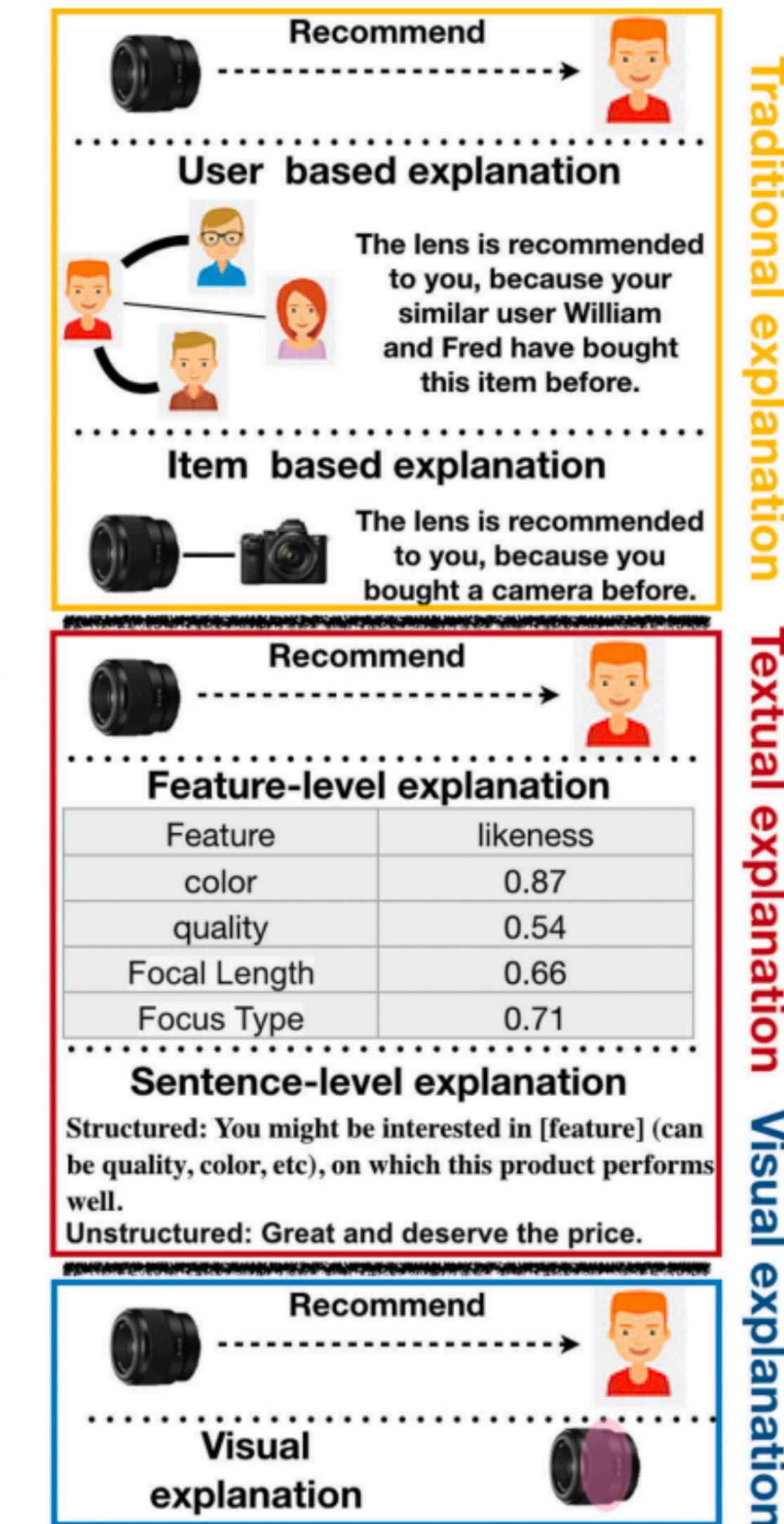
Transfer Learning



Others

Explainability

			Not a bad price and it works. Can't do much more than that. We'll see how long it takes me to wear it out.
			For the price, I would definitely buy again. It's sturdily constructed, bright, and feels good in hand.
			I love this camera. It is amazing. It gives professional quality. I am still learning all the excellent features. The more I learn, the better I love this camera.
			Love the watch, but the delivery was WAY after the original predicted date and that was disappointing since it was a prime item and should have been two day max.
			Continuously shuts down. Numerous errors and issues.
			Pretty good performance in night, especially when recording videos. Good choice for a starter.
			Great lens for its price sure it doesn't have phase detection but the a7ii has it built in and with the update the autofocus is pretty fast once you calibrate it to your camera
			I have been wanting a new camera for years. This one is great for me
			This lens is great and perfectly functional. Be sure to take off both protective films from the front and back of the lens. The focus doesn't pull as cleanly as the canon brand 50mm but it is a perfect intermediate lens when you are on a budget.
			For the price, I would definitely buy again. It's sturdily constructed, bright, and feels good in hand.



Traditional explanation

Textual explanation

Visual explanation