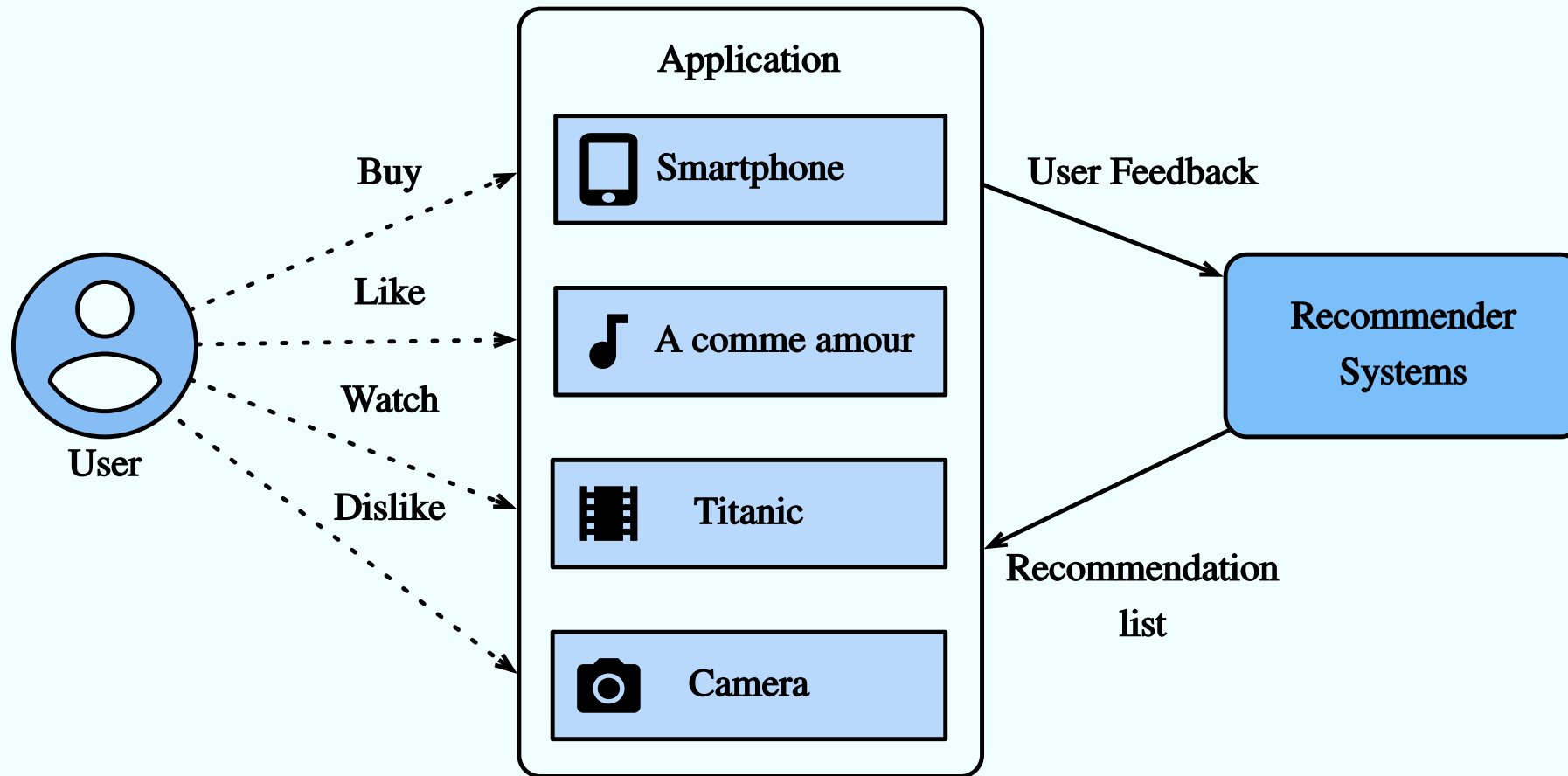




Lecture 7: Recommender systems

Leonid Sanochkin





Recommender systems

Content based methods

Define a model for user-item interactions where users and/or items representations are given (explicit features).

Collaborative filtering methods

Model based

Define a model for user-item interactions where users and items representations have to be learned from interactions matrix.


























Memory based

Define no model for user-item interactions and rely on similarities between users or items in terms of observed interactions.

Hybrid methods

Mix content based and collaborative filtering approaches.

Collaborative Filtering

	Item ₁	Item ₂	Item _j	Item _m
User ₁					
User ₂					
.					
User _i					
User _m					

User-item rating matrix

CF
Model

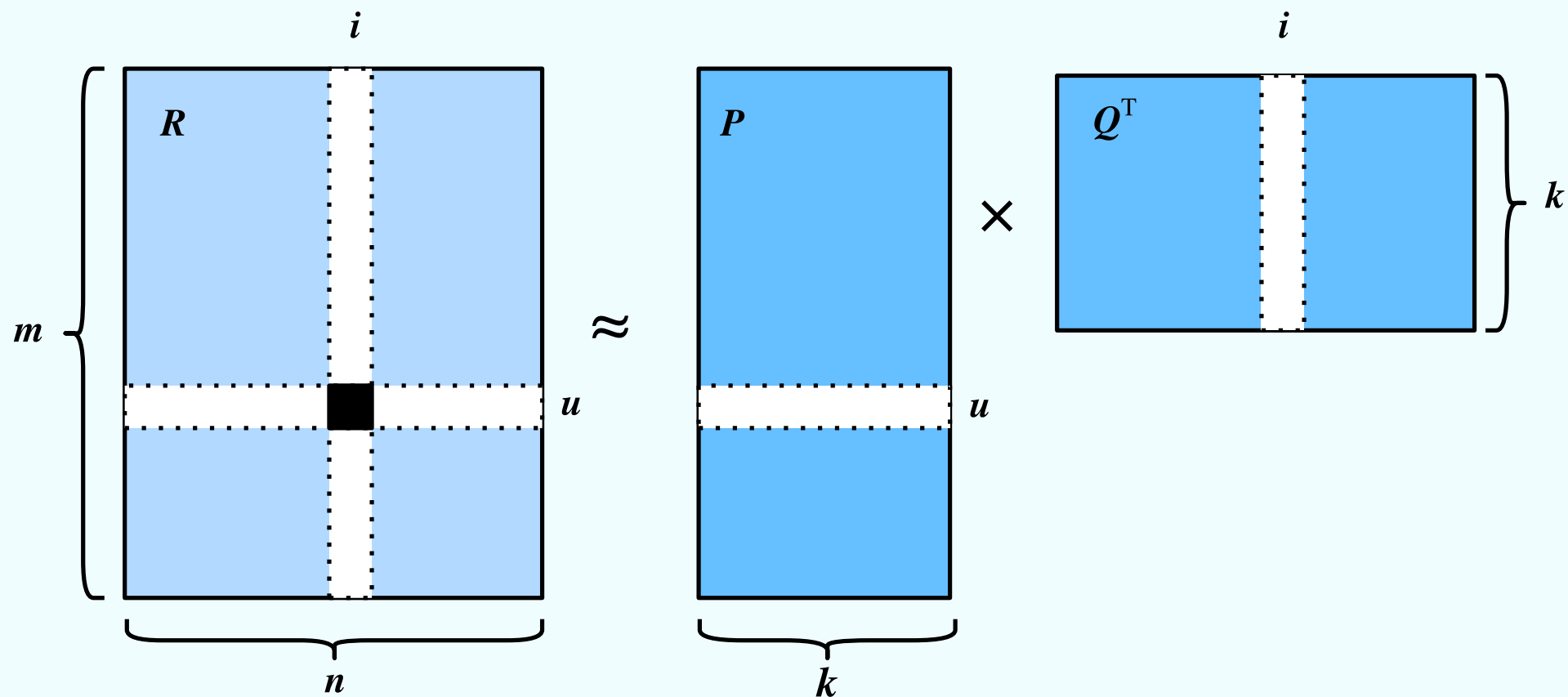
Prediction on item j for
user i (active user)

Prediction

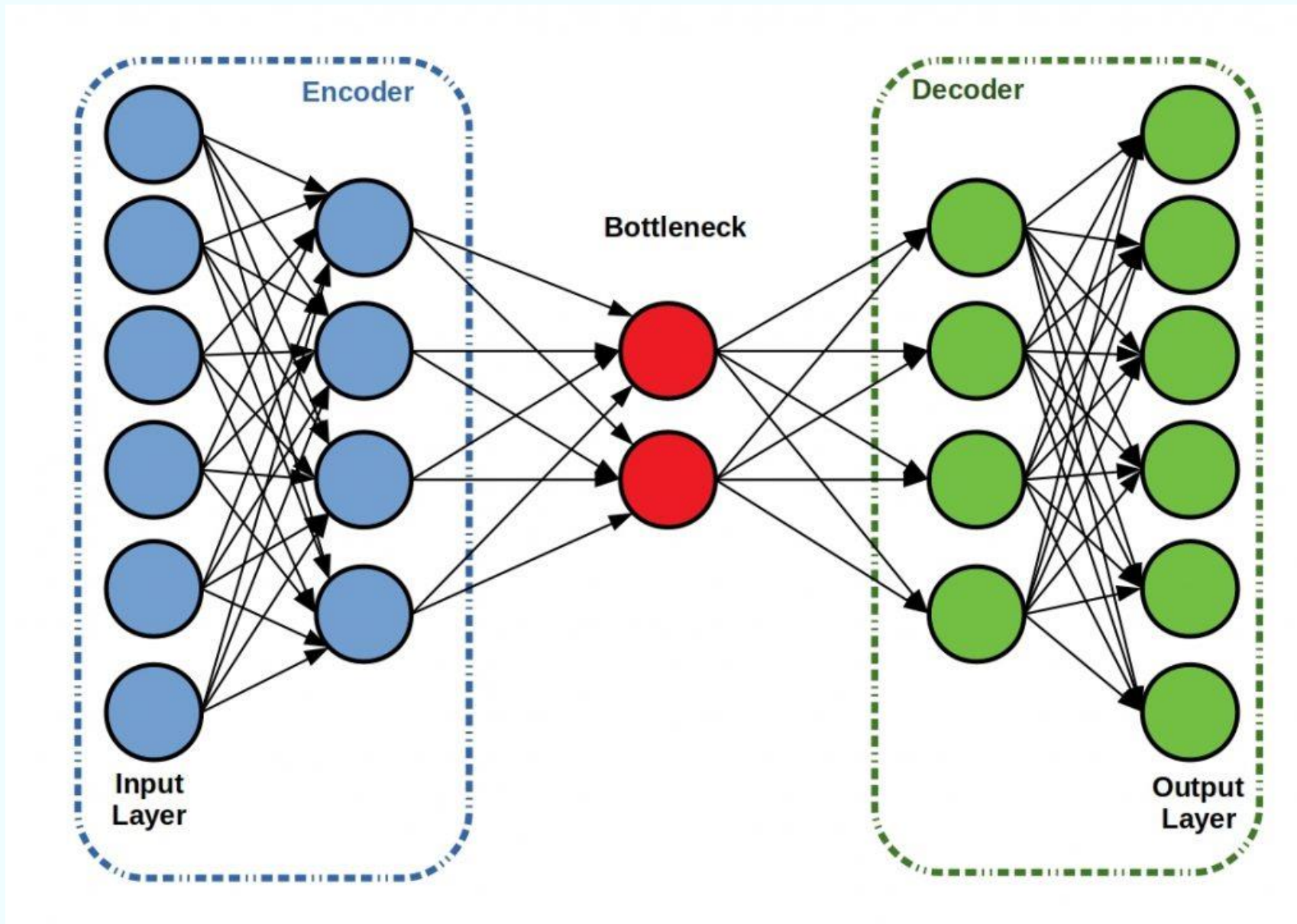
Recommendation

Top N list of items for user I
(active user)

Matrix factorization



Autoencoder



Common quality metrics

- Ratings accuracy
 - MAE, MSE
- Event quality
 - F-score, ROC-AUC, PR-AUC
 - precision@k, recall@k
- Ranking quality

- $DCG@k(u) = \sum_{p=1}^k \frac{rel(i,p)}{\log(p+1)}$
 - $nDCG@k(u) = \frac{DCG@k(u)}{\max(DCG@k(u))}$



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