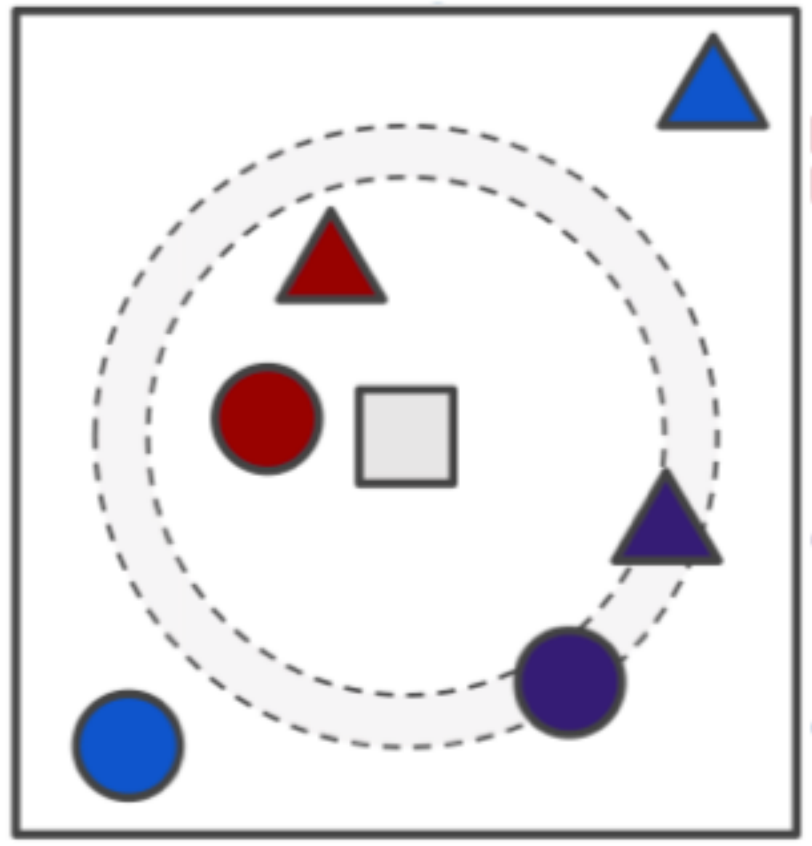
Proposed Method

Metric Learning with Interest Sustainability Score



(b) CRIS^{reg}

- Incorporate the ISS in the above metric learning framework to consider how users' interest in each item will sustain in the future.
- The underlying idea is pull items with high ISS to users and to push items with low ISS from users.
- Design a ISS-based objective L_S with continuous labels (p_i):
  - $L_S(u, i^+, i^-) = \{(d(\mathbf{u}, \mathbf{i}^+) - d(\mathbf{u}, \mathbf{i}^-)) - (p_{i^-} - p_{i^+})\}^2$
- The goal of L_S is to arrange item i^+ and i^- by according to the difference of their ISSs ($p_{i^-} - p_{i^+}$).
- For example, if $p_{i^-} - p_{i^+} < 0$, the objective makes the positive item will be closer to the user than the negative item by $|p_{i^-} - p_{i^+}|$.

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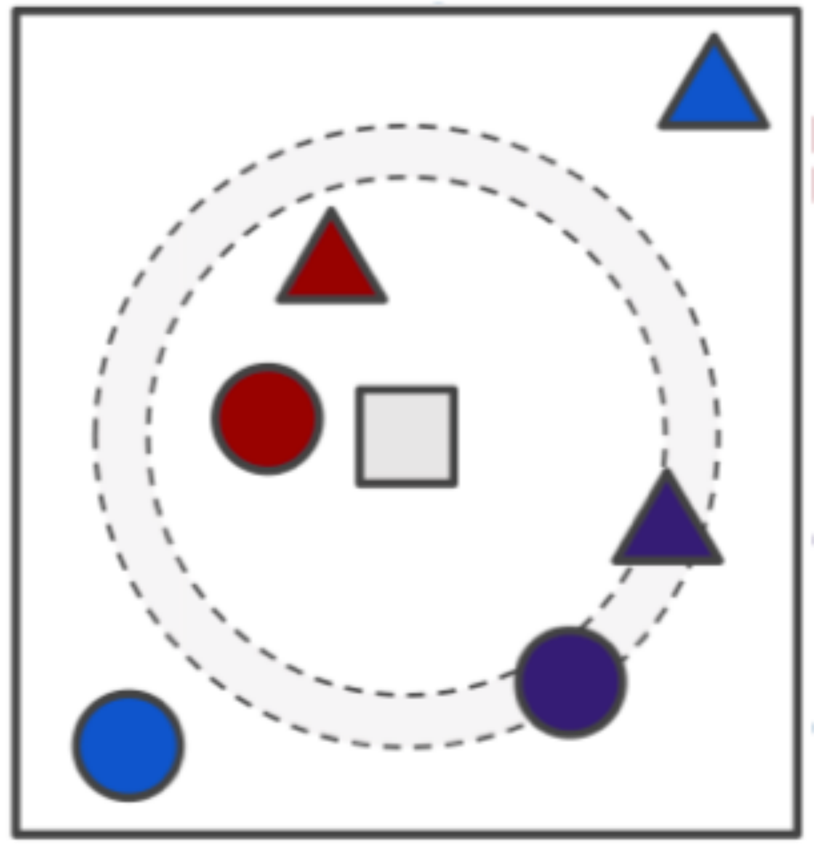

(b) CRIS^{reg}

- The final loss is a linear combination of both objectives:
  - $$L = \sum_{(u,i^+) \in P} \sum_{(u,i^-) \notin P} L_C(u, i^+, i^-) + \lambda L_S(u, i^+, i^-)$$
  - P: set of user-item interactions, λ: balancing coefficient,
    L_S: regularization on metric learning framework.

- Given the combination of both objectives, the metric learning method can build a representation space with considering both whether users liked items (by L_C) and how users' interest in the items sustain in the future (by L_S), name this method as CRIS^{reg}