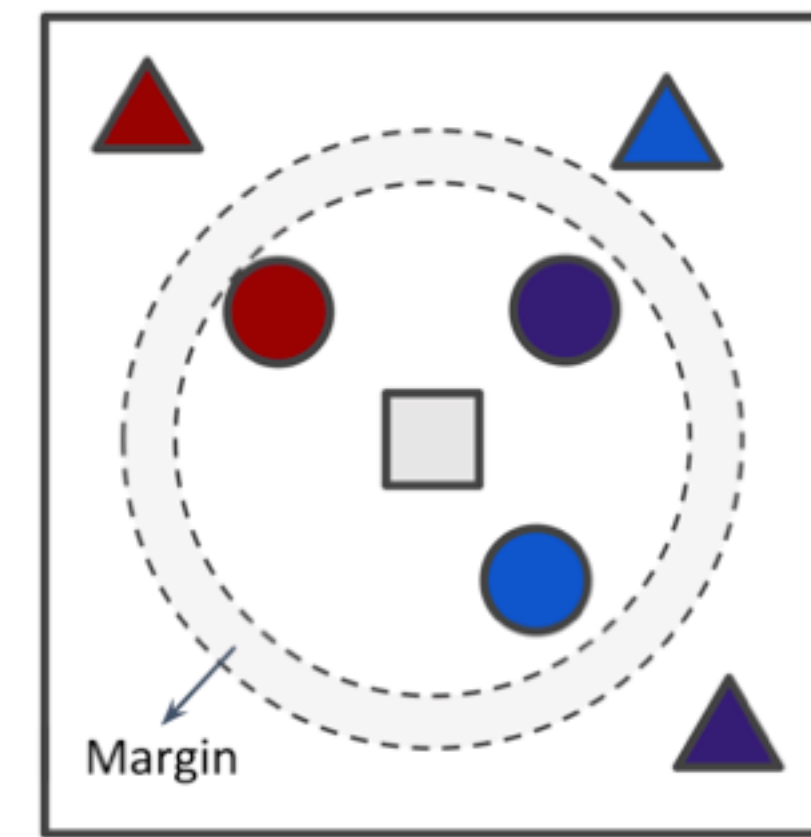


Proposed Method

Metric Learning with Interest Sustainability Score

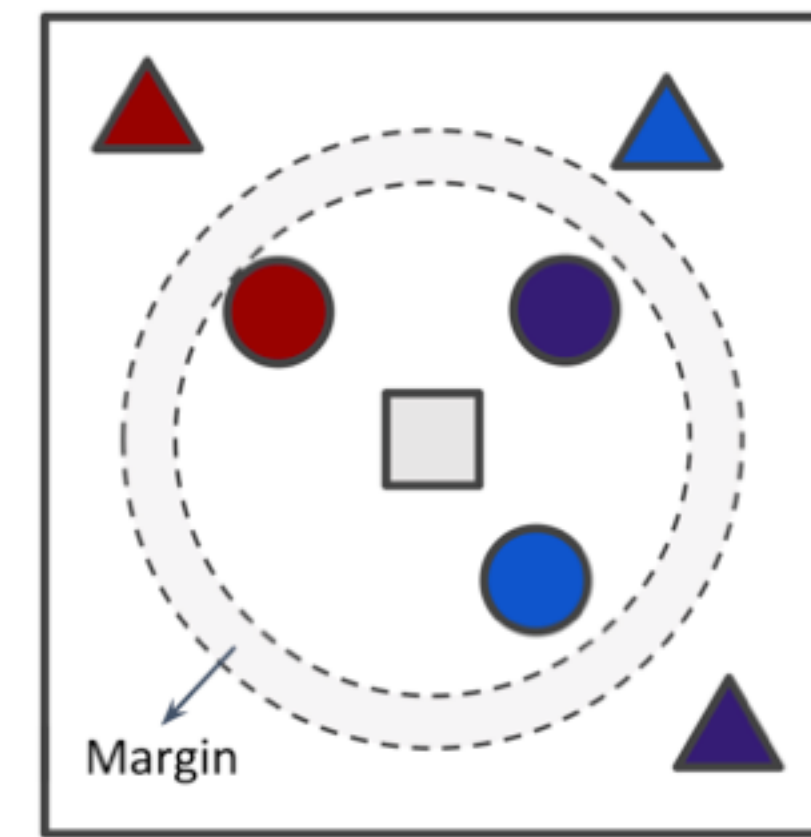


(a) CML

- Task: recommendation with the ISS p_i to model how users' interest in each item will sustain in the future.
- The basis of the proposed recommender system is a metric learning framework, which makes users closer to items consumed by them (positive items) than items not consumed by them (negative items) as shown in Fig.4a.
- Consumption-based objective L_C defined as follows:
 - $L_C(u, i^+, i^-) = [m + d(\mathbf{u}, \mathbf{i}^+) - d(\mathbf{u}, \mathbf{i}^-)]_+$
 - $[x]_+ = \max(x, 0)$, $\mathbf{u}, \mathbf{i}^+, \mathbf{i}^- \in \mathbb{R}^K$: embedding vectors of user, positive / negative item

Proposed Method

Metric Learning with Interest Sustainability Score



(a) CML

- $L_C(u, i^+, i^-) = [m + d(\mathbf{u}, \mathbf{i}^+) - d(\mathbf{u}, \mathbf{i}^-)]_+$
- Used euclidean distance as a distance metric d .
- Margin $m \in \mathbb{R}_{>0}$ imposes u to be closer to i^+ than i^- by m in the representation space.
- Impose the space to be a unit sphere by normalizing the embedding vectors (e.g., $\mathbf{u} \leftarrow \mathbf{u} / \max(1, \|\mathbf{u}\|^2)$) for each epoch.