Proposed Method

Interest Sustainability Prediction

- Train a parameterized model M under a supervised-learning framework with binary cross entropy loss:
  - $L_{IS} = \sum_{i}^{|I|} y_i log(M(f_i; \theta)) + (1 - y_i) log(1 - M(f_i; \theta))$
  - θ: model parameters
  - f_i: feature representation of item i
- ISS is defined by the output of the trained model:
  - $p_i = M(f_i; \theta)$
  - $p_i \in \mathbb{R}$: ISS of item i in the form of probability.

Proposed Method

Interest Sustainability Prediction - Predictive Model and Feature

- Given the classification problem, introduce f_i, M as shown in Fig.2.
- Intuitively, the consumption pattern of an item over time will be an important clue in determine consumed in the feature.
- To model the consumption patterns of items over time, we represent the timestamps at which an item was consumed as frequency bins:
  - item : $[t_1, t_2, \cdots, t_N] \xrightarrow{Binning} [b_1, b_2, \cdots, b_B]$
  - t_j : j-th timestamp at which an item was consumed
  - N: number of consumptions of the item in D_f

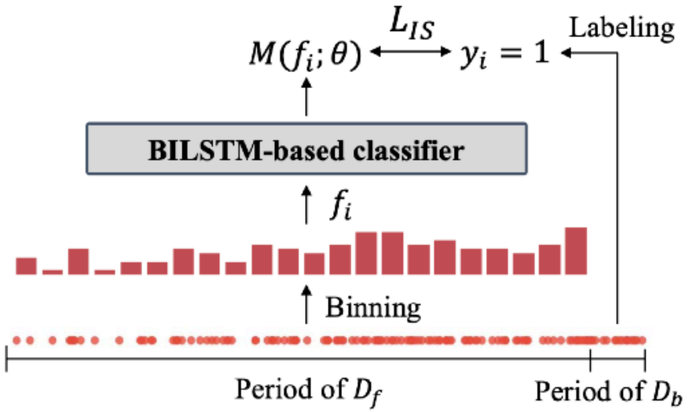

Fig. 2: Training process of a propose classifier on the interest sustainability prediction.

- b_k: number of times an item was consumed in the period of k-th frequency bin
- B: number of bins where $N \gg B$