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Collective Memory Recall Dynamics on Wikipedia

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Extended Abstract

Motivation. Collective memory refers to how past events and individuals are remembered and shared within a society [1]. While many events follow a continuous decay, some individuals are recurrently recalled due to social triggers or anniversaries. Understanding the mechanisms behind such recall dynamics is important for clarifying how social attention evolves in complex information environments. Previous works have modeled collective memory decay using mathematical models [2,3], showing that attention often follows exponential or power-law decay patterns. However, less is known about why some memories are repeatedly recalled while others simply fade away.

Approach and Methodology. Recent availability of large-scale digital trace data makes it possible to analyze collective memory quantitatively. Wikipedia pageviews provide a useful proxy for public attention, allowing us to study temporal patterns of memory at large scale. Here we analyzed English Wikipedia pageviews corresponding to individuals who passed away between 2015 and 2020. After preprocessing, we obtained more than 8,000 individuals, and fitted a two-phase decay model [4], $S(t) = C_1 e^{-\beta t} + C_2 t^{-\alpha}$, where t is the days since the peak. We estimated parameters $(C_1, \beta, C_2, \alpha)$ using a Markov Chain Monte Carlo method and then classified the parameters by K-means clustering ($K = 2$).
To investigate the mechanism of recall, we further analyzed structural and behavioral features related to each Wikipedia page, including number of editors and links as well as gender of individuals. These features were used as proxies for the underlying network structure and user activity associated with each page.

Results. The K-means clustering successfully distinguished two groups (Fig. 1): Cluster 1 (recall group, $n = 400$) and Cluster 2 (decay group, $n = 7957$), as summarized in Table 1. Recalled individuals (Cluster 1) exhibited significantly smaller decay parameters, indicating slower forgetting and sustained interest. Analysis of editing behavior showed that recall group pages were edited by more distinct editors compared to the decay group. Assuming that sustained editing activity reflects user engagement, this suggests that recalled individuals are supported by a more dedicated fan base. Additionally, recalled individuals were more connected in the information network, having significantly higher numbers of internal Wikipedia links and external reference links.
These results suggest that recurrent recall is associated with richer network connectivity and stronger user engagement. From a network science perspective, recall dynamics may emerge from interactions between users and information structures, where highly connected nodes and active user communities sustain long-term attention.

Conclusions and Outlook. Our findings demonstrate that collective memory for individuals can be mathematically classified into distinct decay and recall patterns. Recurrent recall is strongly associated with dedicated fan activity and network connectivity rather than demographic factors like gender. By the time of the conference, we aim to complete additional studies exploring the "contagion" of recall patterns—analyzing how the recall of one individual triggers the recall of another through hyperlink structure.

References

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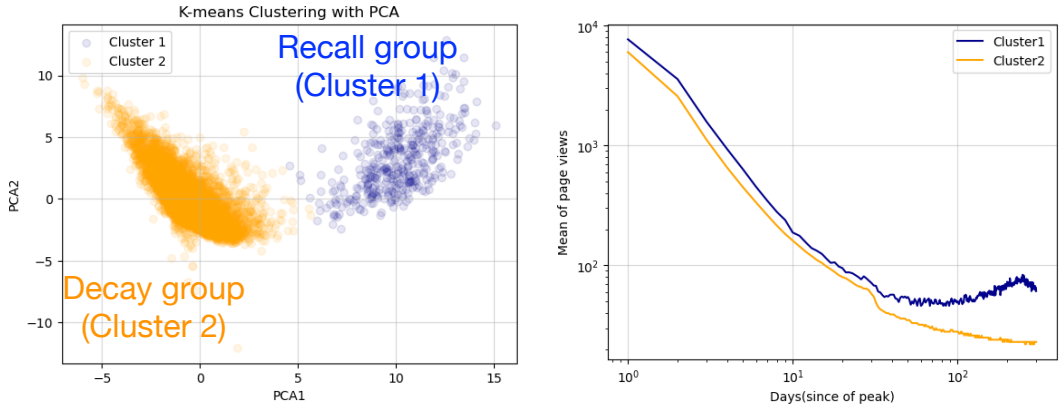

Figure 1. **Recall (Cluster 1) and decay (Cluster 2) trends.** (left) K-means clustering by parameters. (right) Median pageview trends for Cluster 1 and Cluster 2 over 300 days.

Table 1. **K-means clustering features.** Eigenvectors for the principal component analysis (PCA) corresponding to Fig. 1.

	C_1	β	C_1	α
PCA 1	−0.193	−0.062	−0.372	−0.906
PCA 2	0.700	0.047	0.593	−0.395