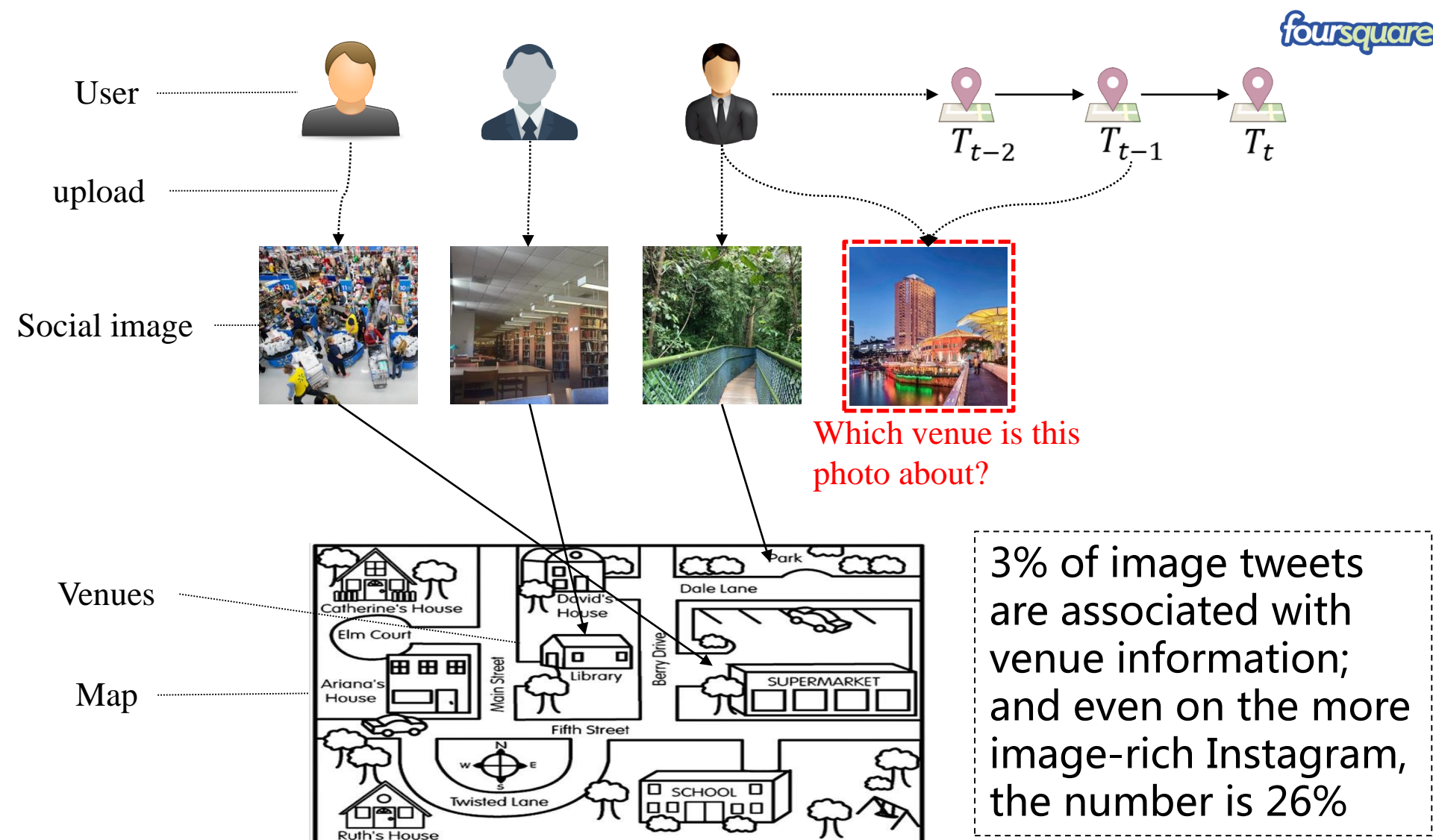


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Task: Venue Prediction

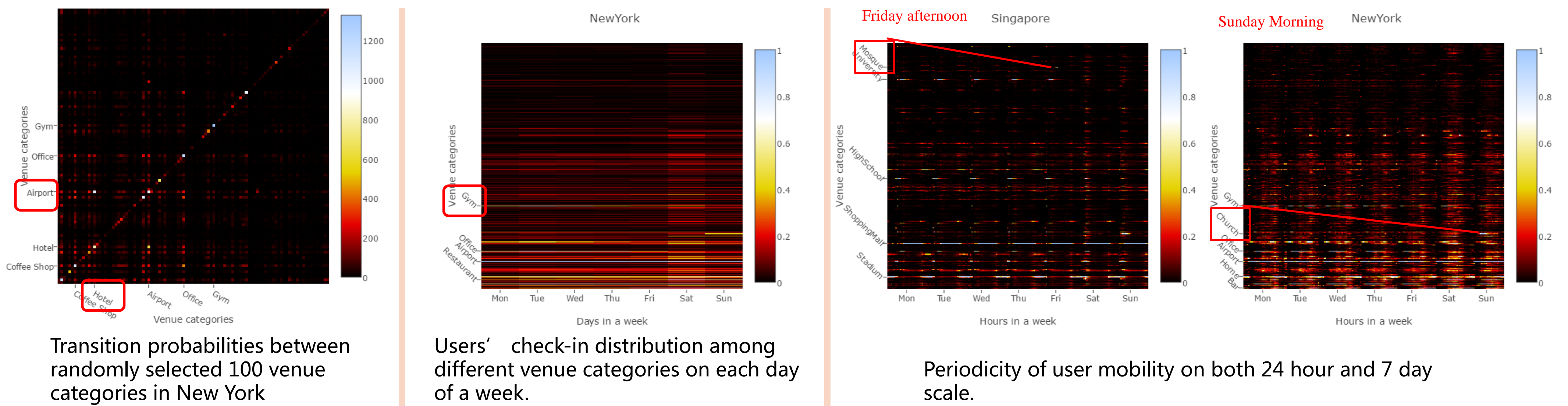


Challenges

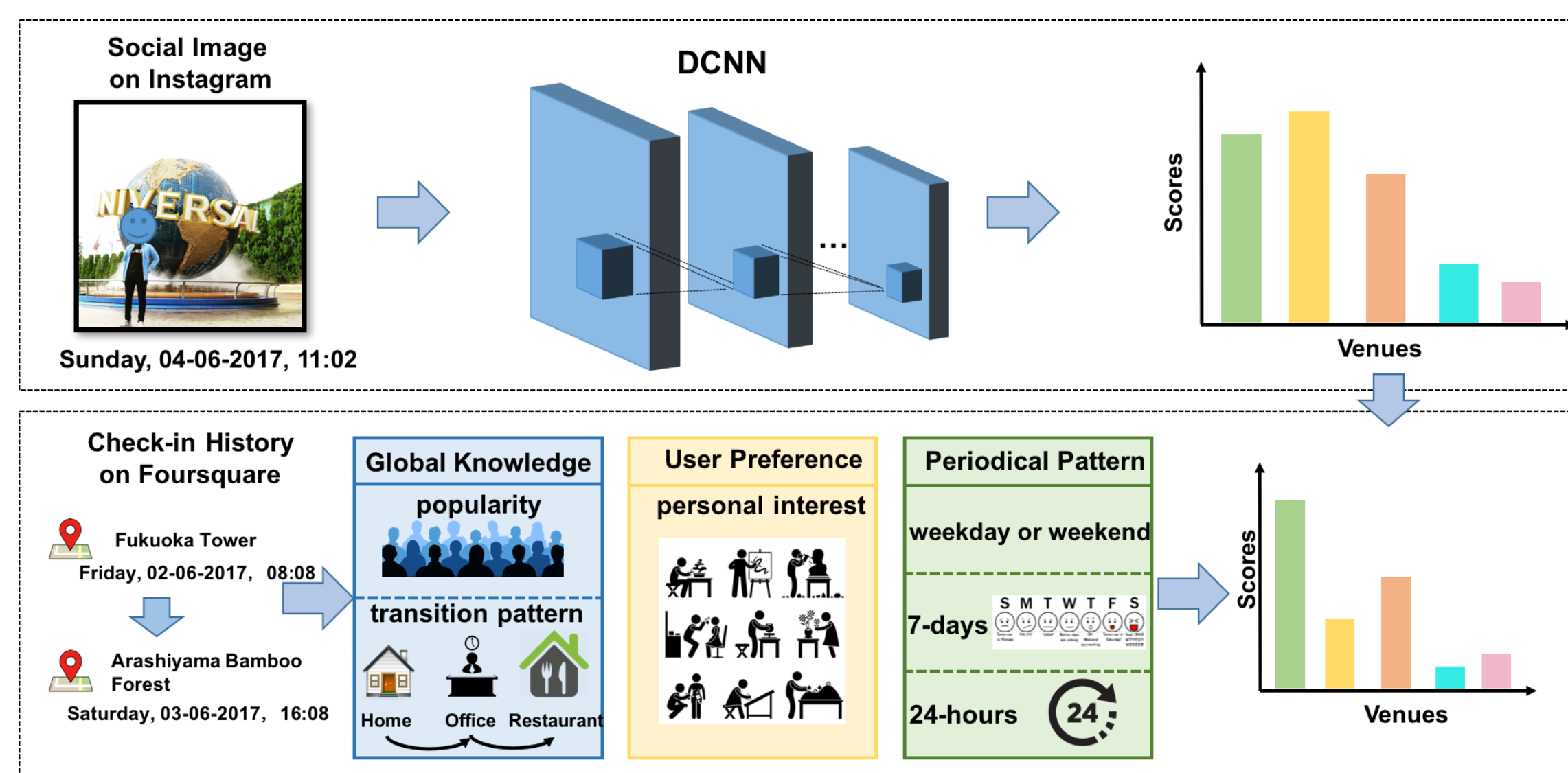


- The top three images have different venue tags but very similar visual content.
- The bottom three images have the same venue tag but very different visual appearance.

Statistics on Transition Patterns and Temporal Patterns



Model



$$p(l_u^{n_u+1} | S_u, i_u^{n_u+1}) = p(l_u^{n_u+1} | S_u, i_u^{n_u+1}, c_u^{n_u+1}) \cdot p(c_u^{n_u+1} | S_u, i_u^{n_u+1})$$

First predict venue category
Then predict specific venue

We model many feature interactions such as:

<user, venue category>
 <time, venue category>
 <last check-in, next check-in>

- The model considers:
- Popularity of venue categories or venues
 - User's personal interest
 - Correlation with user's last check-in
 - Visual content
 - Periodical patterns

Conclusions

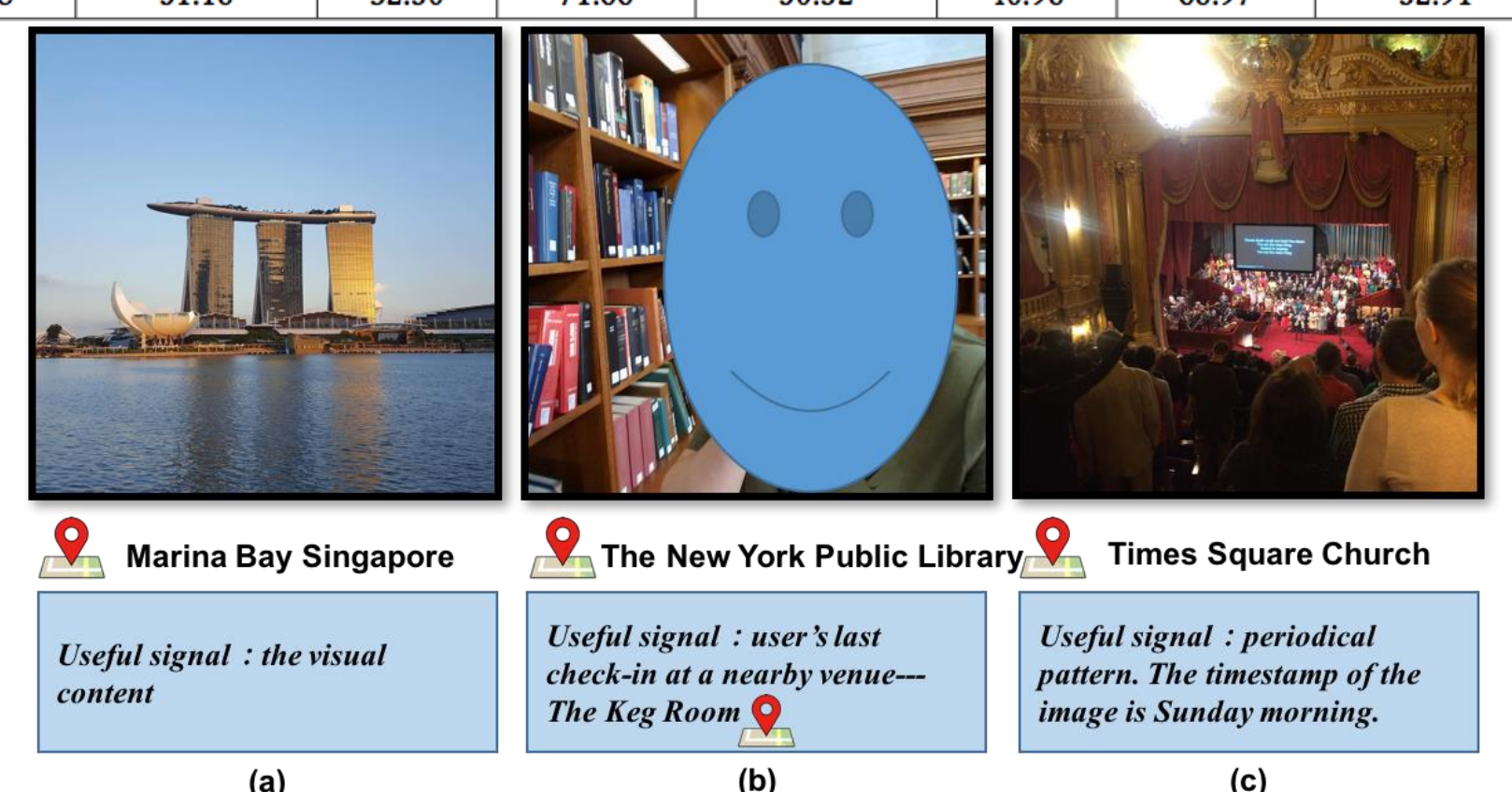
We studied the novel problem of specific venue prediction of social images. We developed a generic embedding model based on matrix factorization to capture the interactions between visual content and temporal patterns.

We highlight two qualitative insights gained from this work.

- It is promising to exploit the venue category information for location-related tasks.
- Transition patterns and periodical patterns are strong signals in predicting users' movements and activities.

In future, we plan to investigate the effect of GPS information for venue prediction of multimedia content.

Illustration of prediction results. They respectively justify the importance of visual content, transition patterns on successive check-ins, and periodical patterns.



Method	London			Singapore			NewYork		
	Top-1(%)	Top-10(%)	NDCG-10(%)	Top-1(%)	Top-10(%)	NDCG-10(%)	Top-1(%)	Top-10(%)	NDCG-10(%)
VenuePop	8.25	25.31	15.95	13.38	39.35	25.04	11.03	25.79	17.26
ContentBased	11.01	39.09	23.01	12.76	41.29	24.86	10.07	37.72	21.86
NearestNeigh	28.71	49.48	38.29	19.13	41.59	29.14	27.72	46.60	36.52
FPMC-LR	35.21	63.81	48.68	31.27	69.60	48.84	38.99	65.25	51.08
MFTP	38.25	65.98	51.16	32.50	71.66	50.52	40.96	66.97	52.91