

Data-Based Promotion of Tourist Events with Minimal Operational Impact

Srikanth Tamilselvam, Biplav Srivastava,
Vishalaksh Aggarwal
IBM Research

Abstract

We demonstrate a family of novel, standards-based, online applications for promoting tourist events with minimal operational impact using AI methods. The solution offers benefits to citizens, travelers, city managers and businesses and can be rolled out to cities around the world.

1 Introduction

Tourism promotion is a key function of modern cities to grow economic activities and increase job opportunities. But when not planned well, the upside comes at the cost of increased traffic jams, crime and environment degradation, that can impact future growth. Humans are social beings and it is their social need to meet which provides the context for many of the spurt in activities seen in a city - i.e., shopping festivals, concerts, sporting matches, rallies. The social rendezvous needs are represented as human-level events, and are published and advertised by governments, businesses and citizens in print and digital media to be discovered by others. City governments today may record some of these human-level events but not all. Today, these human-level events are hard to search and rarely used systematically for city management - e.g., handle traffic situations, preempt public safety risks. The focus in city management has rather been on operational events like detecting and handling an accident or traffic jam in isolation of the social context.

Our approach is to provide a suite of novel, standards based, online and mobile applications that use AI-techniques to generate insights for promoting tourist events with minimal impact. It consists of three parts: (a) collecting human-level events and other data, (b) analyzing it for better promotion and impact assessment, and (c) disseminating insights to promote discovery by future travelers. We demonstrate two applications, Bharat Khoj (BK) and City Concierge (CC)¹, which are targeted for usage in India and Europe, respectively, with key features summarized in Table 1.

¹BK-W: <http://bharat-khoj-starter.mybluemix.net/>, BK-M: <https://play.google.com/store/apps/details?id=com.ibm.irl.bharatkhoj>; CC: https://www.youtube.com/watch?v=Clacz4s_nk.

2 Data Collection

Getting high-quality tourist-event data and operational data are crucial for our solution. In Europe, CitySDK² is a prominent standard for cities to disseminate data, including human events happening in cities, and is backed by EU. The data is in different languages and many cities support it (4 in 2014, 8 in 2016). Further, Open311³ is an emerging standard on how cities allow anyone to report civic maintenance issues electronically and is supported by tens of cities globally. We use both the standards for cities supported in CC.

For India, there is no prominent standard for either. However, government departments, private agencies and people frequently publish such information in newspapers and on digital media like websites. We support crowdsourcing in BK by providing a simple, secured, interface for anyone to post event information.

As future work, one could potentially learn events from postings in social media provided one can validate information accuracy and overcome redundancy [Ritter *et al.*, 2012].

3 Analytics

We use a slew of AI techniques on event data for new insights related to promoting tourism and understanding its impact.

Attendance Estimation

Attendance is an important attribute of any event which, if known accurately, can help organizers anticipate potential problem and provide ample time to manage pro-actively. It can also be used by potential visitors in making participation decision since some prefer company while others seclusion. However, attendance estimate may not be available for a new

²<http://www.citysdk.eu/>

³<http://open311.org/>

S.No.	Aspect	BK	CC
1	Event Ingestion	Crowd	CitySDK APIs
2	Promotion Anal.	Attendance Est.	Event comp.
3	Impact Anal.	Traffic Imp	Services clust., Open services
4	Standards Used		CitySDK, Open 311
5	Special feat.	Text-to-speech	Multi-lang. support
6	Apps on	Web, Mobile	Web

Table 1: Summary of Tourist Apps.

tourist event especially if there is no history or if it is happening at a new location or time of year. Prior work on estimation of event attendance are based on ticket sales and aerial scans. However, not much work have been done based on the analysis of online data.

We use historical data and similarity between event types, locations and times to arrive at an attendance estimate. In our approach, we extract event data from form fields and then using IBM Watson’s relationship extraction service[IBM, 2015], key parameters are found. For non-periodic events, similar events from its near by location around the same period from online sources available in both semi-structured data (DBPedia) and unstructured data (Google search) are crawled. If the event is periodic, we consider attendance data of previous event instances from online sources and extrapolate for the new instance. The system keeps a local repository of past event predictions and actual attendance, to reduce error over time.

Experience Index

Another novelty we provide is decision support on experience if one were to attend the event. This is useful to various stakeholders like for citizens in making participation decision, organizers in planning for human events in the context of (a) other human events or (b) operational events, authorities for handling operational events using the scope of human event(s).

Once an event is known, we try to estimate the experience of a participant for it based on where and when the event is happening, the capacity of the venue to conduct it and what other events are happening in close space and time proximity. For example, a city holding an event with expected attendees to resident ratio of 1:10 is more likely to hold it well than when it is 3:1. In general, this is a multi-faceted analysis involving factors like commuting, hotels, food services and crime. We use open data about city demographics and rules to make an experience estimation currently, and in future, propose to use a traffic simulator to augment the what-if analysis. The experience result is presented to the user in a simple color encoded format, where red color means bad experience, yellow means moderate and green means good experience, as shown in Figure 2. This abstracts the complexity of factors and is easy to understand.

Clustering City Services into Known Groups

There is a wide diversity in the number and type of interfaces cities support to provide (Open311) services information. For example, in 2014, Lisbon provided 70 services in Portuguese while Bonn had 8 services in German. To enable comparison, we identify specific groups that city services deal with: *health*, *traffic*, *building*, *cityimage* and *others*, and cluster a city’s services around them using their description in native languages. Thus, users only see services in familiar groups.

Comparing cities

We enable comparison of cities based on the number of tourist events happening in a city and the number of operational service requests that are outstanding. In Figure 1, CC is shown with a comparison of tourist events that someone may be interested in as well as outstanding requests which can indicate

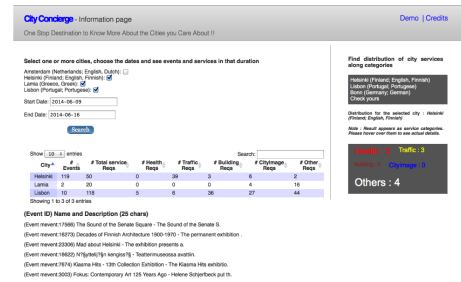


Figure 1: CC- Web version



Figure 2: BK - mobile and web versions

the risk to good experience one may have. As future work, we can link with external city comparison tools that use open data, like City Explorer[Aggarwal *et al.*, 2016], and further contextualize events.

Event Dissemination

The third part is about techniques through which the above analytics are made available to users. The complete infrastructure resides on cloud and is available as a service from web and mobile apps. The platform provides an interface to submit, store, browse and search events but the mobile version additionally hosts a simple and intuitive user interface and accessibility features. The search algorithm is based on Allen’s Interval Algebra to give users a full opportunity to discover ongoing events. The app uses text-to-speech feature to read the users event name and its details, and can take feedback from users.

4 Discussion

The CC app was initially launched on the web in 2014 summer as part of a hackathon where it was a runner’s up. The BK app has been available on the web for over a year and mobile app was released on Android store in Jan 2016. The feedback from the early adopters has been positive, and especially the experience index. A few companies in hospitality industry are keen to consume its analytics.

References

- [Aggarwal *et al.*, 2016] V Aggarwal, B Srivastava, and S Tamilselvam. Towards a general framework for data-driven city comparison and ranking. In *COMAD*, 2016.
- [IBM, 2015] IBM. Relationship extraction. In *IBM Watson Developer Cloud*, 2015.
- [Ritter *et al.*, 2012] A Ritter, Mausam, O Etzioni, and S Clark. Open domain event extraction from twitter. In *Proc. 18th ACM KDD*, 2012.