Eventity: Online Platform for City Event and Tourism Information

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Abstract
This paper presents an online platform for visualizing and analyzing city event and tourism information, called *Eventity*. The tool allows the user to interact with the information by selecting the view the information within a selected period. It visualizes both contextual and geographical information. It displays past, on-going, and up-coming events. It assists the user in analyzing the information with heatmap and statistics modules. The tool has been evaluated the real users and nicely received as a useful tool. Eventity can be useful for general users with its assistive viewing and planning functionalities, as well we urban planners with its analysis feature.

Author Keywords
Peer-to-peer public transit; on-demand public transit; mobile app; shared public transit system.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

Introduction
We're currently experiencing a fast-growing urbanization. Today, more than half of the global population now living in cities. By 2050, world population is projected to reach 9.7 billion from which

68% will be living in cities [8]. Urbanization is quickly transforming places globally. Improving urban environments for the well-being of the increasing number of urban citizens is becoming one of the most important challenges of the 21st century. City is composed of different functional regions e.g., residential areas, business districts, and educational areas, which support different needs of people's urban living and serve as a valuable organizing method for framing detailed knowledge of a metropolitan. People travel between these regions for different purposes, which creates urban mobility patterns that characterize the area [7]. Commuting trips may happen in a weekday's morning when people travel from residence area to their workplaces. Several trips to shopping area may happen in the evening or weekend. Different functional regions can thereby influence people's mobility with different functional elements, such as markets, schools, banks, attractions, and so on.

Besides the city functional regions, social event is one of the influential factors for people's mobility [2] in addition to social influence [6] and weather effect [4]. Different types of event can draw different magnitudes and directions of the crowd and mobility. A sports event may draw a different crowd compared to a music event and vice versa. Understanding the event's type and location can be useful to estimate mobility and crowd levels for better informed urban planning and design. From the citizen's point of view, knowing information regarding the on-going or up-coming social events can help with their awareness of the events, planning and scheduling around the events e.g., attending the event, avoiding traffic due to the event, and so on.

Event is a temporary attraction unlike a tourist destination, which is an attraction permanently attached to the location e.g., temple, park, and monument. As such, an event creates temporary people flows and mobility that need dynamic planning. Social events data is therefore important as an information source for both urban planners and citizens. There are some data services available for obtaining social events information. Facebook provides the Graph API[1] that allows the user to request for social events information, however it only provides social events information related to the requesting user but not all events available in the city. The user also needs to log in to request the information. Another service source is Allevents.in[2], which is a website that allows the user to inquiry for social events information in cities worldwide. However, there still lacks of geographical representation of the data which can further describe the events in greater detail – especially, in geographical sense.

The work presented in this paper thus aims at filling in this gap by developing a web platform called *Eventity*, which pulls together and visualizes social event information with both contextual and geographical details, as well as basic statistics for preliminary analysis of events. Unlike existing apps, such as ZipEvent, EventBank, and EventDex, which are event information management apps that mostly benefits event organizers in managing registration, collecting payments, printing badges, and so on, Eventity provides information regarding past, on-going, up-

coming events in the city for any users (i.e., no log-in or registration needed) who can be urban planners or urban citizens. The information is provided over a web platform for easy access. The user can view all past, present, and future events or select to view particular event types and dates along, which can be useful for event planning and analysis such as social event tracking [9] and evolution [1].

System Overview

Eventity has been developed to provide an access to social event and tourist attraction information both contextual and geographical details for general users, as well as planning functionality and basic statistics for preliminary analysis. The system overview is shown in Fig. 1 where the core system connects to two data sources via APIs; social events and tourist attractions. The system processes and visualizes the data on a web platform. In this present development, Chiang Mai city is used as a case study.
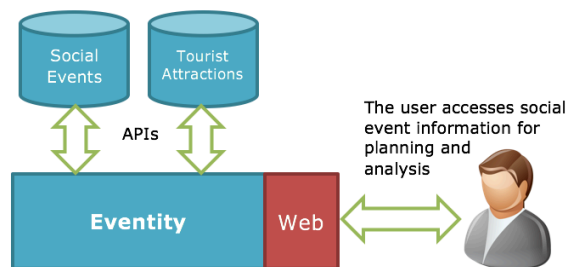

Figure 1: System overview of Eventity.

Data Sources

Eventity system uses data from two main sources. The system incorporates both types of attraction; social

events and tourist destinations (i.e., temporary and permanent, respectively) that can subsequently generate occasional and routine people flows and mobility patterns in the city.

Tourist destination data is obtained from the Thailand Department of Tourism via their Tourist Attraction API[3]. The system makes requests for all tourist destinations' information in the area, which each includes name, geolocation, and short description. The current version of their API does not allow images of tourist destination to be requested yet. Therefore, no images of tourist destinations are included in this version of our developed Eventity.

The other data source is Allevents.in from which social event information is gathered via their API[4]. Event related information such as name, dates, and images are obtained and processed in our system. The request is made according to the event's dates i.e., date is an input along with the requesting location (i.e., Chiang Mai city).

The data received from both sources are stored in a cloud-hosted database for later use. Our system uses the Firebase Realtime Database[5], which is NoSQL cloud database in which data is stored as JSON and synchronized in realtime with our Eventity web application.

Web Interface and Functionalities

Eventity provides an easy access to its social event and tourist attraction information through its web interface. The user can simply visit the Eventity web site. Our developed prototype is available at https://eventity-8b10d.firebaseapp.com.

A snapshot of the Eventity web interface is shown in Fig. 2 where there are mainly 15 elements to be described as follows.

1. Home page button: The user clicks to return to the home page or to refresh the current page.
2. Heatmap module: The user clicks to view searched/filtered result in a heatmap i.e., shading map representing geographical distribution of resulting social events/tourist destinations (as shown in Fig. 3).
3. Statistics: The use can choose to view basic stats about the social events in the city i.e., the accumulated numbers of events per type, per day of the week, and per month over selected dates. An example is shown in Fig. 4. These bar charts are drawn using Chart.js[6], which enables responsive and interactive charts. The user can move the mouse over the chart to see corresponding details. These basic stats can facilitate preliminary analysis of the pattern and trend of social events in the city.
4. Selected dates: The user can choose to view the events that take place during the selected dates.
5. Categories: The user can choose to view all social events or specific type of events. There are eight different types of event available in our system including business, meetup, concert, sports, music, workshop, party, and other.
6. Submit button: The user needs to click on this button to process the request.
7. Blue marker for an event that will take place in the future. The user can click on the marker to view a brief description and related photo of the event (an example is shown in Fig. 5).
8. Green marker for an on-going event that is currently taking place. The user can also click to view a brief description and related photo.
9. Red marker for a past event that has already took place. The user can also click to view a brief description and related photo.
10. Purple marker for a tourist attraction. The user can also click to view a brief description of the attraction. However, as previously mentioned, photo is not available yet due to Thailand Department of Tourism's current API limitation. An example is shown in Fig. 6.
11. Marker legend.
12. Event list: The user can click on this button to view a list of on-going and up-coming events.
13. Attraction list: The can click on this button to view a list of tourist attractions.
14. Information display panel: Information on each item on the selected list is displayed in this panel.
15. Add-to-Calendar button: The user can add the event into his/her Google Calendar by clicking on this button of each event.
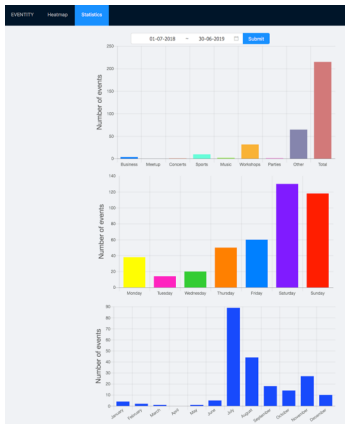
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[6] https://www.chartjs.org

Figure 4: Snapshot of the Statistics module. It shows the accumulated number of events per event type, across days of the week, and months over the selected period.
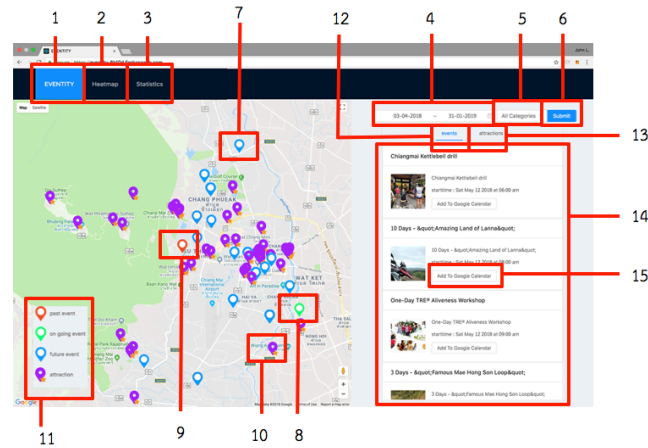

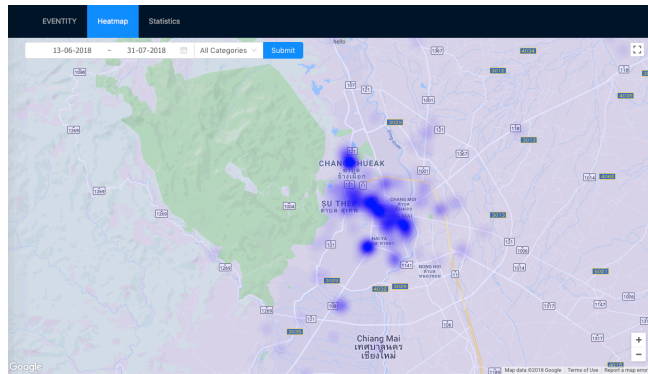**Figure 2**: Snapshot of the Eventity web interface.

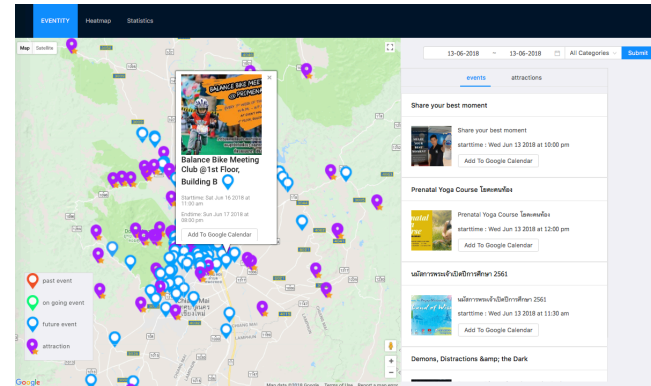**Figure 3**: Snapshot of the Heatmap module.

Figure 5: User can click on the event marker to view a brief description and related photo of the event.
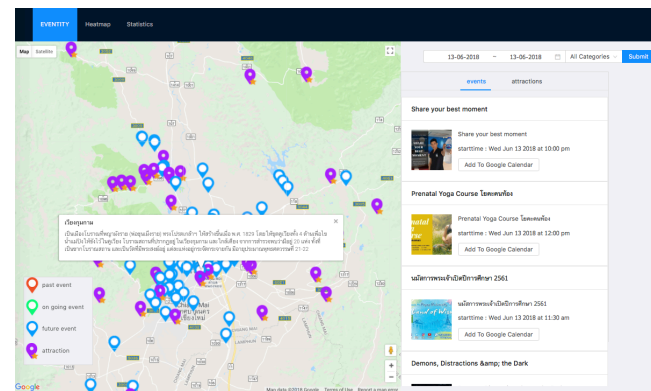

Figure 6: User can click on the tourist attraction marker to view a brief description of the event.

Demo

For demonstration purposes, a video clip showing how Entity works is available here:
https://youtu.be/eCx148zH-hc

User Experience Study

To evaluate the developed Eventity, we put it into the test by the real users by conducting a user experience study. Each user was asked to use Eventity and then asked to answer a questionnaire (shown in Fig. 7). The survey questionnaire was designed base the Theory of Four Elements of User Experience [3], which askes to the user to rate their level of agreement with four different statements concerning the user experience with the system that include:

1. It is useful.
2. It is easy to use.
3. It is easy to start using.
4. It is fun and engaging.

Figure 7: Questionnaire for the user experience study.

There are 50 participants in total that include 21 males and 29 females, which is a mixture of ages and occupations. Each participant was asked to give a rating of agreement level to the four statement where the rating score is a 5-likert scale where 1 means the lowest level of agreement and 5 means the highest level of agreement.

Overall, the users perceived our Eventity system as being useful with the average rating of 4.12, followed by being easy to start using (3.94), being easy to use (3.82), and lastly being fun and engaging (3.22), as shown in Fig. 8. The overall result acknowledges that the users feel that the system is useful but not fun and engaging, which is sensible as the Eventity is developed to focus on providing social event and attraction information suitable for planning and preliminary analysis but not providing fun-and-engaging feature that is lacking but important element as well. This suggests that our future development should emphasize on improving the fun and engaging element that may include adding or adjusting functionalities and features such as designing more attractive graphics, infusing gamification, and social networking functionality, which can potentially make the system more attractive and being more fun and engaging to the users.

Based on the conversation with the users and the suggestions and comments given by the users in the questionnaire, most of the users thought that Eventity is useful. One of the comments was "*It's useful for me. I don't know if there are any other websites that provide this kind of service. I can definitely use it.*". Another comment was "*It's useful and convenient. But it needs to improve on its appearance. It should have more interactive and attractive graphics.*"
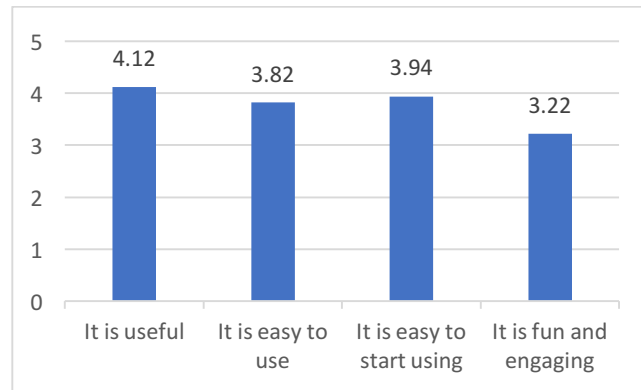
Figure 8: Overall result of the user experience study.

Figure 9: Result of the user experience study when grouped by gender.

When separate the users by gender, the result (Fig. 9) shows that female users rated (4.28 and 3.93) higher than male users (3.90 and 3.67) for the "it is useful" and "it is easy to use" statements respectively, while male users rated (4.00 and 3.33) higher than female users for the "it is easy to start using" and "it is fun and engaging" statements. This seems to suggest that females feel that the Eventity is more useful and easy to use than males, which may be due to the fact that females are better in multitasking than males [5] or perhaps females are more organized than males so such tool that supports productivity is more of their interest and usage.

From the conversation with the participating users, one of the comments from a female was "*I like it. It's useful. It's easy to use just like any other websites that I used before. But it looks like unfinished website. It will look better with some graphic makeup.*"
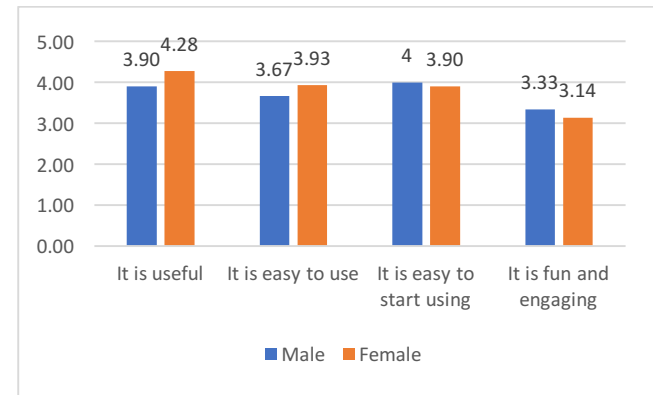
We further grouped the users by age range: less than 20 years old, 20-29 years old, 30-39 years old, 40-49 years old, 50-59 years old, and more than 60 years old. The result is shown in Fig. 10. The aspect of the system being useful and easy to use each was rated the highest by the users in the 40-49 age group at the same average rating of 4.67 for both. The lowest rating was given by the youngsters (less than 20 years old) at 3.50 and 3.67 for being useful and easy to use, respectively. This seems to make a lot of sense as the Eventity is probably more of interest to young professionals to middle age users who are mostly tight up with work and need tools that can help with planning and scheduling for social events. Urban planners, who can benefit from the use of Eventity, are also in this age range. Users who are in 30-49 age groups felt that the system was easy to start using with their high ratings; 4.36 and 4.33. Interestingly, the senior users (over 60) had the highest rating among other age groups (3.75) for the system being fun and

engaging. One of the senior users said "*I enjoy using it. I get to see what's going on in the city and what people are interested in from these displayed event information. I can play with it for a long time.*". This seems to interestingly suggest that the Eventity can be not only the event planning helper but also city newspaper for some users.
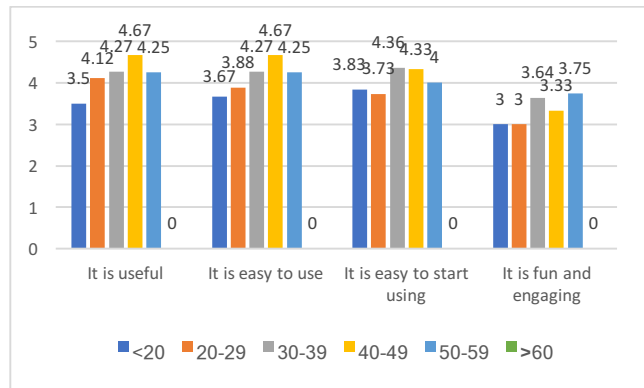

Figure 10: Result of the user experience study when grouped by age.

When grouped by occupation, the result is shown in Fig. 11. Users were students, academic staff, officers, urban planners, and others. Expectedly, urban planners gave the highest rating for Eventity being useful (4.50) while students on the other hand gave the lowest rating (3.92), which seems to align with the age-group result for young users (less than 20). Office workers felt that the system is easy to start using with the highest rating of 4.67 among other groups. Surprisingly, academics felt that the system is not quite easy to use with the lowest rating of 3.00 among other groups. One of the comments from academics was "*It seems to be quite*

useful but I think the tool must improve its features to attract people to use it. First, the date selector is difficulty to use. The user should be able to turn on and off the markers on the map. The user should be able to click Enter which should have the same effect with clicking Submit button. It's annoying to have to click Submit button every time to process the request rather than just pressing Enter on the keyboard. Also, it would be great for the Statistics part to allow the user to do more than observing the amount of events in different categories." This comment is valuable and it allows us to pin point particular functionalities that need improvement in our future development.
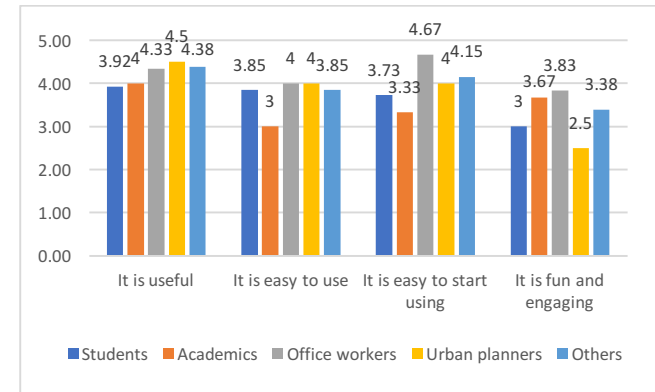

Figure 11: Result of the user experience study when grouped by occupation.

The results from our user experience study help inform our future design and development, which should emphasize on improving the "fund and engaging" aspect along with appearance and analysis functionality.

Conclusion

This paper presents the development of web-based platform for accessing city's social event and tourist attraction information, namely Eventity. To our knowledge, Eventity is the first web-based service that provides interactive visualization of city's social event and tourist attraction information both contextually as well we geographically. It allows the user to view social events and their statistics within a selected period. It displays past, on-going, and up-coming events. It shows the accumulated number of events per event type, daily, and monthly as well as heatmap for preliminary analysis of social events, such as spatial distributions, patterns, and trends. A user experience study was conducted to evaluate the system. Overall, the results show that the users feel that the system is useful and there is a need to improve on fun and engaging aspect of the system. Comments from study participants were constructive and taken into account for our future development of Eventity. We believe that Eventity is a useful tool for general users who want to keep track with and planning around the social events, as well as urban planners who can benefit from using it as a preliminary analysis tool.

Acknowledgements

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