

Case Studies of Shareable Personal Map Visualization

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Abstract

This paper presents two examples of personal data visualizations to be shared among peers. The visualized and shared data were travel destinations in Thailand and daily commutes in Bangkok, Thailand. The former gathered much attention with almost a million visitors within the first week after launch or approximately 2% of internet users in Thailand. Despite minimal data collection, large data samples of the first case study enable various analyses. The easy-to-use interfaces and simple visualizations can be a model of the genre of personal visualization whose main task is to share.

CCS Concepts

•**Human-centered computing** → Visualization theory, concepts and paradigms; Information visualization; Visualization design and evaluation methods;

1. Introduction

We have created two sample web applications to study the design of personal visualizations (of private data) and the effect of their shareability (as a public display). Both have map visualizations of the provinces in Thailand and the bus lines of Bangkok, Thailand. They gather and show the personal travel and commute data to be disseminated by the user at their will. This user experience is not uncommon and holds business values but is rarely discussed in the visualization community.

Personal visualization is a visualization practice in a personal context [HTA*15]. Shareable personal visualization can be considered as the community reflection application of personal visualization i.e. data scope and influence context of community level: friends or friends of friends on social networks.

Quantified-selves [CLL*14] collect their personal data including health data, work data, and other data. Because there are no tools that perform tracking and analysis for all purposes, the *selfers* often build their own custom tools or workflows. We provide a simple tool to distribute specific personal data with sharing functionality. While there are visualizations specifically designed for personal data such as mobile data [SM08] and visual mementos [TBHC16], we do not provide a novel visualization but the design emphasizes shareability which touches the topic of public visualization.

Public displays of different sizes from personal display to architectural scale [VJTV13, VWVM14, BVgSB14] can help raising public awareness and initiating related discussions. Our work is of a

similar purpose but of a bigger scale—publicly but not physically—reaching many more people. From the number of users, we consider these shareable visualizations successful and potentially useful for the future design of a lightweight personal data acquisition and distribution.

2. Shareable Personal Map Visualization Design

The shareability of personal visualizations implies that the underlying data is personal but not completely private. To increase the shareability, the data should even be able to show a lifestyle or personality, at least to the data provider's friends. For example, unlike typical medical data, exercise data, such as running routes, can be posted on social media without a sense of information breach because it emphasizes the active lifestyle and overall positive personality [CLL*14]. Our choice of domestic travel data has a positive tone of high (but not excessive) disposable income and adventurous attitude. The other application on daily commutes can imply personal wealth based on home and work locations but also the effectiveness of the bus system in Bangkok.

We utilize maps as the main visualization technique of both applications because of the data domain and the early design testing. Later on, the prototype had been adjusted to accommodate only the main functionality to provide and share data with ease on a desktop computer or a mobile phone.

The web applications were implemented with standard web technologies and a visualization library D3.js. The architecture is intentionally almost serverless. Every major components except generating an image to be shared on social media are performed on the client web browser. No aggregate result, such as the number of gen-

[†] email:

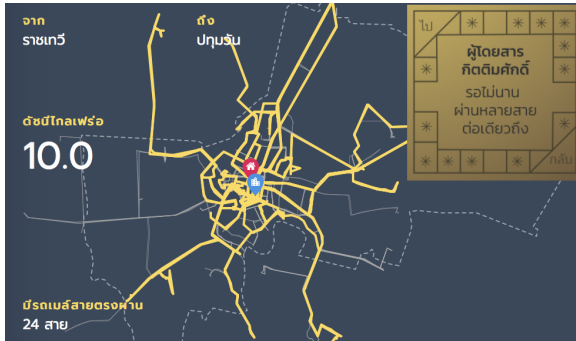


Figure 1: The result page of the personal map visualization to show all the bus lines (in yellow) that connect between home and office locations (in red and blue markers).

erated maps or popular provinces, is shown to the users to reduce database queries and server load.

2.1. Case Study: Where I Can Go By Bus

Where I Can Go By Bus in Figure 1 asks for personal informations, home and work locations, to determine how the current public bus system serves between two input locations. The application finds the closest bus stops around the locations (within 300 meters) and shows all bus lines that pass the stops on a geographical map of Bangkok. The yellow bus lines are intentionally drawn beyond the departure and destination locations to show how extensive the bus system can be. The map result to be shared is exactly the same as the one shown to the user. There is also a score to present how convenient the commute is; many bus lines and few transfers yield a high score (0–10 from the least to the most connectivity).

The web application was presented at TED×Bangkok on August 5, 2017 and was not available outside of the event. There were 3,900 users in total. The submitted result was shown in real time on a screen in the exhibition area throughout the event.

2.2. Case Study: Where I Have Been To

The main interface of **Where I Have Been To** is shown in Figure 2. There is a short instruction to choose provinces that the user has been to. The user can either click on the map or select a province of the drop-down list. To remove, the user either clicks on the same map region again or on the province name on the list.

The website was launched on Thursday, July 6, 2017. A few maps were shared from the author and a group of closed friends on Facebook. The number of their friends on Facebook ranges from approximately 400 to 1,400. The number of viewed and generated maps grew organically and exponentially. After 20 hours, the map had been generated 150,000 times from 310,000 unique visitors. After a week, the number has cooled down to about 390,000 maps and 850,000 visitors, or almost 2% of internet users in Thailand.

The demographics breakdown from Google Analytics showed that there were slightly more female visitors (53.75%) than male visitors (46.25%). Approximately half (46.31%) of the visitors

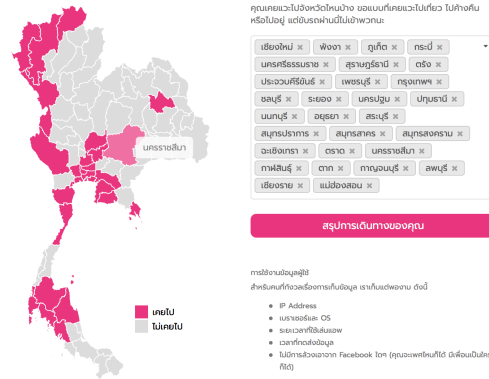


Figure 2: The main interface and result of the personal map visualization of visited Thai provinces. The map of Thailand is shown to the left. 29 provinces (out of 77 provinces) are selected in the map and also in the drop-down list.

were 25–34 years old. Other equally large age groups were 35–44 (22.03%) and 18–24 (19.62%) years old. The rest was older than 45 years old. As the website is in Thai, it was unsurprising that 90% of all visitors were from Thailand. The majority of the participants were engaged, spending 3–10 minutes.

Almost all visitors (95.98%) came from social media and almost exclusively from Facebook; less than 0.50% was from other social media such as Twitter and Instagram. It was also helpful to have a mobile-friendly website, or a responsive website in our case, because 85.16% of our sessions were on mobile devices.

All responses have been to at least one province and 1,640 maps report all provinces. 588 respondents have been to all provinces but the three southernmost provinces—Pattani, Yala, and Narathiwat—where there is an ongoing insurgency. 7,654 respondents have been to exactly one province and 3,386 are for Bangkok. We suspect that this one-province map may be created to show the user’s hometown pride or as a joke.

The regional analysis result is surprising for the south of Thailand that has some of the most popular and internationally well-known tourist destinations such as Phuket but is not popular among the users of **Where I Have Been To**. We also found some patterns regarding residence and trip destinations. For example, people from the north or the south of Thailand rarely visit each other.

3. Conclusion and Future Work

We implemented two case studies of shareable personal visualization with some success. They could gather some personal data and generate a simple visualization suitable for sharing on social media.

Validation is one of our future work. We would like to know the gamut of visualization types and interaction techniques to cover certain percentages or groups of populations. There is no theory on how to design a successful shareable visualization. Ultimately, a design guideline will be invaluable to this genre of visualization. We hope that our two case studies will be useful for designing other visualizations of the same family.

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