# Ask Local: Explore a New Place Like Locals

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**Abstract.** In this paper, we explore the ways of utilizing wearable technologies and social networking to cultivate a medium of cultural exchange between local communities and travelers in order to preserve and share local cultures. As wearable devices emerge and become a mainstream technology, a massive amount of potentials rises to empower micro-cultural habitats to present genuine characteristics of cities and neighborhoods to visitors through introducing contextualized and just-in-time communication. We introduce AskLocal, a novel location-based assisting system that mediates the communication between visitors and locals, allowing visitors to make real-time queries using Google Glass, and gather the user-generated information provided by the local network. We developed and tested a prototype that allows tourists to ask questions with our Google Glass application and receive local's answers on the device's display. Proposed system allows visitors to communicate a particular context that they encounter such as wayfinding in the city or making decisions on leisure activities. User testing demonstrated that the prototype adds a new level of freedom that allows tourists to traverse an unfamiliar place while providing them personalized information. We argue that proposed system encourages strangers to engage in more genuine communications that can be utilized in specific cultural contexts including culinary tourism, micro-history, and local merchandise.

**Keywords:** Wearable computing · Cultural interaction · Tourism experience

## 1  Introduction

The French term '*flanuer*' meaning 'stroller' in English, captures explicitly the exploration of the city through wandering around streets, paying attention to details of the urban life and engaging with the social context in a genuine and personalized way. Purified from intermediate facilitators and guides, *flanuer* initiates an uninterrupted conversation between the city and the travelers, enhanced by surprising encounters and unprecedented discoveries of micro-cultural habitats. In this paper we explore the possibility of utilizing wearable technologies and social networking to encourage *flaneur-like* explorations that enriches and empowers local cultures and allows travelers to enjoy a localized experience in the city.

The proliferation of wearable technologies and universal connectivity has altered how people access information and interact with the other individuals and their environments [7]. The impact of mobile devices is particularly relevant to the field of human mobility and tourism since spontaneous and ad-hoc access to information is helpful for travelers [2]. Mobile device can provide instant information that enables travelers to more effectively solve situational problems [13]. Although tourists have access to a large amount of information that ranges from online resources to location-based data, filtering of this information often becomes a tedious task requiring a lot of time and planning. At the same time, mobile devices are consequently transforming the ability to access information while on the move [14]. More and more the wearable technologies improve their presences in daily practices, acquiring information concerning a particular context on mobile device becomes more relevant in assisting the decision-making process of urban exploration and tourism.

In 2013, Google released Google Glass, a wearable technology that displays information in a new mobile paradigm. Glass, which is a hands-free digital eyewear, enables interactions that take advantage of camera and voice recognition. We chose Google Glass to implement our prototype because of its non-invasive and non-disruptive addition to travel experience. Figure 1 depicts a tourist testing the prototype on Glass.



**Fig. 1.** A tourist tests the Google Glass prototype

This paper describes a wearable technology that is designed to help tourists explore a new place and find the crowd sourced answers to their questions. One can imagine exploring a city with a local guide next to them who is able to respond to questions wherever they go. A wearable interaction was designed to emulate such an experience by combining contextual data with human guidance. The proposed system, AskLocal, allows tourists to ask locals questions given the context, in this case, capturing the surrounding environment through camera using Google Glass. An assigned local or group of locals then answers in real-time and feedback is pushed to the tourists device. Because locals are fully aware

of the context, they can provide information and suggestions accordingly as if they were in the same environment as the tourist.

The system was designed with regards the following four aspects: contextual awareness, just-in-time feedback, personalized experience, and non-invasiveness. The proposed system utilizes contextual awareness since, as previously pointed out, it is the key to assisting tourists to filter information and make decisions. Photographs are simple but powerful tools to communicate the contextual information between tourists and locals in addition to the textual query. The system is designed to give just-in-time feedback when the context is still relevant to the tourist. The goal is to allow tourists to consult the locals as if they are traveling together. Current applications such as TripAdvisor and Yelp provide reviews but do not create a personalized experience tailored specifically towards individual needs. By enabling tourists to make any inquiries directly, the system maximizes the possibility of receiving personalized context-aware recommendations. The system is also non-invasive for both tourists and locals. Tourists are in full control of when they opt to use the system. Locals receive the message through SMS on their phones and do not need to have a necessary commitment to participate.

## 2   Background

We present a survey of existing literature that informed our design process related to the following aspects: tourism, wearable technology and communication of local contextual information. A particular focus is revealing how local cultures would benefit from cutting edge technologies to preserve and communicate their authenticity. A recent cross-cultural study by Cheng et.al discusses how foreign visitors perceive the local cultural commodities [4]. The statistical measures over the recognition of different local cultural resources by tourist in Luoyang, China show that the majority of the interest is focused on local crafts and products, and the cultural and creative commodities in the area are substantially overlooked.

The key point to overcome superficiality of cultural exchange in local neighborhoods is to understand the nature of urban experience. The concept of understanding the city by strolling is primarily employed by the 19th-century French writers such as Charles Baudelaire, Emile Zola, and Balzac. The term influenced modernist and post-modernist studies in sociology, philosophy, literature and cinema. Walter Benjamin describes *flaneur* as "botanizing on the asphalt" [1]. De Certeau has followed Benjamin's footprints and explored the impression of experiencing the city by walking [3]. In his writing, we see the rise of pedestrian as an everyday practitioner of place who produce the space by organic mobility in the city. Similarly, in Lynch's work on city perception, he draws attention to motion awareness by stating that a city is perceived in motion with visual and kinesthetic senses [10]. The concept of moving is also associated with the fragmentation of urban perception.

Numerous tools have been developed to assist tourists in navigating through a new place. Kounavis *et al.* have previously explored the idea of utilizing

augmented reality to enhance the tourist experience [8]. In a manner similar to how AskLocal aids in the decision-making process for tourists, they describe the idea of how contextual awareness can mitigate information overload. Ultimately, the benefits of such a highly portable AR application are that it can function as a tourist guide and delivers information upon request. AskLocal extends this idea to wearable devices, as the user is able to ask questions and get information on-demand. An added benefit is that the wearable device can seamlessly enter and leave the user's field of view as needed.

Tussyadiah evaluates the potential transformation of tourist experience by using Google Glass [12]. Applying a content analysis method over the tweets by the users who expressed their potential use if they had Google Glass, she revealed that the dominating use was exploration. Aforementioned tweets were part of a competition held by Google to win an early prototype of Google Glass. Her conclusion is that Google Glass introduce a new potential that would transform travelers to explorers, encouraging production of first person narratives, enriching spatial experiences with just-in-time information and removing the barrier between the visitors and locals by providing a feeling of safety and ease of interpreting local commodities.

Davies et al. that compares identifying landmarks by transmitting photos to a server or using a map [5]. The user research results include the counter-intuitive observation that a significant class of users appears happy to use image recognition even when this is a more complex, lengthy and error-prone process than traditional solutions. More recent examples include the work by Fan et al. that use strangers as sensors and enable users to ask temporal and ego-sensitive questions, identifies promising strangers that are likely to know the answer and has been deployed in a larger setup [6]. Similarly, the work by Liu et al. enable geospatial query answering using a mobile crowd [9] These systems proved to be effective based on large user test. There are major differences between their works and the present study Ask Local. One difference is that Ask Local provides contextual information with images. Second significant difference is that it expands human sensor to the provide solutions to culture-sensitive questions.

## 3   Methodology

Our study comprises three consecutive parts: ethnographic immersion, conceptual design, and prototyping. In order to gain a deeper understanding of cultural interactions, we limited our study to a particular area of tourism and a local context. For the touristic context we focused on food considering the frequency of exchange around food and the diversity of food merchandise in local neighborhoods; and for the local context we have selected Istanbul, Turkey due to the rich cultural habitat it employs.

### 3.1   Ethnographic Immersion

An ethnographic study was conducted on tourists behaviors and usage of technology. The study primarily focused on food, considering that food is an important

element of tourism [11]. Tourists were observed in restaurants and nearby public spaces. How they decided on where to eat and how they ordered food in a restaurant if they were unfamiliar with the area were among the questions that were explored. The result of the study showed that (1) very often people have trouble understanding the menu or are unable to quickly get a locals recommendation, (2) some tourists heavily relied on tourists reviews, which did not always reflect local taste and perspectives, and (3) mobile devices play a vital role in distracting people and limiting face-to-face interactions throughout dining, sightseeing, and many other experiences during a trip.



**Fig. 2.** A local guide answers questions about a restaurant in Istanbul

The concept was then validated in Istanbul, Turkey during the contextual inquiry study. Foreign to Istanbul, the authors were paired with a local as their guide to explore the city, during which they asked the guide different kinds of questions related to navigating Istanbul (Fig. 2). The goal was to understand the type of questions average tourists encounter in a new place and how locals can respond to these questions in a timely manner. For instance, some questions included Where shall we go to eat around here?, What is Simit? and What is this mosque called?. The result confirmed that unfamiliar geography makes it difficult to identify landmarks, and unfamiliar language makes it difficult to read signs, order food and use transportation etc. [15]. The local guide made it easy to get answers to all of these questions on the spot.

## 3.2   Conceptual Design

Based on the ethnographic study, an initial system was designed, which enables tourists to ask locals questions while on the move and to receive context-related answers in as close to real-time as possible. An attempt was made to alter how

tourists traverse a city, by creating a Glass application that connects tourists and locals in real-time. Such a system needs to take into consideration contextual information and needs to be fully personalized. The following questions were considered:

– How can Glass be utilized to introduce a new layer of local communication for a tourist traversing a city?
– How can we improve a tourists experience in a non-invasive way?
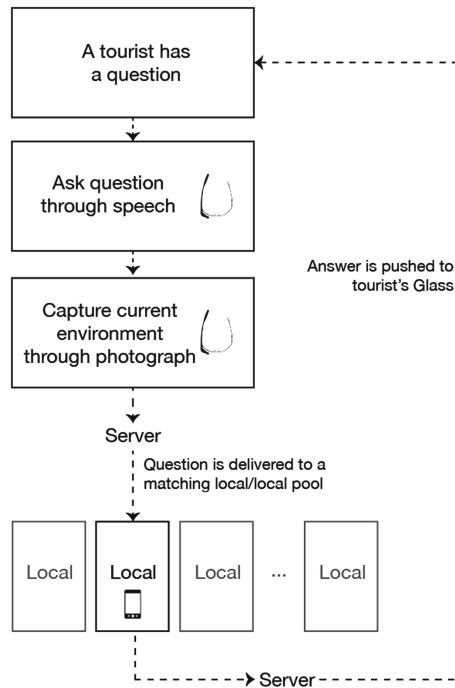– What kind of interactions can enrich the cultural and local experience for tourists?



**Fig. 3.** System model and the communication flow.

To address these questions, the developed system captures contextual inquiries of the tourist and shares them with local networks. The system operates in real-time, given that the tourist expects an answer from a local within a few second while the context remains relevant. A group of locals committed to providing answers will be asked to respond to queries in time.

User Interface is designed to be simple and easy to reach for a traveler strolling the city. As it is also employed in the design of Google Glass, touch points with the system are limited to occupy small time-spans, providing required information as quick as possible.

## 3.3   Prototype Development

In the last phase, a functioning prototype was developed to test the proposed system on tourists and locals. Design evaluation was conducted based on a combination of Short Message Service (SMS) log files, semi-structured interviews and field observations.

For developing the prototype, the primary focus was on helping tourists find answers to their questions through communicating contextual information with locals. A simple Google Glass application was developed using the Glass SDK, which includes APIs to input text through speech and capture the environment with a built-in camera. The application starts once the user requests Glass: *"OK Glass, ask a local'* The interface prompts the user to ask questions with three given examples: *"What is good here?", "Where to get food?", "Pick one for me."* Once the user inputs the question through speech, the next viewport is a camera frame that allows the user to take and confirm a photograph. The questions along with the photos are sent and stored in a database and are time-stamped. The server then delivers this information, through SMS, to a matched local for a response. The complete system model is shown in Fig. 3. SMS was chosen as the delivery channel in favor of a stand-alone mobile application because of its simplicity and compatibility across different phones. Locals can see questions through their built-in text message service and answer the questions by replying the message. An example process with photographic illustrations is shown in Fig. 4.



(a) Ask local a question about what Turkish pastry to get

(b) Glass captures the environment of the pastry store
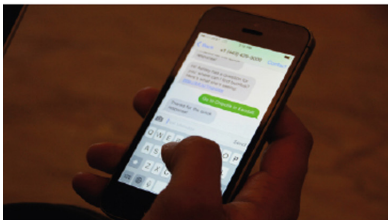
(c) Local replies to the question

(d) Suggestion is delivered to Glass

**Fig. 4.** Example Illustration of the prototype.

# 4    Design Evaluation and Results

After implementing the system, user research was conducted to evaluate the prototype and test its feasibility. Specifically, the average response speed, the quality of response, quantitative questions versus qualitative questions, and whether more than one local should to be matched with each tourist were evaluated. Quantitative data was gathered by logging the content of each message, the corresponding time stamp, and by whom the message was sent on what device (Fig. 5).

An initial user exploration was performed with two setups in order to gain perspectives from both tourists and locals. In the first setup, two locals were recruited from the area and assigned their phone numbers to the AskLocal server. One of the researchers pretended to be a tourist and used the system to ask questions. In total, 10 questions were asked over a testing period of two hours. Through this setup, the average response speed and the quality of response were tested. Log file analysis shows that the response was in average 1.5 min. An analysis of the quality of the answers showed that all answers were very informative and locals were genuinely interested in assisting tourists. The responses were easy to follow, and the advice allowed researchers to make decisions accordingly. Qualitative questions overall require longer response time but are generally more helpful than quantitative questions (yes/no questions).

In the second setup, Glass was given to tourists who came to visit a college campus. After being given Glass, tourists received a quick tutorial before they continued their trip using AskLocal. In this setup, the researchers served as locals, which ensured the response time and answered questions in a different environment with mobile phones. Field observations and follow-up interviews indicate that tourists sustained interest throughout the interaction and used

| Body | Status | Sent Date | Image | Time |
|---|---|---|---|---|
| Thanks for the quick response! | sent | 2014-05-04 09:37:58 PDT | | |
| EECS / many other classes | received | 2014-05-04 09:37:57 PDT | | 12 min |
| Hi! Ashley has a question for you: what is taught in this building? Here's what she's seeing: | sent | 2014-05-04 09:23:41 PDT | http://bit.ly/1fHWYvl | |
| Thanks for the quick response! | sent | 2014-05-04 09:17:06 PDT | | |
| Walk straight until end of hallway, take left, walk down stairs, go straight until first door on left leads to a bridge to walk over | received | 2014-05-04 09:17:06 PDT | | 3.5 min |
| Hi! Ashley has a question for you: how to get to start? Here's what she's seeing: | sent | 2014-05-04 09:13:32 PDT | http://bit.ly/RhND1Y | |
| Thanks for the quick response! | sent | 2014-05-04 09:12:27 PDT | | |
| More commonly known as Killian Court | received | 2014-05-04 09:12:27 PDT | | 1min |
| Thanks for the quick response! | sent | 2014-05-04 09:11:57 PDT | | |
| Overlooking the river from Lobby 10 under the big dome | received | 2014-05-04 09:11:57 PDT | | 30 sec |
| Hi! Ashley has a question for you: what part of campus is this? Here's what she's seeing: | sent | 2014-05-04 09:11:27 PDT | http://bit.ly/1fHVSjc | |

**Fig. 5.** The log of communication between a student and a visitor in the college campus

locals feedback to make decisions. Response time is key in the AskLocal system. Since the analogy is to have a real local companion guiding the tourists and answer questions, tourists expect to receive immediate feedback. Failure of just-in-time response will result in (1) user is no longer in the relevant context as when the question was asked; (2) the feeling of having a local companion diminishes greatly and (3) the user loses interest in the service, finding it unreliable. A conclusion can be drawn that for AskLocal to work reliably, more than one local needs to be on-call to guarantee just-in-time responses.

## 5    Discussion and Future Work

The AskLocal system has been tested only on the individual scale. Future work for scaling up the system involves methods to identify and recruit locals. Potential solutions can be facilitating online community or using the tourists extended social network. Further research can be conducted on how many on-call locals are needed for each tourist to guarantee a timely response and keep tourists feeling like they are being accompanied.

## 6    Conclusions

By assessing the tourists experience in an unfamiliar place in the era of wearable technology, this paper describes a concept that enables tourists to experience a new place like a local using a combination of Google Glass and human intelligence. By creating a prototype that allows tourists to ask locals questions along with contextual information, and receive timely feedback, we demonstrated that wearable devices could provide tourists in a foreign place a new level of freedom and a more personalized experience. Ultimately, by merging augmented reality (Google Glass) with human intelligence (local perspective) the combined system brings in a human element to technology adding to the overall cultural experience for tourists.

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