Towards a Functional Ontology for Mobile Map Applications

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ABSTRACT
In this position paper, we argue for constructing a functional ontology to build an integrated system, in order to improve mobile map user experience. We propose a very first idea towards such a functional ontology.

Author Keywords
Ontology; Mobile map application.

INTRODUCTION
Imagine that you are going to get some documents in an unfamiliar place in your city, and meet a friend for lunch afterwards. The day before, you planned the route in a mobile map application and chose the nearest shopping mall, which is 2km away, as the meeting point with your friend. There is no public transportation between them, but there are public bicycle stations around both places. Hence, you planned a bicycle route from one station to another using the same application. Everything seems perfect so far. On that day, you go to the first place, finish your paper work and get a public bike in the station nearby. Then you follow the application to ride to the station near the shopping mall. You reach there, and discover a piece of paper stating that the station is currently closed. You then open the application again, find out three more public bicycle stations around the shopping mall. You continue further towards those stations, eventually discover that none of them is in use. You have no other choice but to call the public bicycle company for help. Unfortunately, they tell you all the public bicycle stations on this main road have been closed since two months ago, because of the road constructions, and the nearest station that you can give your bicycle back is actually the station you came from. In addition, they explained that they have their own system to inform users about the current situation of all the stations, but you cannot plan your trip there. Finally, you ride back to the station you started from half an hour ago, and take a taxi to meet your friend. You end up with feeling like a foreigner in your own city and start meeting your friend with complaining about the poor mobile map application. This is not a typical scenario for using a mobile map application, but it has happened to one of the authors in reality.

When we think about improving mobile map user experience, we consider up-to-date technologies, pleasant map design and intuitive user interfaces. However, we tend to overlook the functional connections of mobile map with other infrastructures. In fact, Navigation are not navigation tasks alone. No matter in which scale, they are connected with other infrastructures. For example, in a railway station, navigation is influenced by the train timetable, the cleaning process in the station, etc. In a city, road constructions affect navigation. On the other hand, navigation also have impacts on other tasks. They intervene each other.

In practice, we most likely to focus on the tasks separately, and therefore come up with individual solutions to serve different functions, which are actually connected. Users have to adapt to all those solutions, otherwise, they may encounter the above described experience. If we look at the problems holistically enough to consider those functions as sub-functions of a big function and formalize their interconnections, we would be able to build an integrated system, which serves users more efficiently. In order to integrate all the services, we need to start from the semantics. A functional ontology lays a formal foundation for building an integrated system.

A FUNCTIONAL ONTOLOGY FOR MOBILE MAP APPLICATIONS
A functional ontology starts with the functions. Since the functions differ significantly in various environments (e.g., in indoor environments, the functions of a hospital and its infrastructures are notably different with those of a shopping mall), the first thing required to consider is to categorize the environments that mobile map applications are serving for. Within each category, it is necessary to investigate into the detailed infrastructures and their functions in that environment. Then, for each function, we can borrow their established domain ontologies [1]. Moreover, we need to look into the interconnections of those functions.

CONCLUSION
In summary, we argue that mobile map service is intervening with many other functions. In order to provide better user experience, we should look beyond navigation services. Thus, we suggest to establish a functional

ontology to build integrated systems for mobile map applications.

REFERENCES

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