

Development and Evaluation of a Game Application for Parking Lot Identification

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Abstract

With the appearance and fast growth of metropolises and increase of number of vehicles, finding a parking lot has become a serious issue (Schrank & Lomax, 2007). Drivers have difficulties finding a parking lot due to the lack of information on location and availability of parking possibilities. High traffic density caused by vehicles cruising for parking has various negative effects on drivers, citizens and environment in general (Giuffrè, Siniscalchi, & Tesoriere, 2012; Schrank & Lomax, 2007; Shoup, 2006; Young, Regan, & Hammer, 2007). Although several approaches are already developed to simplify parking, none of them completely solves the problem.

Infrastructure-based solutions such as sensors require a huge implementation effort and bear high costs (Hoh et al., 2012). Crowdsourcing-based solutions that require on individuals to share parking data do not require a lot of investment, but lack encouragement and incentive for anyone to participate (Morschheuser, Hamari, & Koivisto, 2016).

In this paper, we propose and implement a gamification approach which encourages users to participate in a crowdsourcing application for parking lot identification. Gamification, defined as the use of game design elements in non-game contexts, has already been applied in domains like health, education and finance (Deterding, Dixon, Khaled, & Nacke, 2011). To do so, we first provide an overview of motivational theories, incentive types, and gamification elements used in current information systems literature. Based on that, we investigate the use of gamification in incentivizing crowdsourcing of parking information by analyzing existing solutions. Then, we developed a prototype for gamified crowdsourcing of parking lot data inspired by the Tamagotchi approach. Users can succeed in the developed prototype game by taking care of a digital dog. This includes taking the dog for a walk by walking at least 800 meters as tracked by the phone. While doing so, available parking lots can be recorded to earn coins which in turn can be used to buy food and toys for the dog. With this approach we try to trigger the users' intrinsic motivation, as intrinsic motivation has been shown to be more effective than extrinsic motivation in gamification. We finally ran a survey to evaluate the attraction and effectiveness of the prototype. Unified Theory of Acceptance and Use of Technology 2 called UTAUT2 (Venkatesh, Thong, & Xu, 2012) is used to as a basis for the survey. Based on the survey based evaluation of more than 40 possible users, we can conclude that our prototype is perceived to be enjoyable and therefore triggers intrinsic motivation. This shows that introducing gamification was partly successful with regard to the future use of our prototype. However, the number of participants in the survey is limited, and only partially includes car owners. Moreover, the application is based on our interpretation of a set of gamification theories. A focus on different theories might result into different outcomes.

Our work applies gamification in the context of parking in order to identify location and availability of parking lots. It therefore contributes firstly to research on gamification for crowdsourcing as the idea can be introduced to crowdsourcing solutions in other contexts as well. Secondly, we contribute to current, practice-oriented research that tries to solve the issue of inner-city parking. Building on this idea and implementing it further can lead to a cheap and efficient business models for parking space solutions. This paper is valuable for city municipalities and authorities as a strategy to reduce unnecessary traffic, and air and noise pollution. The developed application is released for Android and iOS devices under the name ParkMyDog.

Literature

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