Overcoming Space Inequalities in City Building Games Through Negotiation

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Abstract. Serious games for urban planning can support the process of consensus building among various stakeholders. They make possible to negotiate among different scenarios about the use of space. We present You Place It!, a prototype for a multiplayer geo-game dealing with negotiations related to the development of the road infrastructure of Dharavi, a complex low-income area in Mumbai (India). We discuss the implementation choices being carried out and the relevance of introducing a language component in the game to deal with negotiations.

Keywords: Serious games · Urban planning · Dharavi · Negotiations
Language

1 Introduction

Serious games for urban planning can provide an effective platform for decision-making and conflict resolution in urban development. They can support the process of consensus building among different stakeholders and allow to test different scenarios about the use of space and its resources.

We present You Place It!, a prototype version of a geo-game for urban planning. It takes as case study Dharavi, one of the largest low-income areas in Mumbai (India). The game is a multiplayer one and focuses on negotiations related to planning and building road infrastructure in Dharavi and the obstacles (i.e. spatial and financial) that are encountered in the process. It can play an important role in the process of consensus building among different stakeholders: government, developers and citizens. The main aim is to achieve common ground by taking into account individual needs and those of the community. Reaching consensus about the use of resources is crucial in spatial planning, especially for urban poor communities. Local governments often cannot provide solutions, it is thus worth assessing an alternative path in which communities can get involved spelling out their needs and their knowledge by proposing their own solutions [1].

Communication plays a crucial role in negotiation processes even though its role is often neglected in (urban planning) digital games. The proposed game, through the introduction of a chat-box, allows for negotiations among the players to be carried out through communication. It creates an innovative conceptual framework to investigate

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whether certain spatial configurations (physical/F2F vs. digital/online) can support consensus finding (in urban planning) better than others.

2 You Place It!

Serious games for urban planning can provide an effective platform for decision-making and conflict resolution in urban development since they focus on spatial and real- world problems. For example, [2] carried out a pilot project set in Boston to develop a park and used Second Life but also meetings in physical space. NextCampus, a game to evaluate the implications related to moving the campus of the University of Hamburg to a new location was developed by [3].

You Place It! Is a serious game for urban planning with the goal to support the process of consensus building among different stakeholders that can play and test different scenarios about the use of space and its resources, as well as possible responses to these scenarios. The game focuses on one of the largest low-income areas in India, Dharavi. Its population is estimated to more than 1 million inhabitants. It is located in Mumbai and was founded in 1880s during the British colonial area. It is a very diverse and multi-religious settlement. It currently covers an area of about 230 hectares. The value of the land occupied by Dharavi has increased substantially due to its central location, the vicinity of the airport and the business area BKC. Dharavi is the basis of many local industries dealing with pottery, leather goods, embroidery and garments, food, among others. It has a turnover between $650 million and 1 billion annually. Figure 1 shows a bird's eye perspective of this area. Figure 2 demonstrates the study area on the satellite image.

Fig. 1. View of Dharavi

Fig. 2. Satellite image of area

Dharavi represents a very complex urban area: several plans have been proposed during the years which didn't succeed in their realization. There is the need to involve diverse stakeholders in order to design an acceptable urban plan and a game such as You Place It! might represent an opportunity to interact and to facilitate participation.

The game was originally conceived as a single player one [4]. It focuses on negotiations related to planning and building road infrastructure in Dharavi and the obstacles

(i.e. spatial and financial) that are encountered in the process. The player plays against the system that takes the role of the road developer. The implementation was based on the level-k negotiation model ([5, 6]). The player negotiates on the basis of the space occupied and the costs related to removing obstacles.

We have extended the initial implementation that is described in [4], into a multi-player game with the goal of achieving consensus in building a road infrastructure by relying on negotiations supported by communication. The main aim is to achieve common ground and build the roads by taking into account individual needs and those of the community. The space represented in the game is the actual geographical area of Dharavi and the application is built on top of Google Maps, as can be seen in Fig. 3 which shows the start of the game: players can log into the application and are assigned a role to play and a budget.

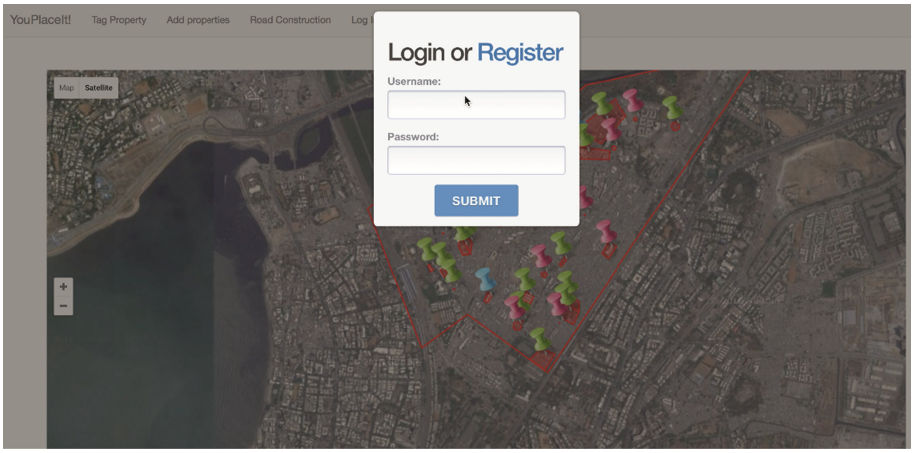

Fig. 3. Login You PlaceIt!

Different roles are envisaged: residents, representatives of the government, real-estate developers, commercial representatives that have business in the area and NGOs. Residents own properties in Dharavi and they need roads to connect to other properties, they do not have a budget to build the roads but they can vote for various proposals. They can influence the decisions of the others by raising or lowering the price of their own property. The representatives of the government are in charge of planning the roads, but they do not have a big budget for their development so they need the cooperation of the residents to accomplish their plans: they own properties and they have the most influential vote. The real-estate developers aim to redevelop the area for business purposes, they do not own properties but have a significant budget: their vote is the least important. The commercial representatives own properties and need a better infrastructure to connect to clients, suppliers and the rest of the city: they have a vote and a budget. NGOs own properties having public utility, they have a small budget and a vote.

Several objects are accessible to the players (they are represented by the colored pins distinguishing them) and are tagged beforehand with their properties associated to them

(prices and negotiation margins), they include commercial buildings, houses, school buildings, hospital, market places, civic facilities such as religious buildings, water plants, parks.

Players can propose a road to be constructed as can be seen in Fig. 4. A requirement is that it should connect properties. Negotiations take place if the road development occurs into obstacles such as properties that need to be demolished or take a path that is not beneficial for the community.

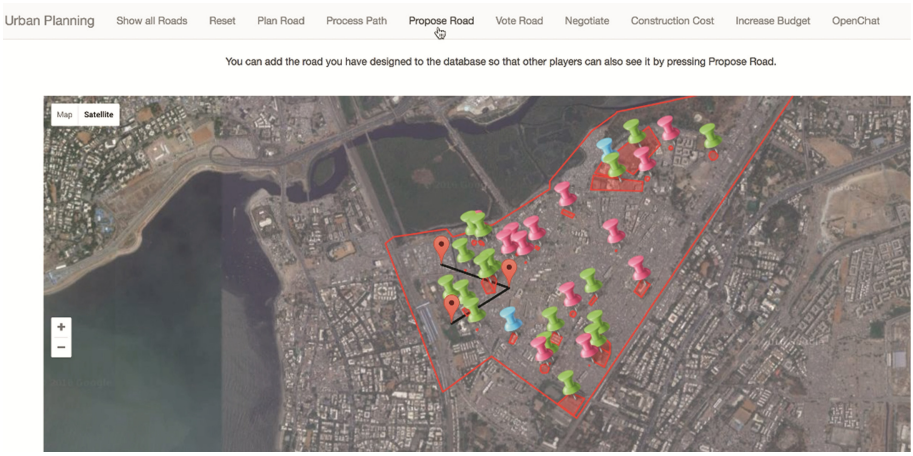

Fig. 4. Proposed road in black

Negotiation includes a financial transaction but also communication through the chat-box. Players can try to influence each other by using messages that are either private or public. Finally, consensus with respect to the proposed road is expressed through voting so that it is decided whether the road can be maintained or removed.

3 Language and Negotiations

The multiplayer implementation has been enhanced with a chat-box in order to add the possibility to use language in negotiations. Negotiation is a process of communication and language offers insights in this process (i.e. conditions of bargaining, introduction and closure) as well as in the social aspects. Furthermore, an analysis of the information of messages exchanged by negotiators based on linguistic signals (i.e. presence or absence of degree, comparative word categories) shows correlations with negotiation success or failure [7]. Therefore, adding a chat box in the game provides complementary information to the actions related to the negotiation process, as can be seen in Fig. 5. The use of text-based forms of communications in online games has not received much attention in the literature: they have been addressed mainly in the educational context, especially with respect to language learning [8]. However, language plays an important role in online games especially in the case of a multiplayer game since it gives insights

in the discourse strategies. Language is virtually the only means in online games to enact authority in order to become group leader as well as to create group identity [9]. In the context of YouPlaceIt!, it can be employed not only in building consensus but also in the creation of social interaction, roles and identities [10].

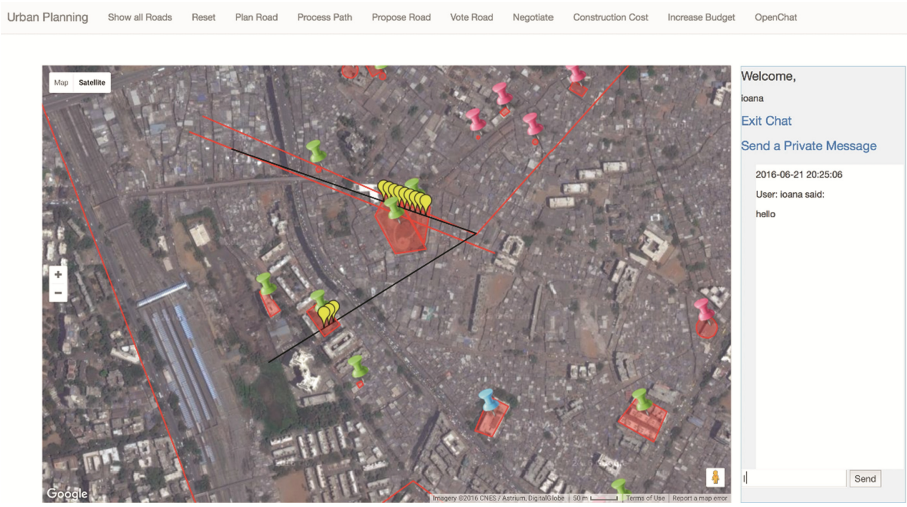

Fig. 5. Negotiations through the chat box

The analysis of communicative interactions in digital games has not received much attention. The inclusion of a language component in the game is an innovative extension that allows for corpus creation of the language data that can be extracted. More specifically, the data is collected in the database for retrieval and it includes the sender and receiver ids, the message id, the message text and the time the message has been sent. It allows for a quantitative analysis of the role of language in digital space that can offer new insights in online interactions. It creates the conditions for a comparison with F2F interactions in similar settings that make possible to assess the role of language and eventually that of spatial configurations (physical/F2F vs. digital/online) in negotiations within a (web-based urban planning) game.

Urban planning games can be of relevance in analyzing whether certain spatial configurations (physical/F2F vs. digital/online) can support negotiation and consensus finding better than others so that communication and knowledge exchange is facilitated. While physical space plays an important role in triggering socialization, in online games this function is taken over by language. The style of communication or the vocabulary adopted can be a relevant indicator of a community and identify cultural and social differences [11].

4 Implementation

An SQL database is used for storing both the information related to the user and the game objects. It includes tables related to the user identification, those related to the connection among players and game rounds (including the id of all players involved and their roles), tables concerning the properties (including location, type of owner, costs, margins for negotiation) and tables concerning the roads (including its coordinates and the id of the player that proposed it).

There are individual actions possible within the game such as login, add new tagged properties, propose roads, visualize proposed roads and delete proposed roads while multiplayer actions include the possibility of private chat or with the whole community of players to carry out negotiations at different levels.

The implementation carried out is available in a Github dedicated page at https://github.com/YouPlaceIt/Dharavi.

5 Evaluation

The prototype has been evaluated by Computer Science students of Utrecht University in the context of a game development course. They pointed out several bugs and gave suggestions with respect to the user interface that was supposed to be more intuitive, it should include more explanations concerning the game actions and have self-explanatory labels for the buttons. In addition, it was suggested to give the possibility to delete roads proposed if there was not enough consensus. Furthermore, it was mentioned to start the game with objects already tagged regarding their type and owners. This feedback has been worked out in the current implementation. It was also suggested to move away from Google Earth and have a schematic representation of the area. This suggestion was not taken into account since the current implementation has the advantage that it can be easily adapted to new environments.

The game was also evaluated by students of the summer school on Arts, Fashion and Culture at the University of Macerata (Italy) that suggested to relate the road development to the cultural and religious buildings present in the area in order to support the cultural heritage.

At the Workshop on Urban Futures and Urban Utopia in South-Asian Megacities organized at the Institute of Development Studies in Kolkota (India), the game was perceived as a useful instrument for community empowerment in order to learn how to negotiate with the government.

6 Conclusions

The You Place It! game is conceived as a tool to reach consensus in the negotiation of space in a complex urban planning context such as that of Dharavi. It can constitute an alternative, bottom up way to achieve consensus in urban development by focusing on the needs of the citizens and the requirements of the stakeholders involved. It is a multiplayer game enhanced with a language component to carry out the negotiations.

There is a shortcoming in the development of current City Building Games since their game mechanics and interface don't allow for development of utopic visions [12]: spatial inequalities are often ignored and there are no possibilities to explore different models. You Place it! has the potential to fill this gap since it confronts the players with the challenges and the problems of mega-cities while creating the possibility to imagining alternative solutions for their development.

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References

1. Papeleras, R., Bagotlo, O., Boonyabancha, S.: A conversation about change-making by communities: some experiences from ACCA. Environ. Urbanization **24**(2), 463–480 (2012)
2. Gordon, E., Manosevitch, E.: Augmented deliberation: merging physical and virtual interaction to engage communities in urban planning. New Media Soc. **13**(1), 75–95 (2010)
3. Poplin, A.: Playful public participation in urban planning: a case study for online serious games. Comput. Environ. Urban Syst. **36**, 195–206 (2012)
4. Vemuri, A., Poplin, A., Monachesi, P.: YouPlaceIt!: a serious digital game for achieving consensus in urban planning. In: AGILE 2014 Workshop (2014)
5. Costa-Gomes, M., Crawford, V.P., Broseta, B.: Cognition and behavior in normal-form games: an experimental study. Econometrica **69**(5), 1193–1235 (2001)
6. Nagel, R.: Unraveling in guessing games: an experimental study. Am. Econ. Rev. **85**(5), 313–1326 (1995)
7. Sokolova, M., Lapalme, G.: How much do we say? Using informativeness of negotiation text records for early prediction of negotiation outcomes. Group Decis. Negot. **21**, 363–379 (2012)
8. Kardan, K.: Computer role-playing games as a vehicle for teaching history, culture and language. In: Sandbox Symposium Proceedings, Boston, MA, July 2006
9. Rusaw, E.: Language and social interaction in the virtual space of World of Warcraft. Studies in the Linguistic Sciences: Illinois Working Papers 2011, pp. 66–88 (2011)
10. Newon, L.: Online multiplayers games. In: Georgakopoulou, A., Spilioti, T. (eds.) The Routledge Handbook of Language and Digital Communication. Routledge, London (2016)
11. Monachesi, P., Markus, T.: Using social media for ontology enrichment. In: Aroyo, L., Antoniou, G., Hyvönen, E., ten Teije, A., Stuckenschmidt, H., Cabral, L., Tudorache, T. (eds.) ESWC 2010. LNCS, vol. 6089, pp. 166–180. Springer, Heidelberg (2010). https://doi.org/10.1007/978-3-642-13489-0_12
12. Bereitschaft, B.: Gods of the City? Reflecting on City Building Games as an Early Introduction to Urban Systems. Geography and Geology Faculty Publications. Paper 8 (2015)