VR-Participation: On the feasibility of next-gen Virtual Reality technologies as Participation channel

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ABSTRACT

[1]While progress in the development of e-Participation platforms has been significant and the emergence of new Social Media-driven platforms appears to bring significant (by quantity), citizen engagement, little attention has been paid by researchers to the limitations of the pervasive textual communication for political participation. In this paper, we describe the major socio-technical challenges of classic e-Participation solutions and how the emerging next-gen Virtual Reality (VR) technologies can be leveraged to alleviate some of the issues identified.

CCS CONCEPTS

• **Information systems → Data management systems engines** • **Information systems → Collaborative and social computing systems and tools.**

KEYWORDS

E-Participation, Social Media, Virtual Reality

1 INTRODUCTION

The Web 2.0, interactive hypertext-based e-Participation became a standard for electronic means of communication between governments and citizens[1, 4]. Modern e-Participation platforms, especially those integrating popular Social Media like Facebook or Twitter have been recognised by the scientific community for their ability to overcome major participation barriers like: physical distance, time affordance, accessibility and

transcend of the economical divide resulting in significantly greater engagement of citizens. Nevertheless some authors report major issues with online participation. Researchers point out that online, textual communications alter people behaviour in comparison to face to face interaction. In particular, Parycek et al. [3] argues that anonymity online may lead to more aggressive tones of discussion. In principle, anonymity results with a high volume of unconstructive and abusive postings. More importantly the work by Sia [5] on computer-mediated communications showed that reduction of social presence (by reduction of visual cues like in the case of textual communication) leads to increased discussion group polarization hence putting a significant obstacle to healthy political deliberation. This notion is corroborated by more recent study by Grafsgaard et al. [2] which argues that due to non-verbal sparsity of textual communication, participants need to rely on implicit interpretation of transmitted information (that could use emoticons or images to support their message) which limits the effectiveness and restricts the applicability of textual communication alone. In this paper, we argue that the next-gen, immersive and affordable VR technologies provide for the first time an opportunity to enrich large-scale online participation communication with vivid multi-modal (non-verbal) communication elements. Therefore VR technologies could be considered as a viable support for improved political deliberation and more effective e-Participation in comparison to state-of-the-art current text-based technological platforms and solutions

2 ENRICHING E-PARTICIPATION WITH NON-VERBAL COMMUNICATION USING VR TECHNOLOGIES

We acknowledge that explicit non-verbal communication elements and visual cues that are lacking in the textual mode of communication occur in teleconferencing and similar existing technologies. Nevertheless, due to technical challenges, teleconferencing solutions with large amount of participants do fail to scale. In fact, major commercial solutions like Skype, Google Hangouts, WebEx or GotoMeeting support limited number of participants. Therefore, we argue that state-of-the-art technologies providing non-verbal communication such as teleconferencing cannot support large-scale e-Participation. We argue that beyond the-state-of-the-art solutions such as VR-based e-participation technologies could deliver very rich non-verbal communication support. Specifically, in the last couple of

years, we have witnessed a re-introduction of virtual technologies to consumer market through affordable, yet powerful and fully immersive VR platforms (PC or mobile-based). The trend started by Oculus Rift headset (run as Kickstarter campaign in 2012) has been followed by ubiquitous and fully mobile - Google Cardboard viewer (in 2014) and has been continued with an avalanche of low to high-end VR solutions, with major innovation introduced by stationary, and most advanced HTC VIVE, Sony PlayStation-console-powered Sony-VR and mobile Samsung Gear VR and Google Daydream (successor to Google Cardboard platform). In Table 1 we present a short comparison of the leading VR platforms. By the shade of grey we indicate the better performance in specific category (the darker the better).

Table 1: Leading affordable VR platforms

Platform	Mobile	Affordability	Performance	Sales
Oculus Rift	NO	~ 599$ headset + PC price	Highly immersive, good movement tracking, lack of free walk support	250K
Google Cardboard	YES	~ 20$ + average mobile phone price	Weakest performance, poor movement tracking, no walk tracking	5M Official + 20 M
HTC VIVE	NO	~ 800$ + PC price	Most immersive solution, best screen, free walk, best movement tracking	420K
Sony Playstation VR	NO	~ 400$ + PlayStation 4 price	Highly immersive, good movement tracking, limited walk support	750K
Samsung Gear VR	YES	~ 78$ + Samsung S6/S7 Mobile Phone price	Medium performance, decent movement tracking, no walk support	5 M
Google Daydream	YES	~ 70 $ + Google Daydream certified movile phone	Medium performance, decent movement tracking, no walk taracking	5K (newly introduced)

It is clear that mobile solutions thanks to low entry price and ubiquity seem are viable candidate for advanced communication. In particular, Google Cardboard, thanks to significant availability (very affordable) is the absolute leader. Nevertheless, the poor performance of this early solution disqualifies CardBoard as mainstream communication support tool. The more advanced mobile platforms like Samsung Gear VR or Google Daydream show to be the perfect candidate with a balanced performance and availability. From the non-verbal communication perspective, the advanced head tracking enables nodding as well as bowing and other head expressions. Moreover, mobile solutions presented are constantly rolled up with a growing set of accessories improving the already significant immersion and interactivity that has been out of limits for the past, PC-Online-based virtual reality solutions like Second Life[2]. Among the accessories are pointers, wands and game controllers that enable a wide range of virtual gesticulation, expression and interaction. The late VR gloves provide full hand expressions so important for face to face communication (that can be also of significant value for hearing impaired). Finally the VR environments can

provide any suitable setting (room, beach, concert hall, city hall) that can be selected accordingly to fit any meeting purpose (for instance dependable on topic and theme – forest, lake) and audience size. By integrating these mobile VR technologies with massive computational resources available on the Cloud, a rich non-verbal communication for e-Participation at scale becomes feasible.

3 DISCUSSION

The past VR massive multiuser solutions like Second Life or Minecraft proven that mass communication in VR (in contrary to teleconferencing) is possible as large conferences and events are being organised successfully on these platforms. Unlike in the classic teleconferencing systems, VR can host large meetings thanks to the 3rd dimension and possibility of increasing or diminishing audio-visual contact between the participants based on the distance and on demand (based on other properties and metrics). The next-gen VR reality sets, thanks to increased interactivity and immersion, as well as the ubiquity and accessibility brought by mobile devices take the non-verbal communication in VR to the next level. The best proof of the significant drift towards mobile VR platforms can be the recent porting of Minecraft to mobile Samsung Gear VR and Google VR platforms. VR faces several challenges, such as availability of affordable and accessible solutions, and yet to be explored psychological impacts of long VR sessions. Nevertheless, in our opinion, the advantage brought by VR technologies over classic text-based and teleconferencing solutions in respect to non-verbal communication and scalability enables more qualitative improvements to e-Participation where individuals can express themselves better, are less anonymous (thanks to better presence).

4 CONCLUSION

The innovation brought by the late, affordable VR mobile solutions create a significant opportunity to improving the existing e-Participation channels in respect to the quality of communication by introduction of essential visual clues and overall better expressiveness. The future research should bring more detailed case studies and experiments employing VR for specific e-Participation cases.

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