

Complementing e-Government Services through the use of Video: The LiveCity Project

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Abstract: Although established as a mainstream mechanism for delivering public services, the adoption of electronic government (e-government) has not been uniform. One of the problems mentioned in prior research relates to the fact that e-government services are perceived as being distant and impersonal from a user or citizen perspective. In this paper, the authors argue that complementing existing e-government services through the use of a video-to-video platform could alleviate this problem. This paper presents the concept of the LiveCity project which proposes the delivery of high definition video over existing Internet infrastructure to enhance public services. The potential benefits of overlaying video on top of e-government applications are examined through use case scenarios.

1 Introduction

E-government was introduced more than a decade ago [NR13], with the aim of offering better services for citizens, that are available regardless of their location, in an efficient and transparent manner [AS06][BH07] [DMB06] [FDF08][NR13]. Previous research shows that early predictions in terms of citizen adoption of the introduced online services have not been met [CC12][Ch09][FM10][HRB13][NR13]. A persistent problem that has hindered its adoption and diffusion has been the poor take up by citizens. Although governments have continued to push digital applications to the front line of public services, research shows that the richness of human interaction found in face to face services are hard to replace through electronic means. This is particularly true when dealing with complex services such as health and education and social or domestic services such as social security, housing or employment [ABC07][SLB10]. While many governments have succeeded in enticing citizens to use simple services such as payments for public services, fines or renewal of applications through the use of e-government systems, the take up of more complex services have been less than satisfactory in many cases. While some attribute this to lack of awareness and interest on the part of citizens, others associate this with more deep rooted issues which range from accessibility and

affordability to inclusion of the elderly, disabled and disadvantaged. As such, questions have been raised on whether the delivery of public services using e-government has contributed to excluding certain segments of society from access to key services. Certainly, the identification of 'social inclusion in the digital age' as a priority area for research by the European Commission indicates that the use of e-government as a mainstream method for public service delivery has raised some concerns among policy makers.

In this paper, we examine whether the integration of video technology with e-government in the provisioning of public services can replicate the richness found in face to face contact while at the same time maintaining the efficiency and speed of e-government services. We posit that citizens who are less comfortable or are not enticed to use e-government services due to influencing factors such as trust in e-services, skills, accessibility, usability and usefulness may be motivated to actively engage with public services that are offered electronically, if they are supported through a video to video (V2V) connection where a more personalised service can be offered. Such an approach, while eliminating the inefficiencies and inconvenience of traditional face to face services that are offered in a physical premises, has the potential to offer all the benefits of e-government while maintaining the personal touch that is associated with face to face services. The use of video can also be exploited in all existing channels that are used to offer e-government services such as personal computers, tablet devices, mobile phones and digital TV. This will not only ensure that more personalised services are offered to users, but also that all the features of modern hardware devices used to offer these services are fully exploited by the public sector for benefit of their citizens.

It is a well-known fact that affluent and professional segments of society rarely need access to front line public services as these communities are often self-sustained. In this respect, for public services that are most needed by marginalised sectors of society, such as the poor, elderly and disabled, video can play a significant role in making these services accessible and available to these citizens. For instance, the home bound or elderly can participate in community activities or enhance their ICT skills by engaging in remote learning using two way video. Likewise, those recuperating after illness can benefit from health and lifestyle guidance remotely in the comfort of their homes. In addition, from a broader public administration sense, those needing guidance on range of services such as housing assistance, planning permission, job seeking and tax advice etc., can all benefit from the use of video where real-time face to face communication can be established to complement any e-government application associated with such services. Such use of video can easily counter a common problem associated with stand-alone e-government services, which is the lack of assistance when citizens have problems using an e-government system or have questions regarding the information or steps involved in the process of completing a service [SZA12].

Given the above arguments, in this paper we discuss the potential of using high definition, live video on Internet infrastructure to provide public services and the potential benefits it can offer to the community. In order to do so, the paper is structured as follow. The next section offers a brief introduction on how high definition video to video can be provisioned. This is followed by examples of using V2V in public services.

The benefits of the proposed approach are presented in the next section. The last section ends with a summary of the paper.

2 The use of high definition video on public infrastructure

The usage of video-to-video communication in e-government services is not new [NR13]. However, its usage suffers from the drawbacks that the current Internet infrastructure has. Previous public services trying to use video-to-video have reported delays and data loss that result in poor video quality and unusable systems [BRR11][BTS08][CG04][CHJ09][KZZ13]. These led to poor user experience and frustration. Up to now, guaranteeing the Quality of Service (QoS) in video based applications has been a huge challenge due to the multiplicity of organisations offering data communication on the public infrastructure / internet. In this respect, the LiveCity project (which is funded under the European Commission Framework 7 program) aims to alleviate some of the problems that the current infrastructure poses in order to assure high definition video-to-video communication [GCB12]. To facilitate high quality video to video communication on the public internet, a Virtual Path Slice (VPS) controller is used to prioritise internet traffic (eliminating interferences from unwanted traffic) allowing the transmission of high definition video from point-to-point (see Figure 1). Essentially, the VPS controller is a software application that will help guarantee right of way for video traffic between two end-points once a connection is established using infrastructure. In this respect, the results are similar to a virtual private network, however the communication is realised over the public Internet. Therefore, the innovation in the LiveCity project lies in the potential exploitation of the VPS controller to aggregate the services offered by different public and private network operators to facilitate common services.

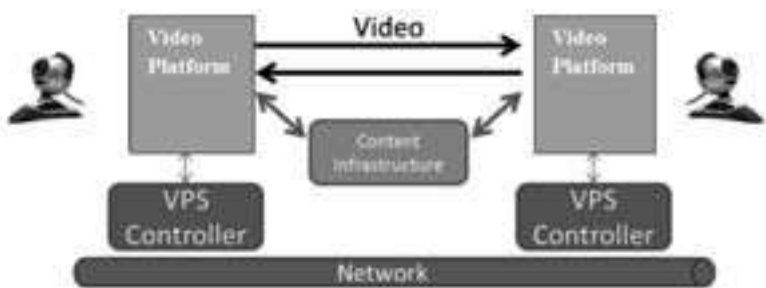


Figure 1: Video platform with the use of VPS controller [Ch12]

We pose that by using high definition video, the experience will be closer to face to face communication, and hence it would have the benefits that current e-government services

have, without losing the human interaction. In the LiveCity concept, the VPS controller in figure 1 will create a virtual path on the Public Internet to guarantee right of way for video communication between two remote locations when connection is established between the two points. The VPS controller will then ensure high quality video transmission between these two remote locations by eliminating interference from other internet traffic. As such, services that are enabled through e-government at present can be complemented by overlaying video on top of the e-government application to offer users a rich service that is similar to a physical face to face consultation. In essence, this will allow public services to retain the personal feel while at the same time exploiting the benefits that the Web and electronic services can offer such as efficiency, transparency, cost savings, accountability, to name a few.

3 Application of video service in the public sector: potential use case scenarios

The use of e-government is now a well-established practice in most local municipalities across Europe. Common services that have been facilitated through e-government include local municipality services such as tax payments, utility bill payments, renewal of parking permits, application to schools, searching and applying for employment, application for social security or housing etc. Many of these services have been successfully implemented by local government authorities and adopted by citizens as the e-government element has added a degree of convenience and efficiency for both the government and citizen. Citizens no longer have to dedicate time to attend to these routine services by having to physically complete the transaction in the presence of a face to face meeting with a public official. However, such services only constitute part of the local government service portfolio. Services such as application for planning permission to build a house, application to start up a new business or engaging in a on-going / continuous community led education programme requires much more than a transaction level electronic interaction with a system as facilitated by e-government. In such services, the richness of the face to face communication with a public official cannot be underestimated. Moreover, in most such cases the lack of face to face communication in an e-government context can impede the citizen from completing the service resulting in a poor user experience with public services and dissatisfaction with their elected government representatives. In this respect, video that is overlaid on top of e-government applications can enhance the citizen experience of using the more complex public services such as those mentioned here. The following scenarios describe three brief cases of how video can assist public services at local government or municipality level.

- a) Video can play a significant part in facilitating remote community based learning for the home bound or elderly citizens. The concept here involves the use of video to assist the elderly and/or home bound to engage in learning activities (i.e. ICT skills, Language Skills or Vocational Skills of varying nature). Here, the video will allow the teacher to deliver the content as well as context in a mode similar to a classroom. While the learner will be able to

experience the richness of the face to face connection unlike in an on-line distance learning course, the teacher will also be able to answer questions that the learner may have thereby ensure that the learning outcomes are met. Moreover, group video will allow interactive discussions and an overall richer experience for both the teacher and learner.

- b) Health and social care is another area where live video can contribute to delivering services. A patient recuperating after a heart attack, stroke or accident being assisted in physiotherapy by connecting the physiotherapist with the patient via live video is a good example. For patients recuperating at home after such illness, it is common practice for a nurse or physiotherapist to visit regularly costing the health service and the tax payer money. In such cases, continuous treatment can be facilitated through live video saving the national health service money and time through better and more effective utilisation of resources. Likewise, in a social service context, home bound or elderly people can be monitored and stimulated through constant engagement using live video between social service workers and/or carers and patient.
- c) A third scenario is the use of video to facilitate municipality or local government services, such as, planning permission for building a house or business premises or applying for a permit to set up a new business venture. In such scenarios, the level of communication or interaction between the citizen and the public agency is more intense and frequent than when dealing with a service such as paying a bill or fine. In such scenarios, one would expect the applicant to submit a series of forms and additional information that is quite specific to the scenario. In many instances, it is common that citizens will need assistance with specific questions or information relating to their case. An example can be, questions about the technical details of a new building that is planned or organisational structure of a new business venture that is proposed which the citizen may not fully understand. In such cases, live video will offer the richness of face to face interaction between citizen and government official and help bridge the gap left by e-government services without having to incur the high cost of face to face physical meetings.

4 Benefits of using video to video

It is without any doubt that face-to-face communication offers richer information due to non-verbal communication, whereas long-distance communication can lead to misunderstanding or misinterpretation of the information [KZZ13]. However, when due to distance or because it is more convenient, face-to-face communication is not possible, high definition video-to-video services could lead to a similar experience. Therefore, the main benefit that comes from the use of high definition video-to-video is to create a more personalised and interactive service that would allow communicating information in a similar way to face-to-face communication [MWE13]. Hence, it is expected to improve the trust and uptake of the new service as the service will be friendlier and will have a better quality of service than a service consisting only of text (in the case of e-

government) or voice (in the case of telephone services). As a result, it can radically improve the access and the range of e-government services available via the Internet to less IT savvy people, disabled and elderly citizens. Also, it will allow providing complex services that are difficult to be provided otherwise, to infirm or elderly users via the Internet, which would previously have required them to make a visit, therefore reducing the risk of accidents or the need for people to move into assisted living accommodation.

It is expected that video-to-video will enhance the efficiency and utility of the offered service, and will also improve accessibility and the ease of use of e-government services. As the lack of assistance when citizens need help when using an e-government service is one of the problems mentioned with regards to current services [SZA12], video-to-video services when overlaid on top of e-government applications could also be used to offer help to citizens when they need it [WEM12]. Therefore, this leads to a greater accessibility and comfort of use of e-government services. Moreover, as citizens do not need to travel to designated buildings in order to conduct local government or municipality services, the usage of video-to-video can decrease fuel costs and greenhouse emissions by reducing travel and traffic within the city. This could result in a number of concrete benefits for individuals such as lowering travel time and road traffic and pollution.

When used in healthcare services, it is expected that video communication would improve quality of life and individual health as continuous monitoring and early detection of health problems could be achieved. In addition, as described before, video services can also assist the lifestyle of home bound, elderly and recuperating patients.

On the top of the social benefits, usage of video-to-video in municipal service will offer several economic benefits. It will decrease the need to travel and hence lower the cost of participation in services for end-users. Moreover, the municipal service locations which are currently in expensive city centre could be moved to cheaper locations. Due to the personal nature of the video-to-video communication, it could also increase and encourage the number of entrepreneurs and hence leading to significant benefits in terms of job creation. The demand for new services will also promote the modernization of existing and building of new telecommunication infrastructures. In addition, it is hard to associate monetary value on improved citizens' education and healthcare (by improving engagement between health and social care workers and patients as well as teachers and learners). However, there are several benefits which could be highlighted such as: (a) providing high quality education to citizens in remote areas or those home bound, at a cheaper price, as this could be done through the use of video communication by a remote expert; (b) decreasing the travel time, and hence the cost for the medical staff (to travel to the patients who are home bound) or patients (to travel to the hospital); and (c) decreasing the number of days the patients spend in the hospital and hence the costs by continuous monitoring of the patients and being able to make a more informed decision about his/her condition.

6 Summary

The integration of innovative ICT technologies can help in playing an integral role in delivering better-personalised e-government services. In this respect, utilising high definition video technology in the provisioning of public services provides an interactive and engaging virtual environment emulating the traditional way of face-to-face contact offered in physical premises. This paper established a valuable insight on how when such innovative technology is integrated within e-government could overcome some of the existing challenges related to citizens' adoption of electronic services such as trust, skills, accessibility, usability and usefulness. The examples examined in the paper verified that V2V in the e-government context could help in enriching citizens' experiences and facilitating their engagement. The authors recognise that this can be extended into other existing technological platforms (e.g. personal computers, tablet devices, mobile phones and digital TV), and this can lead to an overall better e-government services delivery for all. By doing so, this will ensure that citizens will have better accessibility to public services and at the same time lowering costs of services through sharing of resources and skills across various service domains and locations. The discussions offered and arguments presented in this paper are based on a research project that is currently being undertaken by the authors as part of a consortium that is funded by the European Commission. This project is funded under the ICT PSP program of the EC and is entitled LiveCity. Finally, while the authors acknowledge the positive impact and benefits of integrating video technology in e-government services, there are many technical and process related challenges that the LiveCity project is working towards tackling in the piloting stages of the project. Findings from these pilots will be reported in forthcoming research.

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