

Preface

EXAMINING THE IMPACT OF UTILISING VIDEO TO VIDEO TECHNOLOGY FOR DELIVERING PUBLIC SECTOR SERVICES

1. INTRODUCTION

Since the introduction of electronic government as a mainstream mechanism for delivering public services over a decade ago, a persistent problem that has hindered its adoption and diffusion has been the poor take up by citizens. Although various governments have successfully piloted other channels of service delivery such as mobile applications (or mobile government) or digital TV, the impact of these channels are yet to be proven on a broader scale. Studies have shown that the average citizen often prefers to have face to face contact when dealing with public services and this is particularly true for complex services such as health, education and social or domestic services such as social security, housing or employment. While many public sector agencies have succeeded in transforming these simple customer facing services such as payments for services or fines or renewal of applications through the use of e-government, others have struggled to facilitate the more complex services through e-government. 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. Prior research in the field has indeed suggested that socially and economically disadvantaged communities such as the elderly, poor, and disabled are often less engaged with e-government due numerous issues such as lack of access, trust, awareness, usability, et cetera.

In this preface, the authors propose the use of video technology as an alternative and complementary mechanism to replicate both traditional face to face contact and e-government in the provisioning of public services. Authors posit that citizens who are less comfortable or are not enticed to use electronic services due to influencing factors such as trust in e-services, skills, 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. Moreover, the V2V approach can facilitate all existing channels that are used to offer e-government services such as personal computers,

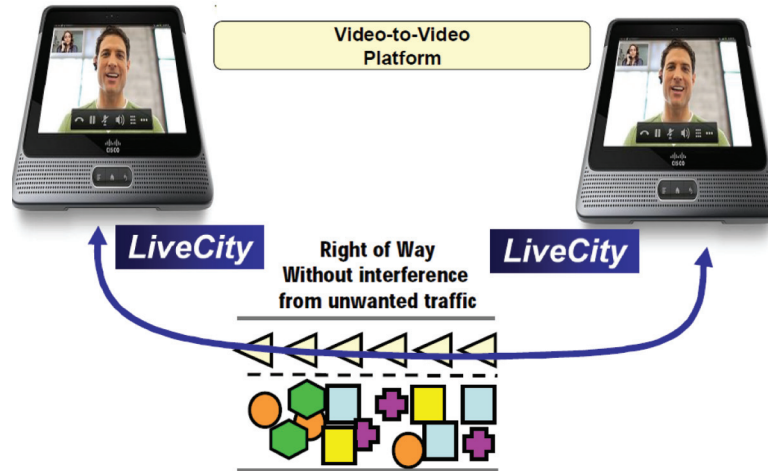
tablet devices, mobile phones, and digital TV. This will not only ensure that more personalised services are offered to users, but also that all the features of modern hardware devices used to offer these services are fully exploited by the public sector for benefit of their citizens. Furthermore, in areas such as health and education, the impact and value of using V2V cannot be understated. For instance, in health, V2V can contribute to saving lives as well as offering a platform for learning and teaching. Similarly, in education, V2V has potential for many applications in the virtual learning space.

This preface discusses the potential of using high definition video on the Internet to provide public services and the associated benefits it can offer society. In order to do so, it is structured as follows. The next section offers a brief overview of how V2V will work on the Internet followed by examples of the application of V2V in the public sector. This is followed by highlighting examples of how V2V may work in the provisioning of healthcare, education and city or municipality services and the associated benefits to society. Finally, the preface summarises the key benefits offered in the use of V2V technology for public services and concludes by outlining the future directions for the use V2V services in the public sector.

2. THE USE OF HIGH DEFINITION VIDEO IN PUBLIC INFRASTRUCTURE

The concept of using V2V in public services via various applications such as Skype, Google Chat, and FaceTime is not necessarily new. Yet, although these applications are used by millions of users across the globe for business and social or personal purposes, when they are used in public infrastructure, are often limited by technological constraints and cannot extend beyond certain boundaries. This leads to a low image definition, image stuttering, and delays for the user. Such issues result in poor user experience and users are often not able to assimilate the information contained in the video. The authors propose the concept of high definition V2V transmission on the Internet to overcome such problems by using Right of Way (RoW) (see Figure 1) to guarantee a lack of interference from non-desired traffic. The method of RoW has been previously used in some specific virtual private networks (VPNs) by employing appropriate Quality of Service (QoS) based mechanisms. However, the use of RoW that guarantees no interference from unwanted traffic is not offered presently on the mass market. This preface suggests the use of RoW on the public infrastructure (Internet) to allow video traffic to have a guaranteed bandwidth that can alleviate the problems that appear when delivering video together with other unwanted traffic. As such, the authors posit that their solution not only eliminates some of the QoS related problems faced by applications currently available in the mass market (such as Skype and Google video chat) but also offers mechanism for facilitating better services in a number of domains in both the private and public sector. In a public sector context, as outlined in figure 1, the use of high definition (HD) video on demand has the potential to create a LiveCity environment where citizens can be more closely linked with each other and their governments wherever they are (irrespective of location) during their daily life routines. Such an environment will provide the platform where two users can communicate through video using RoW. RoW will ensure that the video traffic is prioritised over other Internet traffic “best effort” enabling an improved quality that will lead to a more realistic virtual presence among users, hence increasing the acceptance of the service that makes use of V2V transmission (Coudriet & Babich, 2012).

Figure 1. High definition video to video communication using right of way



3. APPLICATIONS OF VIDEO-TO-VIDEO IN PUBLIC SERVICES

This research is built on the concept of community and of HD V2V public services that are provided to meet community needs. There are several core public services on which video to video can be delivered such as *Education* (teachers and school children) (Chochliourous et al., 2012), *Public Administration* (municipal administrators in cities) (Weerakkody et al., 2012), *Health* (ambulances, patients, doctors, and nurses) (Stamatelatos et al., 2012), and *City Experience* (museums, tourist, and culture consumers). All these services have different challenges that could be addressed by using HD V2V. Although in some of these services several applications of V2V use already exist, what is proposed here goes beyond these applications and uses RoW in order to get better image quality in V2V. The following examples demonstrates how V2V can be utilised in education, health and city experience.

3.1 Education

Collaborative learning has been shown to have a positive impact on learner experience and achievements (Gokhale, 1995; Johnson & Johnson, 1986; Weerakkody et al., 2012). In this respect, a high definition V2V environment has the potential to facilitate learning and teaching regardless of the learners' and teachers' locations. Using the LiveCity concept, a range of collaborative projects could be implemented in an educational context by connecting schools from different locations. These projects can have different goals such as promoting literacy or improving sports education. Promoting literacy can be achieved where students from different schools can read to each other and discuss a local piece of historical folklore/legend using V2V. This would not only improve literacy but can also improve students' knowledge about each other's heritage. Other scenarios could involve collaborative writing in which students from different schools are paired together to create a story. The pedagogical experience is enhanced this way, by using video-to-video conferences. In these conferences, children could discuss each other's work and improve their critical analysis skills. In sports education, students can showcase a sport that is popular only

in their area and during the video conference they will have the opportunity to discuss their experience of this sport with students from other schools located in different areas. V2V can also enhance students' skills where video can be used as a form of assessment through which feedback is given.

3.2 Health

As illnesses often mean a downturn in people's life, health services are probably the most important component of this V2V environment. Today, most health care services offered are either face to face or through voice. When due to various reasons face to face communication is not possible a high definition V2V connection between medical staff and patient can provide richer information and hence a better medical advice/diagnostic. Health services that could benefit by using HD V2V can be classified into: *remote emergency rooms* and *preventive healthcare by tele-consultation and tele-monitoring*. For example, in a city *emergency* case, the baseline is communication by voice. Voice based radio connections and mobile phone connections are available in ambulance and emergency departments in hospitals. Many emergency services have or will be updated with data communications and therefore video can be utilised to provide more information which can help to enhance patient initial diagnostics and decision making regarding treatment options and outcomes. For example, if the emergency personnel need help from the emergency doctor, currently the doctor is able to find information about the patient through the phone, but he cannot see the patient or the results of the analysis performed by the ambulance crew. Having access to this information, a more informed decision can be made about the patient treatment, thus enhancing his chance of recovery. Likewise, usage of HD V2V in *preventive healthcare* can be done through *tele-consultation* and *tele-monitoring*. This would eliminate the need of being physically present in a hospital. This is important especially for patients that need intensive home monitoring by the hospital personnel (GPs, nurses, specialists), as is the case for diabetic patients.

3.3 City Experience

Today, most city administrative services that are available on an over the counter basis are also available online. One constraint that online services have is that the human element is missing. This can be important especially for elderly citizens or in cases where information queries exist or where there is complexity in the nature of the enquiry. Multiple administrative services could be provided by town councils through V2V. These services can be classified into two categories: *Administrative Processes Services* (for example, registration services, statistics, and municipal register of inhabitants, online benefits services, and council tax services) and *Information for Citizens Services* whose objective is to provide general information to citizens and, if appropriate, to transfer the question to another *Administrative Processes Service*. Citizens will be able to access these services in various locations using V2V such as local libraries and dedicated public places in the city. Furthermore, by using V2V, public administrations can create a friendlier alternative to existing e-government services. This can enable a two way communication between citizens and public administration that can facilitate citizens' engagement in decision making, an important aspect of the democratic environment. Moreover, V2V can be used to solve complex queries where a municipality worker can assist a citizen with his service needs by guiding them using a video link, and avoiding the necessity to travel to a physical office to solve his/her queries. In addition, a LiveCity V2V environment can enrich city experiences of citizens or visitors by enabling them to encounter local culture and history through connecting museums and allowing people to interact with exhibits and items of historical or cultural value.

4 BENEFITS OF USING VIDEO TO VIDEO

There are several benefits that using HD V2V will bring to society. First, the RoW approach will enable HD video delivery without interference from other traffic that will alleviate some problems that video delivery currently faces and improve the user experience of video use on the Internet. Second, the LiveCity concept proposed in the article will be using an open set of heterogeneous tools and applications to bridge the gap between existing systems and the requirements of various user communities. Third, usage of HD V2V has various benefits for each of the services outlined above, as described below.

4.1 Education

Usage of HD V2V in education can derive several social and economic benefits. The social impact HD V2V could bring to education are manifold. Schools will have the ability to collaborate on projects regardless of their location, therefore allowing the sharing of resources and teachers facilitating cultural interchanges between schools across the world and therefore increasing awareness of arts, science, and social issues. By doing so, leading teachers will have the opportunity to provide classes to students across the globe facilitating skills transfer offered in better schools towards the less well performing schools between pupils and between teachers, in a cost-efficient way. Furthermore, V2V will allow the easier provisioning of teacher training facilities between schools and training centres resulting in the ability to create richer educational experiences and pupil attainment. In addition, HD V2V will also offer the opportunity for parental involvement in education through the provision of teacher-parent training. All of the above will help improve education standards and, eventually, create a wide universal education system accessible in all sections of society and contribute to generating new a knowledge base, new ideas for learning and teaching through the use of video archives. Finally, the usage of HD V2V will also have economic impacts such as lowering the cost of learning and teaching through sharing of teachers and resources across various locations and the ability to increase the number of teachers and pupils who can undertake training.

4.2 Health

HD V2V in healthcare can be used in *remote emergency rooms* and *preventive healthcare by tele-consultation and tele-monitoring*. For both these services the use of HD V2V can have a significant impact on individual health and quality of life, therefore favourably impacting productivity. Consequently, this will have an impact on longevity (and, in return, in economic terms, on productivity). The value to the economy of improvements in life expectancy is of great importance and can be compared to all other consumption goods and services together. Among the benefits of using HD V2V in *remote emergency rooms* one could highlight: (i) the early availability of expert opinion at the scene when necessary; (ii) ability to optimise the patients' care by deciding which patients can be fast tracked to deliver lifesaving treatment earlier; (iii) earlier recognition of stroke can save lives and improve the chances of independent functioning; (iv) expedite decision making and improve the referral of such patients to the most appropriate centre; (v) earlier delivery of stroke thrombolysis (clot busting medicine) for appropriate patients; (vi) improve outcomes for patients suffering heart attacks by getting the right patient to the right people and the right place; (vii) ensure faster patient recovery, prevent unnecessary loss of life, prevent and minimise trauma in emergency and accident cases; (viii) save tax payers money on medica-

tion, hospital, treatment and compensation; (ix) prevent cases of litigation due to mis-diagnosis, improve healthcare services, encourage collaborative work in healthcare, and contribute towards achieving effective management of trauma situations; and (x) the potential learning opportunities for medical staff. For *preventive healthcare by tele-consultation and tele-monitoring*, patients could be provided with faster and more reliable video feeds and medical telemetry tests (tele-diagnosis and tele-monitoring). HD V2V can facilitate and improve the quality of the health service as more often than usual contacts may improve the quality of life and the ambient living conditions for the diabetic patients. Furthermore, the following are examples of potential economic impacts: (i) savings to tax payers' money on medication, hospital, treatment, and compensation (i.e. sick benefits); (ii) preventing the economic impact that the loss of a bread winner may have on families; (iii) reducing the cost of medication due to reduced trauma scores as well as long term costs for patients and governments; (iv) earlier detections and better solutions to health problems via V2V should result in fewer complications and lower medical costs; (v) the availability of medical specialists via V2V will allow for more effective sharing between locations, therefore leading to greater efficiency, therefore lower cost-effectiveness ratio (it refers not only to education but also to tele-diagnosis of disease and tele-monitoring of the health status); (vi) provisioning of services locally so people do not have to travel far out of the community for their needs. For example spending on health care is an especially significant portion of any economy, especially in remote or rural communities and economies.

4.3 City Experience

The usage of HD V2V in municipal services will radically improve the access and range of e-government services available via the Internet. It will also illustrate to the wider community the potential benefits of face-to-face communication for specific services. In doing so, it will provide a number of societal and economic benefits. The social impact is realised by reducing the citizens need to travel to designated buildings in order to conduct local government or municipality services. This could result in a number of concrete benefits for individuals such as lowering travel time and road traffic and pollution, reducing the risk of accidents, or the need for moving into assisted living accommodation for elderly or infirm users by providing complex services via the Internet which would previously have required them to make a visit. Moreover, HD V2V will help improve face-to-face communication resulting in a better user-service provider relationship and improving trust and the uptake of new services as opposed to voice only or web based services. Furthermore, V2V will improve the accessibility and convenience of using e-government services for the less ICT savvy and other offline physical services for the disabled and elderly. For the government, V2V will reduce the cost of physical space needed to provide services to citizens and reduce the cycle time for service delivery and improve service adoption. In relation to arts and culture, they represent to a certain extent a reflection of our history and identity, being able to know more about each other's cultural heritage, and exchange ideas with people regardless of their location and cultural background, has also the potential to integrate us better in an increasingly globalised society. The usage of HD V2V to enhance the city experience can make this possible. For those not willing/having the time to travel, V2V can allow them access to historical and cultural experiences by interacting with its people.

5. SUMMARY

Electronic service delivery in the public sector is aimed at improving efficiency, effectiveness and transparency of governments. With the increasing demand on Internet and its services, public sector organisations have realised the importance of utilizing the relevant applications and technologies in engaging with citizens and other relevant stakeholders in order to ensure a better service delivery. Prior research in the field has indeed suggested that socially and economically disadvantaged communities such as the elderly, poor and disabled are often less engaged with electronic government services due numerous issues such as lack of access, trust, awareness, usability etc. This article offered some insights on how high definition video-to-video communication can be utilised in a number of public sector services in the context of health, education and city experience to overcome some of the current challenges. The article has shown how Right of Way (RoW) can enhance HD V2V delivery and the potential benefits and impacts a LiveCity environment can offer society in various services. The examples examined in the article demonstrated that utilising HD V2V in the public sector can have a valuable economic impact by lowering costs of services through sharing of resources and skills across various service domains and locations enriching citizens' experiences.

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ADDITIONAL READING

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