

# The Village Media Space: The Initial Design of an Asynchronous Media Space for Developing Countries

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## ABSTRACT

Family members in developing countries such as Kenya are faced with an environment of limited technology when trying to communicate with their remotely located family relatives. In rural parts of Kenya, many family members have access to mobile phones that they use to communicate with friends and relatives. Future video technology designs for these devices offer the opportunity for these families to share activities that happen in the village with their remotely located family members who live in large cities away from home where there is no technology limitation. To explore this design space, we have prototyped a mobile media space named the Village Media Space (VMS) that provides asynchronous video sharing between mobile phones or tablet PCs. Families can use the VMS to gather activity awareness and share videos of such activities with remotely located members. The features of VMS can help remote family members feel engaged with ongoing activities in the village or in large cities while at the same time feeling more connected with each other.

## Author Keywords

Video chat; video conferencing; developing countries; media spaces; asynchronous communication

## ACM Classification Keywords

H.5.3 [Information interfaces and presentation]: Group and Organization Interfaces - Computer Supported Cooperative Work;

**General Terms:** Design, Human Factors

## INTRODUCTION

Family members often want to share experiences and events in their lives even when they cannot be in the same location at the same time [3,6]. In many cases, at least one family member is often mobile for reasons related to work or study. For example, a person in a developing country like Kenya may have to leave his village to work in a large city. While away, he may want to stay aware of his family members' activities in his remotely-located home village. Similarly, the family members in the village are also interested in staying aware of his activities while he is in the city.



**Figure 1:** The Village Media Space running on a mobile phone (left) and a tablet (right).

One technology that typically supports family connections over distance is video chat (e.g., Skype). However, such systems cannot be supported with the limited technology that characterizes the rural village settings in developing countries like Kenya. Given this, we are interested in designing video communications technology that could support the sharing of activities between family members in a village setting that has limited technology [9] and their relatives who are located in large cities that do not experience technology limitation.

To explore this design space, we prototyped a mobile media space called the Village Media Space (VMS) (Figure 1) that provides asynchronous video sharing between mobile phones (e.g., Android smartphone) or tablet computers. Both of these devices represent basic computational technologies that are either in rural areas of Kenya already or will likely be there in the next few years. Family members in both a rural village and a large city in a developing country can use the media space to gather and record activities of their village or city life, and then share these activities with remote family members. We elaborate on the VMS's design in subsequent sections and explore how we envision the future of personal video communications to include systems that facilitate communication in areas of the world with low technological infrastructure.

## **THE VILLAGE MEDIA SPACE**

Most media spaces in the past have provided always-on video and/or audio connections [1]; however, in developing areas such as rural Kenya, the technological infrastructure is not currently capable of supporting continuous video streaming between two locations. This will likely remain the case for years to come. For this reason, we designed the VMS to support asynchronous video sharing where media is automatically shared when Internet connectivity is available.

For example, users can capture video clips of themselves, their surrounding, or their activities on their mobile device using the VMS. Once videos have been recorded and saved to the phone, the user does not have to manually send these video clips to a remote family member. To send the recorded videos to a remote user from either the village or a large city, the user only needs to go to an area with Internet access, e.g., at a cyber café for a family member in a village, or in an office or home environment in a large city. Once the user has Internet connectivity, the recorded media is automatically transmitted to an always-available server online. Then, when remote family members similarly travel with their mobile device to an area of Internet connectivity, any new content available for them is automatically downloaded from the server to their mobile device.

The automated sharing capabilities of the media space attempt to model the continuous sharing of content found in more traditional media spaces with the exception that content is shared asynchronously. The automated nature of sharing is also meant to ensure the media space remains a passive device where family members do not need to monitor if the saved videos have been relayed to the server or not.

Since the VMS uploads videos to a central server, it can share video amongst any number of devices. We expect it is best used in situations containing a small group, such as a family unit, where privacy concerns would be minimal.

## **USAGE SCENARIOS**

Through the VMS, remote family members will be able to monitor activities that are ongoing with their relatives both in the village and the large city. Even though the village family member will be hindered by technology limitation, the family member living in the city will be able to monitor village projects without the need to constantly travel to the village to physically monitor such activities should they need to be overseen by the remote family member. The village family member will also be able to follow the activities of their relatives who live in the large cities whenever they are able to access Internet in places such as an Internet café.

An example of this situation could be the monitoring of farming or ongoing construction work being performed in the village. In most developing countries, remote family members living in larger cities for work purposes provide

financial support for family who are in the village to engage in various projects. Through the use of the VMS, a remotely located family member in the city could receive video recordings from family members in the rural village showing the progress on any projects that are being undertaken in the village. Thus, family members can share activities with the remote member who is providing financial support for such projects seamlessly. Similarly, family members located in developed cities can record video clips of themselves or their environments to let family members know about their “new” life.

For some people in developing countries, children go away for schooling once they have reached adulthood. In this case, they are often gone for several years at a time and unable to return home due to the financial cost. The VMS could be used for sharing videos of activities in these situations. This could include church services, weddings, graduation ceremonies, or family discussions on important issues such as inheritance or burials.

We expect that the VMS will enable family members who are living apart from one another to feel “closer” simply by seeing the areas in which each person lives and by actually seeing the person. Family members could even share short greetings with each other or terms of endearment using the VMS.

## **RELATED SYSTEMS**

Many systems have been designed over the years to investigate the idea of media spaces with a lot of these systems being created for work environments [1]. For example, Computer Audio Video Enhanced Collaboration and Telepresence (CAVECAT) is a media space that enables small groups of individuals located in separate offices to engage in collaborative work. The CAVECAT system was used and evaluated with office workers who were collaborating on a project over a period of several months [4] in an office environment. While the VMS could be used from a work location, the goal behind the system is much different than CAVECAT and other work-based media spaces.

Research on media spaces has extended to the home environment through the Family Window (FW) project [3]. The FW was designed as an always-on video media space that connected two distance-separated family homes. The FW study used a design-oriented approach to answer questions about how families could use a media space to connect with each other from separate remote locations. Results from the FW study indicated that the system provided availability awareness, which led to interaction between family members. This, in turn, provided an avenue for sharing everyday life activities. The FW system was followed by, Family Portals (FP), a multi-family media space that could connect three homes with always-on video [4]. Results from its field deployment showed that family members, again, valued the always-on nature of the system,

except in situations where relationships were not as strong (e.g., son-in-law seeing parents-in-law). As mentioned, in an environment with limited technology, such as in rural Kenya, it is not possible to maintain an always-on video and audio connection between separate locations such as was the case with the FW and FP. This differentiates the VMS from both FW and FP.

The VMS is most similar in design to a mobile family media space called Peek-A-Boo (PAB) [8]. In PAB, users launch an application on a mobile device and instantly see a video feed from an in-home tablet display. Similarly, live video is automatically transmitted from the phone to the home when the application is running. In this way, family members have an always-on video link between the mobile phone and in-home tablet, when needed. The expectation is that family members who are mobile can share their activities with people who are at home, and vice-versa. For example, a father could share a ballet recital with a remotely located grandmother who is unable to come in person. The VMS is similar to PAB in terms of potential uses, however, the VMS is focused on asynchronous video as opposed to synchronous.

The VMS is also certainly related to Apple's FaceTime and Skype running on mobile phones. Again, the difference lies in synchronous (FaceTime and Skype) vs. asynchronous (VMS) sharing. As a general standard, people can also capture video clips on their mobile phones using the default software and send them to others (via text message or email); this is similar to the asynchronous sharing found in the VMS. The difference, however, is the automated nature of video sharing in the VMS. Rather than have to explicitly choose recipients and video clips to share, they are automatically sent to family members who have pre-joined a VMS sharing network. This design idea is similar to the "memory capturer" and "interconnected picture frame" concepts articulated in [7].

## DISCUSSION AND CONCLUSIONS

The next stage of our research involves further design iteration and evaluation of the VMS prototype to understand usability and design issues. Our particular emphasis is on understanding how the VMS will influence the family communications patterns of families living in rural areas of developing countries like Kenya. To this end, we are currently conducting a field study in rural and developed areas of Kenya to understand the existing family communication and awareness routines. We will use this understanding to iterate our design. Following this, we plan to evaluate it with real families in Kenya.

Overall, we feel the use of asynchronous video in developing countries is one future avenue for moving beyond "talking heads" to support the sharing of experiences that people have, even in areas where technological infrastructures are limited. In developing countries, the future of personal video communications will

generally take two separate paths. In the rural parts of the developing countries (supported by our current study) there is a group of families that do not have access to personal computers. However some family members in these parts of developing countries are able to operate simple mobile phones that can support video communication (an example of such phones is called Techno). The future of video communications for the rural family member lies in the ability to have a system that could be integrated in mobile phones so that they could directly call remote family members and then on receiving the call, the conversation could go live on video without much activity expected from the village family members. This is because most of the family members in the remote parts of the country have very limited knowledge of the use of computers and current video conferencing services that are widely available to support family communication. The nature of their lifestyles and economic situation also point to the notion that attaining computer literacy to the levels of being able to use personal computers or expensive phones for video conferencing is not practical.

The family members who live in large cities (e.g., Nairobi) in developing countries have access to all of the current video conferencing technologies and the knowledge required for using them. It is likely they will continue to use these technologies for communication in the large cities. However, if these family members are involved with activities that they would like to monitor from their rural communities, then the VMS provides them with an opportunity that is better than using existing mobile phone software for updates or travelling to the remote location. This would also save them the time and hassle that travelling requires in case they are busy with work or business activities.

## BIOGRAPHIES

*Erick Oduor* is a PhD student in the School of Interactive Arts + Technology at Simon Fraser University, Canada. He is investigating the challenges that are involved in the design of a media space that can assist family members who are separated by distance keep in touch with each other akin to how they would feel connected while at home. This includes designing for video technologies to support the everyday activities of people through space and time through the use of mobile devices.

*Carman Neustaedter* is an Assistant Professor in the School of Interactive Arts + Technology at Simon Fraser University, Canada. His research is in design, human-computer interaction, and domestic computing. Here he focuses on the design and use of technologies for connecting people who are separated by distance or time. This includes design for promoting family connectedness, support for workplace collaboration, and bringing people together through pervasive games. To learn more about his research group, the Connections Lab, visit <http://clab.iat.sfu.ca>

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