Comparison and evaluation of mass video notification methods used to assist Deaf people

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Abstract-In this work in progress paper a cost effective and efficient mass multimedia messaging system is explored. The intention is to adapt a successful text-based mass notification system, developed by a local non-governmental organization, to accommodate efficient and affordable video mass messaging for Deaf people. The questions that need to be asked are: How can we compare and evaluate various video streaming messaging methods to find the most effective streaming methods to deliver video messages? What transport vehicles should we consider: MMS, the web, electronic mail or a cell phone resident push/pull application? What is the cost to end user and service provider and how can we make such a service more affordable? How does the video quality in terms of sign language vary between each transport vehicle? Although Deaf people are accustomed to mobile text messaging, they prefer to communicate in sign language. Work related to these aims, the methods planned to achieve these goals, initial work and prototypes will be described. A project plan for this work in progress will be mapped out.

Index Terms—video streaming, mobile phone, South African sign language, cost effective and efficient delivery, mass notification

I. Introduction

Deaf with a capital 'D' refers to people whose first language is sign language and who are members of a specific linguistic culture group. Most South African Deaf people are functionally illiterate. This means that although they may be able to read and write a few words of a spoken and written language like English, they cannot read or write well enough to deal with the requirements of everyday life [1] [2]. Deaf people in South Africa communicate with each other and the broader community by means of South African Sign Language (SASL). It has been found that the majority of Deaf people all over the world use Short Message Services (SMS) to communicate and share information with hearing people and less often amongst themselves [3]. However, their level of literacy prevents effective dissemination of information via SMS and therefore Multimedia Messages Services (MMS) will be considered as a mode for information dissemination because of its ability to carry sign language content.

This paper describes a work in progress to compare and evaluate different modes/methods of video mass messaging. The questions that need to be asked are: How can we compare and evaluate various video streaming messaging methods to find the most effective streaming methods to deliver video messages? What transport vehicles should we consider: MMS, the web, electronic mail or a cell phone resident push/pull application? What is the cost to end user and service provider and how can we make such a service more affordable? How does the video quality in terms of sign language vary between each transport vehicle?

Cell-Life (www.cell-life.org) is a non-governmental organization (NGO) that currently uses mass messaging with a system called Mobilisr on cell phones to provide services to people infected or affected by the Human Immunodeficiency Virus (HIV). The service is used for the dissemination of information in order to prevent infection and also to notify organization members of events, the latest news and when they need to take their medicines. It is worth noting that for the messages to be useful, the receiver must be able to read and interpret the message. Deaf people cannot always use the information they receive via SMS effectively due to text illiteracy. Deaf people would be better served if they could be notified by means of a SASL message, i.e. a video message.

We propose to modify the Mobilisr software to allow for video messaging. Video streaming is a technique used for transferring data as a constant continuous stream over the Internet and is used worldwide to transfer multimedia files such as video, voice and data [4]. The architecture of the different video notifications solutions will be examined to discover which of the alternative video notifications delivery modes is the most effective in terms of transport, comprehension and cost.

The rest of the paper is organised as follows. Section II covers related work. Section III describes video messaging alternatives to evaluate and how to compare and evaluate them. Section IV concludes and identifies future work.

II. Related Work

In this section existing work related to this research project will be discussed. We will look two examples MobileASL a mobile video system make use of compression and decompression methods to avoid too much bandwidth usage and Mobilisr mass text messaging system. MobileASL was developed at the University of Washington for Deaf people using American Sign Language (ASL). Its purpose is to support wireless cell phone communication of ASL. MobileASL employs region-of- interest (ROI) methods on the sign language video to focus on the hand movements and the face of the signer within the video [5].

Mobilisr is an open source mobile platform that was developed by Cell-Life with Praekelt Foundation. The mobilisr application was designed to run on cell phones. It provides services to people infected or affected by HIV. This application increased access to information for HIV infected people.

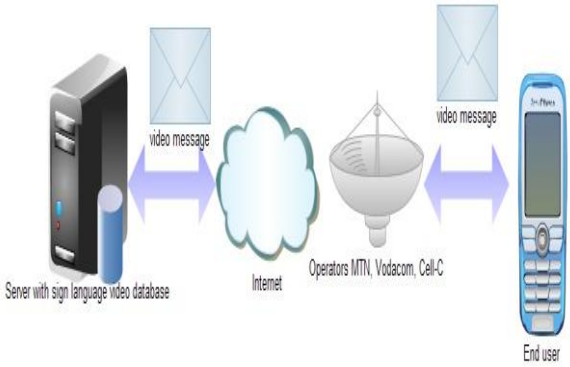

Figure 1: Mobilisr client/server architecture.

III. Video Messaging Alternatives and Methods

This section suggests some alternative video message delivery approaches on mobile phones and describes how we intend to compare and evaluate resulting prototypes to answer the research questions identified in Section I. The research methods will triangulate quantities performance and cost data with qualitative data collected from Deaf end-users via ethnographically-inspired methods such as user observation, interviews and surveys, all conducted with the help of a South African sign language interpreter.

Alternative video messaging approaches include SMS with a web-link to a video to be streamed by a web browser, MMS instead of SMS, e-mail with a web-link or video as attachment, and a phone-resident video push/pull application.

We will build a prototype for each alternative based on Mobilisr's client/server architecture (see Figure 1). Each prototype will be instrumented to collect performance data that can later be used to determine cost, e.g. the number of bytes transmitted for a particular type of video delivery can be used to compare costs at some number of rands per megabyte.

Prototypes will be developed and tested in conjunction with members of a Deaf NGO called the Deaf Community of Cape Town (DCCT). Deaf end-users will help determine the effectiveness of the various video delivery mechanisms because some will present sign language better than others. We will collect this data qualitatively with aforementioned ethnographically-inspired techniques. Then the quantitative performance and cost data can be triangulated with qualitative feedback from Deaf users to arrive at an optimal mass video messaging technique. This process is shown in Figure 2.

IV. Conclusion and Future Work

The intention of this project is to adapt a successful text-based mass notification system, developed by a local non-governmental organization to accommodate efficient affordable video messaging for Deaf people. . The research methods will triangulate quantities performance and cost data with qualitative data collected from Deaf end-users via ethnographically-inspired methods such as user observation, interviews and surveys, all conducted with the help of a South African sign language interpreter.

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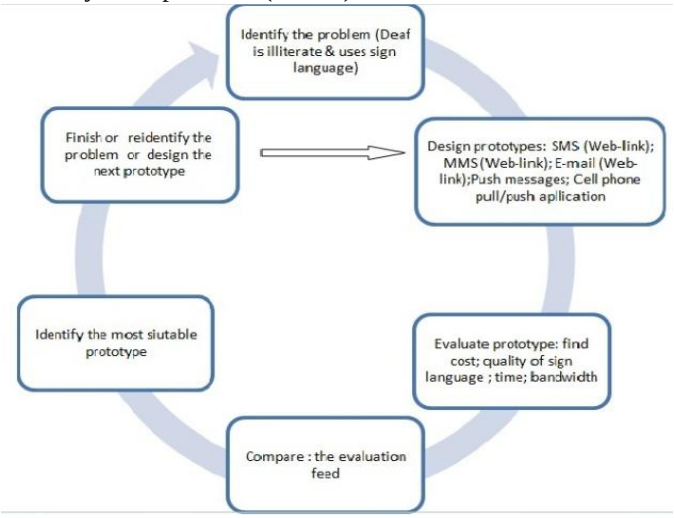

Figure 2: Prototype comparison and evaluation process.

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