DocTalk: Extending Doctors' Visits with Personalized Voice Messages

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ABSTRACT

Because doctors are scarce in developing regions, they often lack the time to provide detailed counseling to every patient. In this paper, we propose DocTalk: a system that extends doctors' visits by allowing them to share pre-recorded audio messages, in their own voice, to patients with low-end mobile phones. DocTalk uses a combination of SMS and interactive voice response (IVR) to orchestrate this communication between doctors and patients. We describe the design and implementation of the system, as well as feedback gathered in conversations with 21 doctors in urban India.

1. INTRODUCTION

It is not uncommon for doctors in rural India to see up to 100 patients per day [2, 9]. Under such conditions, the limited time available for each patient quickly becomes a bottleneck to delivering quality care. Even if many patients have similar ailments and can be diagnosed quickly, time constraints make it impossible for doctors to provide the detailed instructions and counseling that would often make a difference in their recovery. While patients can (and do) turn to other sources of information to substitute for the lack of doctor attention, often the only alternatives are unlicensed practitioners that can sometimes do more harm than good. And while there are electronic resources for high-income individuals to seek expert medical advice, e.g., via Internet portals such as WebMD, these resources remain out-of-reach for low-literate, low-income populations in remote areas.

In this project, our goal is to explore whether mobile phones can be used to amplify the effectiveness of doctors' time in over-crowded clinics. Our key insight is that, if doctors were to spend more time counseling each patient, much of this counseling would be repetitive, because the majority of patients come with similar conditions, such as diarrhea, fever, pneumonia, malaria, and others [5]. Thus, instead of doing a live counseling session for each patient, can we record a single counseling session – recorded once in compassionate and meticulous detail – and make the audio available for all subsequent patients? This is the idea underlying DocTalk.

DocTalk is a system that utilizes SMS and interactive voice response (IVR) to enable doctors to record and share audio messages with patients. While other researchers have sought to make health information available via IVR [4, 8], or have built platforms that could be used for this purpose [1, 3, 6], DocTalk is unique in that it preserves the personal relationship between doctors and patients. Patients are "prescribed" a message during their face-to-face meeting with the doctor, and when they listen to the message later, it is in their doctor's voice. As shown previously in IVR systems for low-income populations in India [7], users are much more likely to listen to a voice message over the phone if they recognize and trust the person who made the recording – in this case, the patient's own doctor.

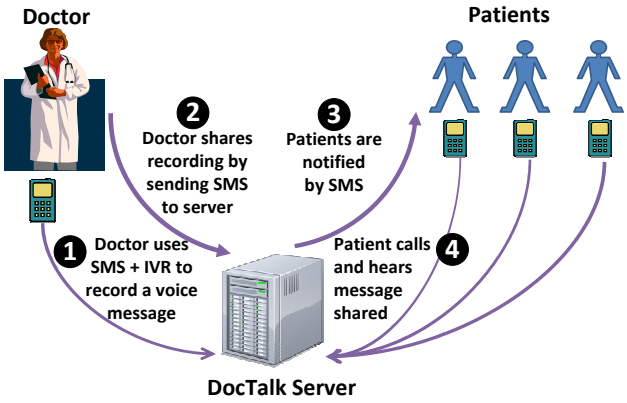

Figure 1: Overview of DocTalk.

In this poster presentation, we report on the design, implementation, and early reception of DocTalk amongst 21 doctors in urban India. While our system is fully functional, and we received positive feedback from most doctors interviewed, there has also been some hesitancy to adopt the system in the context that we studied.

2. USAGE SCENARIO

An overview of the DocTalk system from a user's perspective appears in Figure 1. Figure 2 gives more detail on each of the SMS commands available to doctors.

To understand the system, consider an example scenario. Let's say that a general physician encounters many cases of fever in her daily practice. To prepare a message for her patients, she sends an SMS with the string "record fever" (optionally abbreviated as "r fever") to DocTalk. The system responds by calling her back and asking her to record her message after the beep. When she is finished, this recording is saved with the label "fever". Later, in the field, this doctor encounters a patient whose symptoms are a good match for the message she recorded earlier. The doctor shares the recording with the patient by sending DocTalk an SMS read-

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RECORD *message-id* DocTalk calls the doctor back and allows her to record an audio message. The message is saved and bound to the given alpha-numeric ID.
SHARE *message-id phone-number* DocTalk adds the message with the given ID to the playback queue for the given phone number. The patient is also sent an SMS to notify them that a new message is available.
DELETE *message-id* DocTalk deletes the given message and removes it from the playback queue of all patients with whom it had been shared.

Figure 2: SMS command set. Users can optionally shorten commands to their first letter (R, S, or D).

ing "share fever 0123456789" (optionally abbreviated "s fever 0123456789"), where the last field represents the patient's phone number. Upon receiving this SMS, DocTalk assigns the audio recording for fever to the patient's personal playback list. It also sends the patient an SMS notification that this recording is now available for listening. From here on, the patient can call DocTalk at any time and listen to all prescribed messages in reverse chronological order. DocTalk recognizes the caller ID of the patient and only plays messages that the doctor has shared with him or her.

DocTalk offers several potential benefits to both doctors and patients. Patients benefit by gaining access to detailed counseling from their doctor. Previously unavailable due to time constraints, this session is now recorded and available on demand whenever a patient is unsure about their diagnosis. The audio interface caters to low-literate patients, and the IVR system is very simple to use (no menu navigation or keypresses are required). As described previously, doctors reap benefits by providing better care and saving time: not only via more efficient counseling of patients, but also potentially by decreasing the (large) number of follow-up phone calls from patients who have questions or concerns. The system could also have particular benefit for pharmacists, as they prescribe instructions for taking medications that patients often forget or misunderstand.

3. INITIAL DEPLOYMENT

We implemented DocTalk using a variant of IVR Junction [10], an open system which runs on Windows and uses Voxeo Prophecy as the IVR engine. We utilized a Topex Mobilink IP GSM modem.

Over a period of 10 weeks in summer, 2012, we explored possible deployments for DocTalk amongst private practitioners in urban India. We met with a total of 21 doctors: 18 in Bangalore, and 3 in Mumbai. Via personal contacts, we targeted primarily physicians and surgeons, in both private and public hospitals, with a preference for settings catering to low-income patients.

Overall, doctors offered positive feedback for DocTalk. Even without us having a strong connection to most doctors, more than half of them scheduled a second meeting to discuss in more detail. One doctor invited us to address the entire surgical society of Bangalore, where the concept was well-received.

However, despite the enthusiastic conversations, most doctors were hesitant to become the first users of DocTalk. While two doctors recorded messages using the system, and expressed the intent to share these recordings with patients, ultimately they did not do so.

We believe that several factors were at play in hampering rapid uptake of DocTalk amongst this population. The most simple reason is that which motivates DocTalk in the first place: doctors are busy. Given their demanding schedules, they are hesitant to invest time to learn the system and record messages unless they are sure it is going to deliver value for them. Some conversations had an inflection point when a doctor asked excitedly, "who else is using the system?" However appealing the concept may be to doctors, there was hesitancy to being user #1.

Doctors also voiced other concerns about the system. Some questioned whether they could lose credibility if one of their recordings was played out of context, or even face legal liability if their recordings were misused.

4. CONCLUSIONS

We have presented DocTalk: an innovative platform that allows doctors to share pre-recorded voice messages with patients, all using low-end mobile phones. In future work, we think we could gain more traction by enlisting the support of leading health institutions, instead of private practitioners who may be more risk-averse regarding their personal practice. A smart phone application might make it easier for doctors to record and prescribe messages. We could also leverage feedback from patients – absent as of yet – to help persuade doctors as to the benefits of the system.

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