SHARING INFORMATION IN RURAL COMMUNITIES THROUGH VOICE INTERACTION

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Most of the world’s poor depend on agriculture

World’s extreme poor: 71% of 1.2B are rural

India: 600M agriculture-dependent lives

Majority smallholders (< 3 acres)
Earning < $750/yr; Debts > $300/yr
Agricultural Extension

Dissemination of expert advice and technologies to rural communities

100,000 extension officers in India

Not comprehensive
Not on-demand
A Case for Voice Interaction
Why voice?

Works with all phones

Overcomes literacy constraint

Voice preferred to text

Voice for development

Advancement through Interactive Radio [ICTD 2007]

FreedomFone [ICTD 2009]

HealthLine [ICTD 2007]

IBM VoiceSites [ICTD 2009]

Source: International Telecommunications Union, www.itu.int
Research probe: Avaaj Otalo

For information access and sharing
  Users: low/no education, low literacy, computer novices

Interactive voice response (IVR) in Gujarati
  Dial a number, navigate automated prompts

Record question; listen to posted questions; answer a question
Listening to questions on AO

AO:  
<tune> Welcome to Avaaj Otalo!
You can get to the information by saying a single word.
To ask a question, say ‘question’.
To listen to announcements, say ‘announcements’.
To listen to the radio program, say ‘radio’.

User:  Question.

AO:  Okay, you want to ask a question.
To record a question, say ‘record’.
To listen to other farmers’ questions and answers, say ‘questions’.

User:  Questions.

AO:  Okay, you’ll now hear the most recently posted questions & answers. Here is the first question...
Development Support Center

Non-governmental organization for natural resource management and agricultural productivity enhancement
Three features

ANNOUNCEMENTS

RADIO ARCHIVE

QUESTION AND ANSWER

Sketches courtesy of Bill Verplank
Piloting Avaaj Otalo

Goals
- Gather feedback about functionality
- Observe usage patterns
- Give DSC administration experience

Participants
- 63 males (all but 2 were farmers)
- Across 4 geographic regions of Gujarat
- Native Gujarati speakers
- Age 18 - 60 (median: 29)
- 80% no more than high school education
- No experience with computers or IVRs
Pilot (63 farmers)
Pilot (63 farmers) v. 2011 (488 farmers)

- Toll-free: 240 calls/week
- Metered: 94 calls/week
Lower call duration by 60%
Forum browsing and peer responding hit hardest

Nearly 0% of responses from farmers
What to do about metering?

Easy! Make it cheap (or free) to access but...
not practical for constrained budgets
What “freebie” encourages usage and social interaction?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREE CALL</td>
<td>Call into system for free</td>
</tr>
<tr>
<td>FREE RECORD</td>
<td>Record question, comment, or other feedback for free</td>
</tr>
<tr>
<td>FREE RATE</td>
<td>Rate a message for free</td>
</tr>
</tbody>
</table>

Hypotheses
- CALL will lead to more usage
- RECORD will lead to more usage and contribution.

w/ Klemmer and Parikh
Measures

Number of calls
Number of message posts
Interviews
Greetings! Here’s today’s information of the day

<Spotlighted info>

Your feedback is very important to us...

Please hold to be connected to AO...

Please record a question, comment, or feedback...

Please rate this message according to this scale...

w/ Klemmer and Parikh
## Broadcast calls made

<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>Pickups/Attempts</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREE CALL</td>
<td>138</td>
<td>993/1400</td>
<td>271</td>
</tr>
<tr>
<td>FREE REC</td>
<td>137</td>
<td>990/1489</td>
<td>65</td>
</tr>
<tr>
<td>FREE RATE</td>
<td>138</td>
<td>933/1382</td>
<td>303</td>
</tr>
</tbody>
</table>

w/ Klemmer and Parikh
Time on the system varied between conditions...

All pairs $p < .05$ using t-tests

<table>
<thead>
<tr>
<th>Use/Participant (min)</th>
<th>CALL</th>
<th>REC</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>53</td>
<td>35</td>
<td>18</td>
</tr>
</tbody>
</table>
...but less unsubsidized calling

“I used to call before but I don’t call now as I have started to get calls from AO.”

CALL (t=3.33), RATE (t=5.14) p<.01
More messages with free calling and recording

CALL (|t|=3.93), REC (|t|=3.23) > RATE p<.01
Free calling led to more use, but not more recording

- **Use/Participant (min)**
  - Free Call: 53 min
  - Free Rec: 35 min
  - $t = -2.56, p < .05$

- **msgs/Participant**
  - No significant difference between Free Call and Free Rec

w/ Klemmer and Parikh
Thanks to...

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http://hci.stanford.edu/research/voice4all