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Job Opportunities through Entertainment: Virally Spread Speech-Based Services for Low-Literate Users

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Our Long Term Vision

**Speech-based information access
for low-literate people
in underdeveloped countries**

Examples of information services:

- speech-based Craig's List
- speech-based citizen journalism
- speech-based message boards/blogs
- health, agriculture, jobs, education,...
- ...

How can we reach the low-literate?

Speech over simple phones is a viable way to reach low-literate people in underdeveloped countries



Problem 1: User Training

Even simple IVR systems are often a challenge for the low-literate

Speech Interfaces usually require user training

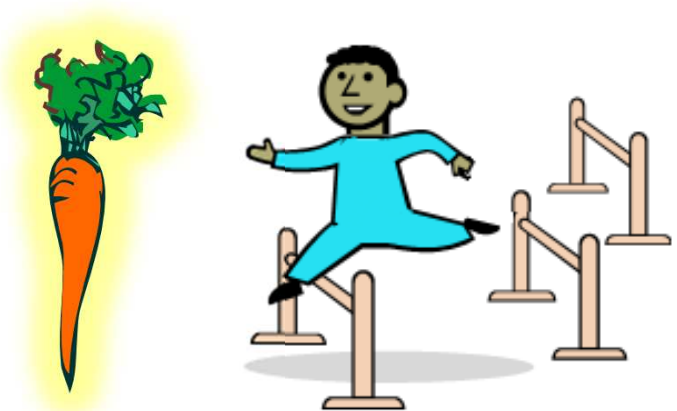
e.g. Healthline (Sherwani et al 2009), Avaaj Otalo (Patel et al 2010)

Explicit training is not a scalable solution

Solution: Incentivize people to train themselves

“Where there's a will there's a way...” [Smyth et al 2010]

“Entertainment turns UI Barriers
into mere speed bumps”

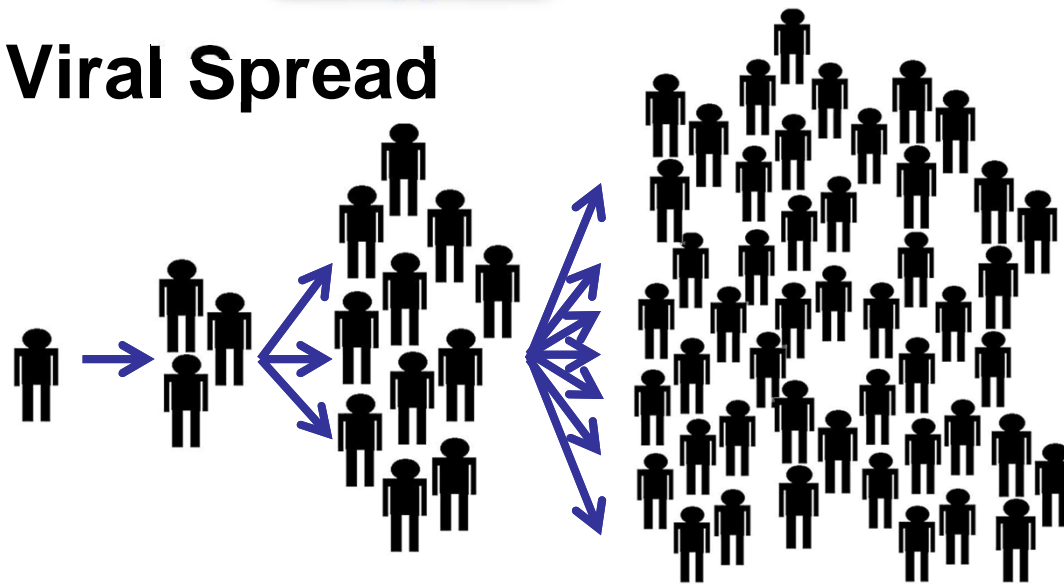


Problem 2: How to Mass Disseminate?

How to advertise / communicate to masses who don't read?



Solution: Viral Spread



Goal of this work

Develop ***Viral Entertainment*** as a vehicle for disseminating ***Development*** related telephone based services

1. **Introduce** and **popularize** speech interfaces
2. Use Entertainment as a **Viral Conduit** for delivering **core development services**
3. Setup an **Experimental Testbed** for testing speech interface choices
4. Provide **Entertainment**

Polly (میاں مسٹھو)

Polly is a **telephone-based, voice-based** application which allows users to make a short recording of their voice, **modify it** and **send the modified version to friends**.



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This brief video depicts a typical user interaction with Polly

USER INTERFACE

First Information Service: Job Audio-Browser



1. Scan Pakistani newspapers for jobs for low-skilled workers



Ref: paperpk.com



2. Record these ads
3. Invite Polly's users to audio-browse them

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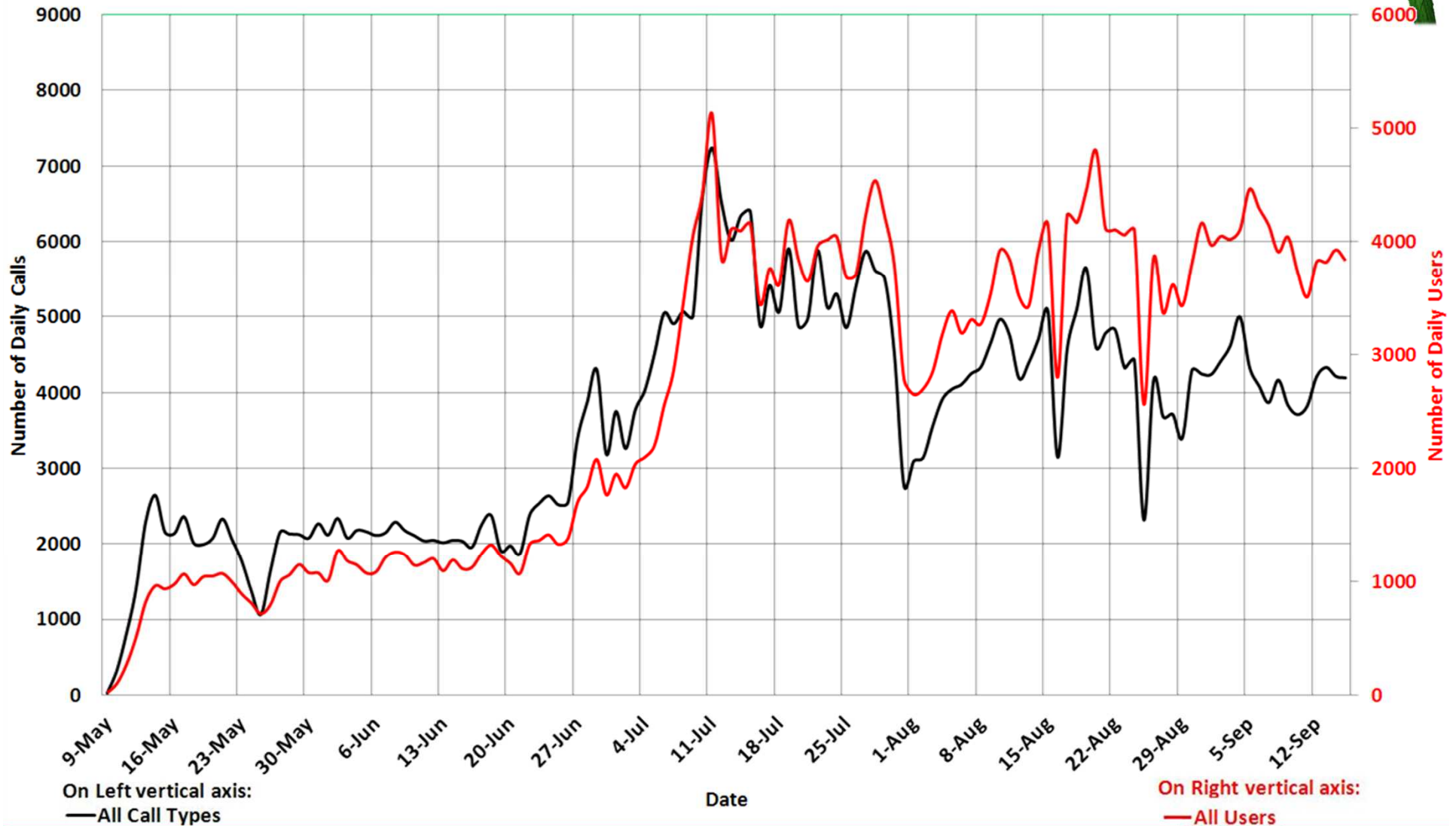
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2012 – Large Scale Deployment



- Launched on May 09, 2012:
 - Gave the phone number to **5 low-literate people**
- After **141** days (mid-September 2012):
 - **495,000** calls
 - **85,000** users
 - Spreading to **1,000 new people daily**
 - **27,000** people used the job search service
 - listened **279,000** times to job ads
 - and forwarded them **22,000** times to their friends.

2012 – Large Scale Deployment



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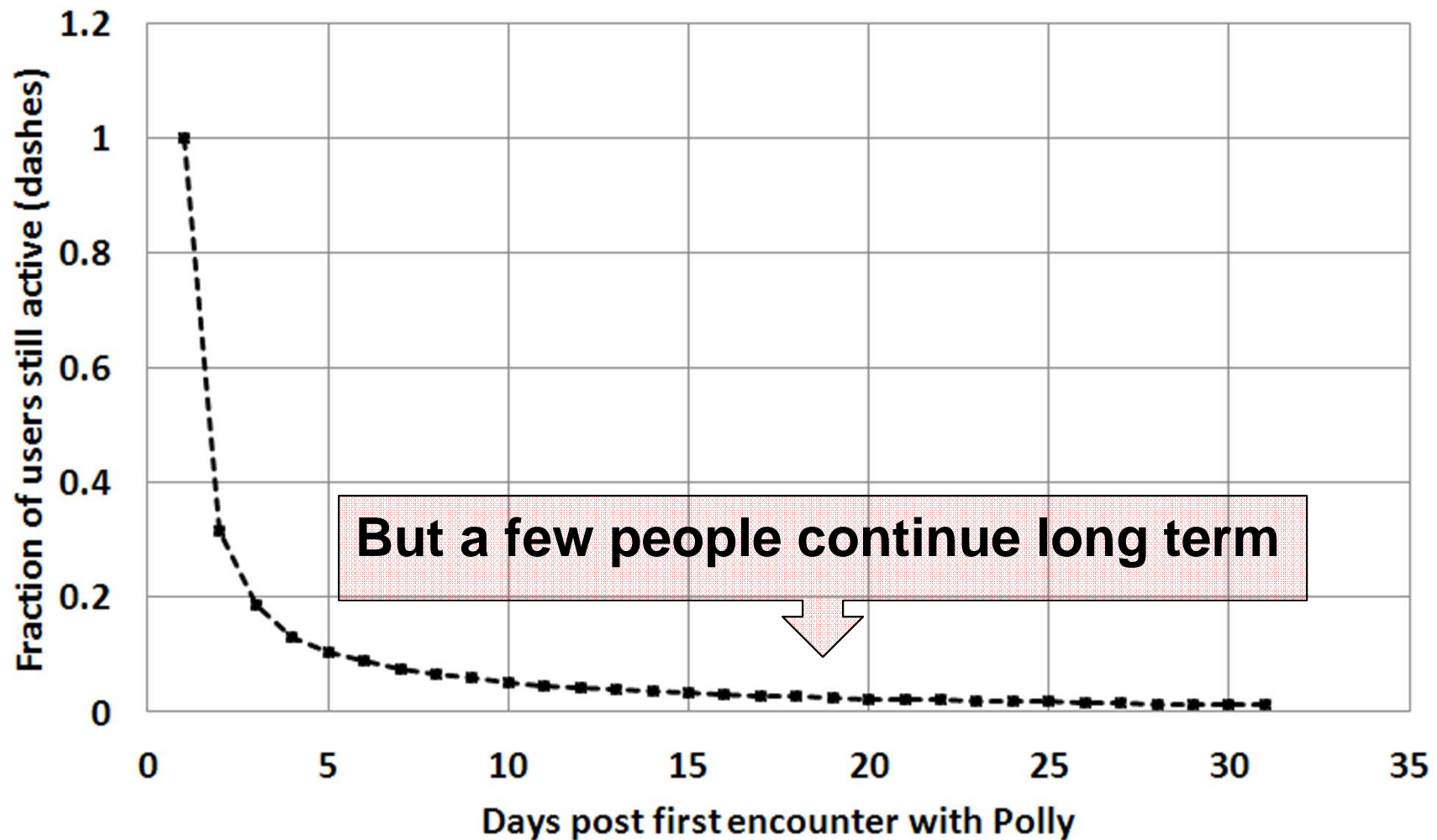
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Enthusiasm is Lost Quickly:

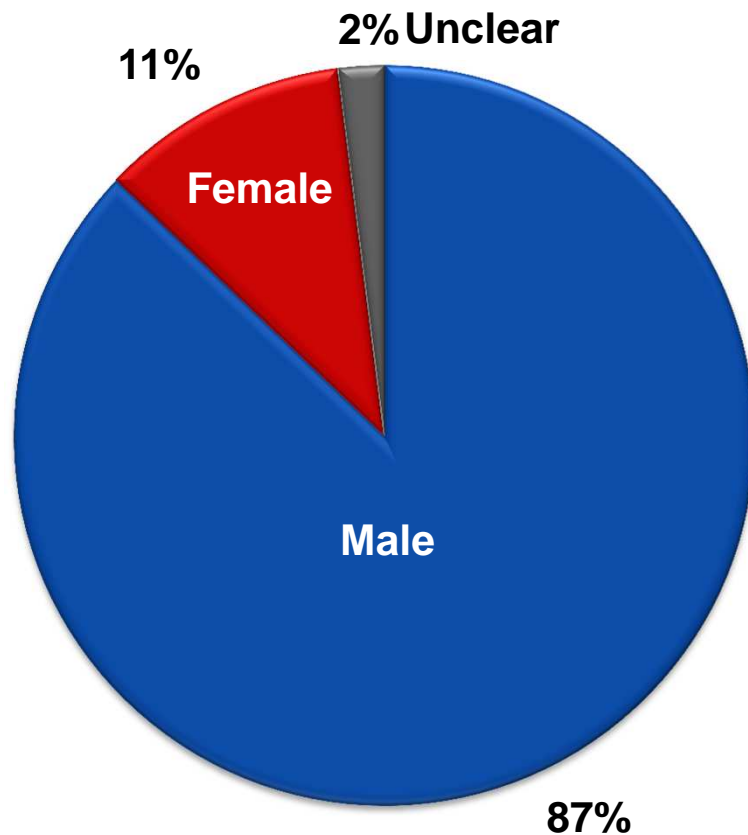




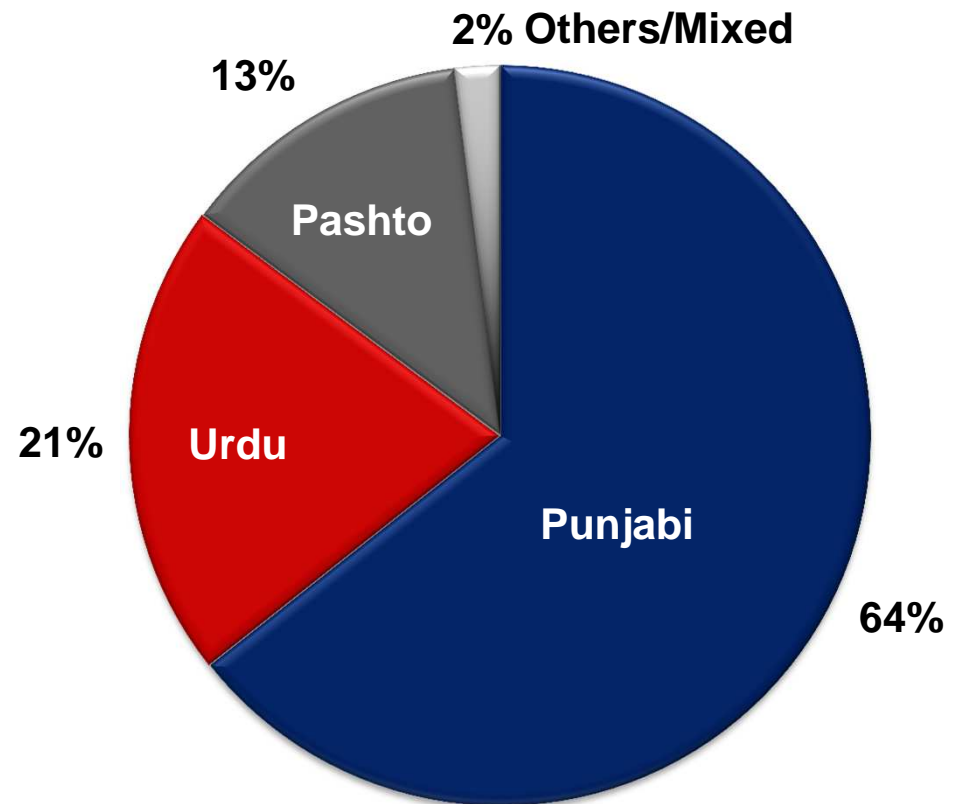
User Demographics

Determined by listening to a sample of recordings:

Gender



Languages

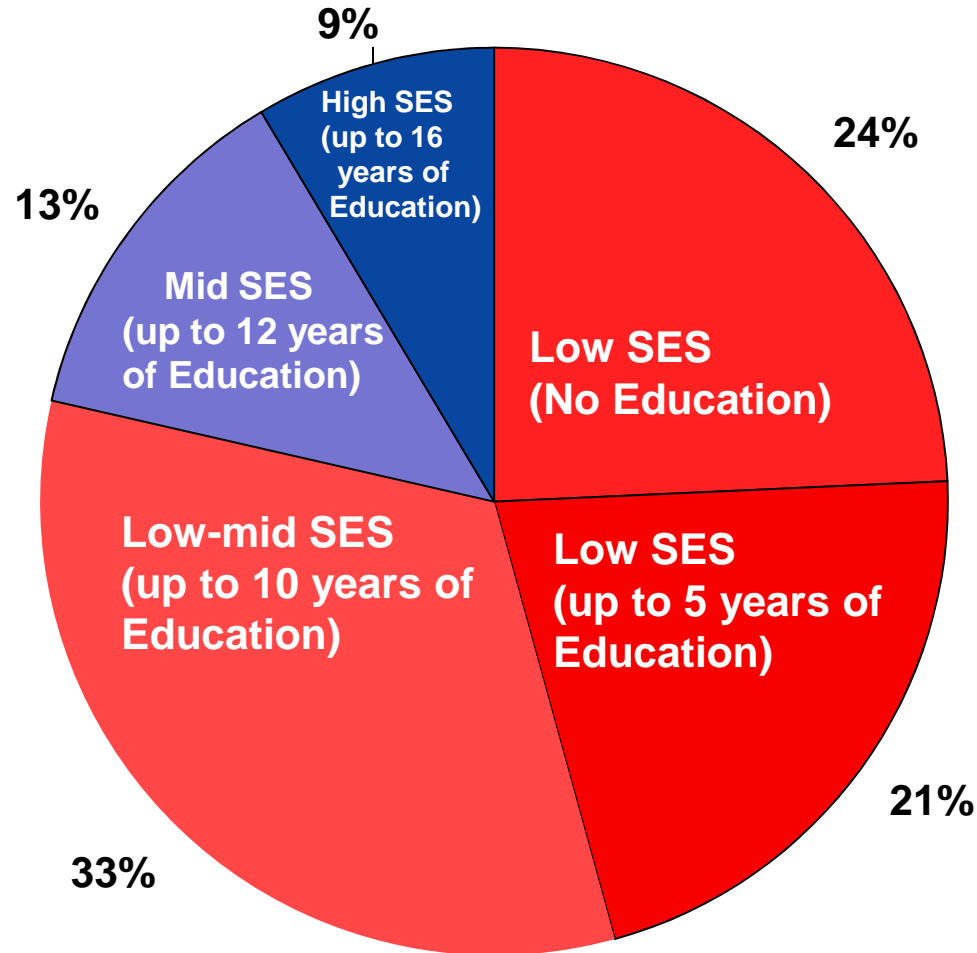


User Demographics

Determined from 207 survey calls



Socio-Economic Status



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Randomized Controlled Trials



Very convenient RCT setup!

- Hundreds of new users join every day
- So far we have been paying all airtime charges using “missed call” mechanism
- **Goal:** Reduce our airtime charges while maintaining system spread among the poor
- **Question:** How will various quotas affect user behavior?

Is Polly compelling enough for people to spend their own money on it, at least sometimes?

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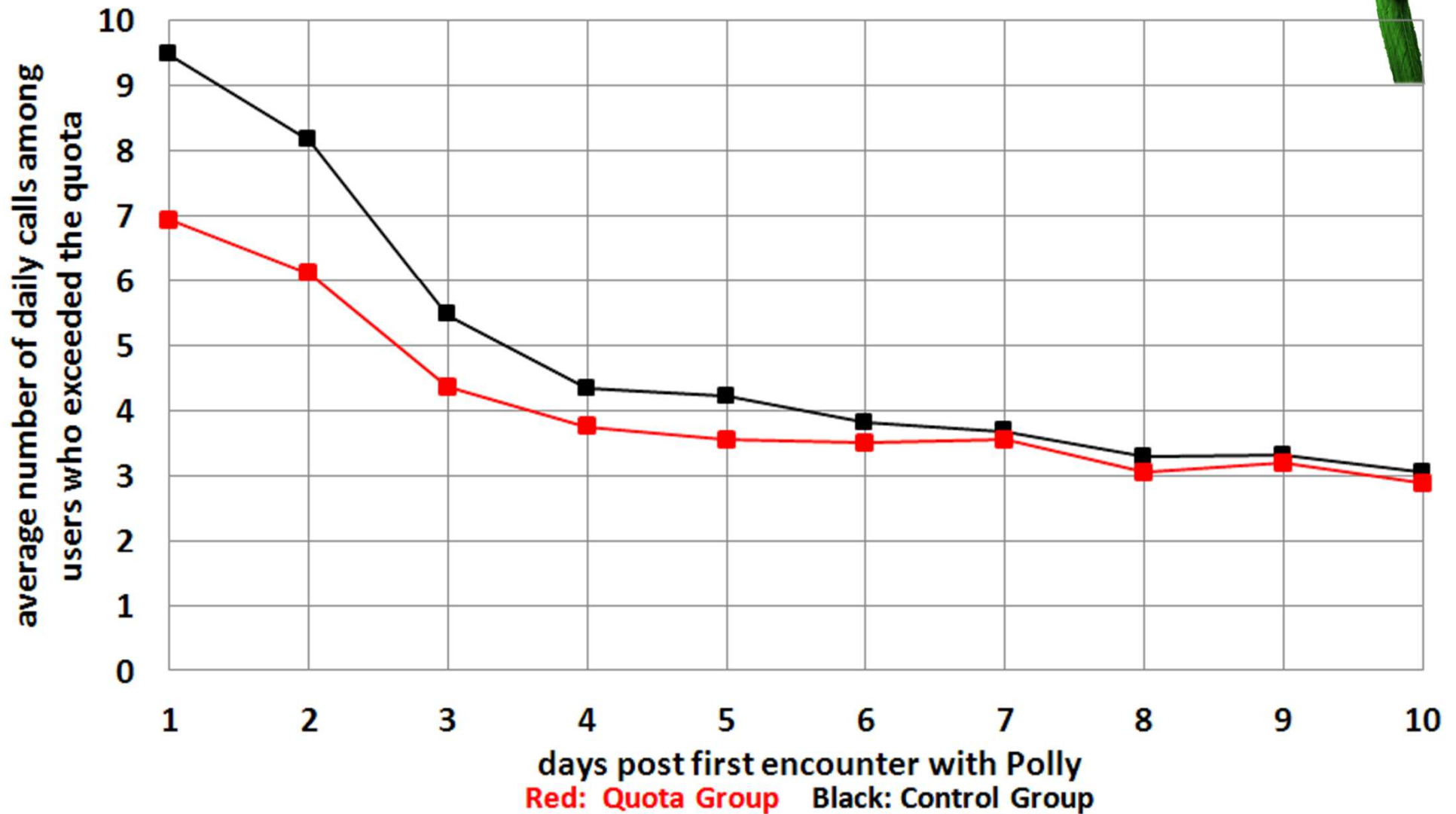


Randomized Controlled Trials

- Introduced a caller-paid line
 - Calls picked up, caller pays airtime
- Impose various quotas (Q_x) on the number of toll-free calls (x) per day (for each user).
- When quota exceeded, direct caller to caller-paid line
 - Q_7
 - Q_3
 - Q_2
 - Q_1



RCT: Effect of Daily Quota of 7 Calls



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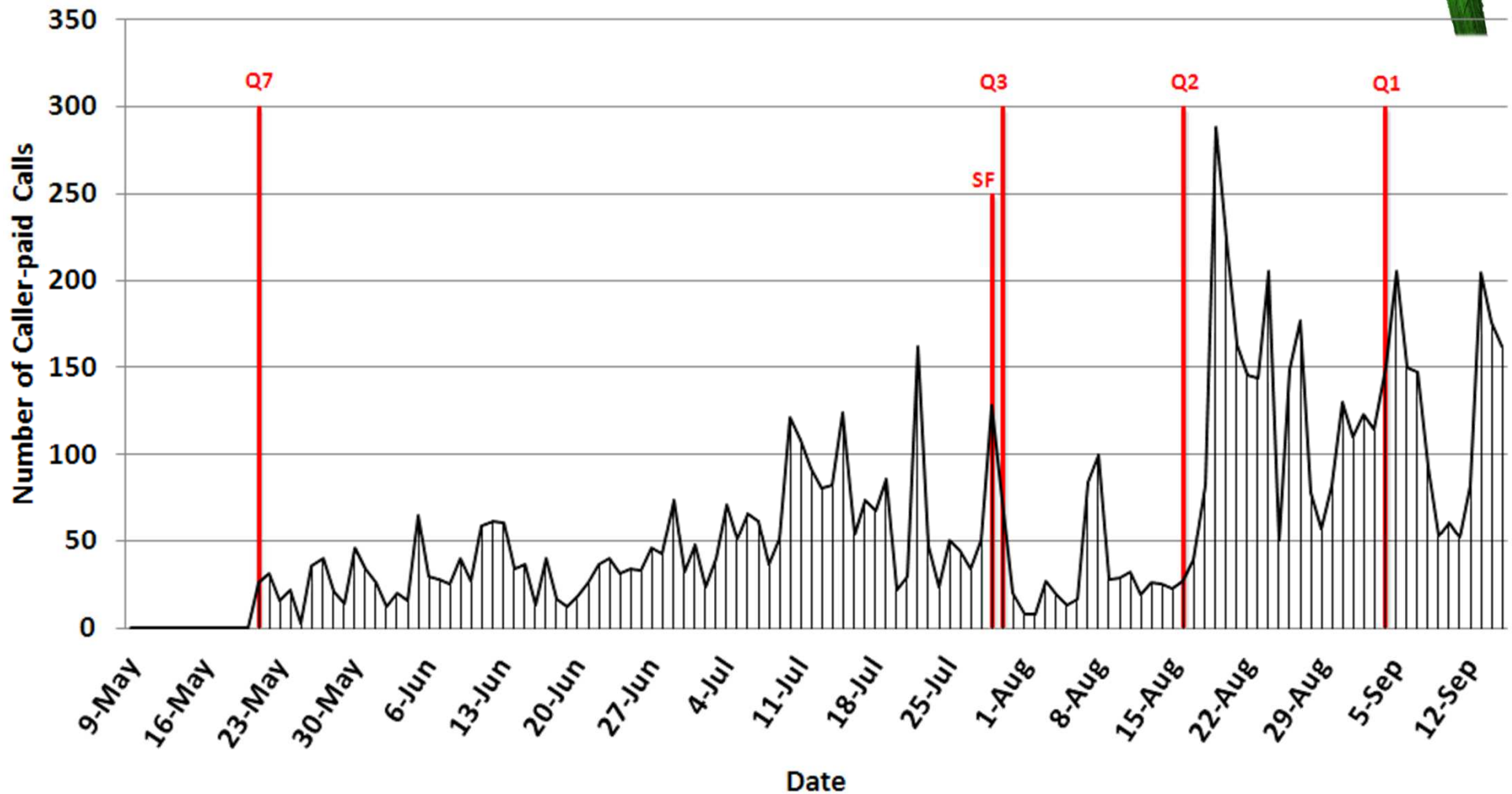
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Caller-paid Line



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Current Work



- Launching Polly in another Pakistani location as a caller-paid-only service
- Launching Polly in India with better mechanisms of populating Job Ads and tracking employment outcomes
- Porting Polly to open source telephony platforms like FreeSwitch

Current Status



As of April 22, 2013:

- **349** days
- **630,080** calls
- **163,787** users
- **33,682** people used the job search service
- listened **384,836** times to job ads
- and forwarded them **33,484** times to their friends.

For more recent stats please visit:

www.cs.cmu.edu/~Polly

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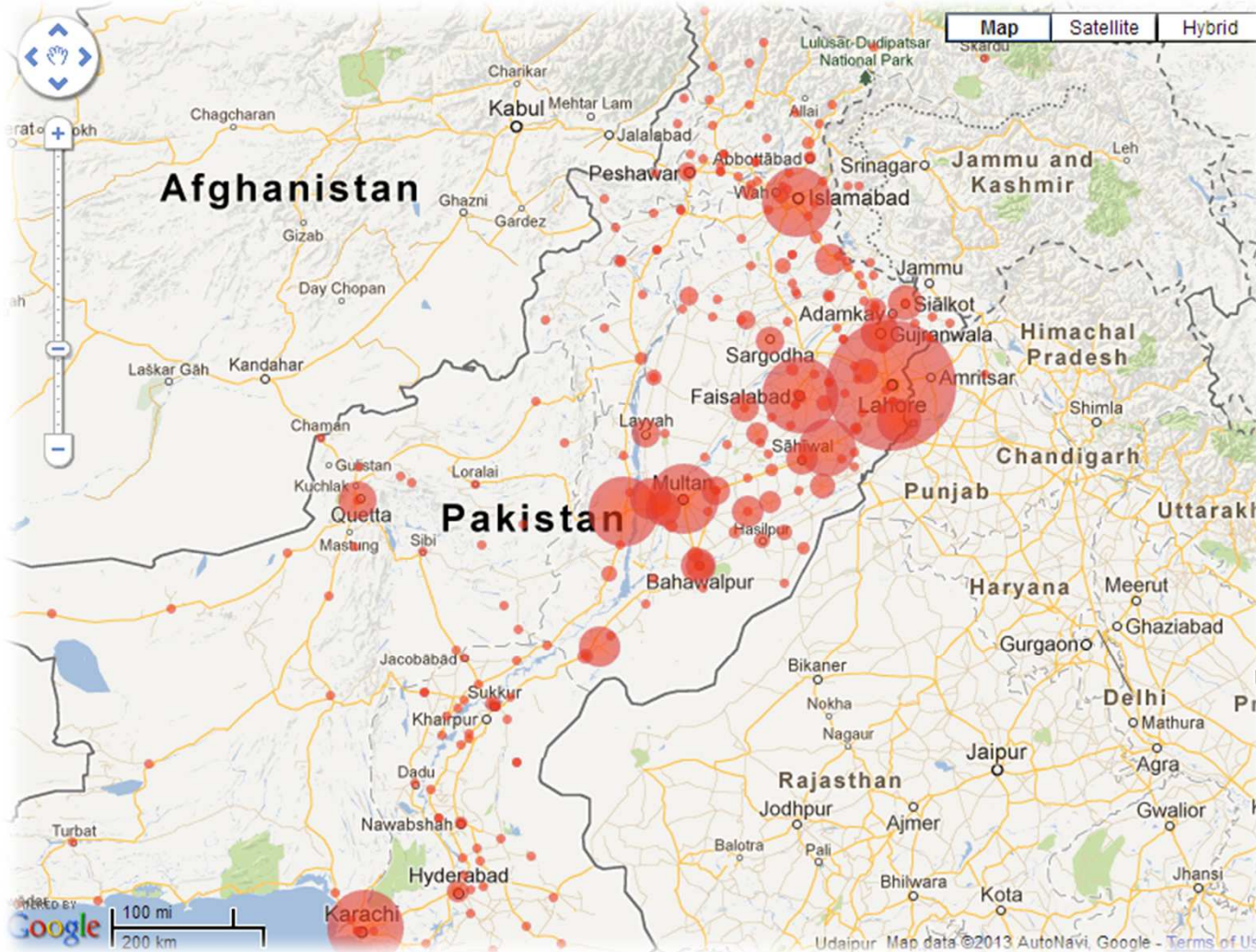
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Current Geographical Spread



And also a handful of calls from:

- India
- Belgium
- Oman
- Saudi Arabia
- UAE

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Summary



1. Can such a system scale up to millions of calls?
 - **Yes!**
2. Core development-related service: Job audio-browsing
 - **Good uptake** (*many started calling specifically for this service!*)
3. Can it be made cost effective?
 - **No conclusive answer yet:**
 - audio ads, content sponsors, carrier revenue sharing
4. **Polly as an experimental testbed:**
 - Used mostly by uneducated young men (some mid- and high-SES)
 - Interest declines within ~4 days, for most*
 - Most users very sensitive to airtime cost
5. Large dataset of social interaction, currently being analyzed
 - **Let us know if you want to work on it!**

Thank you!