



mClerk: Enabling Mobile Crowdsourcing in Developing Regions

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Paid Crowdsourcing has yet to Deliver on its Potential in Developing Regions

Prior efforts either have middle-class workers..



..or see barriers to scale in low-income contexts





mClerk

Overcoming the Barriers to Scalable Crowdsourcing in Dev. Regions

Lack of access to
computers & Internet

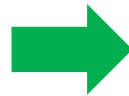
Limited skills
for tasks

Lack of payment
mechanisms

Low awareness

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1. Send visual
tasks via SMS

Limited skills
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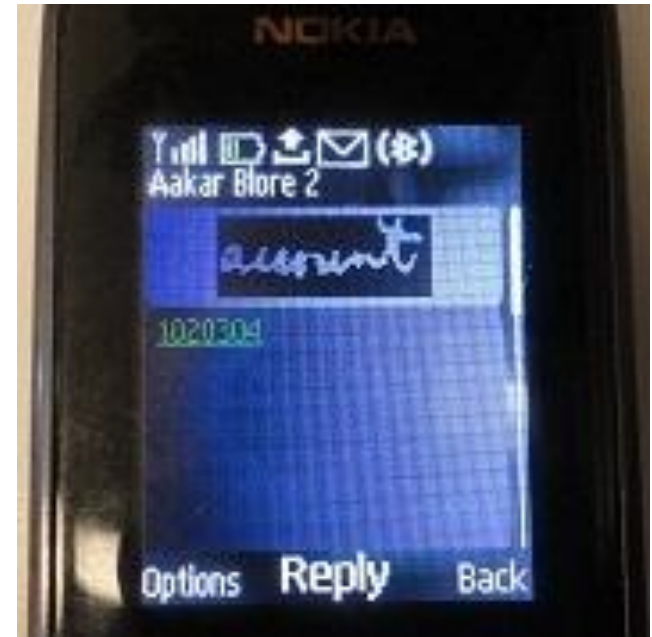
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1. Send Visual Tasks via SMS

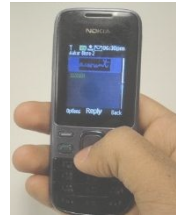
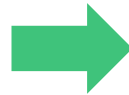
Nokia's Smart Messaging

- Binary Images
- 74x28 pixels
- Same cost as 3 SMSs!



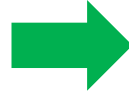
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2. Local-language
digitization

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2. Local-Language Digitization

Goal: Digitize paper documents in local language

(i) Document Segmentation

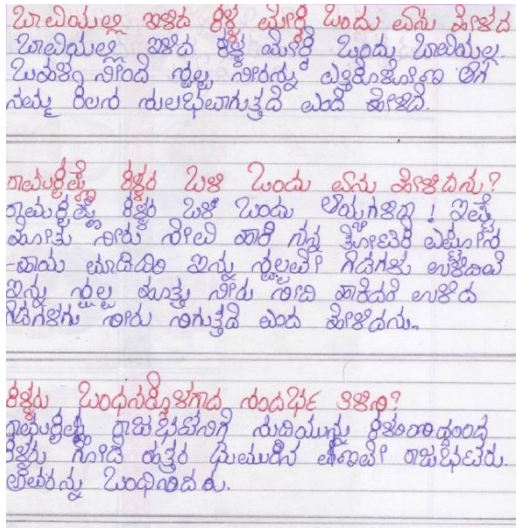


(ii) Crowdsourced Digitization



(iii) Response Verification

(i) Document Segmentation



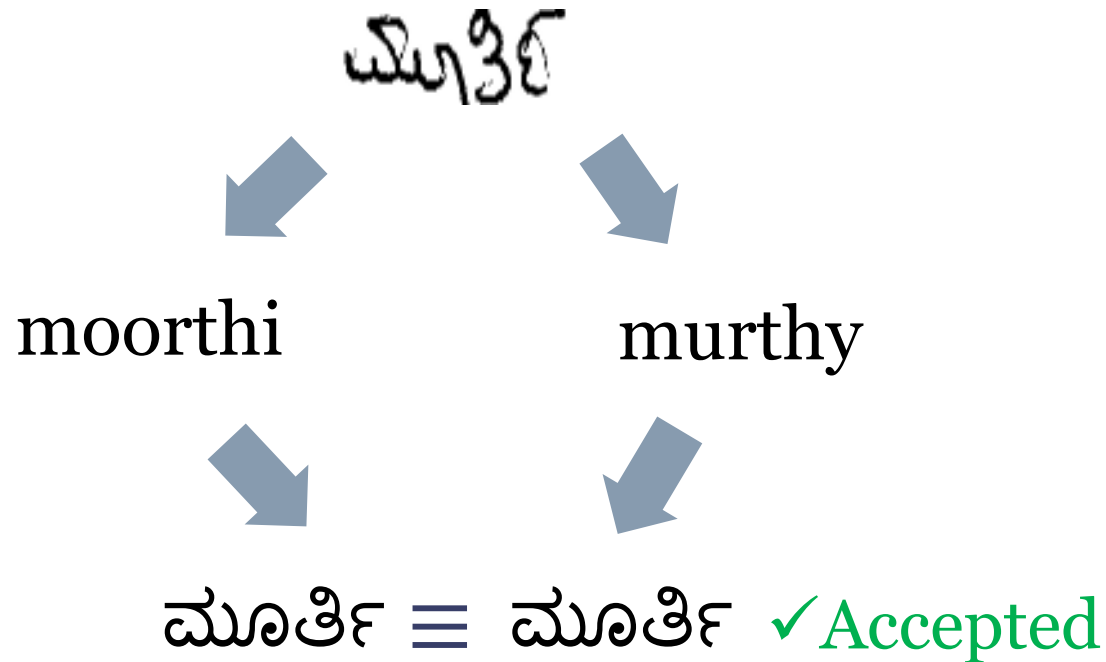
Clean, Segment, Binarize, Resize

(ii) Crowdsourced Digitization

1. Send worker a word image via **picture** SMS ಮೂರ್ತಿ
2. Worker replies with **text** SMS
 - But local language fonts difficult or unsupported!
 - Solution: back and forth **transliteration**



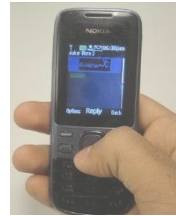
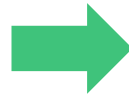
(iii) Response Verification



Verify agreement of transliterated text

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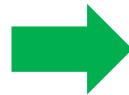
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3. Pay with
mobile airtime

Low awareness

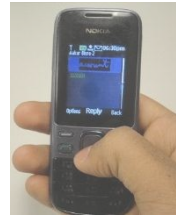
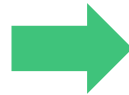
3. Pay With Mobile Airtime

- Manual recharge via mobile shop



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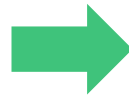
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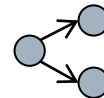
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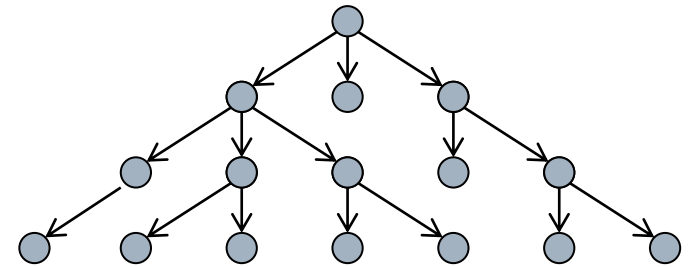


4. Incentivize
viral spread

4. Incentivize Viral Spread

(i) Referral system

→ Each worker earns 10% of their referrals' earnings



(ii) Leaderboard messages

(iii) Feedback & motivational messages

Field Study

Will users adopt the system and use it willingly in a real-world setting?



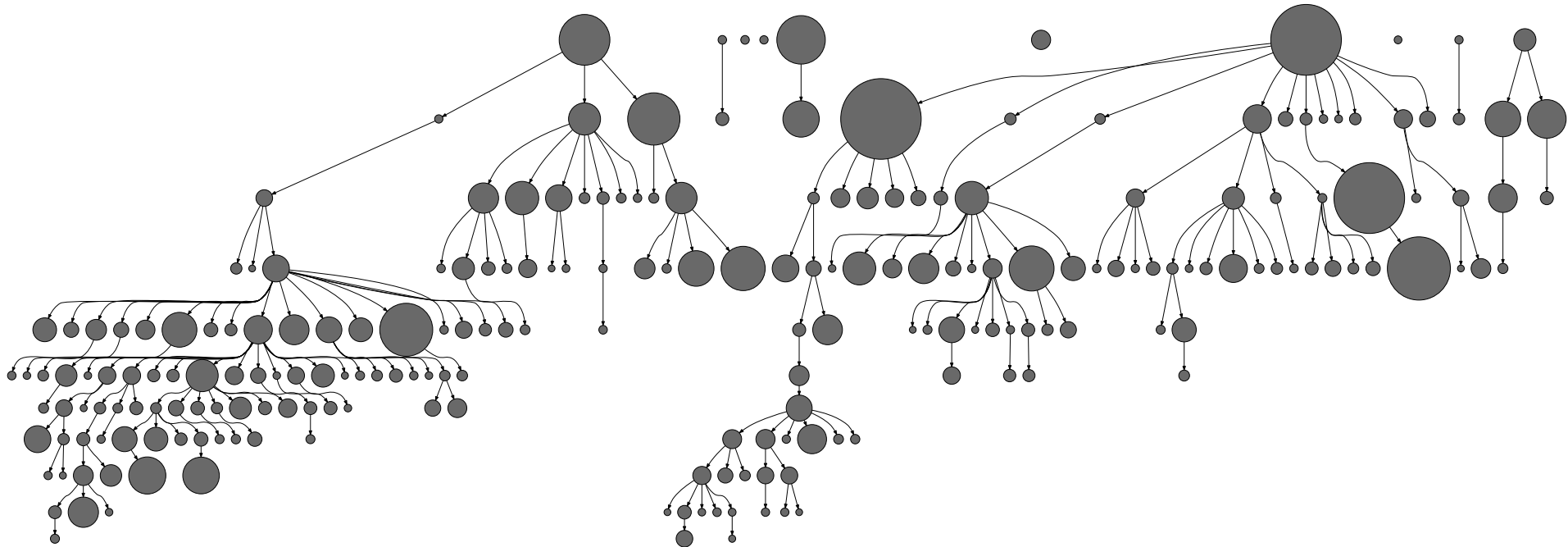
Field Study

- 5 Week study, divided into 2 phases
 - Phase 1 (3 Weeks): Paid INR 0.5 / task (~1 ¢)
 - Phase 2 (2 Weeks): Paid INR 0.2 / task
- Semi-urban location,
4 hours from Bangalore
- Language: Kannada



Results: Diffusion Network

We contacted only 10 users. Five weeks later:



239 Users, 64000 Responses, 25000 Digitized Words

Results: Group Effects



Social interactions drive usage

Qualitative Themes

Time Pass

*“I have to wait 20mins for bus. I stand and **do at bus-stop**. I have stopped going to the recharge shop, I get enough.”*

Flip side

*“We sit at back in class and **message during lecture**.”*

“Earlier we [friends] used to message poetry, jokes etc. Now no one does that. Everyone is busy with this.”

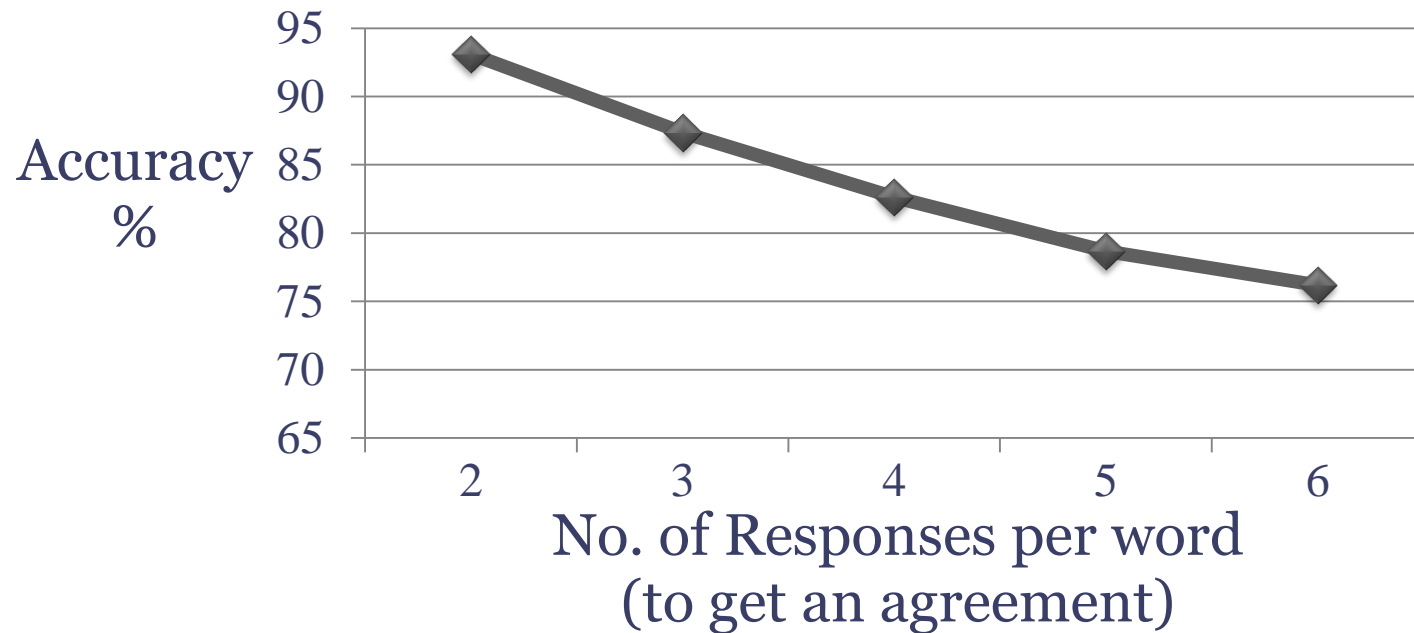
Skepticism

*“It is like some **code sending**. What do you do using this?”*

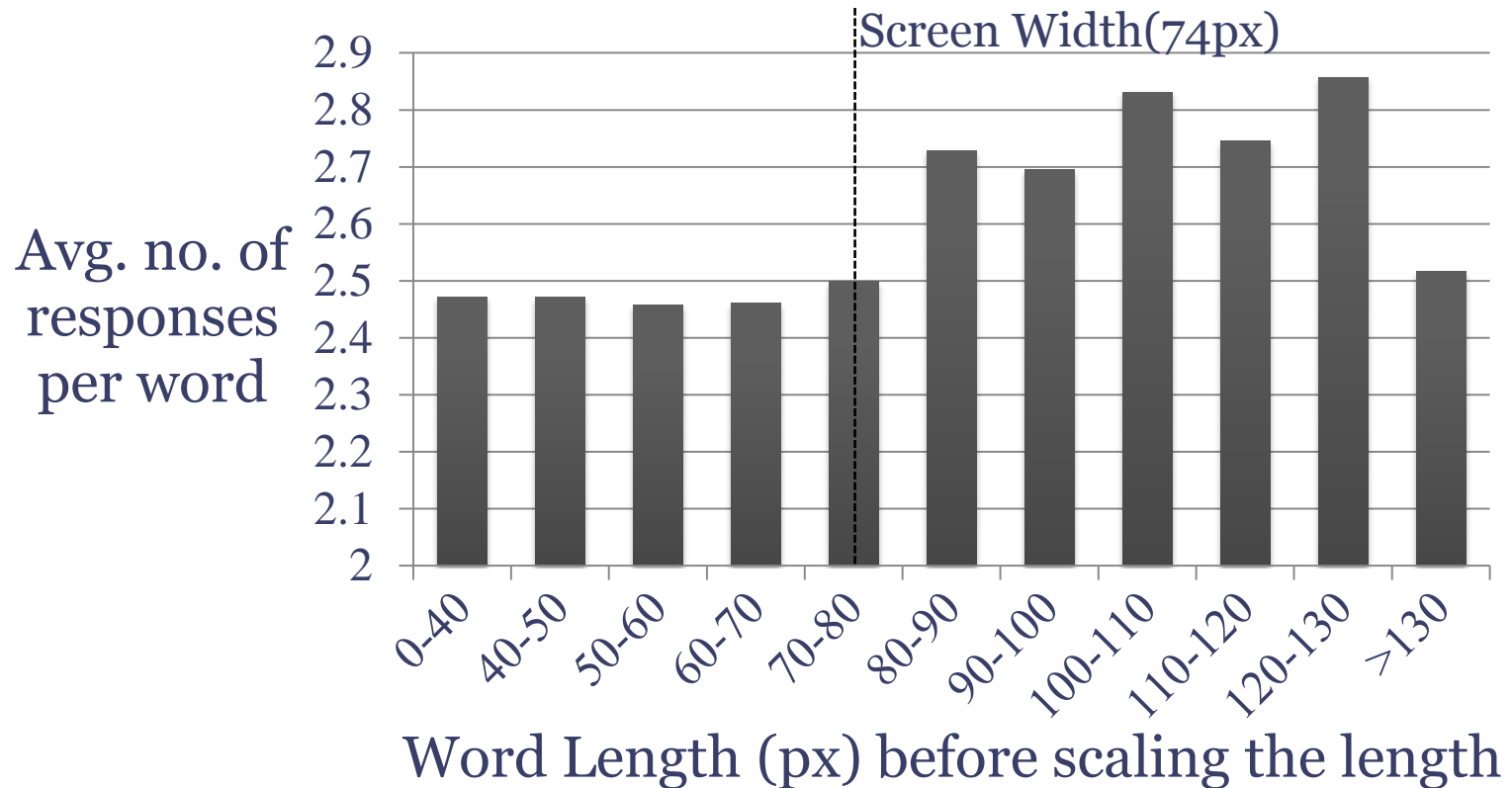
*“**Is it legal?** What’s your profit? I don’t want any trouble.”*

Performance: Accuracy

- Fraction of words digitized correctly: **90.1%**
- Improvement of Accuracy



Performance: Agreements



Business Sustainability

	mClerk	Market
Costs	Phase 1: 2.4 ¢/ word Phase 2: 1 ¢/ word	2 ¢/ word
Accuracy	90%	97%

- With some optimization, could be market viable
 - Partner with telcos to decrease payment overhead
 - Identify more accurate workers to improve accuracy

Conclusions

- **mClerk** enables scalable crowdsourcing in developing regions by:



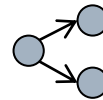
1. Sending visual tasks via SMS



3. Paying with mobile airtime



2. Leveraging local language skills



4. Incentivizing viral spread

- Future opportunities in
 - Optimizing accuracy and costs
 - Finding more tasks amenable to picture-SMS

Thank You

To Nithya Sambasivan, Richard T. Guy, James Davis, Indrani Medhi

To all of our **users**,
as well as their..

Collaborators - *“Coming back from college in the bus, **all of us** do messaging and **ask each other meanings** of the words for fun. One time no one knew so we thought we’ll ask the Kannada lecturer in college and if he does not know that will be fun.. but he knew.”*

Competitors - *“All my friends have become leaders [at least once]. Now I sleep at 12, so that I can do fast messages at night.”*

Family members - *“I gave my **phone to my wife**. She is free at home. She can do more SMS. I take it in evening when I get free with friends”*

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