

No “one-size fits all”

Towards a principled approach for incentives in mobile crowdsourcing

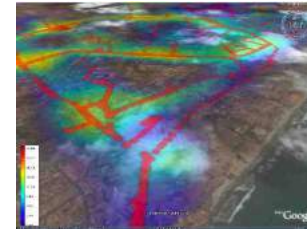
John Rula, Vishnu Navda*, Fabian Bustamante,
Ranjita Bhagwan*, Saikat Guha*

Northwestern University

*Microsoft Research India

Background

- Mobile crowdsourcing
 - Participatory/mobile sensing
 - Mobile micro-labor
 - Traffic Monitoring



- Various requirements

- Spatial coverage
- Temporal response
- User attentiveness
- User participation
- ...

} Different applications
weight them differently

Incentives and mobile crowdsourcing

- Why incentives?
 - ↑ spatial coverage, user engagement, contribution
- Types in desktop crowdsourcing
 - Micro-payments
 - Beyond money
 - altruism, enjoyment, reputation
- Types in mobile crowdsourcing
 - Micro-payments
 - Micro-labor
 - Altruism and social rewards
 - Participatory sensing



Ad-hoc, one-off solutions

Goal: Build a framework

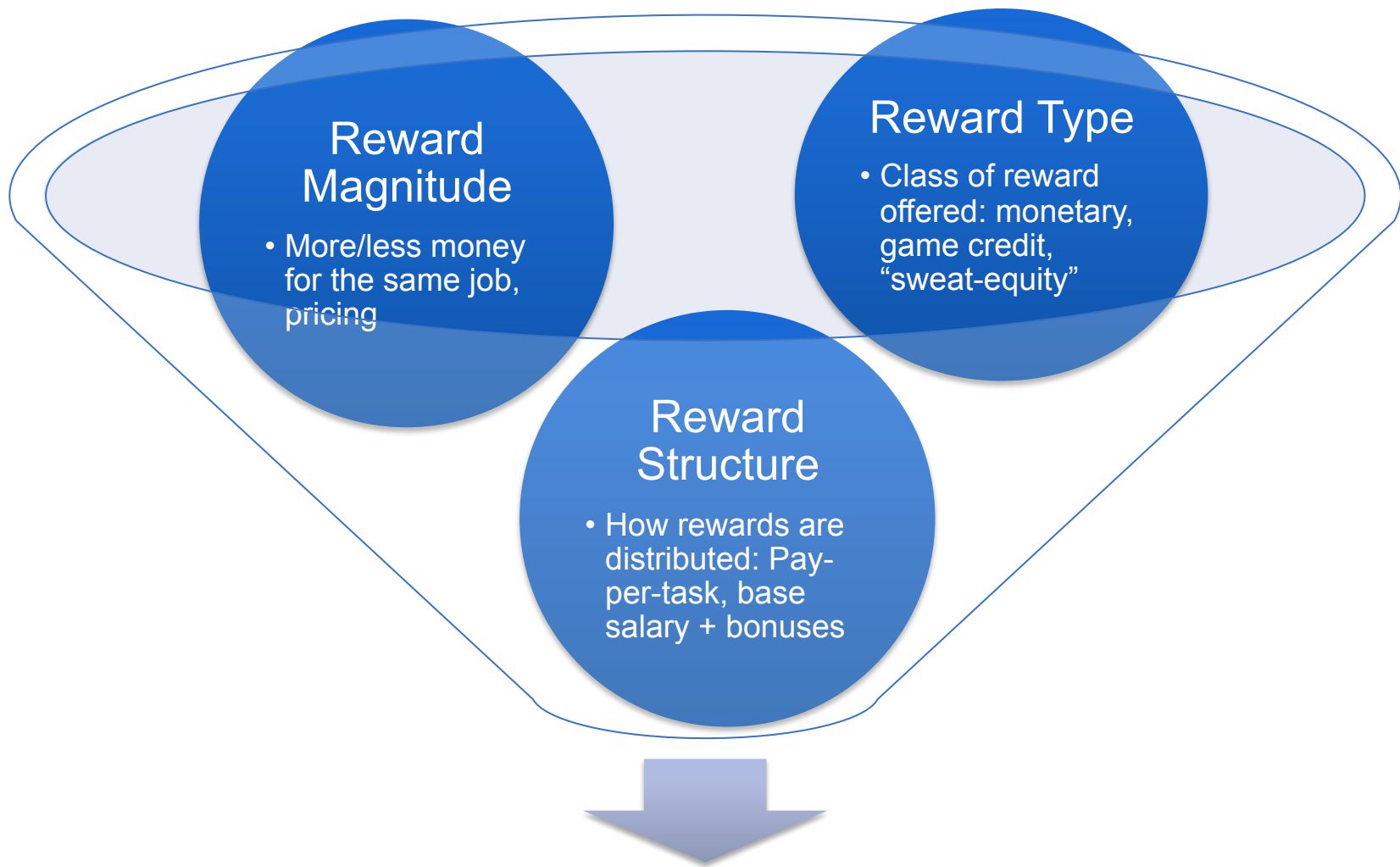
Compare and characterize incentive mechanisms

- *How to evaluate?*
- *Do users react differently?*
- *Tradeoffs?*
- *Best fit for application?*

→ This work

- Experimentally derive characteristics of two incentive structures that help answer these questions

Dimensions of incentives



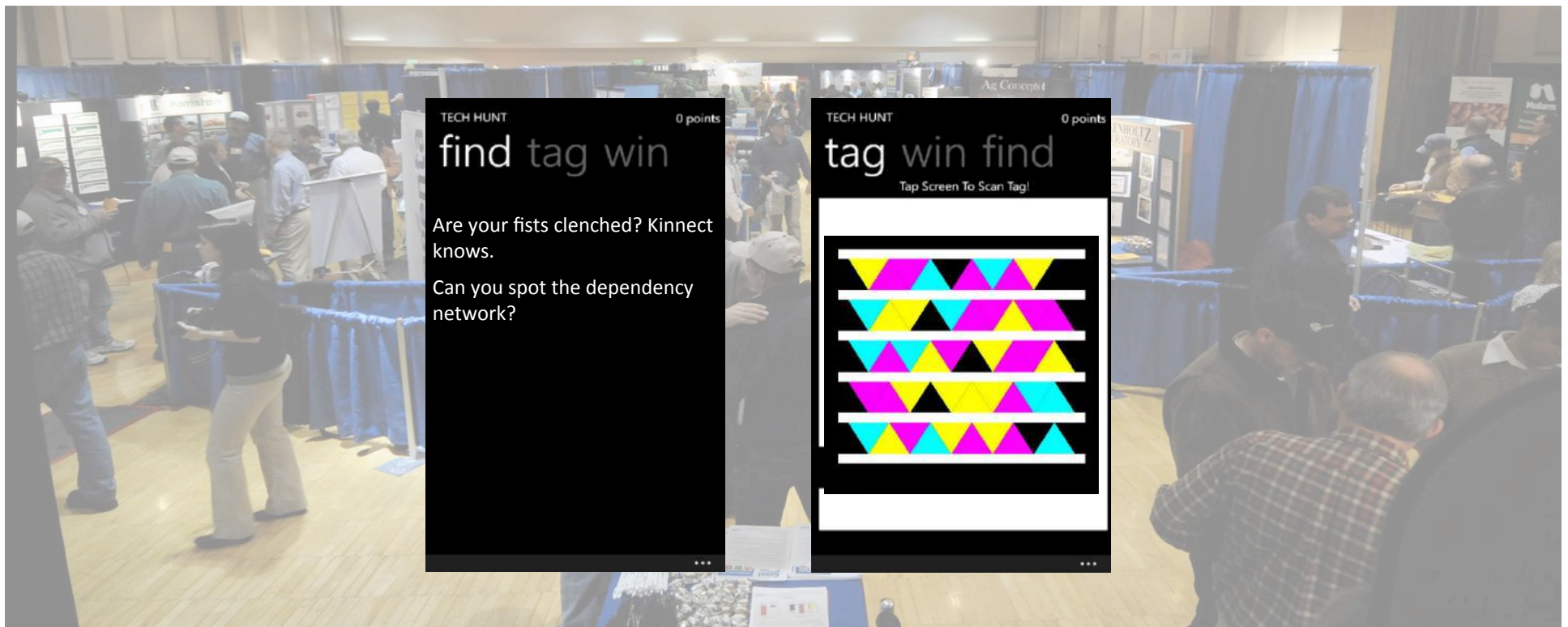
Best Fit Incentive

Experiment: Evaluate two incentives

- Micro-payments
 - Guaranteed payoff
- Weighted Lottery
 - High risk : High reward
 - 20 winners, limit one per user
- Varied only structure of reward
 - Chose one deterministic and one probabilistic incentive structure for comparison

Experiment application

- Microsoft TechFest 2013
 - Two days, two 5-hour sessions, 151 booths, >3000 visitors
- 50 Phones – scavenger hunt application
 - 10 clues → Match clues to booths
 - Scan booth's 2D barcode to complete



Measuring impact of structures

1. Recruitment – Attracting users to campaign
2. Compliance – Users completing tasks correctly
3. User-Effort – Amount of effort/time users are willing to put into each task

Results preview

- Micro-payments
 - Fewer, more productive users
- Weighted Lottery
 - More total tasks, less individual effort

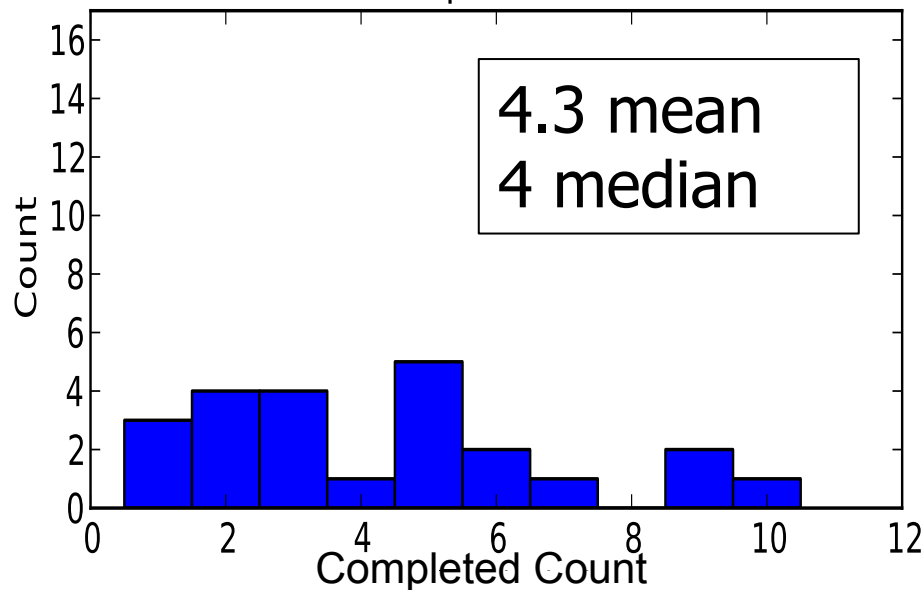
1. Recruitment: greater with weighted lottery

- Micro-payments
 - Lower overall recruitment
 - Recruited 39 participants
 - 23 active participants
 - Lower expected payout
 - Lower willingness to participate
- Weighted Lottery
 - Higher recruitment
 - Recruited 57 participants
 - 39 active participants
 - Lure of low cost/high reward
 - Expected payouts favorable given low initial effort

2. Compliance:

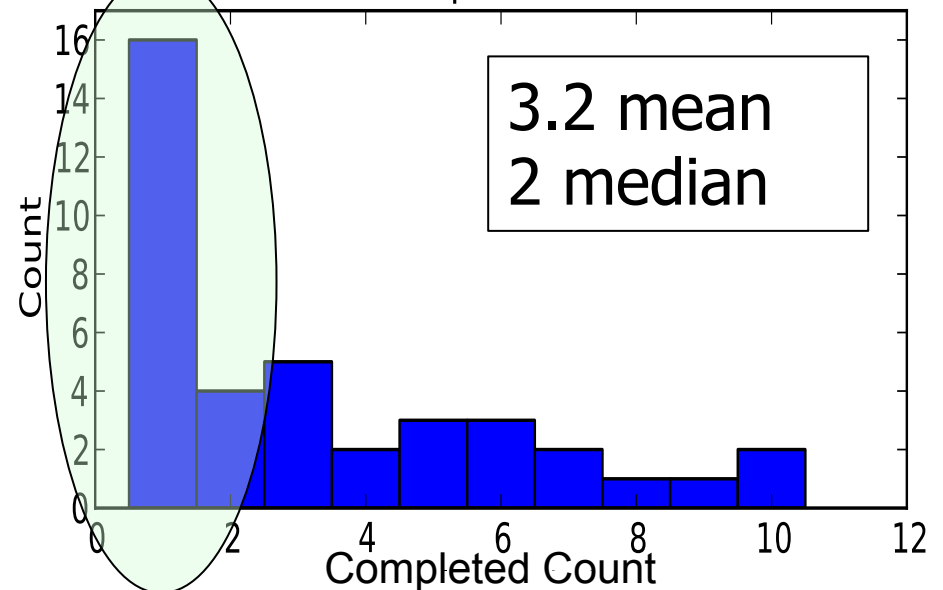
- Micro-payments
 - 99 completed
 - Each user completed twice the number than weighted lottery (median)

of Completed Missions



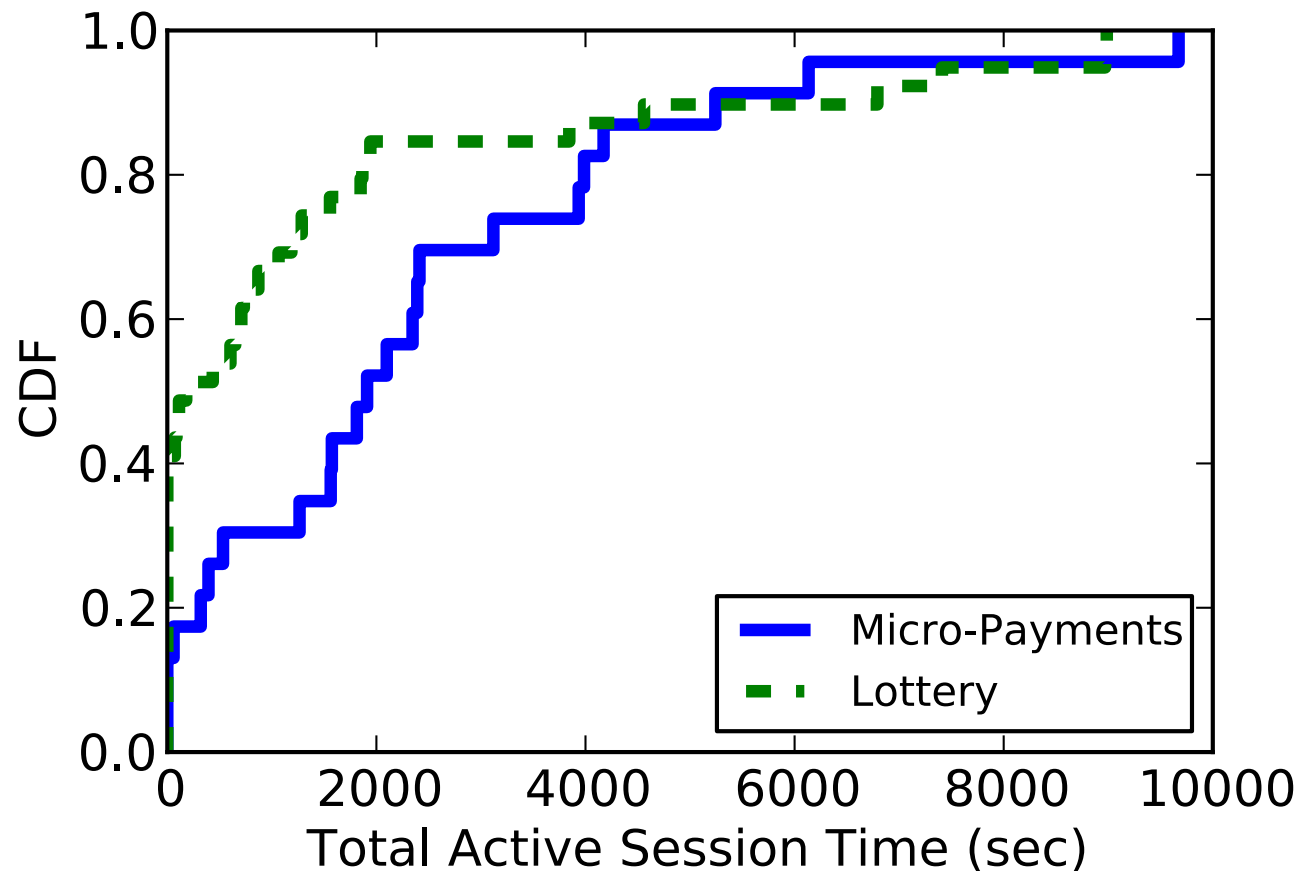
- Weighted Lottery
 - 120 completed
 - Fewer tasks completed per user

of Completed Missions



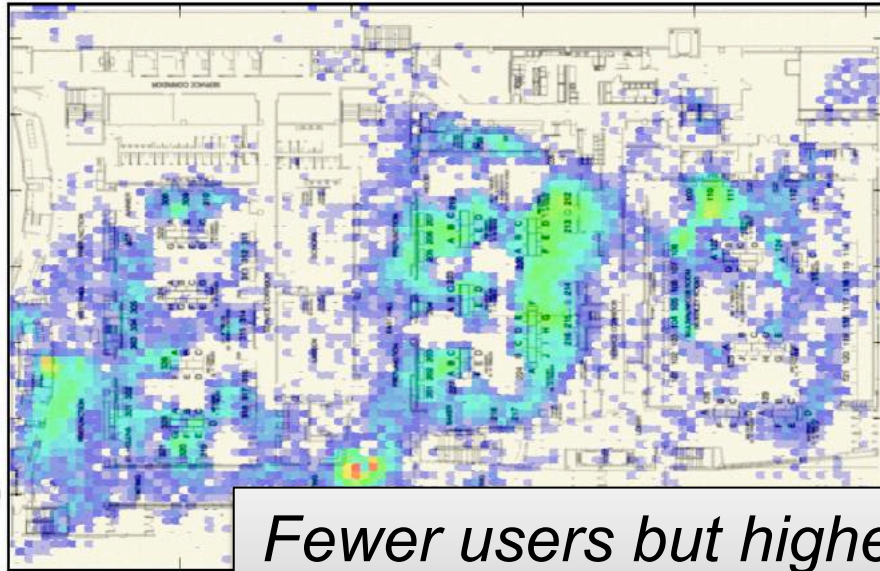
3. User-effort: micro-payments=more engaged

- Time between first and last completed task
 - Most weighted lottery participants had much shorter active sessions

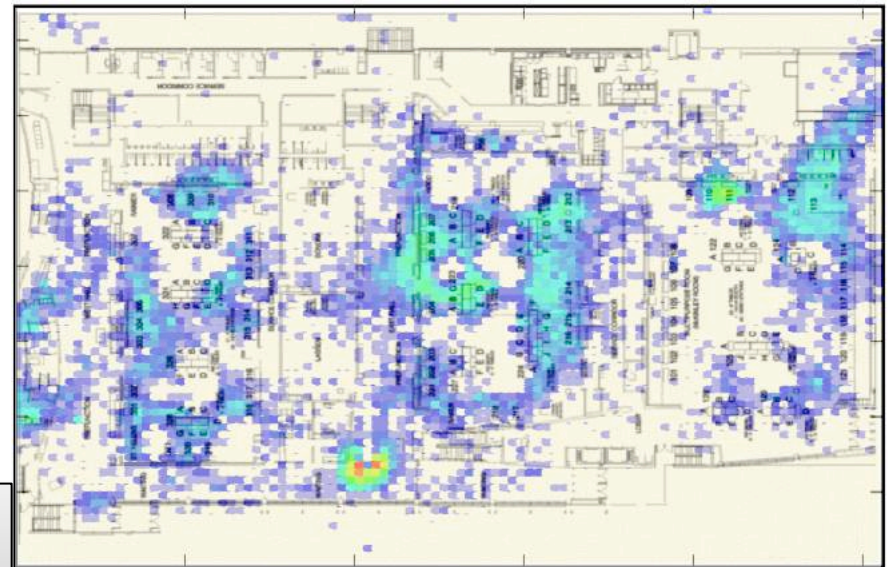


3. User-effort: spatial coverage

Micro-payments



Weighted lottery



Fewer users but higher Coverage!

Results summary

- Weighted Lottery
 - More total tasks, more users, less individual effort
- Micro-payments
 - Fewer, more productive users

Discussion and Future Directions

- Further understand role of incentives for behavior change
 - Humans becoming integral parts of mobile system performance
- Incentive choice affects different aspects of user behavior
- Larger study for further characterization

Thank you!