Motivation & incentives in crowdsourcing platforms

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Overview

- Self-determination Theory
- Motivation in Crowdsourcing Systems
- Incentives for Crowdsourced Language Learning
- Incentives for Geofenced Mobile Crowdsourcing

Self-determination Theory

Self-determination theory

- Psychological needs for motivation

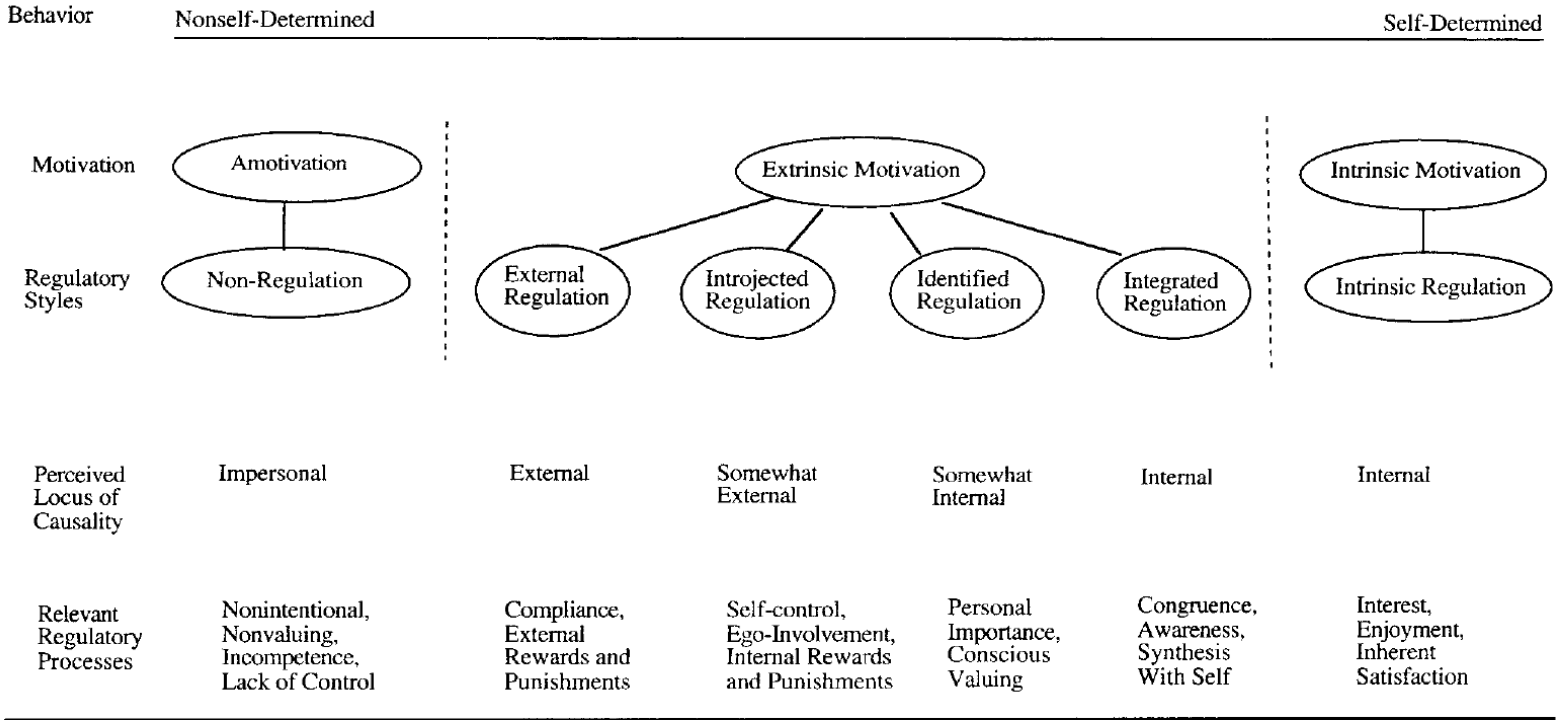
Competence

Autonomy

Relatedness

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist*, 55(1), 68.

Figure 1
The Self-Determination Continuum Showing Types of Motivation With Their Regulatory Styles, Loci of Causality, and Corresponding Processes



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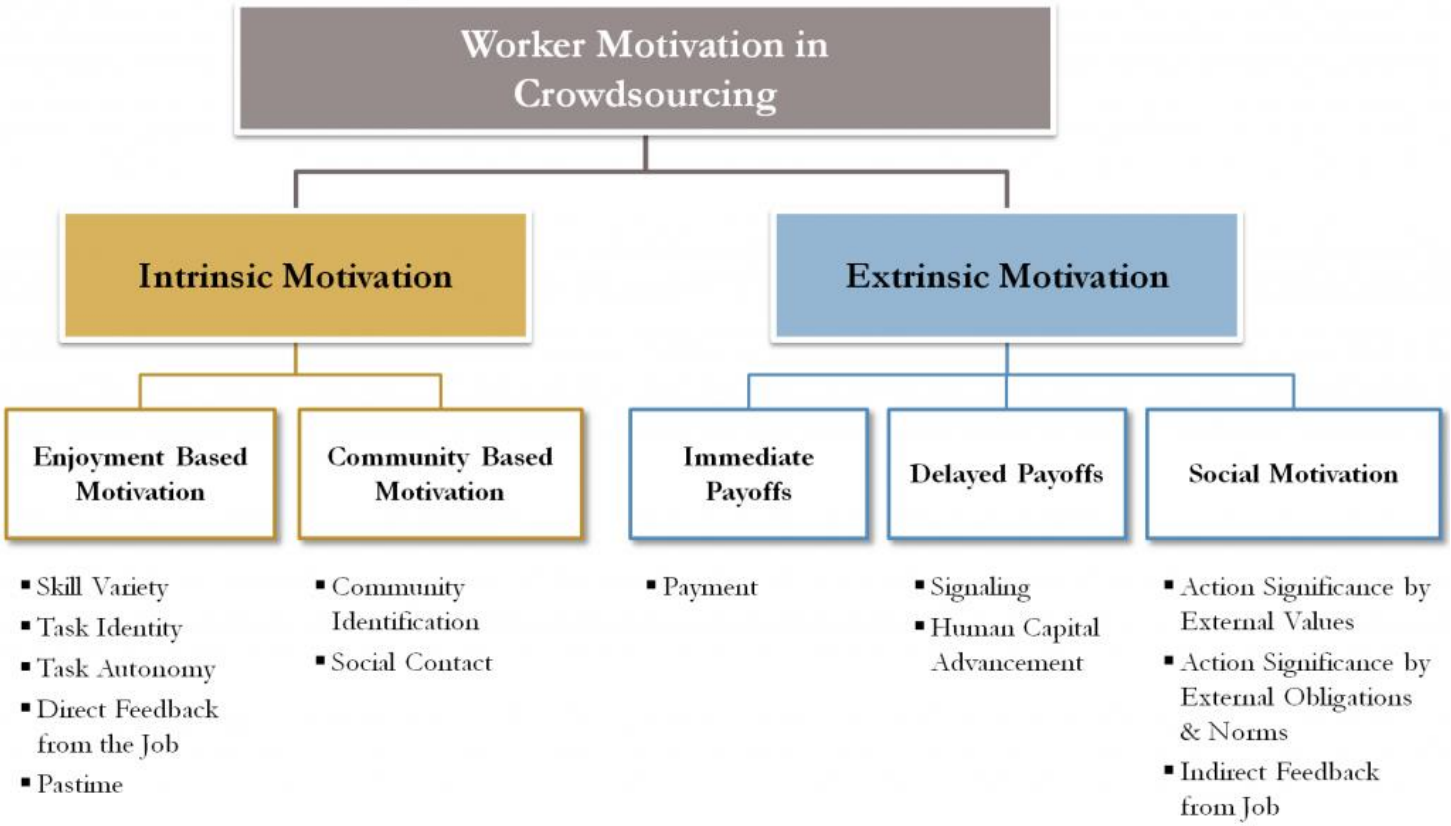
Motivation in Crowdsourcing Systems



Kaufmann, N., Schulze, T., & Veit, D. (2011, August). More than fun and money. Worker Motivation in Crowdsourcing-A Study on Mechanical Turk. In *AMCIS* (Vol. 11, No. 2011, pp. 1-11).

Paid Crowdsourcing: MTurk

- 431 participants are online workers who perform different micro-tasks
- Top motivating factors
  - Payment (external, extrinsic)
  - Task Autonomy (internal, intrinsic)
  - Skill Variety (internal, intrinsic)
  - Task Identity (internal, intrinsic)
  - Human Captial Advancement (internal, intrinsic)

Kaufmann, N., Schulze, T., & Veit, D. (2011, August). More than fun and money. Worker Motivation in Crowdsourcing-A Study on Mechanical Turk. In *AMCIS* (Vol. 11, No. 2011, pp. 1-11).

Paid Crowdsourcing: MTurk

- 158 participants are online workers who perform different micro-tasks
- Top motivating factors
  - Payment (external, extrinsic)
  - Help others (internal, intrinsic)

Rogstadius, J., Kostakos, V., Kittur, A., Smus, B., Laredo, J., & Vukovic, M. (2011). An assessment of intrinsic and extrinsic motivation on task performance in crowdsourcing markets. *ICWSM*, *11*, 17-21.

Paid Crowdsourcing: Threadless

- 17 participants were t-shirt designers
- Top motivating factors
  - Making money (external, extrinsic)
  - Improving creative skills (internal, extrinsic)
  - Freelance opportunities (external, extrinsic)
  - The love of community (internal, intrinsic)
  - Addiction (internal, intrinsic)

Brabham, D. C. (2010). Moving the crowd at Threadless: Motivations for participation in a crowdsourcing application. *Information, Communication & Society*, *13*(8), 1122-1145.

Crowdsourcing Contests: SAPiens

- 39 participants who submitted solution ideas to solve design challenges
- Top motivating factors
  - Appreciation by the organizer (external, extrinsic)
  - Prizes (external, extrinsic)
  - Career options (external, extrinsic)
  - Access to knowledge of experts (external, extrinsic)
  - Access to knowledge of mentors (external, extrinsic)

Leimeister, J. M., Huber, M., Bretschneider, U., & Krcmar, H. (2009). Leveraging crowdsourcing: activation-supporting components for IT-based ideas competition. *Journal of management information systems*, *26*(1), 197-224.

Crowdsourcing Contests: IdeasProject

- 244 participants who submitted solution ideas to solve challenges
- Top motivating factors
  - Learning benefits (internal, extrinsic)
  - Recognition from host companies (external, extrinsic)
  - Hedonic benefits (internal, intrinsic)
  - Social benefits (external, intrinsic)
  - Recognition from peers (external, extrinsic)

Kosonen, M., Gan, C., Vanhala, M., & Blomqvist, K. (2014). User motivation and knowledge sharing in idea crowdsourcing. *International Journal of Innovation Management*, *18*(05), 1450031.

Crowdsourcing Contests: Taskcn

- 283 participants were who solutions to solve various design contest
- Top motivating factors
  - To gain recognition (external, extrinsic)
  - Task variety (internal, intrinsic)
  - Task autonomy (internal, intrinsic)
  - Task analysability (internal, intrinsic)

Zheng, H., Li, D., & Hou, W. (2011). Task design, motivation, and participation in crowdsourcing contests. *International Journal of Electronic Commerce*, *15*(4), 57-88.

Crowdsourcing Contests: Taskcn & Zhubajie

- 420 participants were who solutions to solve various type of contests
- Top motivating factors
  - External motivation (External, extrinsic)
  - Introjected motivation (External, extrinsic)

Chris Zhao, Y., & Zhu, Q. (2014). Effects of extrinsic and intrinsic motivation on participation in crowdsourcing contest: A perspective of self-determination theory. *Online Information Review*, *38*(7), 896-917.

Crowdsourcing Contests: Taskcn

- 156 participants were who solutions to solve various type of contests
- Top motivating factors
  - Work autonomy (internal, intrinsic)
  - Monetary reward (external, extrinsic)
  - Skill enhancement (internal, extrinsic)
  - Enjoyment (internal, intrinsic)

Ye, H. J., & Kankanhalli, A. (2017). Solvers' participation in crowdsourcing platforms: Examining the impacts of trust, and benefit and cost factors. *The Journal of Strategic Information Systems*, *26*(2), 101-117.

Volunteered Crowdsourcing: Tomnod

- 166 participants are volunteers who identify objects in satellite images
- Top motivating factors
  - Help people and environment (internal, extrinsic)
  - Educational (internal, extrinsic)
  - Easy to do (internal, intrinsic)
  - Fun (internal, intrinsic)
  - Given recognition for contribution (external, extrinsic)

Baruch, A., May, A., & Yu, D. (2016). The motivations, enablers and barriers for voluntary participation in an online crowdsourcing platform. *Computers in Human Behavior*, *64*, 923-931.

Volunteered Crowdsourcing: Eyewire

- 1505 users of the Eyewire platforms for understanding the structure of neurons in MRI scans of human brain
- Top motivating factors
  - Contributing to the project (internal, extrinsic)
  - Helping improve scientific knowledge (internal, extrinsic)
  - For the entertainment value (internal, intrinsic)
  - To learn about science (internal, extrinsic)
  - For some personal interest towards Eyewire (internal, intrinsic)

Tinati, R., Luczak-Roesch, M., Simperl, E., & Hall, W. (2017). An investigation of player motivations in Eyewire, a gamified citizen science project. *Computers in Human Behavior*, *73*, 527-540.

Incentives for Crowdsourced Language Learning

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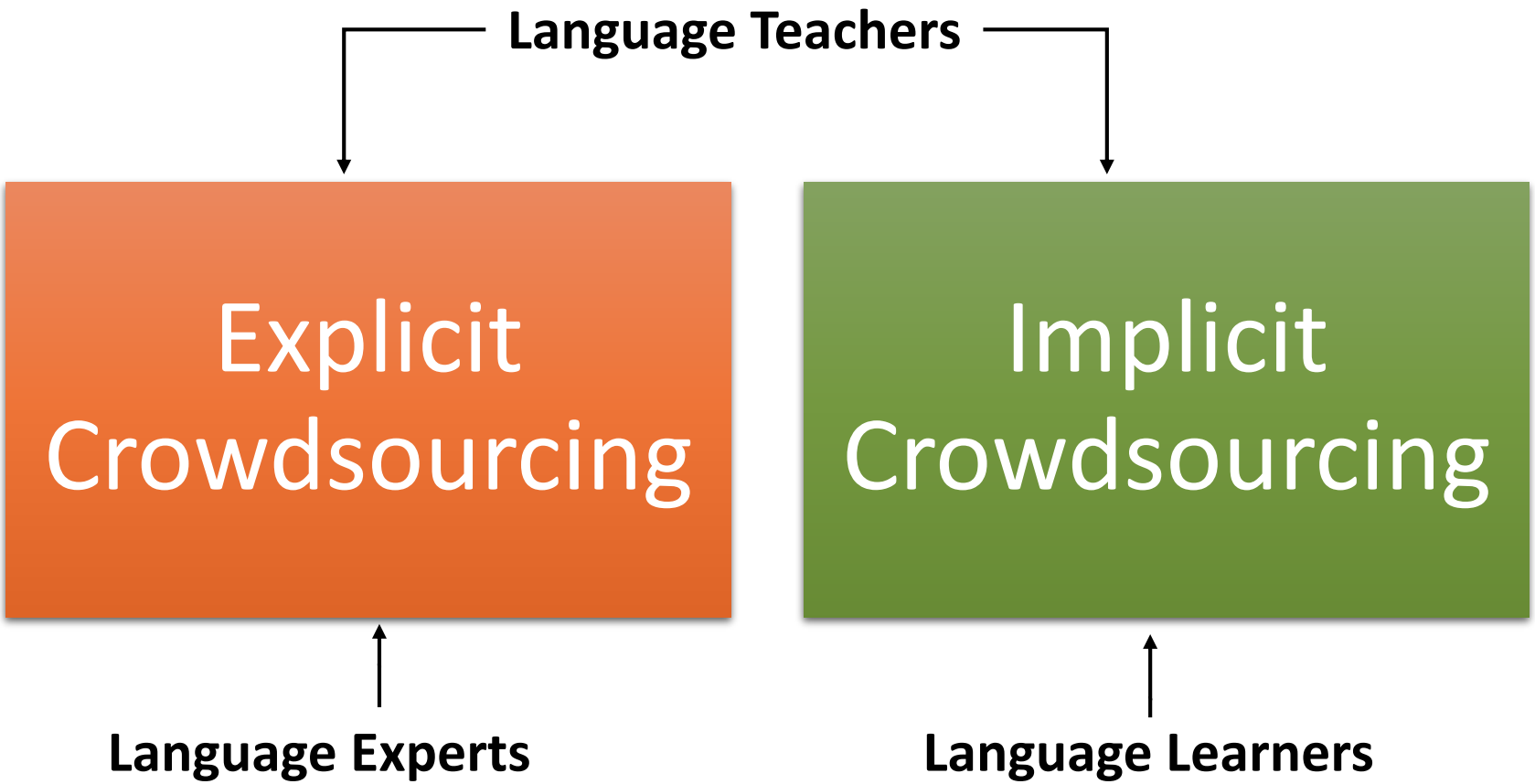


Explicit Crowdsourcing

- Crowdsourced task
  - Creation of learning material for language learning
- Language teachers
  - Generate learning material
  - Generate evaluation material
- Language experts
  - Design and evaluate learning strategies and methods

Implicit Crowdsourcing

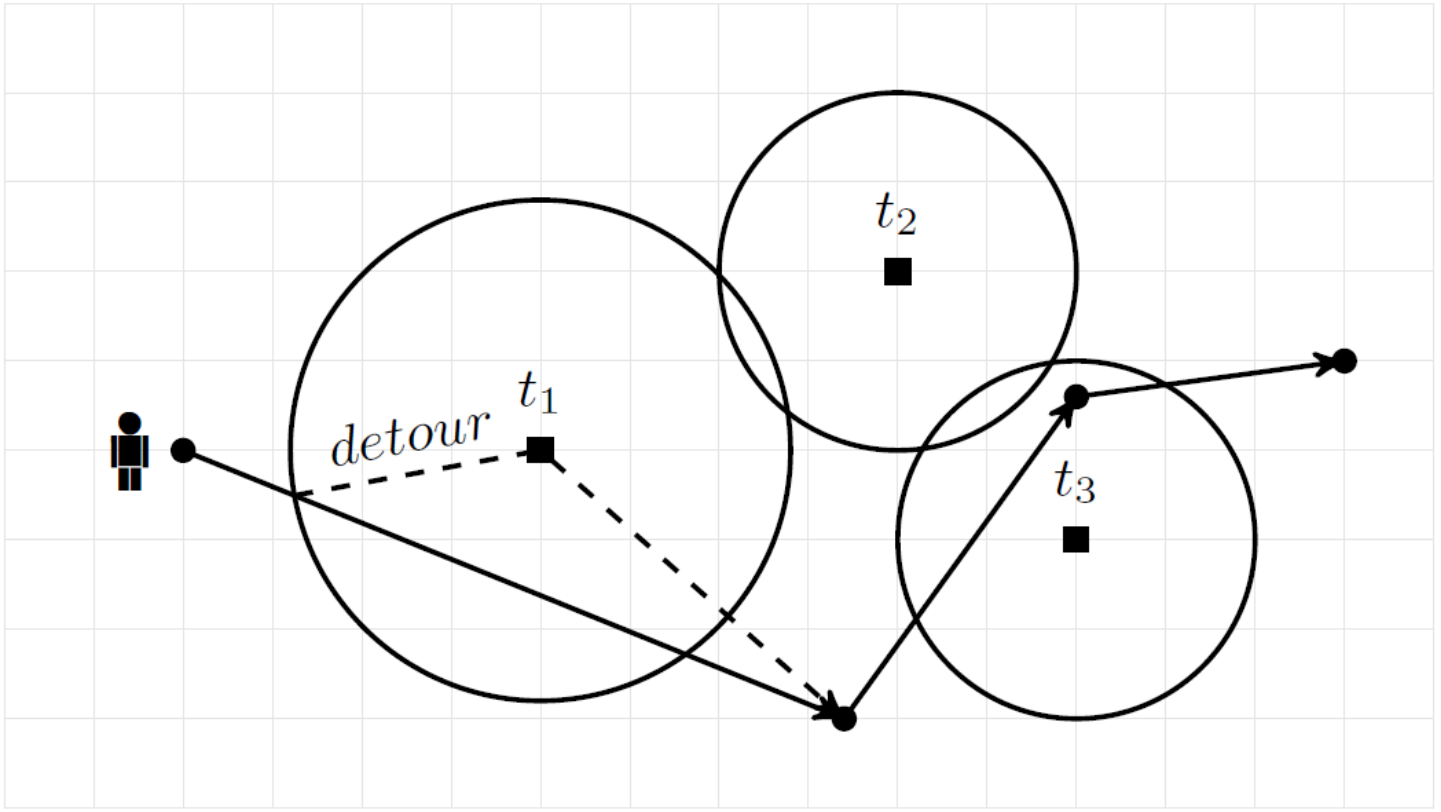
- Crowdsourcing task
  - Perform lessons and provide feedback
  - Provide text or multimedia datasets
- Language experts and teachers
  - Evaluate the effectiveness of lessons
- Language learners
  - Rate the effectiveness of lessons

Suggestions??

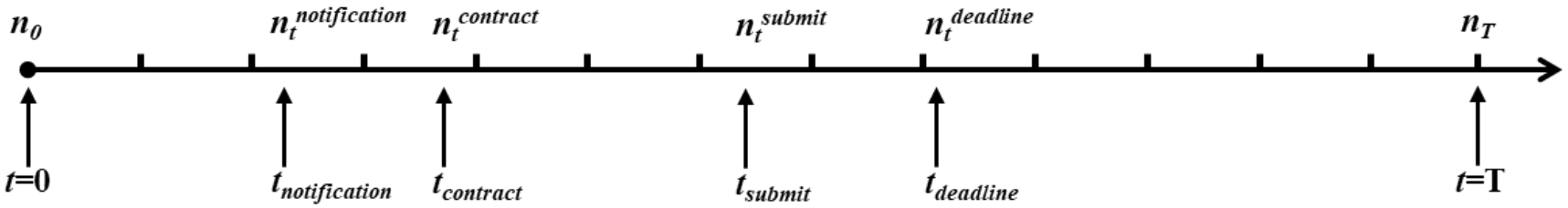
- Learning material generation
  - Rewards (Mturk, Upwork)
  - Recognition (Duolingo)
  - Contests (Taskcn, Kaggle)
- Language learning and datasets
  - Game with a purpose (RoboCorp)
  - Gamification (Duolingo, Eyewire)

Incentives for Geofenced Mobile Crowdsourcing

Geofenced Mobile Crowdsourcing



Assignment Protocol



Research Challenges

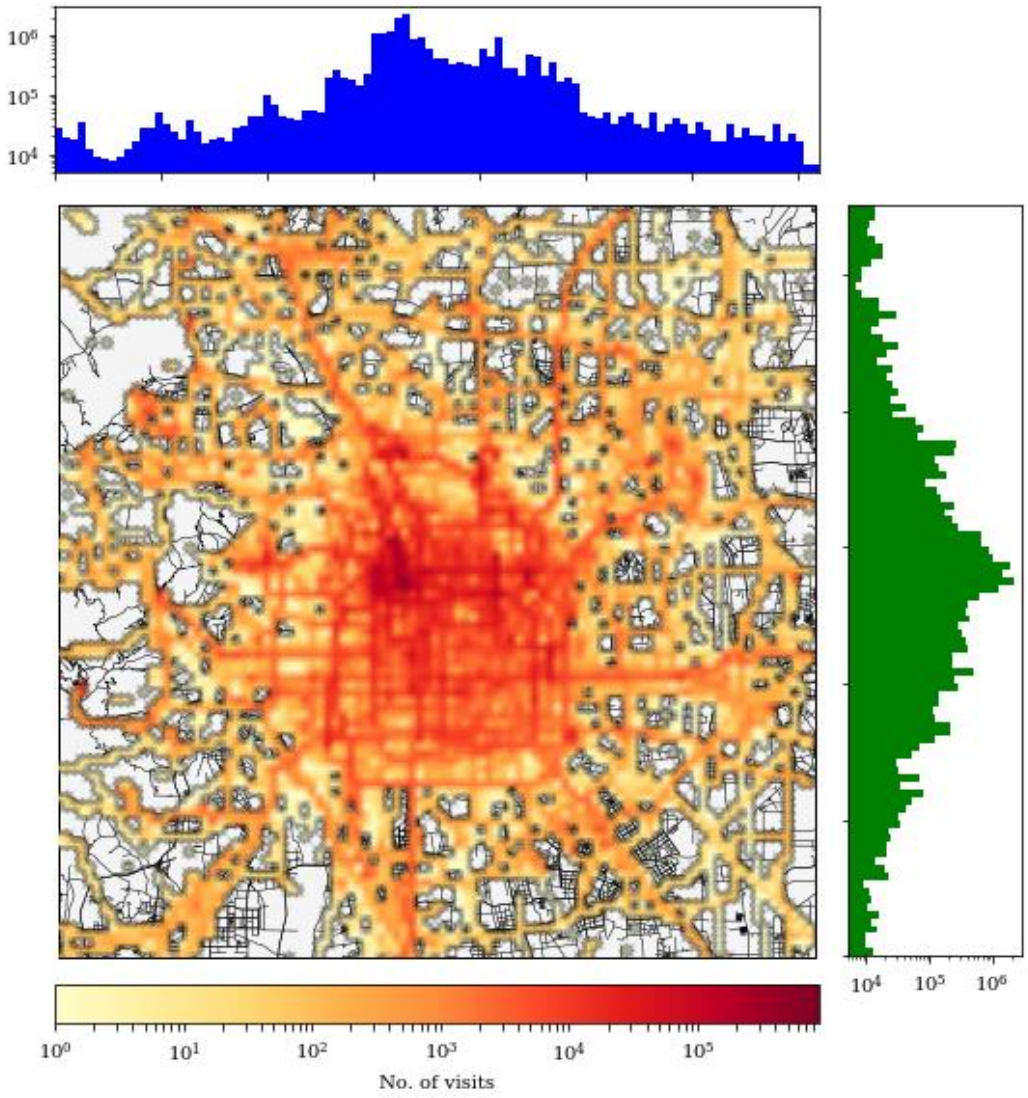
- How to address the trade-off between notifications and coverage?
  - Small geofence -> less coverage
  - Large geofence -> more notifications

- How to tackle the task starvation problem when tasks expire without being completed by any worker?
  - Tasks at less visited locations
  - Rewards value related to task completion

Geolife Data

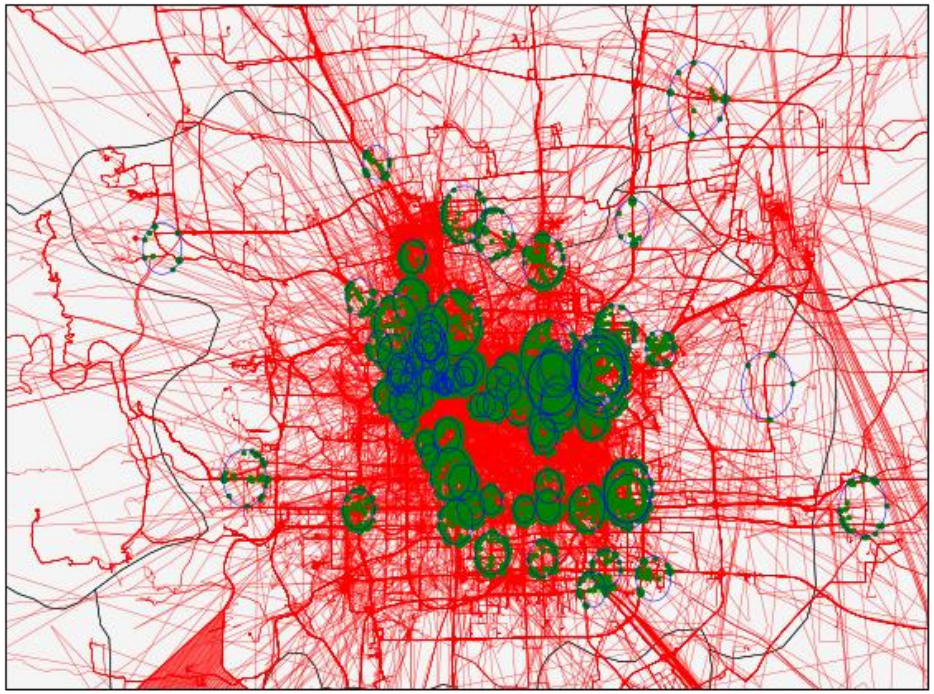
- 17,621 GPS trajectories of the 182 users from April 2007 to August 2012

- Variety of user movements such as
  - travel to home,
  - travel to work,
  - shopping,
  - sightseeing,
  - dining,
  - cycling, etc.

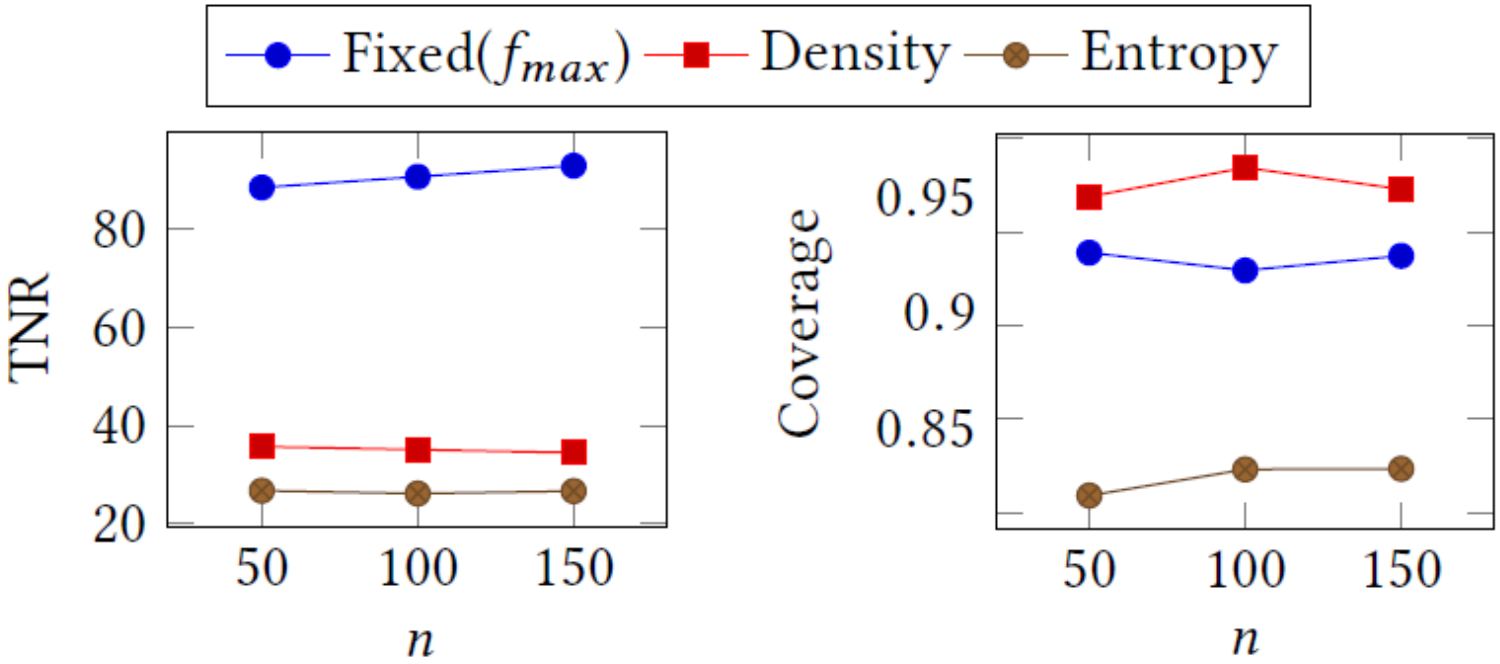


Dynamic Geofencing

- The size of geofence depends on the diversity of visits to a location.
  - Density
  - Entropy
- More diverse location means smaller geofence size.



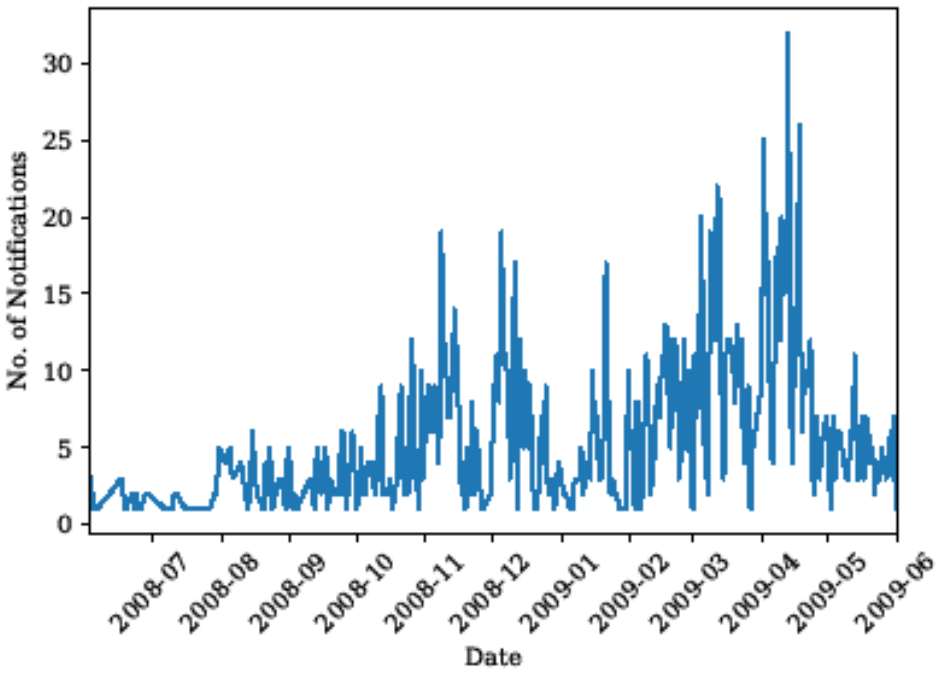
Dynamic Geofencing



Dynamic Pricing

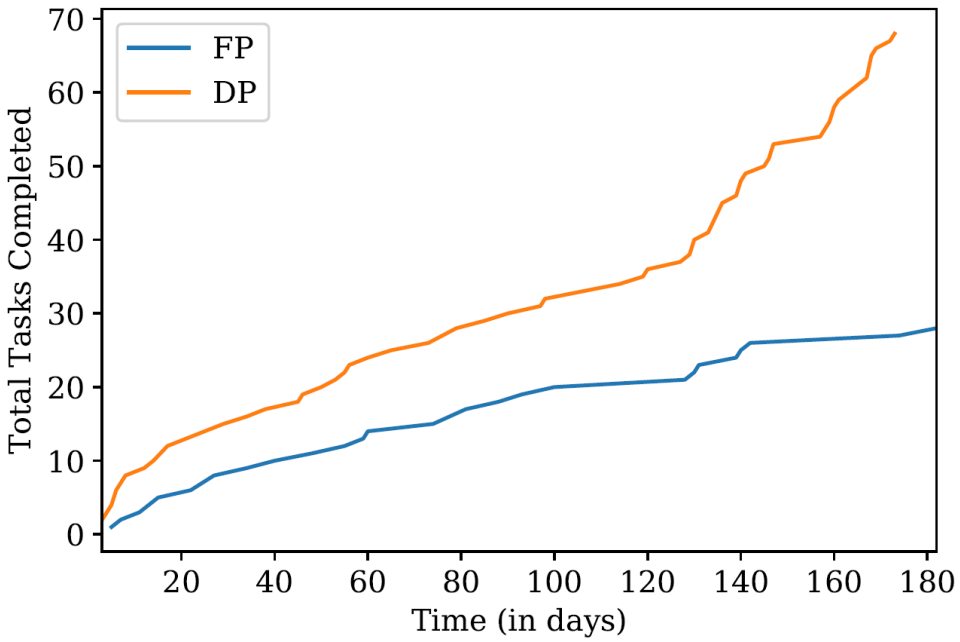
- Post-price incentive mechanism
- At time *t*, price tasks according their likelihood of completion by assigned workers.

$$r_i^t = r_0 + B_t \frac{\omega(\zeta_{i,j}, t)}{\mathcal{V}}$$



Dynamic Pricing

- For fixed number of tasks and fixed geofences.
- Dynamic pricing achieves high completion rate compared to fixed pricing



Thank you.

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