

Digital Civics (COMPSCI 592C)

Crowdsourcing for Addressing Complex Problems

Fall 2018



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Crowdsourcing

“The act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call.”

“Rise of Crowdsourcing” in Wired magazine by Jeff Howe

Crowdsourcing

“The process of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, and especially from an online community, rather than from traditional employees or suppliers..”

Platforms

- ▶ Aim to encourage and/or support crowdsourced work or objectives
- ▶ Differ according to their:
 - ▶ Level of organization
 - ▶ Size of community
 - ▶ Incentives

Example: Amazon Mechanical Turk



- ▶ Requestors (aka employers) post tasks known as Human-Intelligence Tasks (HITs)
- ▶ Workers (aka online users) complete tasks for small financial reward
- ▶ Work is often divided up into “micro-tasks”

Amazon mechanical turk

amazonmechanicalturk Artificial Intelligence [Your Account](#) [HITS](#) [Qualifications](#) **110,288 HITS** available now [Sign In](#)

All HITS | [HITS Available To You](#) | [HITS Assigned To You](#)

Search for containing that pay at least \$ for which you are qualified [GO](#)

All HITS

1-10 of 1895 Results

Sort by: [GO!](#) [Show all details](#) | [Hide all details](#) [1](#) [2](#) [3](#) [4](#) [5](#) > [Next](#) >> [Last](#)

Image Tagging - Answer questions about ONE image. Great images! View a HIT in this group			
Requester: TagCow	HIT Expiration Date: Oct 24, 2010 (2 weeks 5 days)	Reward: \$0.02	
	Time Allotted: 20 minutes	HITS Available: 14019	
Find Restaurant Web Addresses View a HIT in this group			
Requester: Dolores Labs	HIT Expiration Date: Oct 12, 2010 (6 days 23 hours)	Reward: \$0.07	
	Time Allotted: 60 minutes	HITS Available: 8773	
Product Search Relevance View a HIT in this group			
Requester: Amazon Requester Inc.	HIT Expiration Date: Oct 6, 2010 (1 day 21 hours)	Reward: \$0.01	
	Time Allotted: 10 minutes	HITS Available: 7867	
Verify Restaurant Websites View a HIT in this group			
Requester: Dolores Labs	HIT Expiration Date: Oct 11, 2010 (6 days 23 hours)	Reward: \$0.05	
	Time Allotted: 60 minutes	HITS Available: 6760	

Can we harness crowd to solve complex tasks?

- ▶ Example application domains
 - ▶ Crowd work
 - ▶ Citizen science
 - ▶ User-generated content

Crowd work

- ▶ Using crowd workers to complete work that would be difficult to complete otherwise
 - ▶ Volume of work
 - ▶ Tedious tasks
 - ▶ Expertise/abilities involved
 - ▶ Need for outsider insight

Crow work example

- ▶ One of the earliest examples is Luis Von Ahn's ReCaptcha



https://www.ted.com/talks/luis_von_ahn_massive_scale_online_collaboration?language=en

User-generated content



Voluntary contribution



Image: Wikimedia commons

Citizen science

- ▶ Science conducted in whole, or in part, by non-professional scientists

Foldit: solving puzzles for science

foldit BETA
Solve Puzzles for Science

Rank: 34 Score: 9455.364
Solved 229 Core and Tail Design 2
No conditions

Group Competition

Group Name	Score
1 Contenders	94,28
2 Robert Cassiere Foundation	94,27
3 Golfers	94,10
4 National Robotics	94,11
5 Another Hour Another Point	93,96
6 Czech National Team	93,90
7 Good Crushers	93,84

Solved Competition

Player Name	Current	Best
1 ScottMcGrath	-	94,28
2 verlan	-	94,27
3 Demargus	-	94,25
4 Mark	-	94,19
5 wjams	-	94,10
6 Mr_Jolly	-	94,11
7 krmuath	-	94,09

Chat - Group X auto show
Chat - Puzzle X auto show

shpatina: and so?
BlerdleyPark: and left me with an unanswered question
NataneeL: what's up?
BlerdleyPark: what is a tab-complete ? :)
NataneeL: Have you used RC?

Chat - Global X auto show
Notifications X auto show

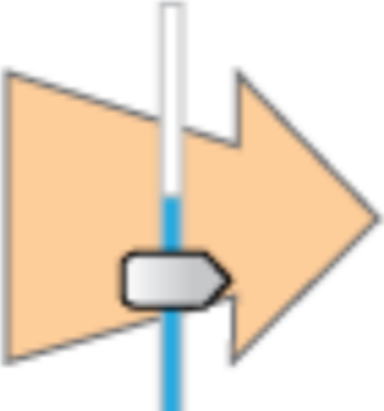
Shake Sidechains Metate Sidechains Wiggle All Wiggle Backbone Wiggle SideChains Freeze Protein Remove Bands Disable Bands Align Guide Reset Structures Reset Puzzle Help Glossary

Actions Undo Social Modes Behavior View Menu

Crowd-powered interfaces

Shortn

This paper introduces architectural and complex endeavors that span many levels of other people. We thus present Soyilent, ability, cost, wait time, and work time for



Crowdproof

let people be able to control

'Be able to' is unnecessary.: let people


allow people to control

The Human Macro

Write a request:

Find Creative Commons figure for paragraph

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Crowdsourcing as a method to improve civics

- ▶ E.g. Wikisurvey, Give a minute, CommunityCrit
- ▶ Budget Map
- ▶ Off-Road traffic Law

Budget Map

Experiment Guide

Start Issue Tagging

Browse Tags by Issues

My Profile

Logout

Your Rank: 124
(Top ranked user tagged: 12522)

"Public Safety"

Find Related/Unrelated Budget Programs.

For instance, if you think "Fire Department Vehicle Maintenance" program is related to "Public Safety", click "Related". It is also important to find "Unrelated" programs in order to aggregate total budget for an issue. Your contribution is calculated based on the number of programs you tagged.

Social Welfare > Vulnerable Group Support > Support for Disabled > Support for Local Disabled Community

Homecare Support for Disabled Women ≈ \$0.85M

Related Unclear Unrelated

Environmental Protection > Water Supply Sewage > Sewerage Management > Sewage Pipe Line Repair

Mok-dong & Sinjeong-dong Sewage Pipe Line Maintenance. ≈ \$1.50K

Related Unclear Unrelated

Social Issues

Public Safety
Accumulated: USD 454M Related: 207

Youth Unemployment
Accumulated: USD 86M Related: 36

Air Pollution (Fine Dust etc)
Accumulated: USD 247M Related: 63

Seoul City's Budget Spending (2015) : USD 21.78B

Public Order & Security: 1000
Education: 1000
Land Development: 700
Agriculture & Marine: 1000
Culture & Recreation: 1000
Public Health: 1000
Social Welfare: 1000
Public Administration: 1000
Transportation: 1000
Environmental Protection: 1000

Firefighting: 80
Public Health: 178
Physical Culture & Culture Programs: 244
Water Resources: 434
District & City: 442
Air Water & Sewage: 41
Child Education: 61
Housing: 63
Road: 380
Public Transportation & Distribution: 233
Elderly & Youth: 144
Childcare & Family: 144
Support for Vulnerable Social Group: 148

Firefighting Programs (53)

Search a program Search

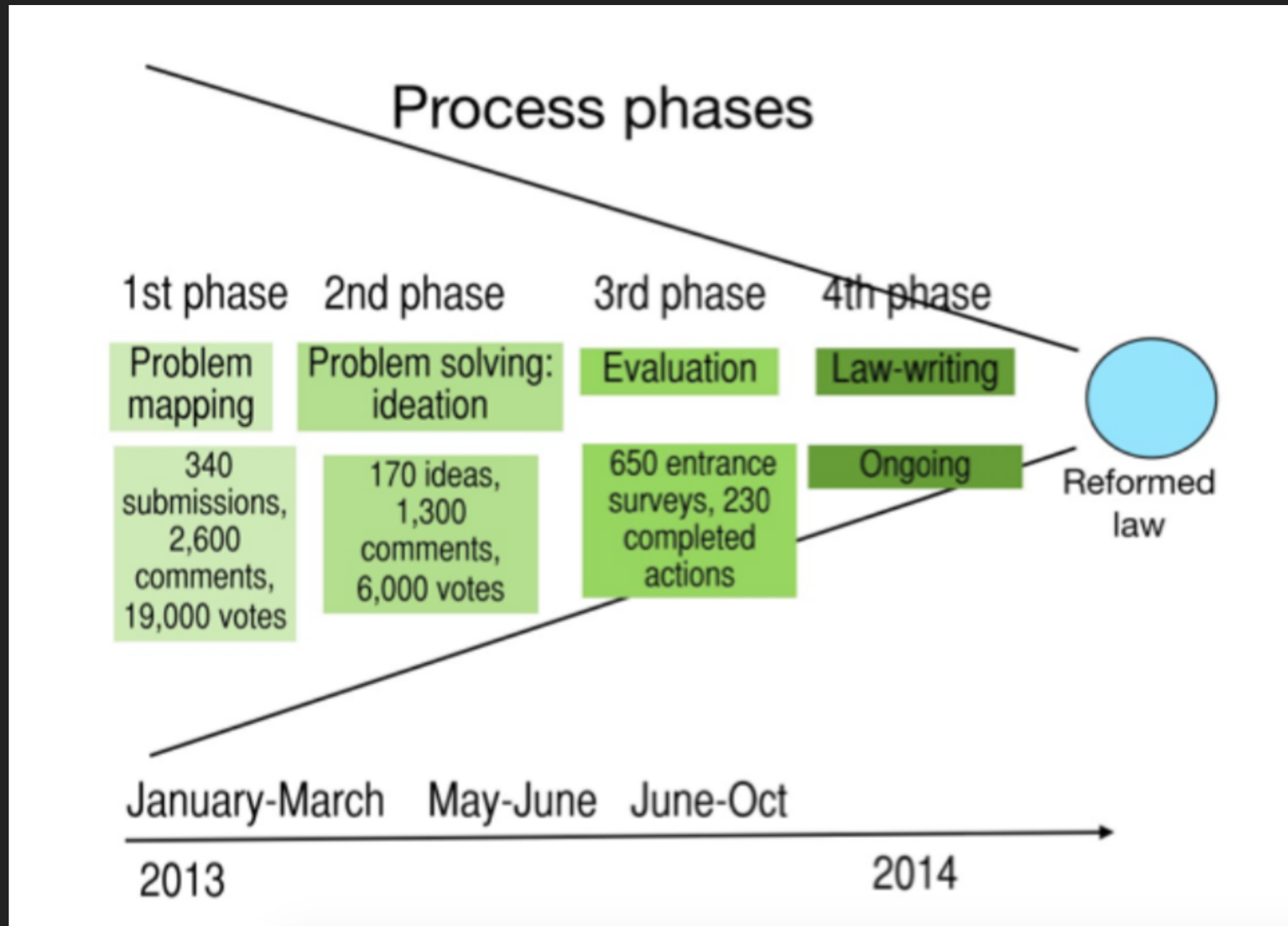
Public Safety Related: 10 Programs

- Fire Officer Health & Welfare Enhanc
- Seongdong Fire Station Establishme
- Fire Station Maintenance
- 119 Firehouse Establishment & Rebuil
- Fire & Aviation Operation
- Emergency Service Specialization
- Fire Assistant Staff Training
- Fire Engine Purchase
- Living Safety & Support for Disadvan
- Special Rescue Team Operation

A
B
C
D

Kim et al. BudgetMap: Engaging Taxpayers in the Issue-Driven Classification of a Government Budget. CSCW 2016.

Off-Road traffic Law



Tanja Aitamurto and Helene E Landemore. Five design principles for crowdsourced policymaking: Assessing the case of crowdsourced off-road traffic law in Finland. 2015.

Challenges

- ▶ Motivating contributions
- ▶ Data/work quality
- ▶ Workflow
- ▶ Performance

Other challenges

- ▶ Ethical and legal considerations, e.g.:
 - ▶ Demographics of contributors
 - ▶ Data storage
 - ▶ Imbalance of benefits

More challenges for community sourcing

- ▶ Ensuring authentic input
- ▶ Using quick and straightforward workflow
- ▶ Sustaining engagement
- ▶ Broadening participation
- ▶ Engaging representative contributors

Project pitches

Events

Data Science career mixer

<https://ds.cs.umass.edu/events/career-mixer-2018/student>