Crowdsourcing and Human Computation

CS115 / MAS115 - Wellesley College

These slides were prepared from materials from Cornell CS/INFO 5306 slides, CMU Luis Von Ahn’s slides, and http://crowdsourcing-class.org/
Collective Intelligence

A shared or group intelligence that emerges from the collaboration and competition of many individuals and appears in consensus decision making in bacteria, animals, humans and computer networks.
Human Computation

Computation: the process of mapping of some input representation to some output representation using an explicit, finite set of instructions (i.e., an algorithm).

Human Computation: computation carried out by humans
Crowdsourcing

The act of outsourcing tasks, traditionally performed by an employee or contractor, to an undefined, large group of people or community (a crowd) through an open call.
There are many definitions...

... a relatively new phenomenon in which web workers complete one or more small tasks, often for micro-payments on the order of $0.01 to $0.10 per task [Heer & Bostock]

... a general-purpose problem-solving method. [Doan et al.]

... people being paid to do web-based tasks posted by requestors [Bederson & Quinn]

... one way for a firm to access external knowledge [Burger-Helmchen & Penin]
Inter-related concepts

“Groups of individuals doing things collectively that seem intelligent”

“A paradigm for utilizing human processing power to solve problems that computers cannot yet solve.”

“The Gig Economy

“A labor market characterized by the prevalence of short-term contracts or freelance work as opposed to permanent jobs.”

“Outsourcing a job traditionally performed by an employee to an undefined, generally large group of people via open call.”

“Applying algorithms to extract patterns from data.”
What is a crowd?

- Employees of a business
- Participants in a poll
- Sports fans betting on games
- Independent stock market investors
- Internet users linking to sites
- Citizens in a democracy
Ways of aggregating collective intelligence

- Stock prices
- Futures contracts
- Voting
- Computer algorithms, interfaces
Foldit Gamers Solve Riddle of HIV Enzyme within 3 Weeks

The online game poses protein-folding puzzles, and participants provided insights recently that solved the structure of an enzyme involved in reproduction of HIV

By Michael J. Coren, Fast Company on September 20, 2011
How to Play

1. You and a partner see the same image.
2. Each of you must guess what words your partner is typing.

Got it, Let’s Play!

View Top Scores

Games with a Purpose [von Ahn et al]
LABELING IMAGES WITH WORDS

MARTHA STEWART
FLOWERS
SUPER EVIL
IMAGE SEARCH ON THE WEB

USES FILENAMES AND HTML TEXT
ACCESSIBILITY

LESS THAN 10% OF THE WEB IS ACCESSIBLE TO THE VISUALLY IMPAIRED

REASON: MOST IMAGES DON’T HAVE PROPER CAPTIONS
THE ESP GAME

TWO-PLAYER ONLINE GAME

PARTNERS DON’T KNOW EACH OTHER AND CAN’T COMMUNICATE

OBJECT OF THE GAME:
TYPE THE SAME WORD

THE ONLY THING IN COMMON IS AN IMAGE
THE ESP GAME

PLAYER 1

GUESSING: CAR
GUESSING: HAT
GUESSING: KID
SUCCESS!
YOU AGREE ON CAR

PLAYER 2

GUESSING: BOY
GUESSING: CAR
SUCCESS!
YOU AGREE ON CAR
The ESP Game

Taboo Words
HAT
SUNGLASSES

Your Guesses
MAN
PERSON
GUY

Type your next guess: [enter]

Time Left: 0:46
Score: 0220

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THE ESP GAME IS FUN

4.1 MILLION LABELS WITH 23,000 PLAYERS

THERE ARE MANY PEOPLE THAT PLAY OVER 20 HOURS A WEEK
LABELING THE **ENTIRE WEB**

5000 PEOPLE PLAYING SIMULTANEOUSLY CAN LABEL ALL IMAGES ON GOOGLE IN 30 DAYS!

INDIVIDUAL GAMES IN YAHOO! AND MSN AVERAGE OVER 5,000 PLAYERS AT A TIME
Welcome to Wikipedia,
the free encyclopedia that anyone can edit.
4,155,199 articles in English

From today's featured article

Drymoreomyys is a genus of rodents in the tribe Oryzomyini, from the Atlantic Forest of Brazil. The single species, D. albivulvata, is known only from the states of São Paulo and Santa Catarina and was not named until 2011. It lives in the humid forest on the eastern slopes of the Serra do Mar and perhaps reproduces year-round. Although its range is relatively large and includes some protected areas, it is patchy and threatened, and the discoverers recommend that the animal be considered “Near Threatened” on the IUCN Red List. Within Oryzomyini, Drymoreomyys appears to be most closely related to Eamoromyys from the Andes of Peru, a biogeographically unusual relationship. With a body mass of 44–64 g (1.6–2.3 oz), Drymoreomyys is a medium-sized rodent with long fur that is orange to reddish-buff above and grayish with several white patches below. The pads on the hindfeet are very well developed and there is brown fur on the upper sides of the feet. The tail is brown above and below. The front part of the skull is relatively long and the ridges on the brancas are weak. The palate is short, with its back margin between the third molars. Several traits of the genitals are not seen in any other omyzomyetine. (Full article)

In the news

- Queen Beatrix (pictured) announces that she will abdicate the Dutch throne at the end of April.
- The World Men's Handball Championship concludes with Spain defeating Denmark in the final.
- More than 230 people are killed and over 160 others are injured in a nightclub fire in Santa Maria, Brazil.
- Miloš Zeman is elected President of the Czech Republic.
- At least 60 people are killed in a prison riot in Barquisimeto, Venezuela.
- Protests coinciding with the second anniversary of the 2011 Egyptian revolution result in widespread injuries and deaths in Egypt.

Syrian civil war - Wikinews - Recent deaths - More current events...

On this day...

January 31: Independence Day in Nasaru (1968)
- 1801 – John Marshall became the fourth Chief Justice of the United States; his court opinions would help lay the basis for American constitutional law and made the Supreme Court a coequal branch of government.
- 1900 – Datu Muhammad Salieh, leader of a series of minor
The Veronica Mars Movie Project

UPDATED: This is it. We're making a Veronica Mars movie! Now the only question is: how big can we make it? We need your help!

Created by
Rob Thomas

91,585 backers pledged $5,702,153 to help bring this project to life.
Mechanical Turk is a marketplace for work.
We give businesses and developers access to an on-demand, scalable workforce.
Workers select from thousands of tasks and work whenever it's convenient.

**127,286 HITs** available. [View them now.](#)

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**Make Money**
by working on HITs

HITs - Human Intelligence Tasks - are individual tasks that you work on. [Find HITs now.](#)

**As a Mechanical Turk worker you:**
- Can work from home
- Choose your own work hours
- Get paid for doing good work

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**Get Results**
from Mechanical Turk Workers

Ask workers to complete HITs - Human Intelligence Tasks - and get results using Mechanical Turk. [Register Now](#)

**As a Mechanical Turk Requester you:**
- Have access to a global, on-demand, 24 x 7 workforce
- Get thousands of HITs completed in minutes
- Pay only when you're satisfied with the results

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Amazon's Mechanical Turk
Amazon’s Mechanical Turk

- Requesters post HITs (Human Intelligence Tasks) for a pool of workers (a.k.a. Turkers)

- Each HIT has a reward, typically $0.01 - $0.10, and a set number of assignments.

- HITs may have one or more qualifications
  - e.g., a 95% acceptance rate or completing a quiz.
Enter Postmark & Stamp Information for this card

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<th>Postmark City:</th>
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<th>Postmark Date: (Ex: Nov-09)</th>
<th>Postmark Year: (Ex: 1909)</th>
<th>Stamp: (Ex: 1c, 2c, half penny)</th>
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Postmark City: Barre
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Postmark Date: Oct-11
Postmark Year: 1886
Stamp: 1c
Reward: $0.01 per HIT