Human Computation (aka Crowdsourcing)

Slides taken from a talk by LUIS VON AHN

IMAGE SEARCH ON THE WEB

USES FILENAMES AND HTML TEXT

LABELING IMAGES WITH WORDS

MARTHA STEWART
FLOWERS
SUPER EVIL

STILL AN OPEN PROBLEM

USING HUMANS CLEVERLY

THE ESP GAME COULD LABEL ALL IMAGES ON THE WEB IN 30 DAYS!
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

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 IS FUN

4.1 MILLION LABELS WITH 23,000 PLAYERS

THERE ARE MANY PEOPLE THAT PLAY OVER 20 HOURS A WEEK
**SINGLE PLAYER GAME**

A single person can play with **pre-recorded** actions as their partner.

We emulate partner by playing pre-recorded moves.

When 2 people play, we record every action with timing information.

Notice that this doesn't stop the labeling process!

**WHAT ABOUT CHEATING?**

If a pair plays too fast, we don't record the words they agree on.

**WHAT ABOUT CHEATING?**

We give players **test images** for which we know all the common labels:

We only store a player's guesses if they successfully label the test images.

**SEARCH RESULTS**
**SAMPLE LABELS**

BEACH  
CHAIRS  
SEA  
PEOPLE  
MAN  
WOMAN  
PLANT  
OCEAN  
TALKING  
WATER  
PORCH

**COMING SOON:**  
MEET YOUR **SOUL MATE** THROUGH THE GAME!

**LOCATING OBJECTS IN IMAGES**

THE ESP GAME TELLS US IF AN IMAGE CONTAINS A SPECIFIC OBJECT, BUT DOESN’T SAY WHERE IN THE IMAGE THE OBJECT IS SUCH INFORMATION WOULD BE EXTREMELY USEFUL FOR COMPUTER VISION RESEARCH
PAINTBALL GAME
PLAYERS SHOOT AT OBJECTS ON THE IMAGE

SHOOT THE:
CAR

WE GIVE POINTS AND CHECK ACCURACY
BY GIVING PLAYERS IMAGES FOR WHICH
WE ALREADY KNOW WHERE THE OBJECT IS

X% OF IMAGES
(100-X)% OF IMAGES

DON'T KNOW

REVEALING IMAGES
GUESSER

REVEALER
CAR

BRUSH
GUESS

PARTNER’S GUESS
MEDIUM-TERM GOAL

USE THE ESP GAME, ALONG WITH THE PAINTBALL GAME AND THE REVEALING GAME TO CREATE THE MOST ACCURATE COMPUTER VISION ALGORITHMS TO RECOGNIZE A WIDE VARIETY OF OBJECT CATEGORIES