

Subjective Problems

Danna Gurari

The University of Texas at Austin

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Review

- Last week:
 - Visual question answering and dialog applications
 - Evaluation for visual question answering
 - Crowdsourcing for visual question answering
 - Crowdsourcing for visual dialog
- Assignments (Class Website & Canvas)
 - Project outline due yesterday
 - Project prototype demo due today
 - Project presentation due in three weeks
- Questions?

Today's Topics

- Subjective problems and applications with visual data
- Crowdsourcing subjective opinions about visual data
- Class activity: brainstorm, choose, & design future dataset creation
- Lab: final project discussion and open lab

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Subjective Problems

What are these? Tasks where people can hold different, yet valid opinions based on their personal ideas, feelings, or tastes

What aren't these? Tasks with a single, objective truth

Applications: Image Search

The image shows a screenshot of the Google search interface. At the top left is the Google logo. The search bar contains the text "face". To the right of the search bar are icons for image search, voice search, and a magnifying glass. In the top right corner, there are icons for a grid, a notification bell, and a user profile picture. Below the search bar, there are navigation tabs: "All", "Images" (which is selected and underlined), "News", "Videos", "Shopping", and "More". To the right of these tabs are "Settings" and "Tools". Further right, there are links for "View saved" and "SafeSearch".

Below the navigation tabs is a horizontal row of 14 colored buttons, each containing a search filter. From left to right, the buttons are: "wtf" (purple), "deformed" (purple), "asymmetrical" (purple), "average" (pink), "beautiful woman" (red), "woman's" (orange), "serious" (green), "surprised" (teal), "skinny" (blue), "confused" (purple), "annoyed" (purple), "angry" (pink), "sad" (pink), and "disgusted" (pink). Arrows on the far left and far right of this row indicate that it can be scrolled.

Below the filter buttons is a grid of 14 portrait images of human faces, arranged in two rows of seven. The top row shows a woman with dark hair, a man with short dark hair, a woman with light hair, a man with short dark hair, a woman with light hair, a woman with dark hair, and a woman with dark hair. The bottom row shows a woman with light hair, a woman with dark hair, a woman with long light hair, a woman with dark hair, a woman with dark skin and freckles, a woman with dark hair and heavy eye makeup, and a woman with dark hair.

Applications: Company/Product Advertising

- e.g., what logo?
- e.g., what website images?
- e.g., what paid advertisements?

Applications: Social Networking

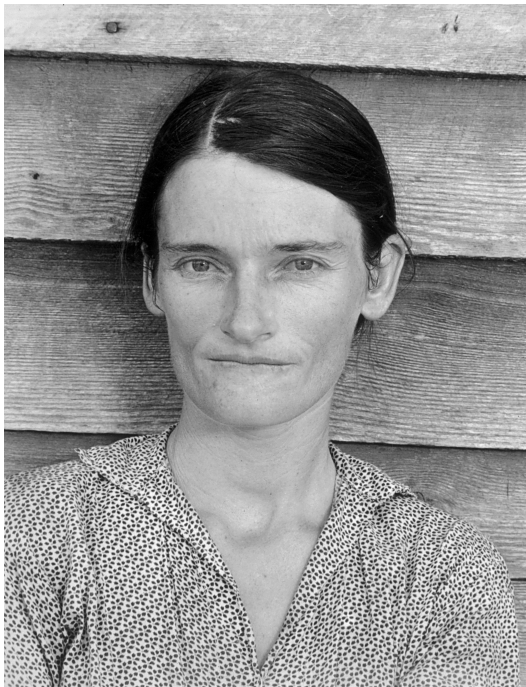
- How to post popular/memorable/funny/viral posts?



Figure credit: <http://www.mysocialstream.com/blog/2017-08-21-unique-strategies-to-make-your-social-media-posts-go-viral/>

Applications: Journalism

- How to use images to convey desired emotions?
 - e.g., what does she feel?

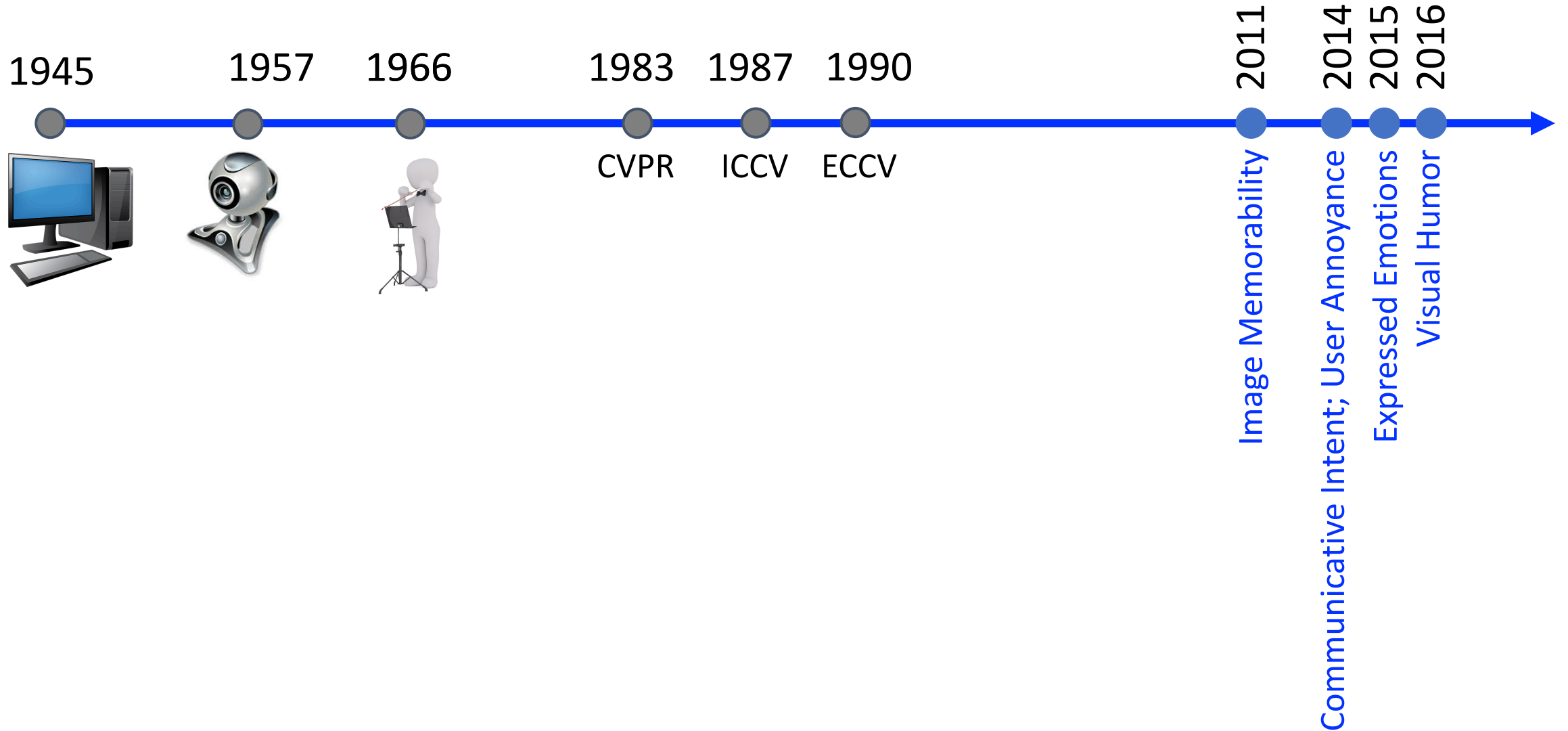


https://upload.wikimedia.org/wikipedia/commons/2/26/Allie_Mae_Burroughs_print.jpg

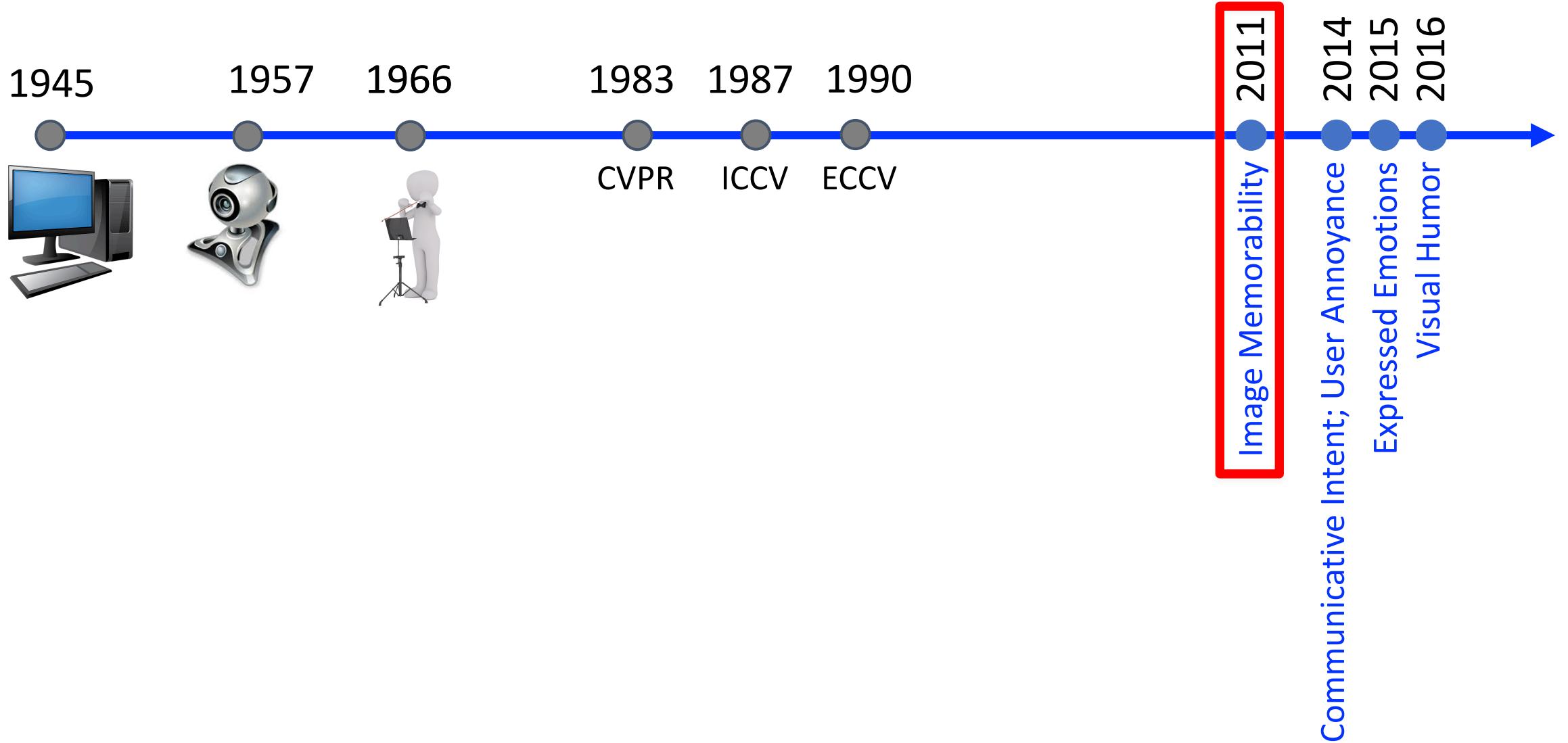
Today's Topics

- Subjective problems and applications with visual data
- **Crowdsourcing subjective opinions about visual data**
- Class activity: brainstorm, choose, & design future dataset creation
- Lab: final project discussion and open lab

Subjective Problem Studies



Subjective Problem Studies



Subjective Problem: Image Memorability

What images are memorable?

Subjective Problem: Image Memorability

1. Image Collection

* 10,442 images from SUN,
each scaled and cropped
about their centers to
256x256

Subjective Problem: Image Memorability

1. Image Collection

* 10,442 images from SUN,
each scaled and cropped
about their centers to
256x256

2. Image Labeling

* Image Memorability
Game posted to AMT

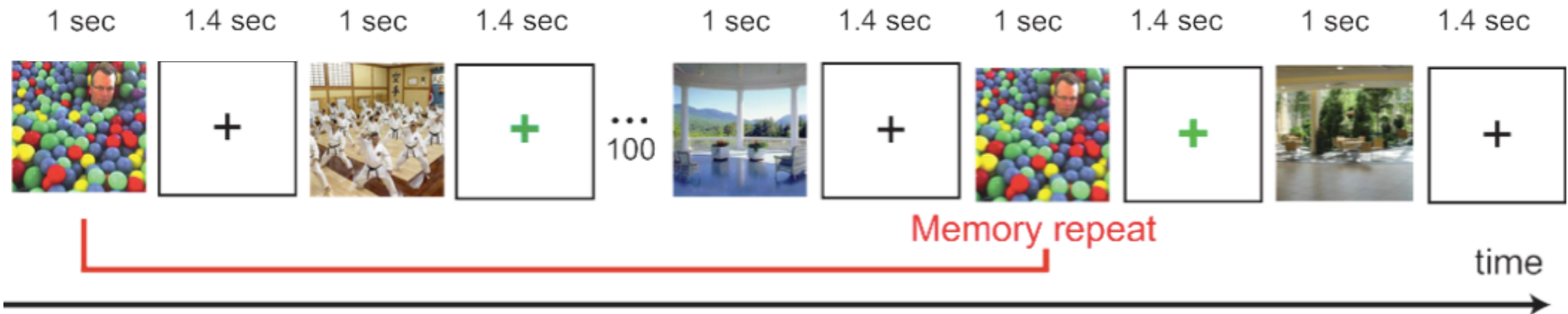
* Quality control performed
to filter crowd workers

* Each image was scored
on average by 78 people

* Memorability score
assigned as % of correct
detections by all people

Subjective Problem: Image Memorability

- Image Memorability Game posted to AMT
 - Sequence of 120 images shown over span of ~5 minutes
 - Each image displayed for 1 second followed by 1.4 second gap
 - Task: press space bar whenever a repeat of a previously shown image is shown



Subjective Problem: Image Memorability



Subjective Problem: Image Memorability

1. Image Collection

* 10,442 images from SUN, each scaled and cropped about their centers to 256x256

2. Image Labeling

* Image Memorability Game posted to AMT

* Quality control performed to filter crowd workers

* Each image was scored on average by 78 people

* Memorability score assigned as % of correct detections by all people

- 1) Qualification and training demo provided before workers could begin the game
- 2) Game automatically ended if participant performance fell below pre-defined success thresholds and data discarded
- 3) Crowd workers were blocked from further contributions when the above happened more than 3 times

Subjective Problem: Image Memorability

- Examples of what the crowd found most/least memorable:



a) Most memorable images (86%)



c) Least memorable images (34%)

Subjective Problem: Image Memorability

- Work was expanded to predict memorability scores for
 - Scenes [Isola et al; CVPR 2011]
 - Faces [Bainbridge et al; CogSci 2012]
 - Scientific visualizations [Borkin et al; TVCG 2013]

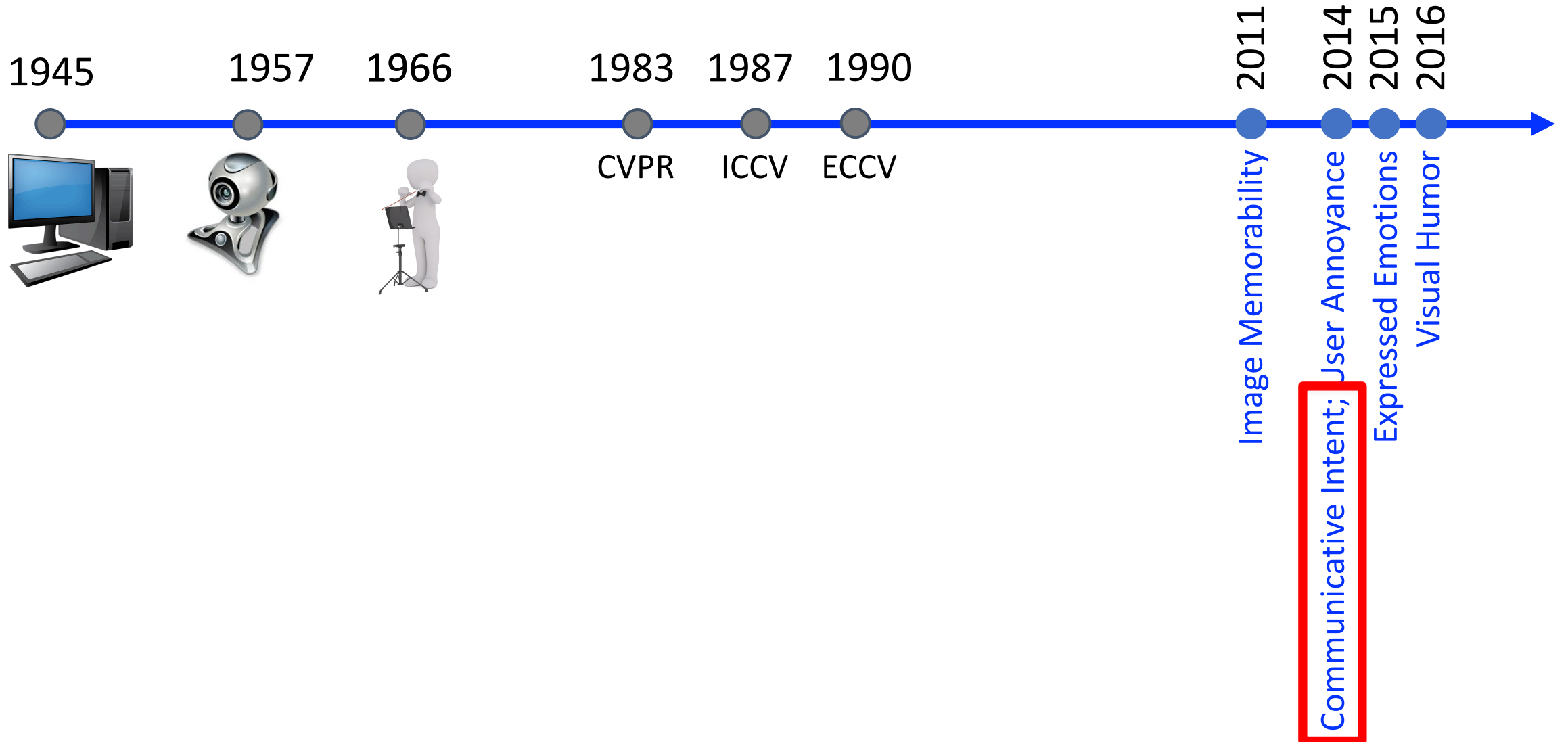
Most Memorable:



Least Memorable:



Subjective Problem Studies



Subjective Problem: Infer Communicative Intents

What message does this visualization try to convey?

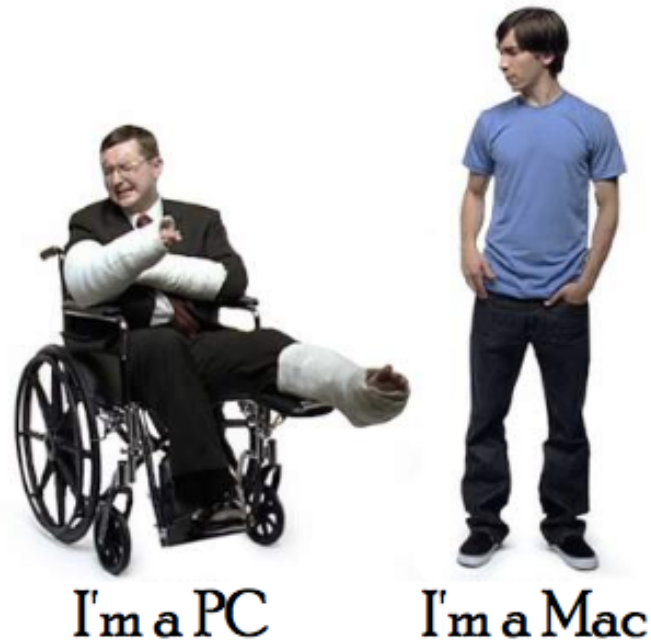


Obama is an inferior candidate to Romney

Jungseock Joo, Weixin Li, Francis F. Steen, and Song-Chun Zhu. "Visual Persuasion: Inferring Communicative Intents of Images." CVPR 2014.

Subjective Problem: Infer Communicative Intents

What message does this visualization try to convey?



Mac is more user friendly than a PC

Subjective Problem: Infer Communicative Intents

What message does this visualization try to convey?

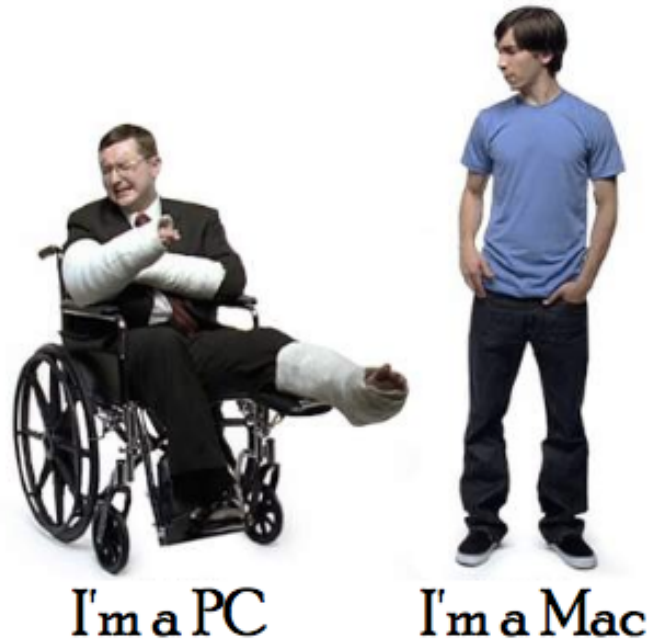
Hitler is kind and trustworthy



Jungseock Joo, Weixin Li, Francis F. Steen, and Song-Chun Zhu. "Visual Persuasion: Inferring Communicative Intents of Images." CVPR 2014.

Subjective Problem: Infer Communicative Intents

Can we understand and teach machines to predict the message that an image conveys?



Jungseock Joo, Weixin Li, Francis F. Steen, and Song-Chun Zhu. "Visual Persuasion: Inferring Communicative Intents of Images." CVPR 2014.

Subjective Problem: Infer Communicative Intents

1. Category Selection

* 9 dimensions chosen following initial analysis:
angry, happy, fearful,
competent, energetic,
comforting, trustworthy,
socially dominant, &
overall favorable

Subjective Problem: Infer Communicative Intents

1. Category Selection

* 9 dimensions chosen following initial analysis: angry, happy, fearful, competent, energetic, comforting, trustworthy, socially dominant, & overall favorable

2. Image Collection

* 1,124 images of 8 US, highly-profiled politicians

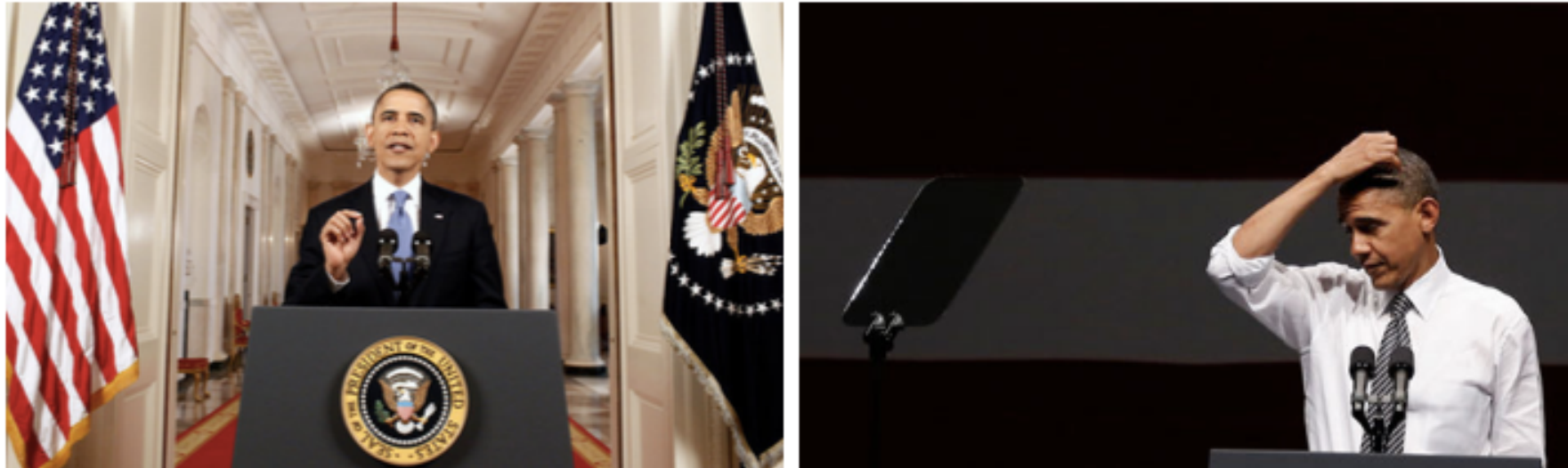
3. Image Labeling

* 10 undergraduate and graduate students annotated all images by providing relative ratings

Subjective Problem: Infer Communicative Intents

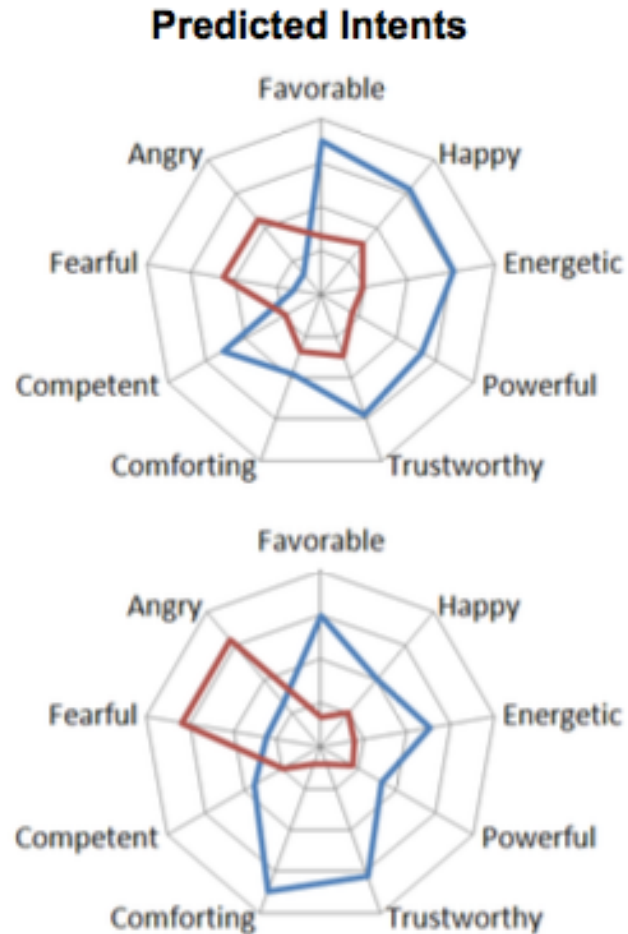
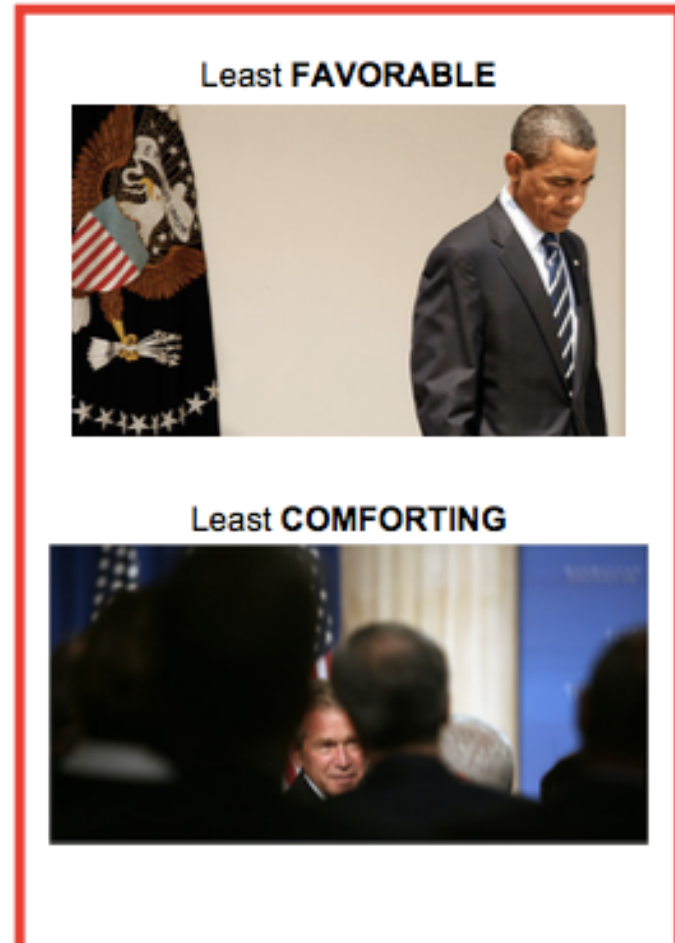
Task for each of 9 communicative intents:

e.g., “In which image does [BARACK OBAMA] look more [COMPETENT]”



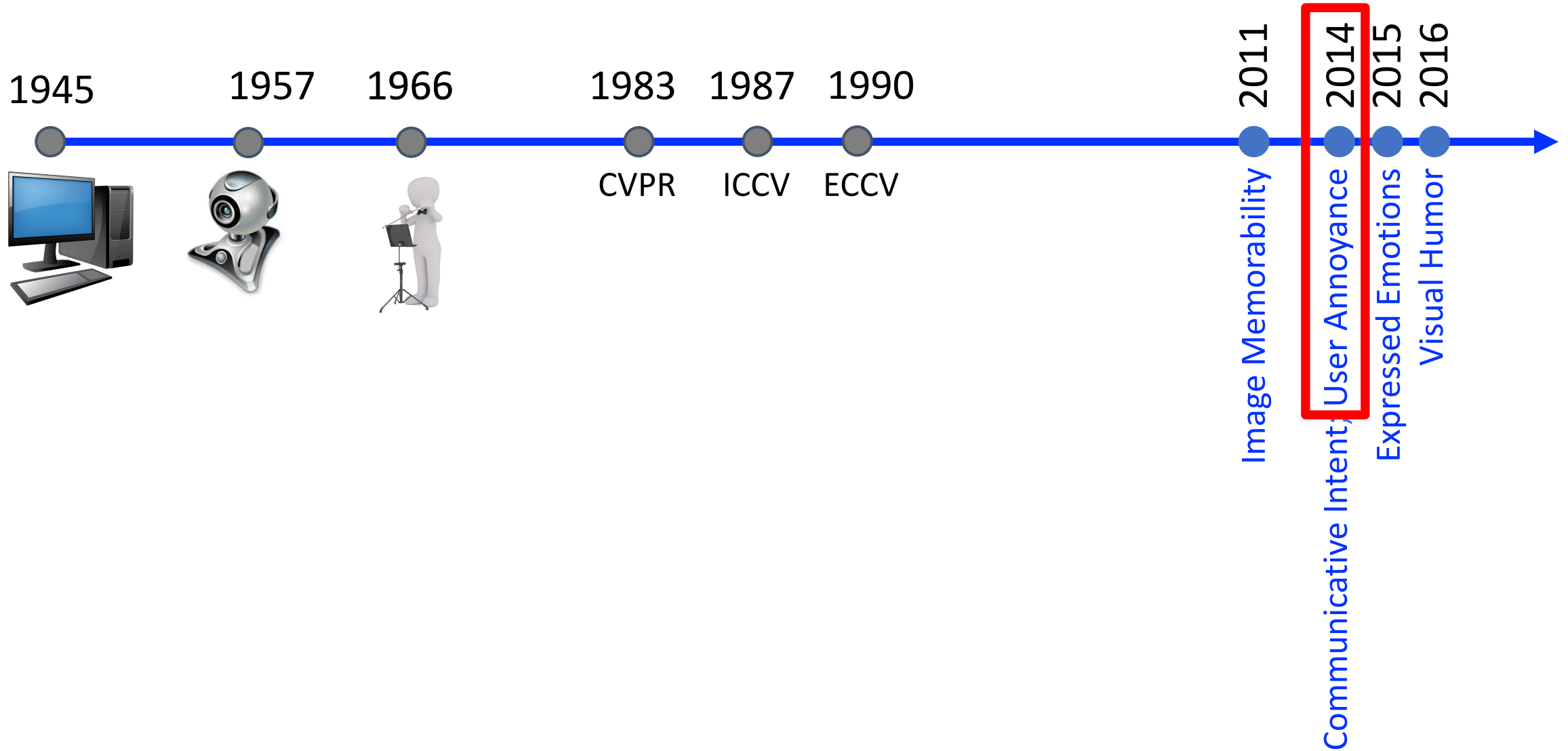
Global ranking created from all results

Subjective Problem: Infer Communicative Intents



Jungseock Joo, Weixin Li, Francis F. Steen, and Song-Chun Zhu. "Visual Persuasion: Inferring Communicative Intents of Images." CVPR 2014.

Subjective Problem Studies



Subjective Problem: Predicting User Annoyance

- If you were looking for a picture of A, would you be more annoyed if the search engine returned a picture of B instead, or a picture of C?

A:



Conference Hall

B:



C:

Subjective Problem: Predicting User Annoyance

- If you were looking for a picture of A, would you be more annoyed if the search engine returned a picture of B instead, or a picture of C?

A:



A (Miley Cyrus)

B:



C:

Subjective Problem: Predicting User Annoyance

- If you were looking for a picture of A, would you be more annoyed if the search engine returned a picture of B instead, or a picture of C?

A:



Mountain

B:



C:

Subjective Problem: Predicting User Annoyance

1. Image Collection

- * 8,523 images from the Public Figures Face database that represents 60 public figures/categories
- * 1,600 images from SUN that span 80 categories

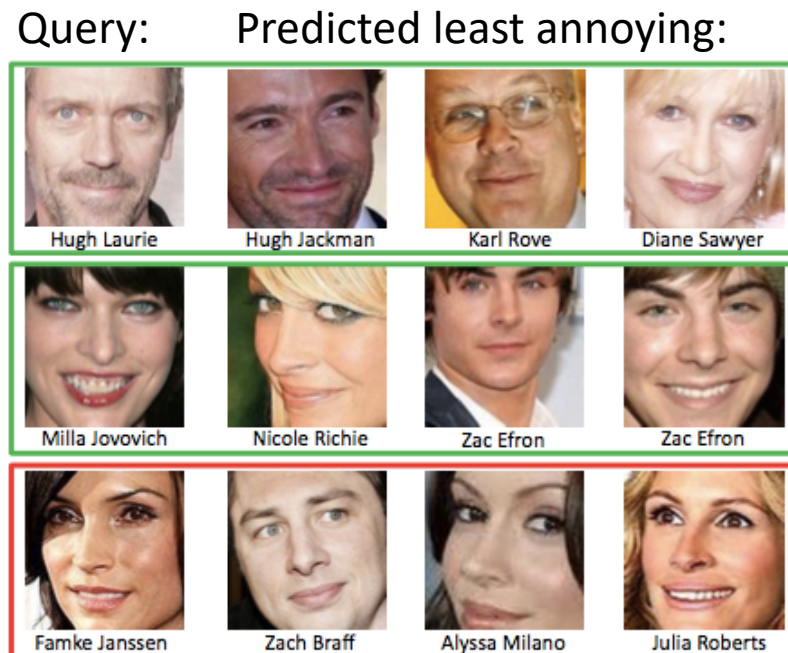
2. Image Labeling

- * AMT crowd workers rated on a scale of 1 (not very annoyed) to 5 (very annoyed) how annoyed they would be in searching for images from class B if they were shown images from class A
- * Redundant annotations collected for each image (10 for PubFig, 5 for SUN)

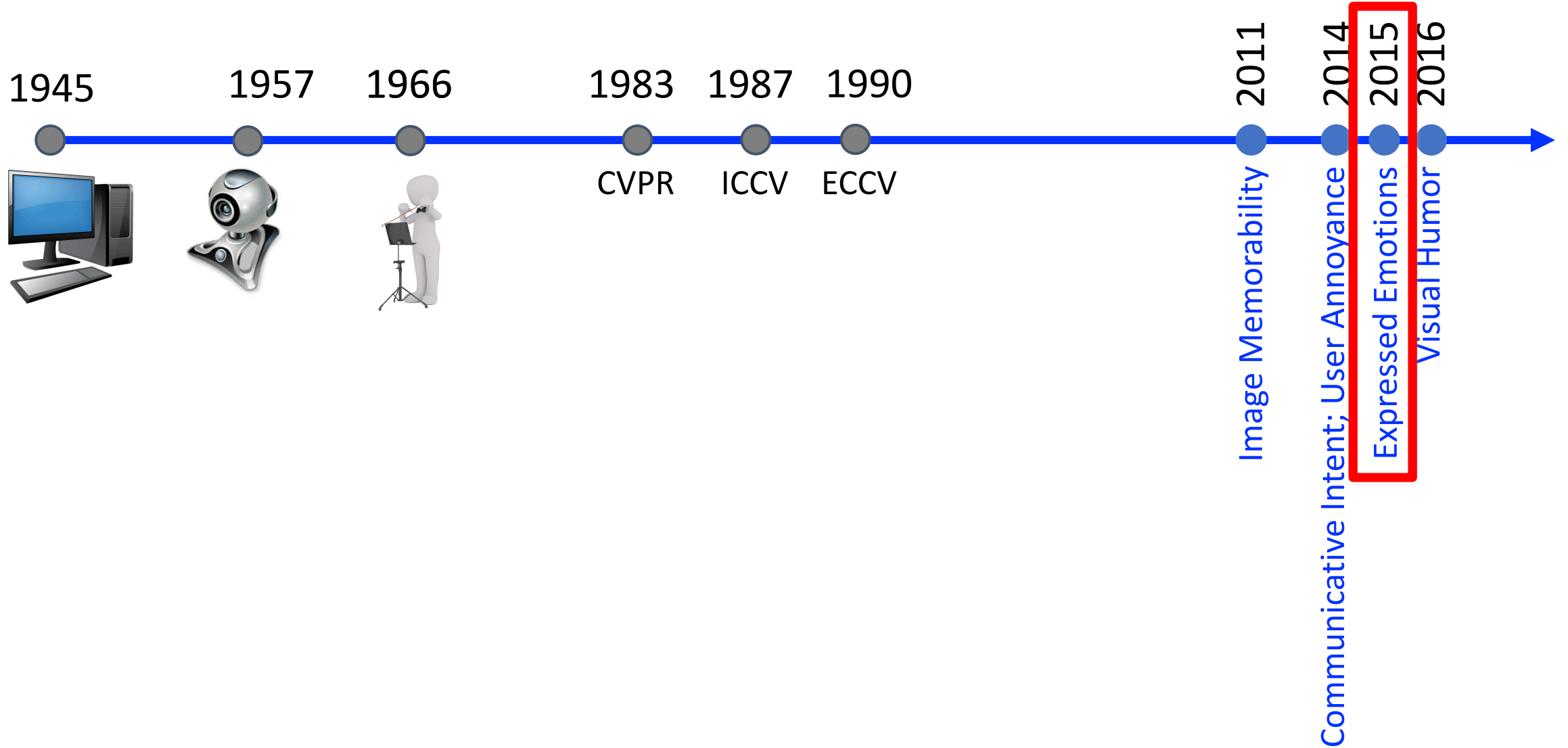


Subjective Problem: Predicting User Annoyance

- Regressors were trained to predict the annoyance score (average score of crowd votes for both datasets (PubFaces and Scenes))



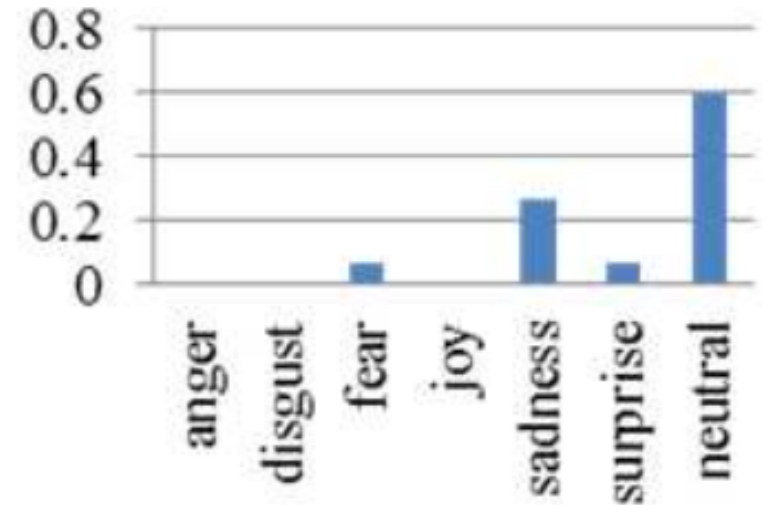
Subjective Problem Studies



Subjective Problem: Emotion Distributions

- Which emotion(s) best describe the expressed emotion of this image?

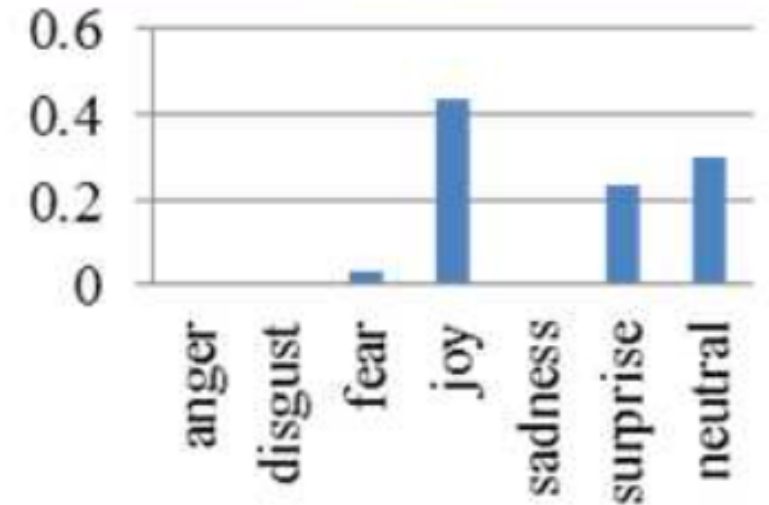
- Joy?
- Sadness?
- Fear?
- Disgust?
- Anger?
- Surprise?
- Neutral?



Subjective Problem: Emotion Distributions

- Which emotion(s) best describe the expressed emotion of this image?

- Joy?
- Sadness?
- Fear?
- Disgust?
- Anger?
- Surprise?
- Neutral?



Subjective Problem: Emotion Distributions

1. Category Selection

* Ekman's six basic emotions: anger, disgust, joy, fear, sadness, and surprise since their importance is implied by multiple psychological theorists employing them

2. Image Collection

* 1,980 images collected with 330 images per category by searching for each category and its synonyms in:

The logo for Flickr, with the word "flickr" in a blue sans-serif font and the "r" in a pink sans-serif font.

3. Image Labeling

* AMT crowd workers employed to rate the evoked emotions for each image

* 15 AMT workers rated each image

Subjective Problem: Emotion Distributions

Instructions:

Task:

Please answer Question 1 – 3 based on the emotion which the main object in the image expresses or the emotion you ...

Photographers take pictures to express the emotions they want to convey or the emotions of the main object in the pictures. Pictures can also change our emotions after we see them. For example, the tiger in the right image expresses angry emotion, but we may feel fearful after seeing it. The EXPRESSED emotion (the emotion of the main object in the image or the author wants to express) and EVOKED emotion (the emotion you feel after seeing the image) may be different.

In this questionnaire consisting of 10 images, you will be asked 7 questions related to the EXPRESSED emotion (question 1–3) and the EVOKED emotion (question 4–7) for each image. Please answer each question carefully according to the corresponding description. We will examine the credibility of the answers of this questionnaire by our algorithm, and only those earnest participants will be rewarded.

Click here to [close](#)

is ...

ED emotion of this image?

is ...

very negative neutral very positive

Question 3: Which one(s) of the following emotion keywords best describe the EXPRESSED emotion of this image? (choose at least one or more keywords which are suitable)

joy sadness fear disgust anger surprise neutral

Please answer Question 4 – 7 based on what you feel after seeing the image.

Question 4: According to your judgement, your EVOKED emotion after seeing this image is ...

1 2 3 4 5 6 7 8 9

very negative neutral very positive

Question 5: Confronted with the image, you are feeling ...

1 2 3 4 5 6 7 8 9

calm relaxed neutral excited stimulated

Question 6: Which one(s) of the following emotion keywords best describe your EVOKED emotion after seeing this image? (choose at least one or more keywords which are suitable)

joy sadness fear disgust anger surprise neutral

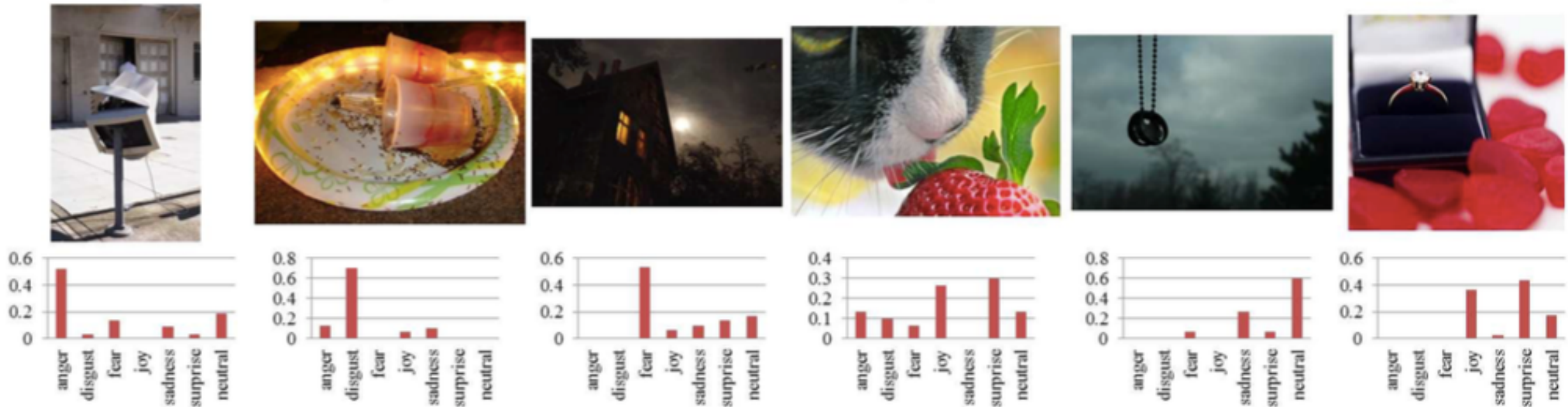
Question 7: which part of the image influences your EVOKED emotion the most? (please draw a rectangle over the most influential part)

You must ACCEPT the HIT before you can submit the results.

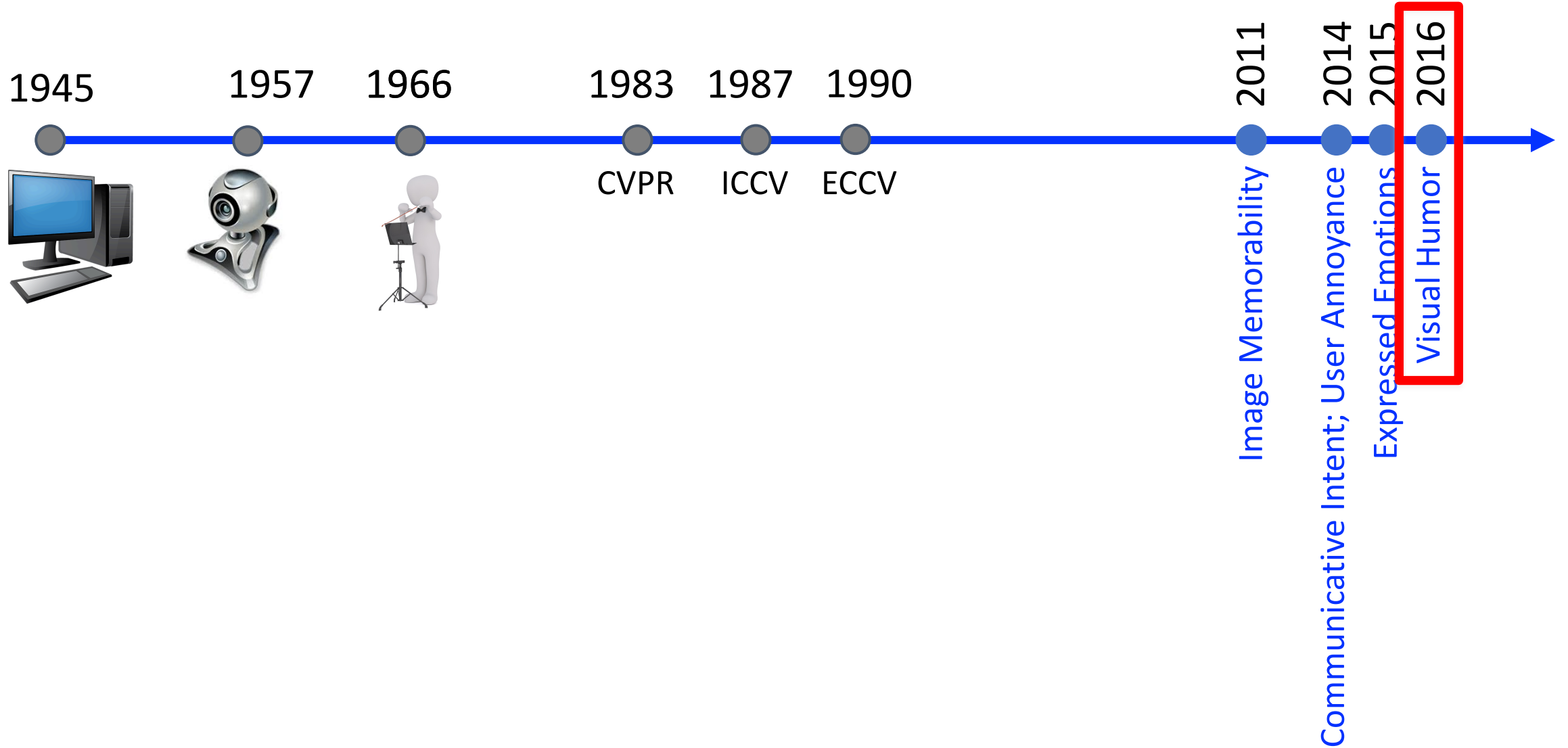
Jungseock Joo, Weixin Li, Francis F. Steen, and Song-Chun Zhu. “Visual Persuasion: Inferring Communicative Intents of Images.” CVPR 2014.

Subjective Problem: Emotion Distributions

- Dataset used to train/test a regressor per emotion and then predict the emotion distribution



Subjective Problem Studies



Subjective Problem: Visual Humor

- What rating would you give this image on a scale from 1 to 5?

- 1- not funny
- 2
- 3
- 4
- 5 - extremely funny



: 0.1

(10 crowd workers)

Subjective Problem: Visual Humor

- What rating would you give this image on a scale from 1 to 5?

- 1- not funny
- 2
- 3
- 4
- 5 - extremely funny



: 4

(10 crowd workers)

Subjective Problem: Visual Humor

1. Image Collection

* Crowd workers recruited to create 3,200 “funny” abstract scenes

Depict Funny Scenarios! (Living/Dining Room)

[Images may take some time to load] [Spamming will get blocked]

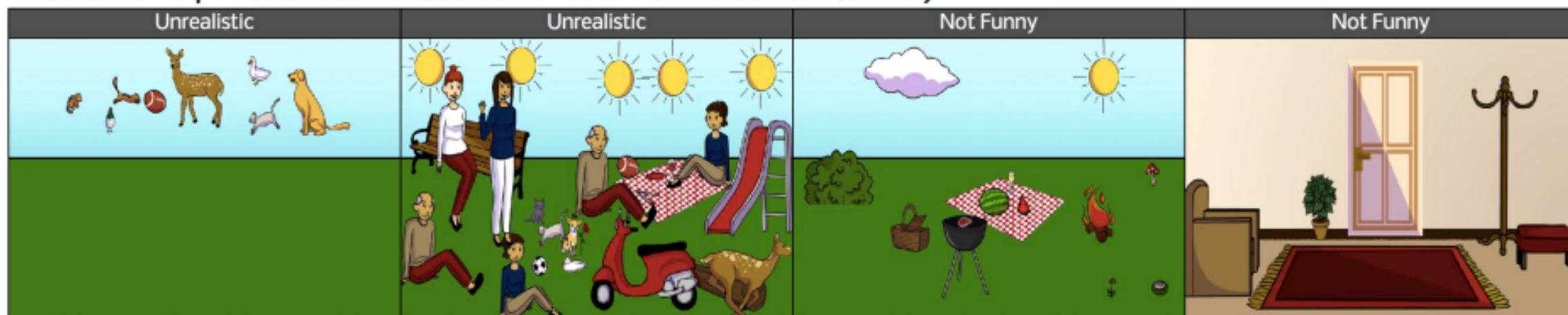
[Tested with Chrome, Firefox and Safari. Interface may not work well with Internet Explorer]

Using the clipart interface below, please create scenes where a funny scenario is being depicted.

Please follow the **instructions** carefully, otherwise your work **WILL BE REJECTED**.

1. While funny, make your scenarios **realistic** and **meaningful** (e.g., the scene should **not** contain a **random assortment** of clipart pieces).
2. **Other people** should also find your scenario funny (e.g., no inside jokes).
3. Please use **at least 6 pieces** of clipart in the scene.
4. If you do multiple HITs, please be sure to create very **different scenarios** across HITs and not minor variations of a previously created scenario.
5. Give us a **description** of why you think the scenario is funny. Once you create a scene and click next, you will be asked to provide a **description** of what about the scenario is funny.

Below are examples of **bad scenarios** that are either not realistic or not funny:



Clipart objects (5 instances each) may be added by dragging them onto the scene and removed by dragging them off. They may be **resized (CTRL + a/CTRL + z)**, **flipped (CTRL + c)**, **sent backward (CTRL + s)** or **brought forward (CTRL + x)**.

You will be asked to complete **2 tasks**.

You can go back and forth between all of your scenarios by pressing "Prev" and "Next". When you finish your last one, a pop-up will ask you to submit the HIT. We'd love to hear any feedback you have about the usability of the interface, any bugs you encounter, or the HIT in general, so feel free to leave a comment.

Thanks for your work!



Scene Depth

Flip

Type

People	Animals	Large objects	Small objects	
 5	 5	 5	 5	 5
 5	 5	 5	 5	 5
 5	 5	 5	 5	 5
 5	 5	 5	 5	 5
 5	 5	 5		

Subjective Problem: Visual Humor

1. Image Collection

* Crowd workers recruited to create 3,200 “funny” abstract scenes

2. Image Labeling

* AMT crowd workers rated on a scale of 1 (not funny) to 5 (extremely funny) each image

* 10 crowd workers rated each image

Subjective Problem: Predicting Visual Humor

- Datasets used to develop a regressor that predicts the funniness score (avg score of 10 crowd votes)



(a) 0.1



(b) 1.5



(c) 4.0



(d) 4.0

Today's Topics

- Subjective problems and applications with visual data
- Crowdsourcing subjective opinions about visual data
- **Class activity: brainstorm, choose, & design future dataset creation**
- Lab: final project discussion and open lab

Class Discussion

Beforehand: brainstorm 1 idea for a subjective task you would like to develop an AI algorithm to be able to do and submit to a Google form

1. [7 minutes] Each group must choose 1 idea from the list
2. [15 minutes] Then, each group must:
 - a. Create a plan for how you will create a dataset with 100,000 labeled examples using crowdsourcing
 - b. Estimate the budget for this project
3. Then, each group will present their final plan to the class
4. Each person in the class will get to allocate \$50,000 to preferred projects
5. We will tally the allocated money to identify which projects are best-funded

Today's Topics

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- **Lab: final project discussion and open lab**

Final Project Paper: Writing Support

- Writing center: <http://uwc.utexas.edu/>
 - can schedule four individual 45-minutes consultation per month
- Tutoring:
 - <https://utdirect.utexas.edu/apps/ugs/my/tutoring/student/tutoring-agreement/>

Final Project Paper: Plagiarism

- Material from: <https://legacy.lib.utexas.edu/services/instruction/avoidplagiarism.html>

University of Texas Definition of Plagiarism:

“the appropriation of, buying, receiving as a gift, or obtaining by any means material that is

attributable in whole or in part to another source, including words, ideas, illustrations, structure, computer code, and other expression

or media, and presenting that material as one's own academic work being offered for credit.”

Final Project Paper: Plagiarism

- Material from: <https://legacy.lib.utexas.edu/services/instruction/avoidplagiarism.html>

Plagiarism in Plain English:

Using someone else's work in your own academic work without giving proper credit. Click a button below to see some examples.

Intentional Plagiarism

Unintentional Plagiarism

Final Project Paper: Plagiarism

- Play It Safe, Give Credit Generously

- Material from: <https://legacy.lib.utexas.edu/services/instruction/avoidplagiarism.html>

Intentional Plagiarism:

- Copying a friend's or classmate's work
- Buying or borrowing papers
- Cutting and pasting blocks of text without providing documentation of the original source
- Borrowing images and other media without documentation of the original source
- Publishing work on the Web without the permission of the creator

Final Project Paper: Plagiarism

- Play It Safe, Give Credit Generously

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Unintentional Plagiarism:

- Careless paraphrasing
- Poor documentation of sources
- Quoting excessively
- Failure to use your own ideas or words

Final Project Paper: Plagiarism

- Play It Safe, Give Credit Generously

- Material from: <https://legacy.lib.utexas.edu/services/instruction/avoidplagiarism.html>

During the course of your research, you come across an idea that you use in your paper. You don't use the author's exact words or even paraphrase -- just the idea. Cite it?

Other people's words aren't the only thing you need to cite. You also need to cite ideas. So in this case, you should give the author credit for the idea by citing them.

Final Project Paper: Plagiarism

- Play It Safe, Give Credit Generously

- Material from: <https://legacy.lib.utexas.edu/services/instruction/avoidplagiarism.html>

You are doing a presentation for your Chemistry class and use an image of the Periodic Table you found on a government web site. Cite it?

You should cite images. Even government websites in the public domain need to be cited.

Final Project Paper: Plagiarism

- Play It Safe, Give Credit Generously

- What can happen if you are accused of plagiarism?
 - Redo assignment
 - Receive a failing grade
 - Be suspended
 - Be expelled
- What resources can help you to avoid plagiarism?
 - Review: <https://legacy.lib.utexas.edu/services/instruction/avoidplagiarism.html>
 - Review: https://legacy.lib.utexas.edu/d7/sites/default/files/services/instruction/AvoidingPlagiarism_guide.pdf
 - Visit writing center: <http://uwc.utexas.edu/>
- Neither you (I believe) nor I have any desire to talk about plagiarism 😊
- Play it safe and give credit generously!!!

Final Project Paper: Writing Support

- Writing center: <http://uwc.utexas.edu/>
 - can schedule four individual 45-minutes consultation per month
- Tutoring:
 - <https://utdirect.utexas.edu/apps/ugs/my/tutoring/student/tutoring-agreement/>

Final Project Video

- Video creation/editing resources:
 - https://docs.google.com/document/d/1y1AENPLDGi4N1oUmd7g4Z4id_ih31HwUOmrM1jy2Gjg/edit
- Attributions:
 - Creative commons license generator: <https://creativecommons.org/choose/>

Give Credit Generously

- Idea: add credit page to your presentation for resources used
 - e.g., Microsoft Azure
 - e.g., freely-shared code/libraries
 - e.g., links to all images
 - ...