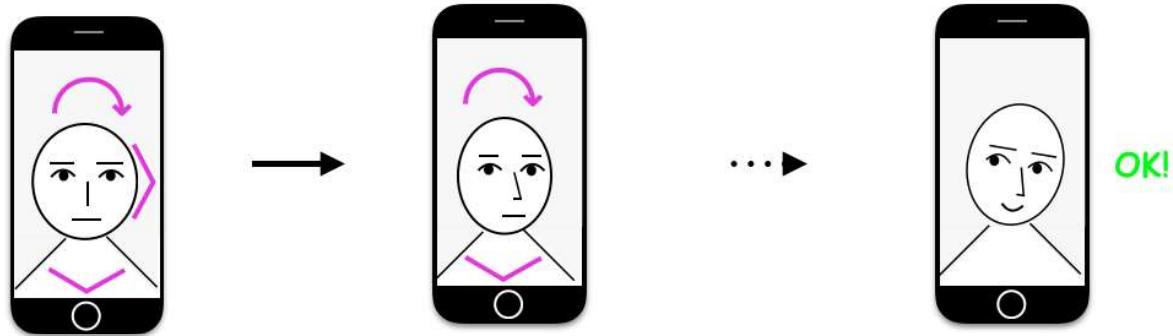




SymCollab 2018

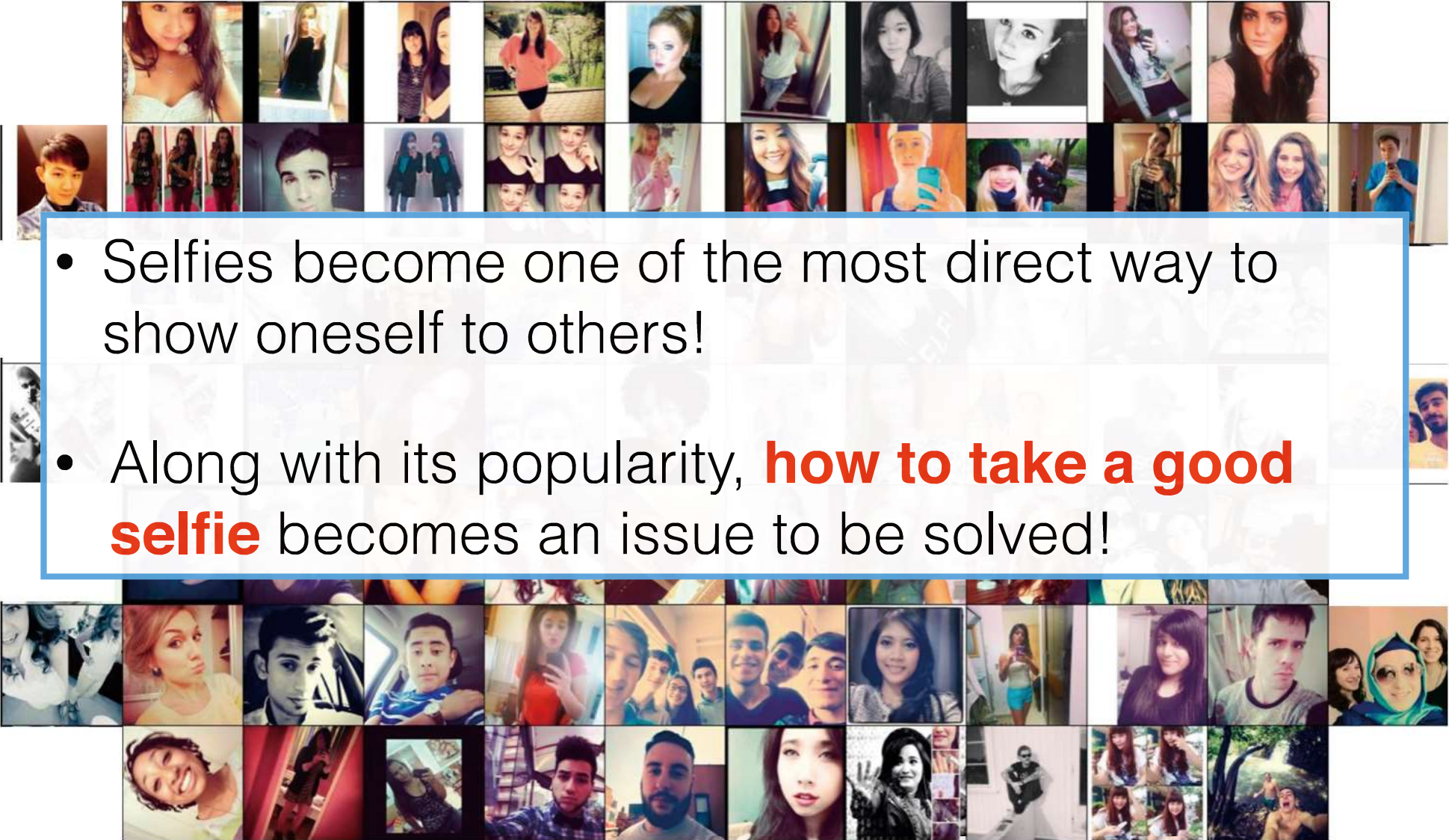


Selfie Guidance System in Good Head Postures

Naihui Fang, Haoran Xie, Takeo Igarashi
The University of Tokyo



Background

- 
- Selfies become one of the most direct way to show oneself to others!
 - Along with its popularity, **how to take a good selfie** becomes an issue to be solved!

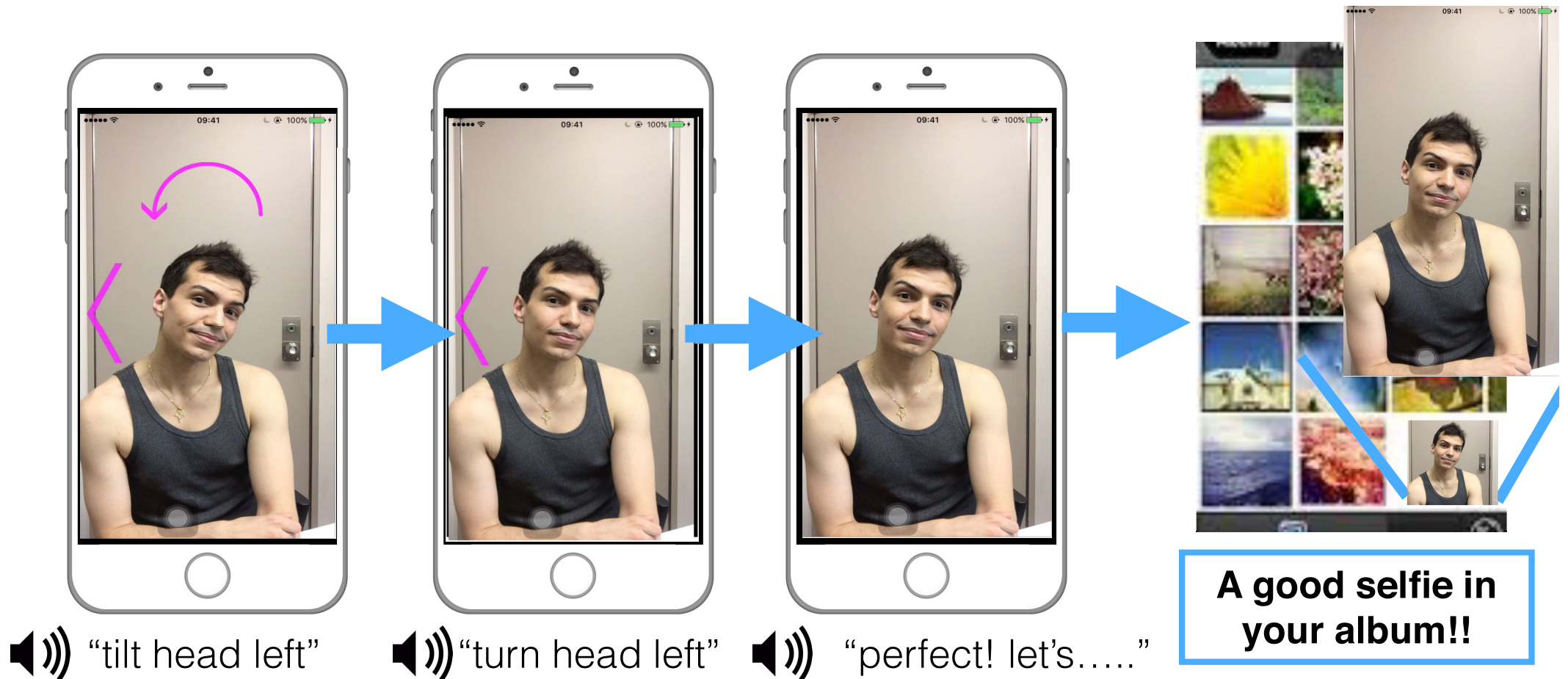
Background



Same person can look totally different **in different angle!**

Our Goal

- Provide **real time suggestions** to take a **good selfie**

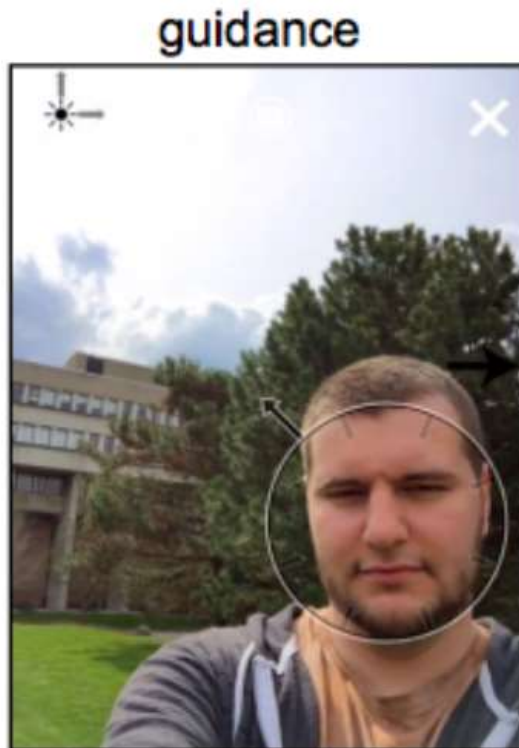


Related Work

[Qifan Li et al, 2017] Suggest **face size**, **face position** and **lighting direction**

- ◆ Our research provides suggestion for **head postures** and **voice instruction**

Previous
Work

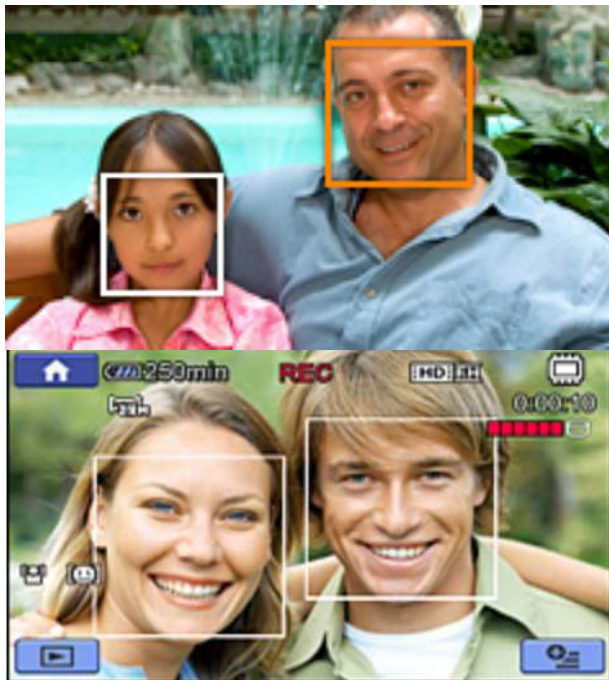


Our
Approach

Related Work

Sony Smile Shutter™  **Automatically** take photo when user **smiles**

- ◆ In our research, we provide **user-friendly interface**



“Perfect! let's take a photo! three, two, one! Cheese!”

Related Work

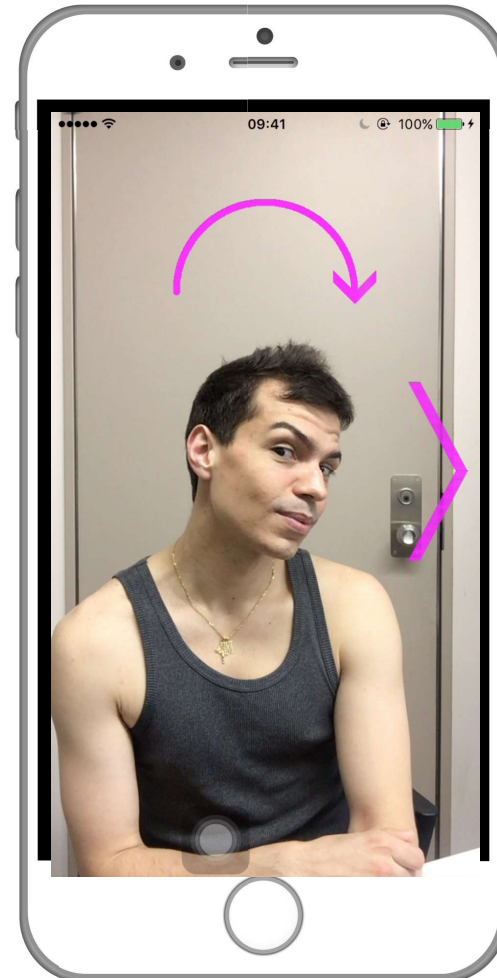
[Mei-Chen Yeh, 2014] Real time **scoring** of selfie.

- ◆ In our research, we **“guide”** the user to good head **postures** to the end user.

Previous
Work

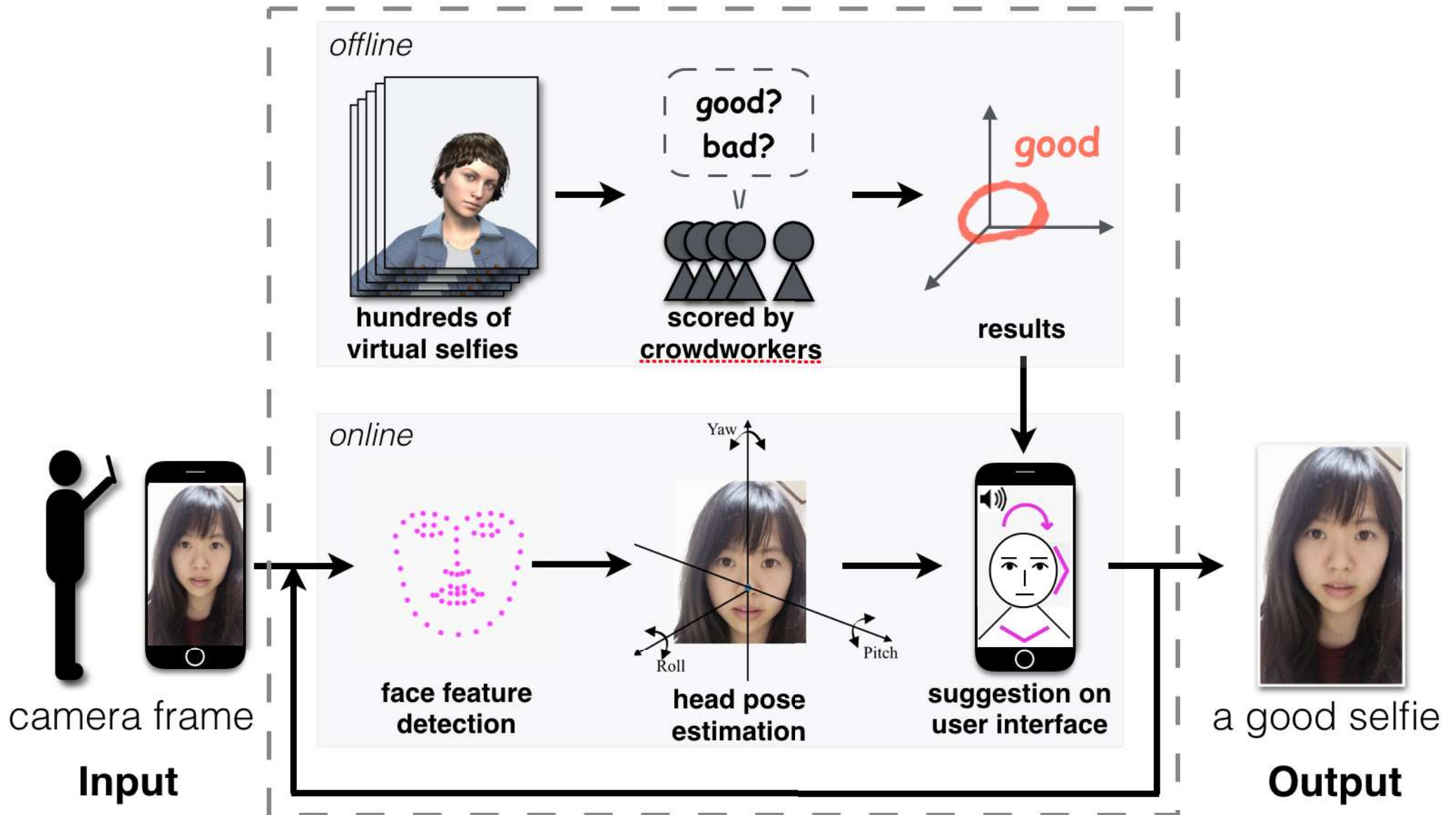


Score Bar

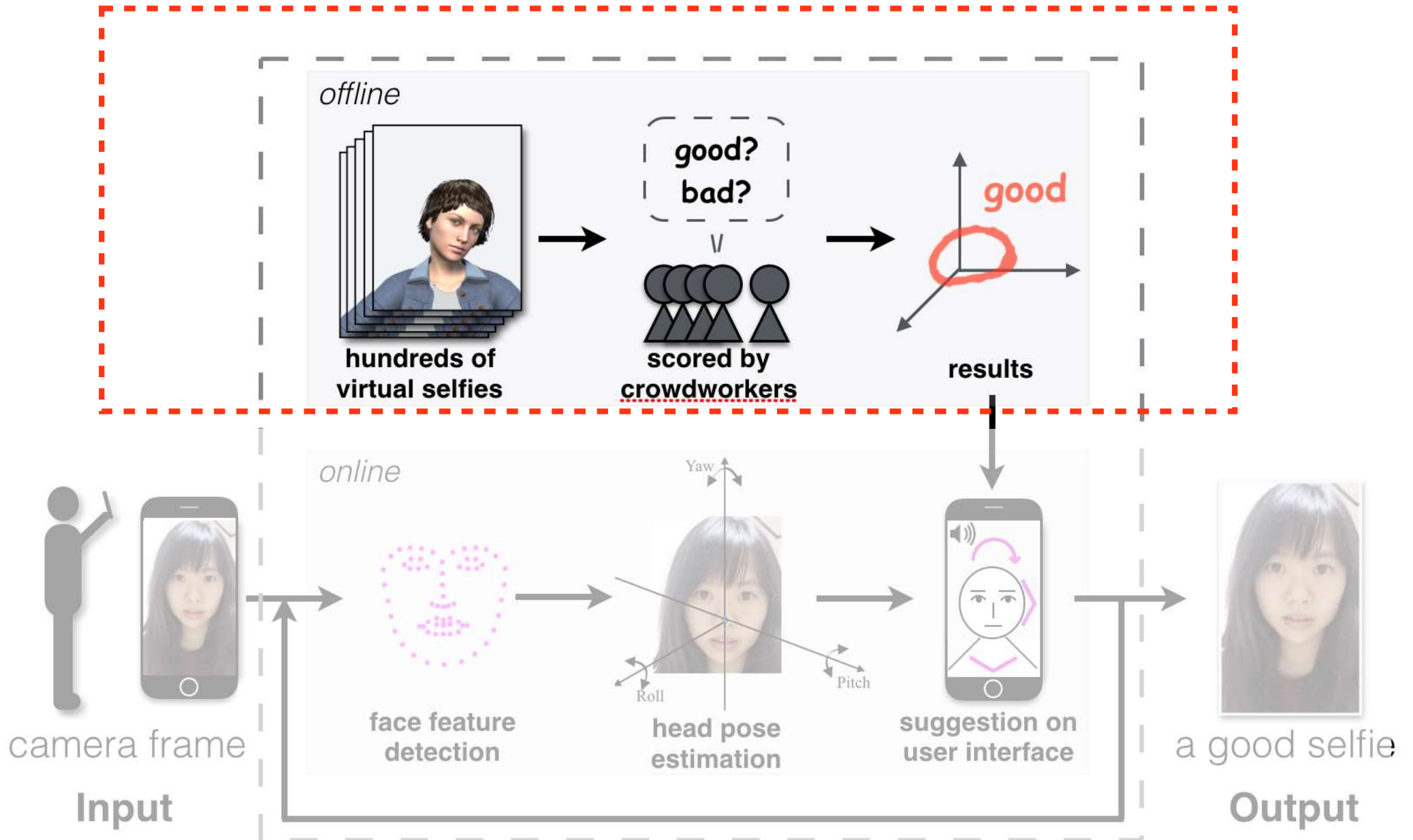


Our
Approach

Framework

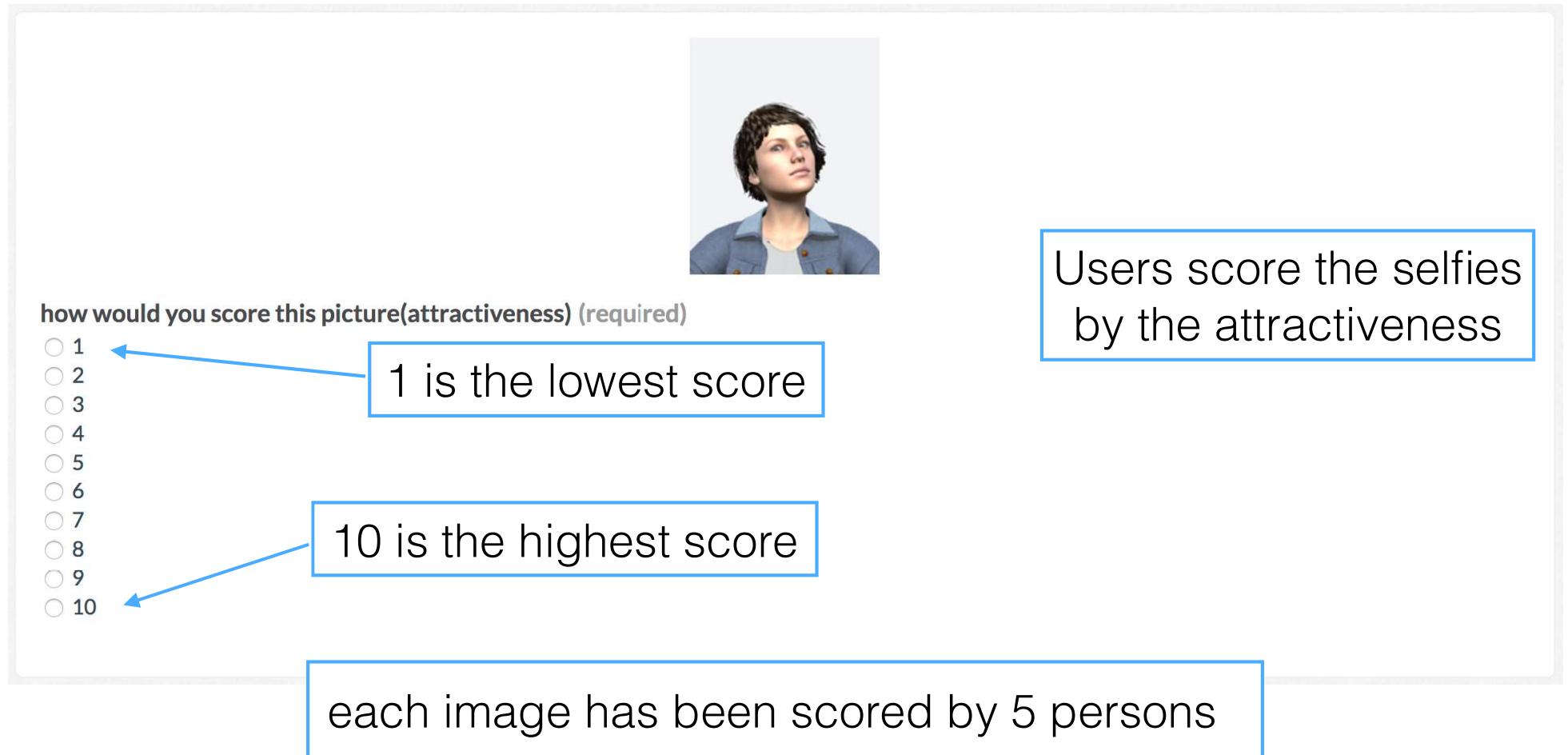


Crowdsourcing Tasks



Crowdsourcing Tasks (1/2)

- Goal: To define good head postures.
- Designed virtual selfies in different head postures.



The screenshot shows a crowdsourcing task interface. At the top center is a virtual selfie of a woman with short dark hair, wearing a blue denim jacket, looking slightly to the right. Below the image is a rating scale with the text "how would you score this picture(attractiveness) (required)". The scale consists of radio buttons next to numbers 1 through 10. A blue box with an arrow pointing to the number 1 contains the text "1 is the lowest score". Another blue box with an arrow pointing to the number 10 contains the text "10 is the highest score". To the right of the image, a blue box contains the text "Users score the selfies by the attractiveness". At the bottom of the interface, a large blue box contains the text "each image has been scored by 5 persons".

how would you score this picture(attractiveness) (required)

1

2

3

4

5

6

7

8

9

10

1 is the lowest score

10 is the highest score

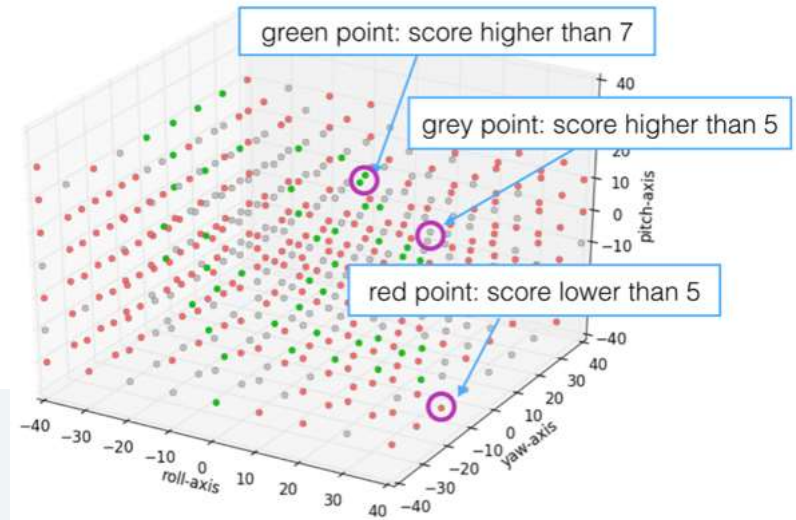
Users score the selfies by the attractiveness

each image has been scored by 5 persons

Crowdsourcing Tasks (1/2)

The results of the crowdsourcing task 1.

486 virtual selfies, 58 that got higher than 7 are defined as the “**good**” head postures.

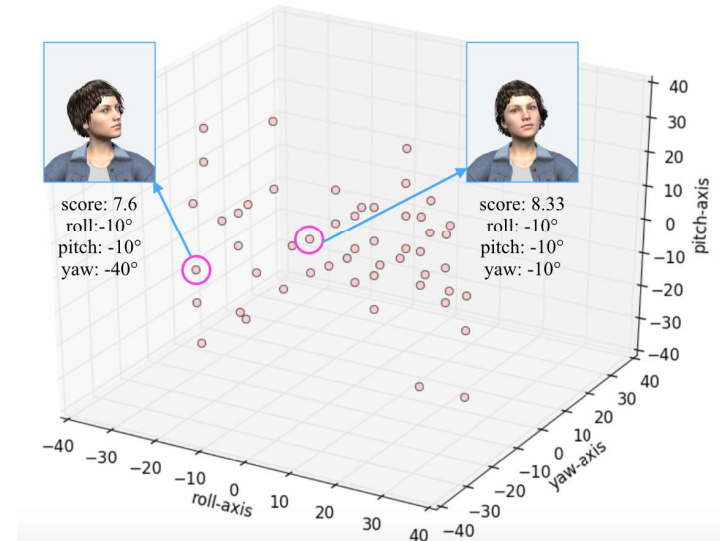


roll:-20°	roll:20°	roll:20°	roll:-40°	roll:-40°	roll:40°
yaw:-10°	yaw:0°	yaw:0°	yaw:-10°	yaw:-10°	yaw:-20°
pitch:0°	pitch:-10°	pitch:20°	pitch:-20°	pitch:-30°	pitch:-20°

good

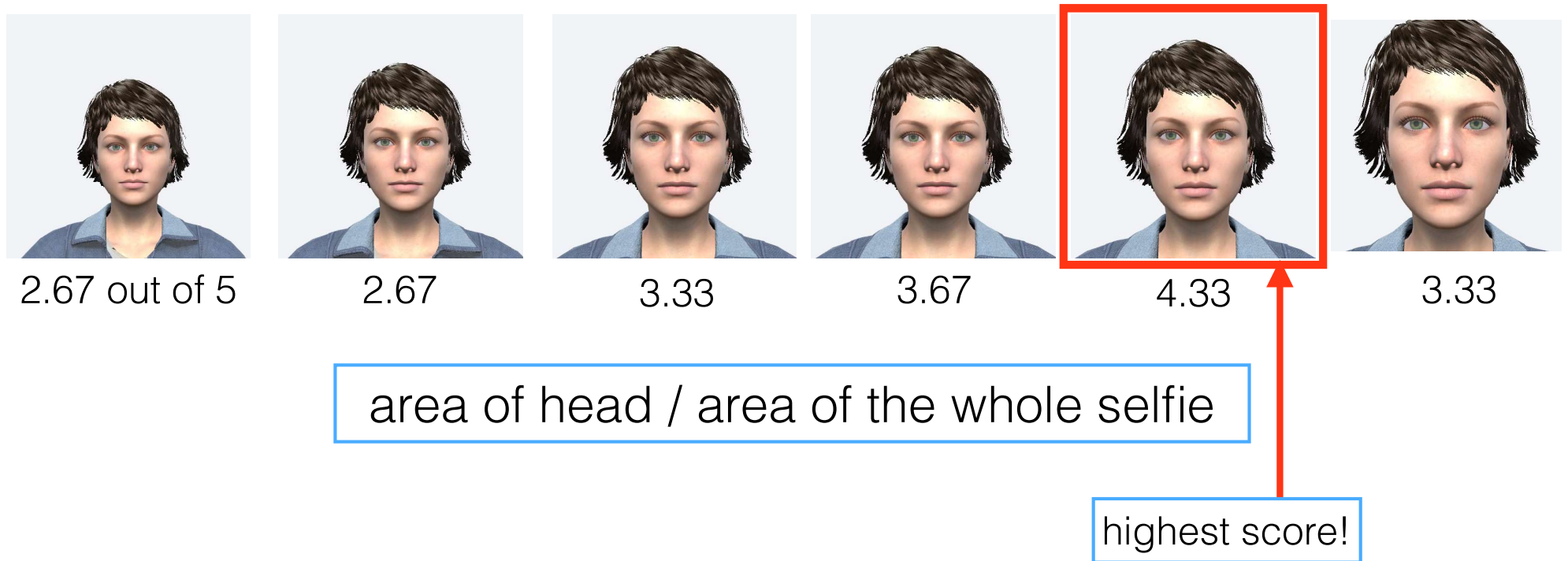
medium

bad



Crowdsourcing Tasks (2/2)

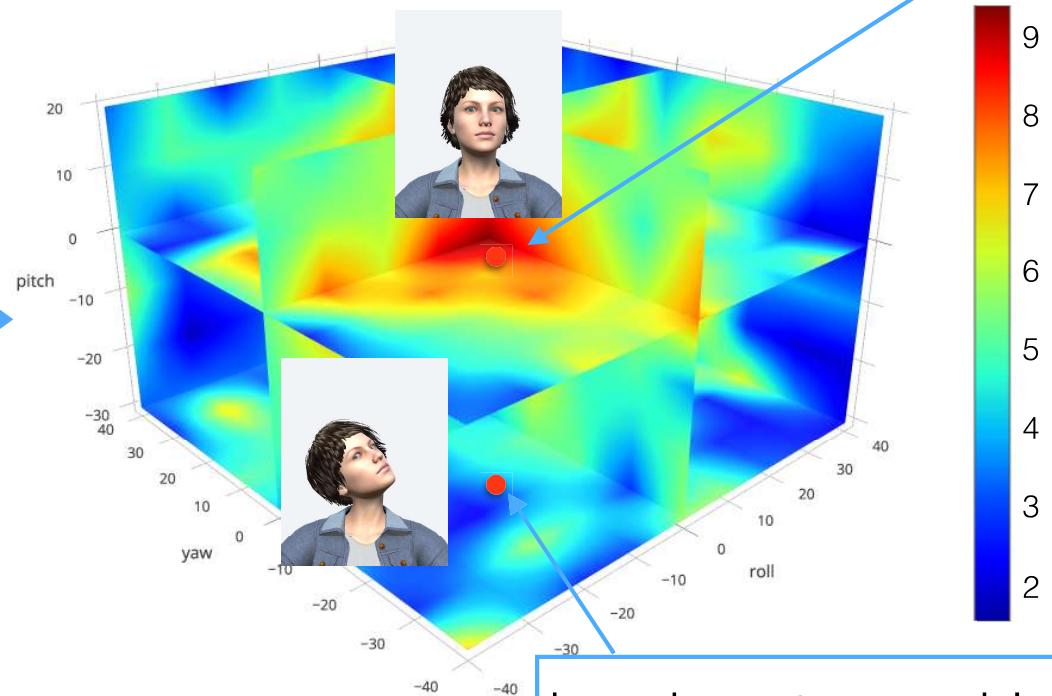
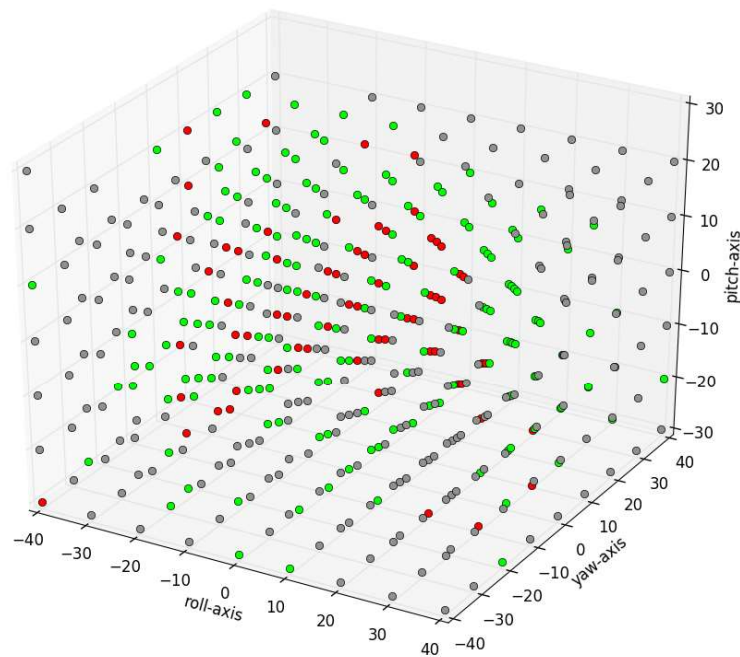
- Goal: To define the best distance of the end user to camera.



Crowdsourcing Tasks (results)

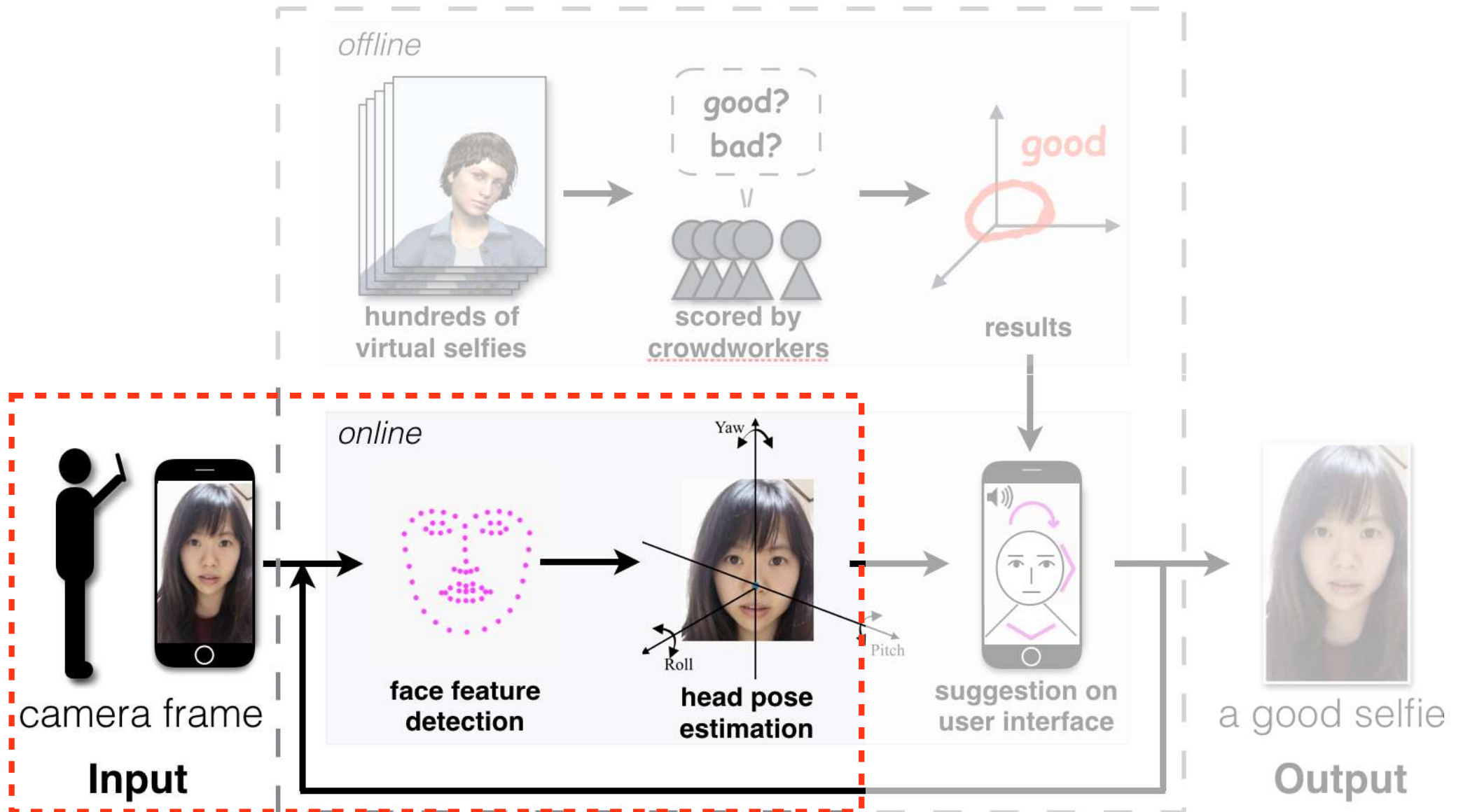
- We obtain a **score function to process continuous assessment** using trilinear interpolation.

head postures which got higher scores



head postures which got lower scores

Head Posture Estimation

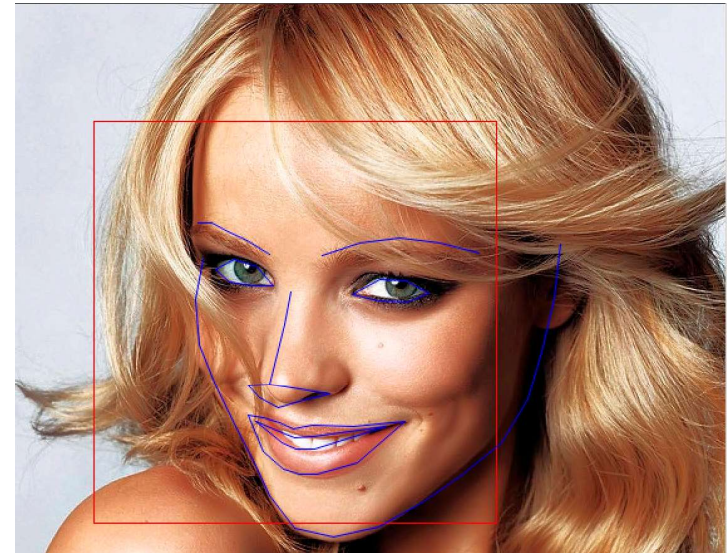


Face Feature Detection

- We adopted **dlib library face detection algorithm** which using **HOG & Linear Classifier**. [*Vahid Kazemi et al., 2014*]
- We extract the eyes, nose and mouth points of end users.



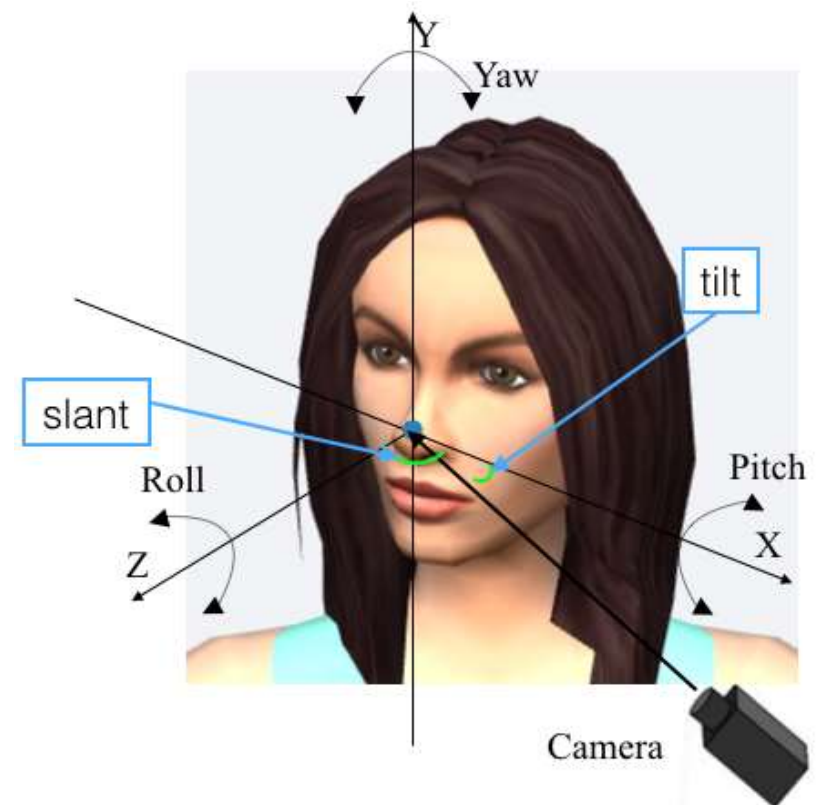
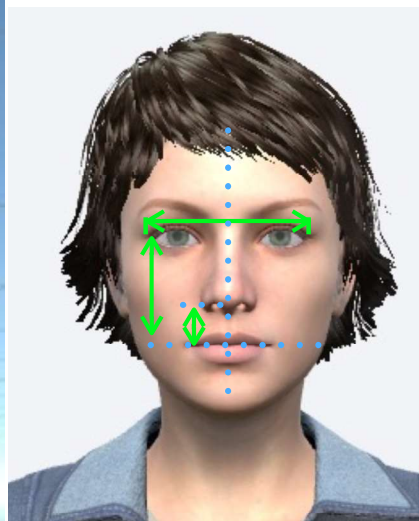
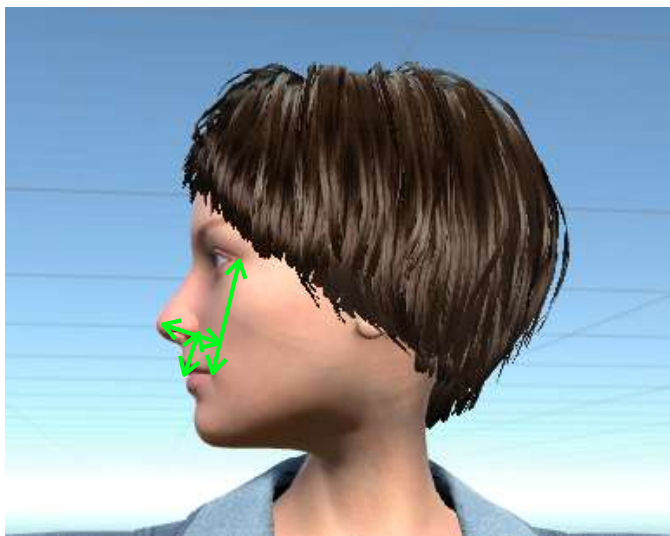
$$S = \begin{bmatrix} x_1 \\ y_1 \\ \vdots \\ x_n \\ y_n \end{bmatrix}$$



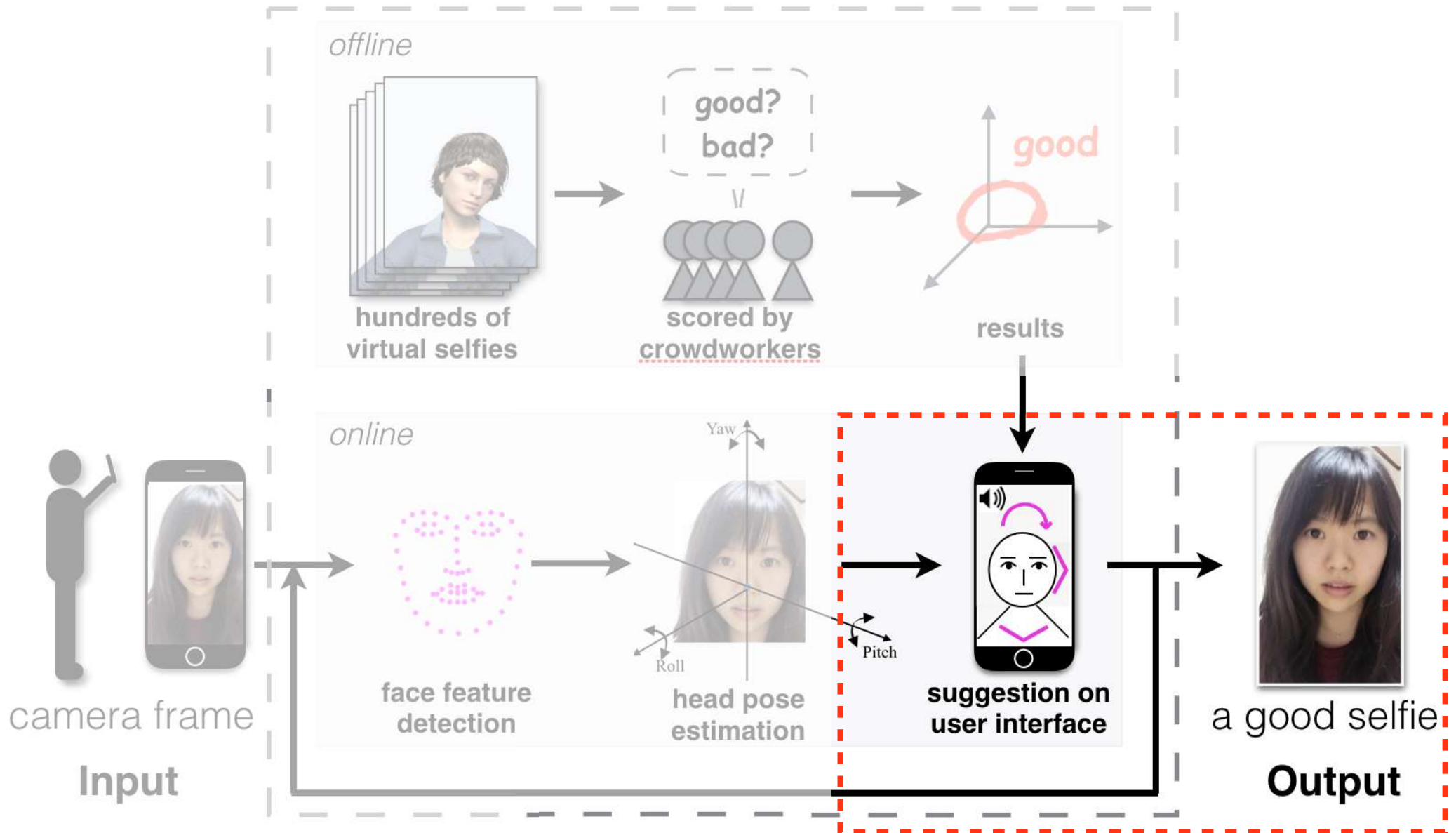
Head Posture Estimation by Geometric Approach

[Andrew et. al 1994]

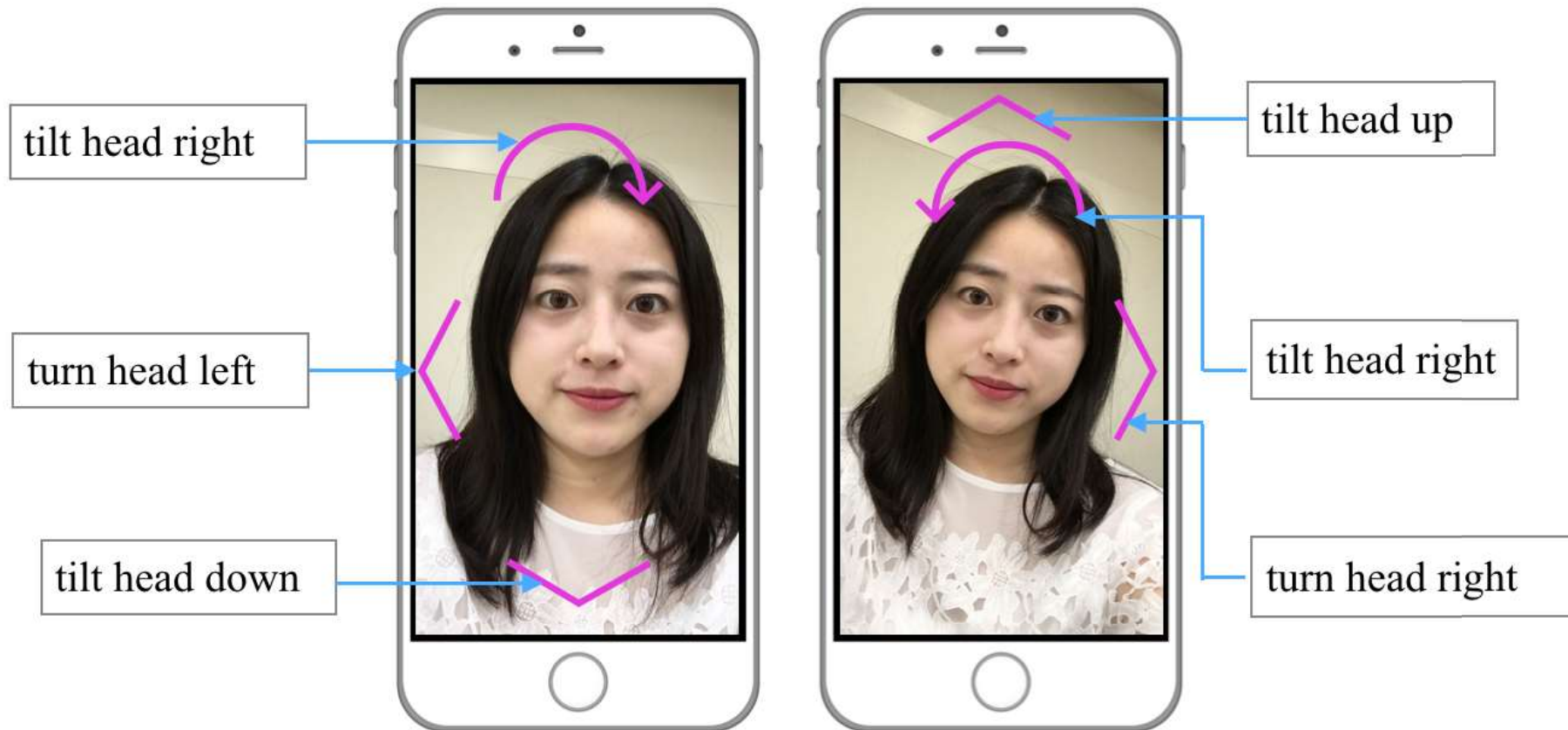
- Facial normal = $(\sin \sigma \cos \tau, \sin \sigma \sin \tau, -\cos \sigma)$.
- slant σ : the angle between image normal and the z axis.
- tilt τ : between image normal and x axis.



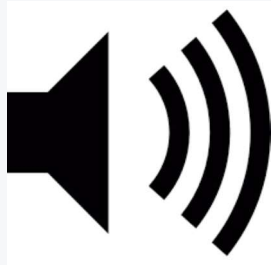
User Interface



Visual User Interface



Voice User Interface



“Turn right, slightly!”

“Turn left, slightly!”

“Tilt head right, slightly!”

“Tilt head left, slightly!”

“Tilt head up slightly!”

“Tilt head down slightly!”

“I've chosen an ideal head pose!”

“Please get closer to the camera!”

“No it's too close!”

“Please smile!”

“Perfect! let's take a photo! three, two, one! Cheese!”

Demonstration

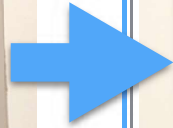
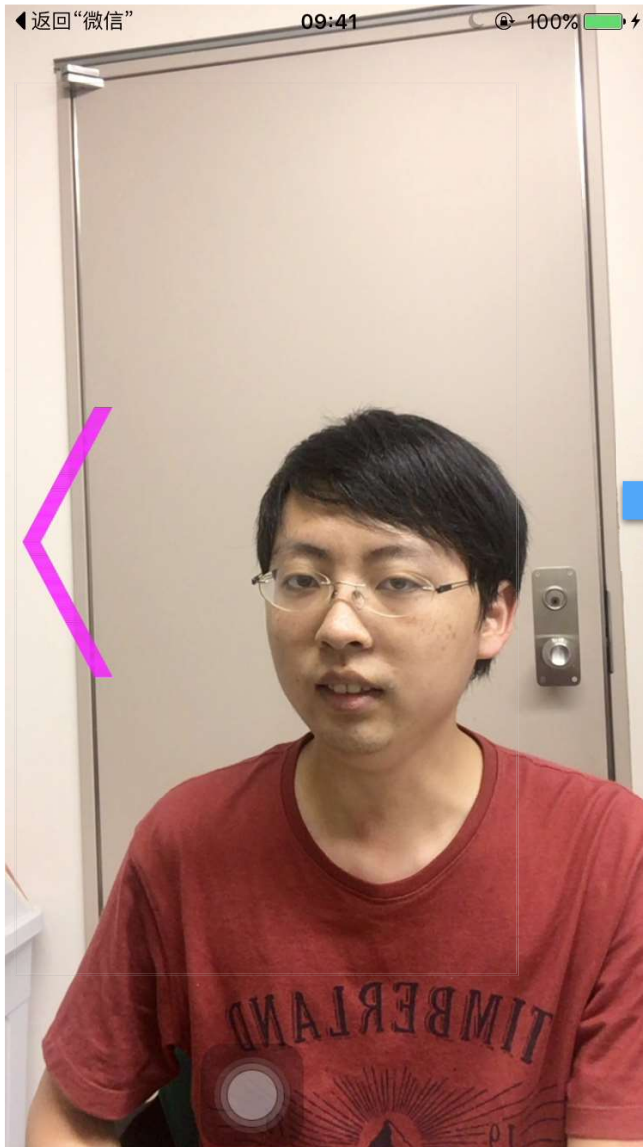
Demonstration & User Interface



tilt head up tilt head left turn head left

“Turn left, slightly!” “Tilt head left, slightly!”
“Tilt head up slightly!” “...”

Demonstration & User Interface



tilt head right turn head right tilt head down

Three video frames showing the man performing different head movements. The first frame shows a pink curved arrow indicating a rightward tilt. The second frame shows a pink straight arrow pointing right, indicating a turn. The third frame shows a pink straight arrow pointing down, indicating a downward tilt. A blue dashed line with arrows at both ends is positioned above each frame, and a pink arrow points from the first frame to the second, and from the second to the third.

“Turn right, slightly!” “Tilt head right, slightly!”
“Tilt head down slightly!” “...”

Demonstration & User Interface



tilt head right	turn head left	tilt head up
<p>🔊 “Turn right, slightly!” “Tilt head up slightly!” “Tilt head left, slightly!” “...”</p>		

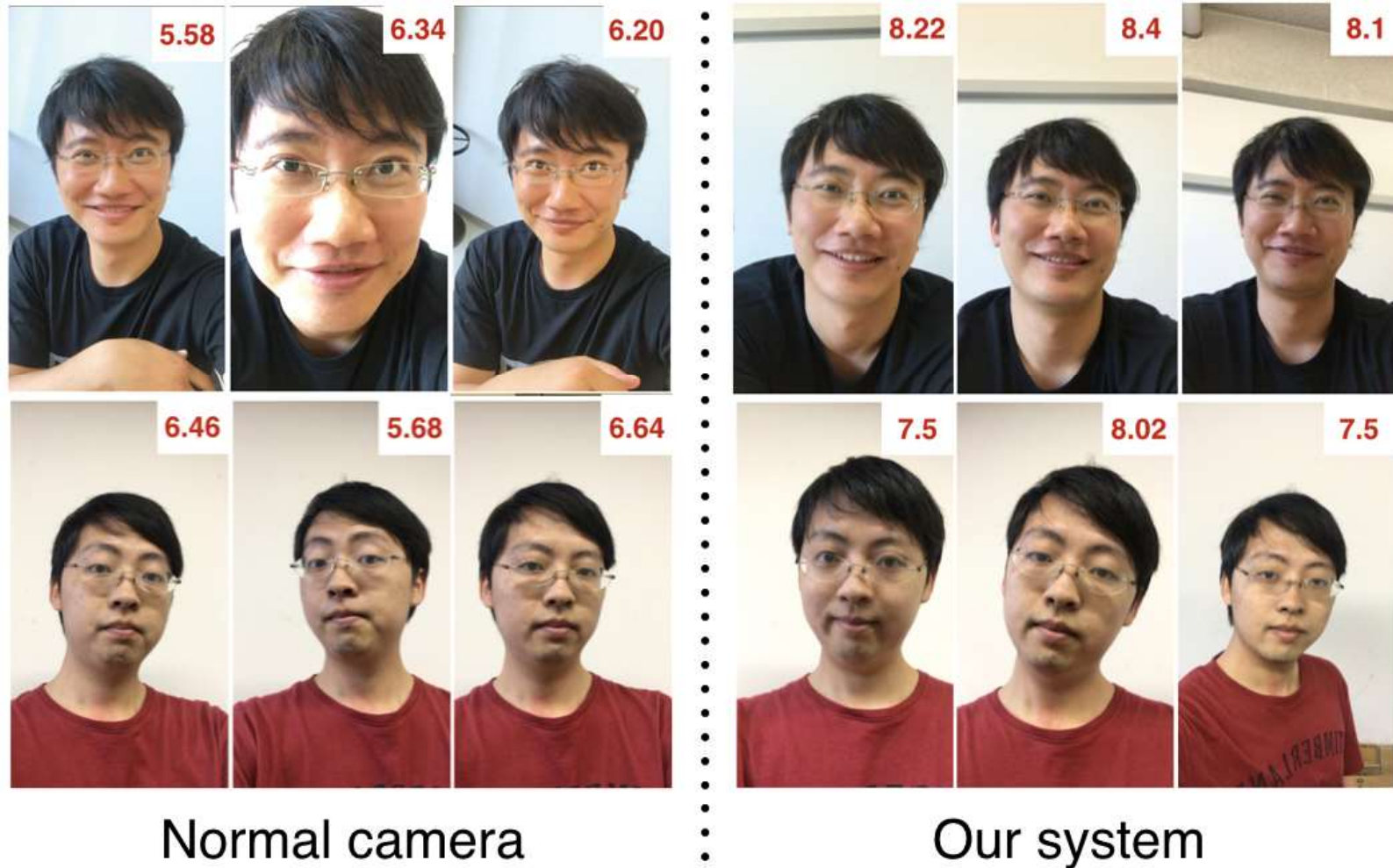
User Study

Results of User Study

- 8 participants.
- Task 1: using a **normal camera** for 5 satisfied selfies
- Task 2: using **our system** to take 5 or 6 selfies.
- Complete the two tasks in **random order**.

Results of User Study

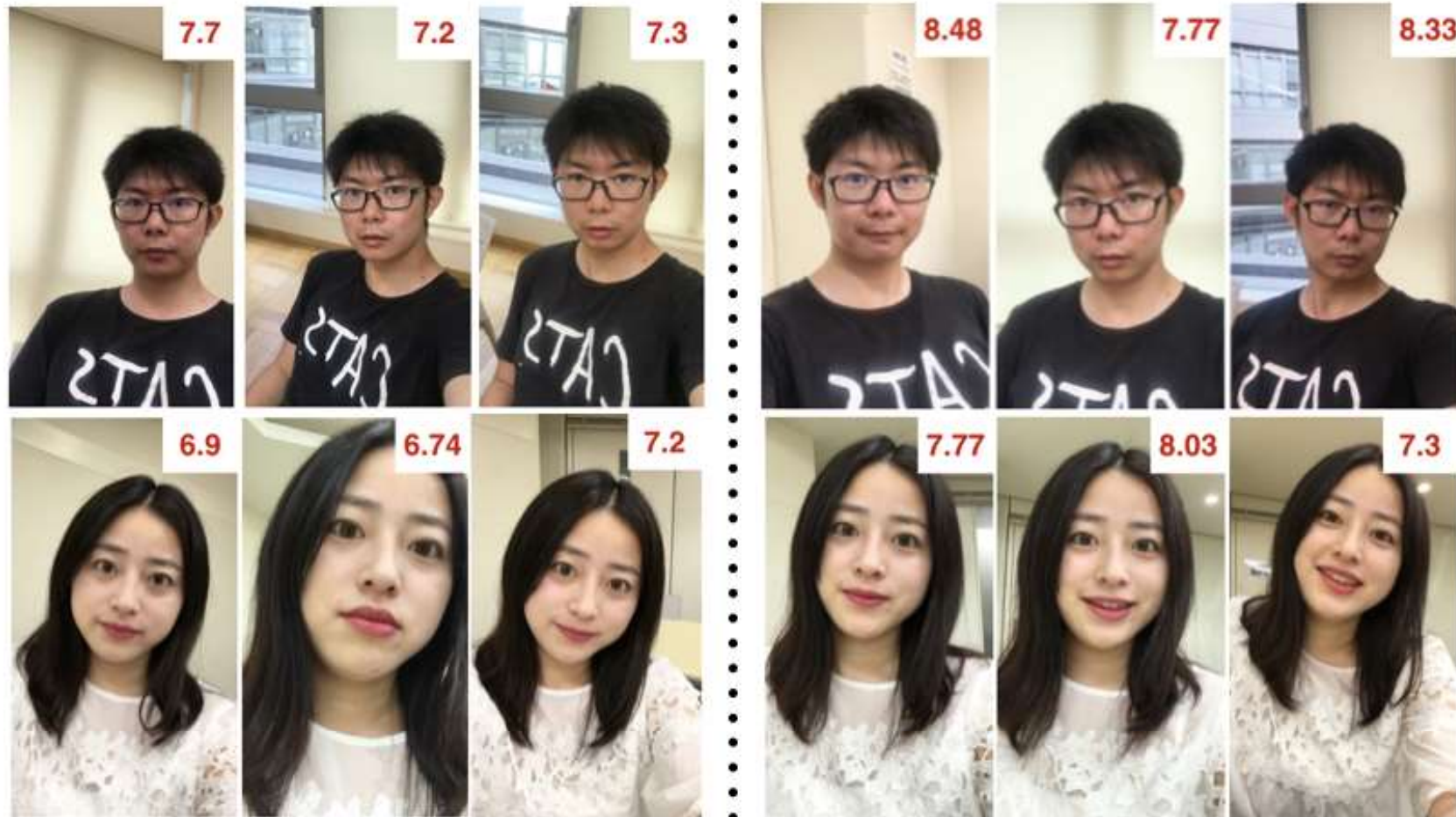
- Users who are not good at taking selfie



The average score of selfies taken by our system **increases around 30%** compared to the selfies taken by normal camera.

Results of User Study

- User who are good at taking selfie



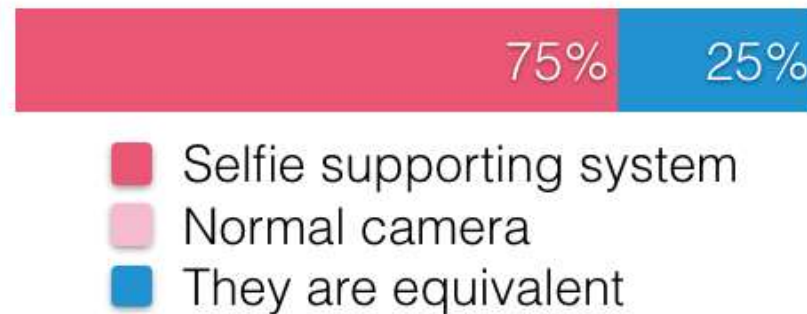
Normal camera

Our system

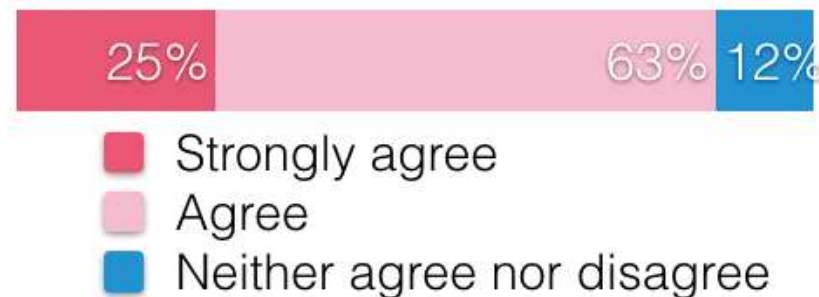
The proposed system can also support them by **providing more head postures** so as to give them options for different appearances.

User Feedback (system)

Which camera do you feel more convenient ?



I think I have more choices of head pose when using this application.



Our system is **more convenient.**

It also provides **more choices of head posture.**

User Feedback (usage)

Average score of user feedback for the application

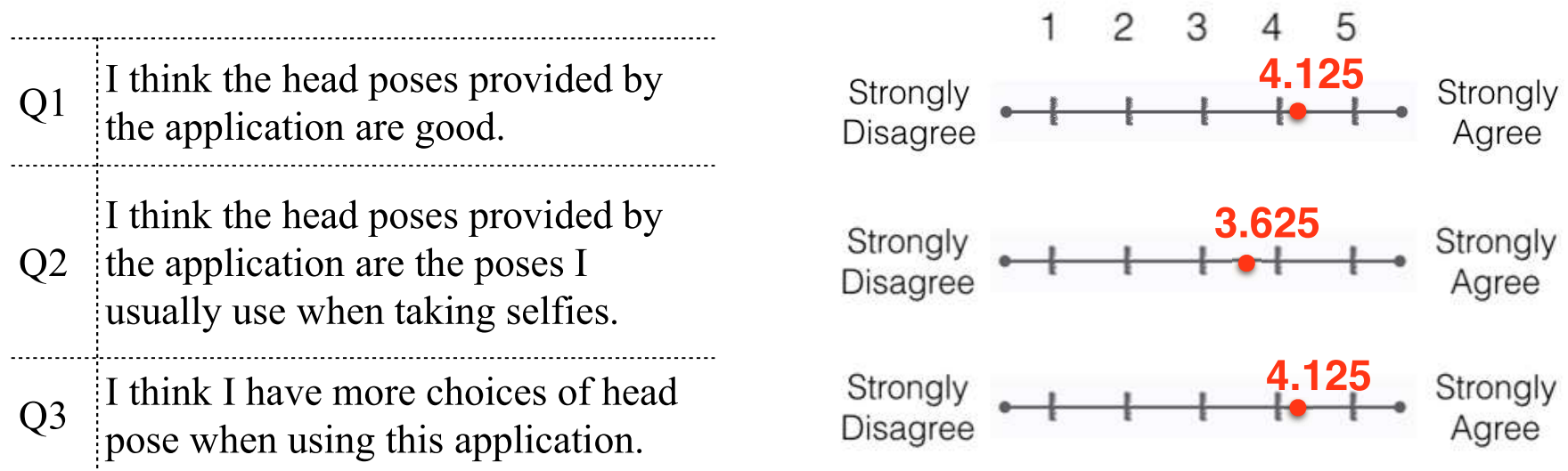
Q1	I think this application help me taking better selfies.
Q2	I think the function provided by the application is needed.
Q3	I think it is easier when taking selfies using this application.(to take a good selfie)
Q4	I want to use this application when taking selfies.
Q5	I think it is convenient using this application.(with tripod)



Our system is **useful and easy to use.**

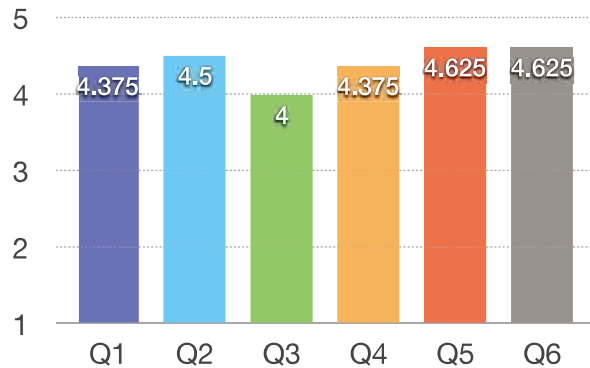
User Feedback (head postures)

Average score of user feedback for the head pose.



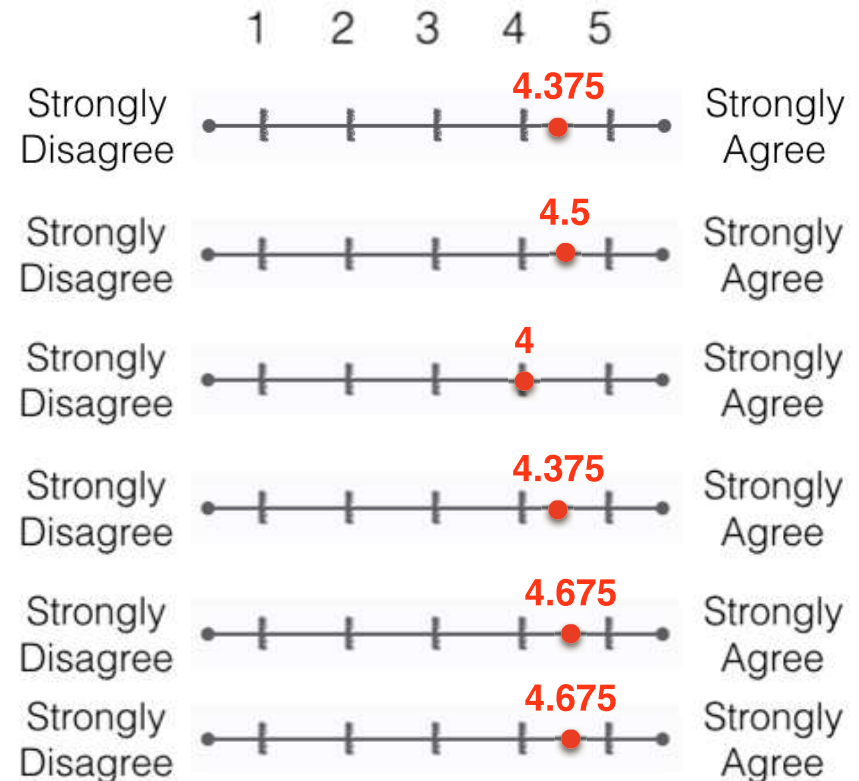
The **head postures** provided by our system are **good**.

Backup (Results of User Study)



Average score of user feedback for the visual user interface

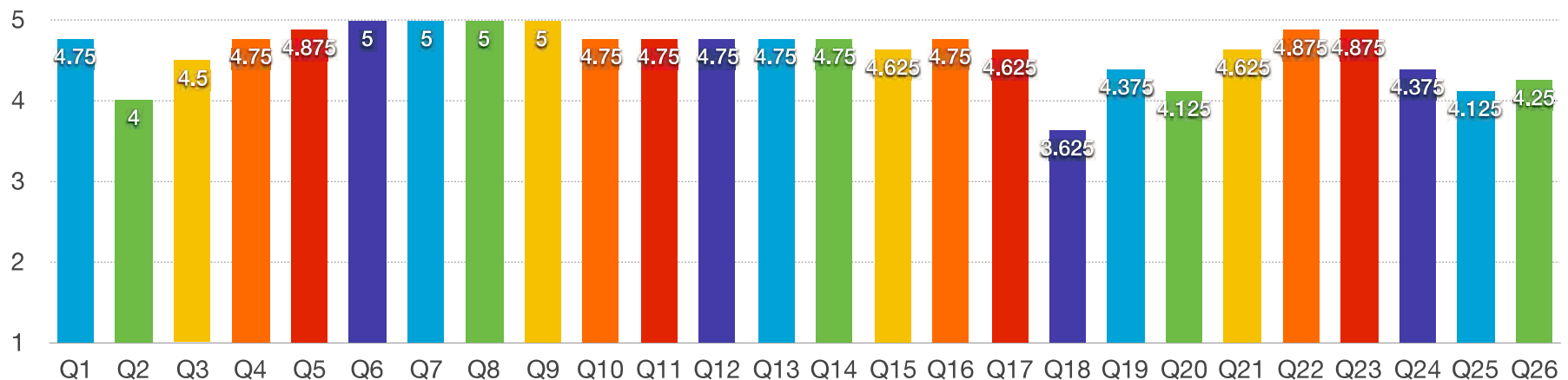
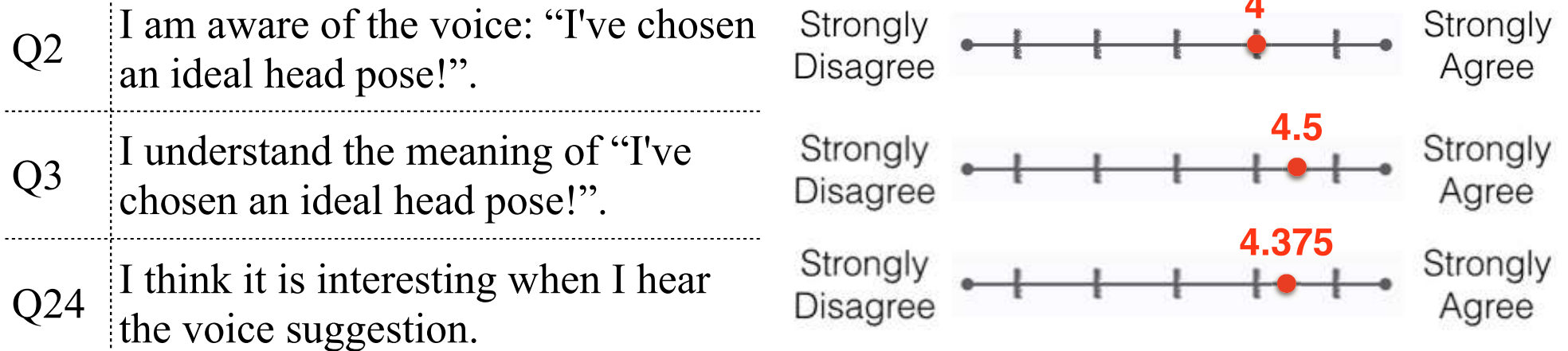
Q1	I can understand the meaning of each arrows.
Q2	I can realize which arrows suggest the roll angle of my head.
Q3	I can realize which arrows suggest the yaw angle of my head.
Q4	I can realize which arrows suggest the pitch angle of my head.
Q5	I know how to follow the suggestions.
Q6	I know when the application takes the photos.



Backup (Results of User Study)

Average score of user feedback for voice user interface

Examples



Conclusion

Proposed an approach to support taking selfies by providing real-time suggestions on head posture and implemented the system.

- Crowdsourcing user study
- Facial feature extraction
- Head posture estimation using geometric approach
- Implemented visual and voice user interface
- Completed user study & evaluations

Limitations

- Didn't take other factors (e.g. lighting condition, face expressions, background) into account.
- To evaluate selfie quality quantitatively
- Personal preference on selfie has not been considered.