

Sensors Know Which Photos Are Memorable

memorable photos

memorability

emotion

physiological data

wearable devices

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ABSTRACT

The goal of this study is to determine if physiological signals are salient in the detection of memorable personal photos. We then build a mixed model to evaluate the predictive power of physiological variables on memorability and emotion by examining whether or not the photographer's data is useful for predicting the ratings of the photographer or the ratings of the subjects in the photos. Our results suggest that heart rate and GSR (galvanic skin response) data are the major predictors of memorability for photographers, and that the sensor signals are not particularly useful for predicting memorability ratings of subjects in the photos.

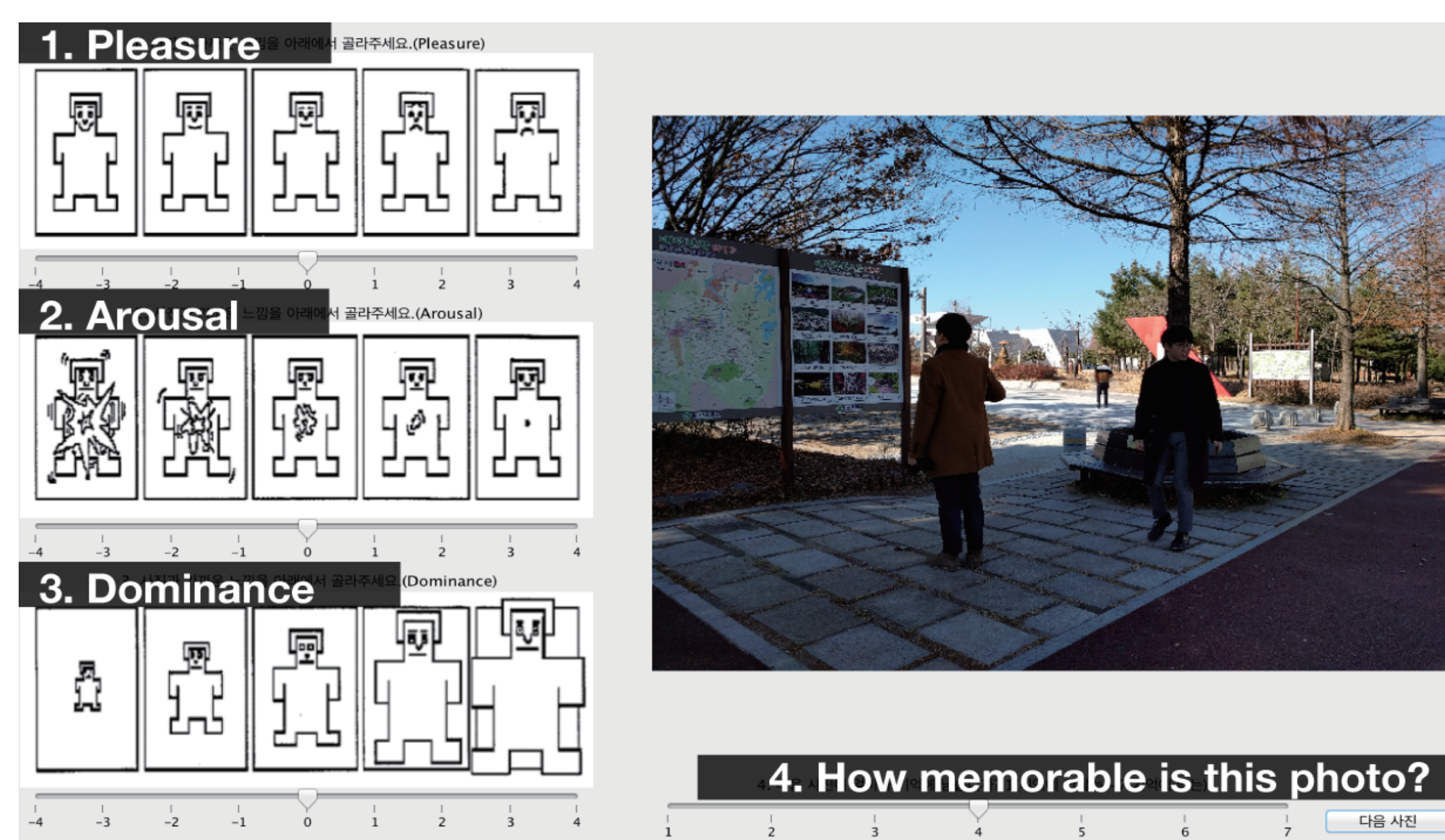
EXPERIMENTAL FRAMEWORK

(1) Capturing photos and physiological signals

- Nexus 5 to capture the photos
- Microsoft Band 2 to capture physiological signals

(2) Measuring memorability and emotions

- The self-assessment manikin and semantic differential (SAM) questionnaire to measure emotions; pleasure, arousal, dominance



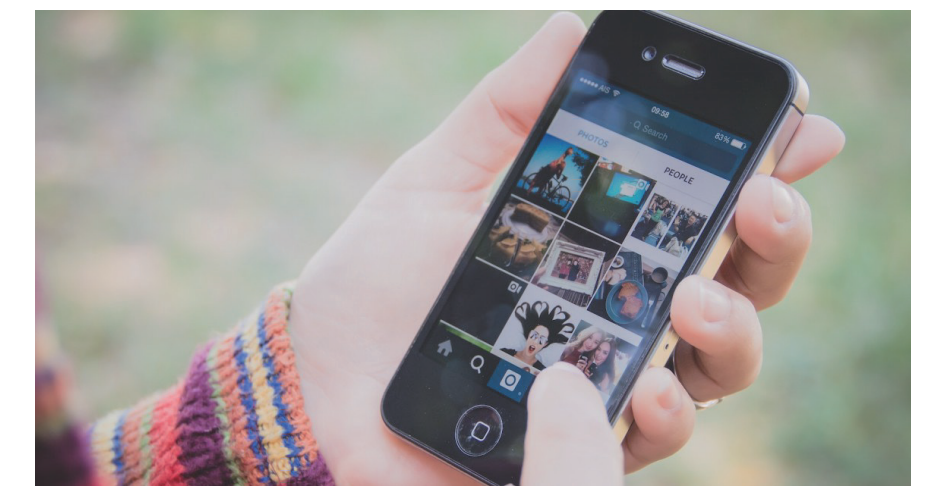
<Photo-rating application screenshot>

RESEARCH QUESTION

Can wearable sensors determine which photos that a user has taken are memorable?

BACKGROUND

There is a desire to find memorable photos that are worth sharing via social media such as Facebook and Instagram, or to automatically shuffle memorable photos to help people reminisce about important life events.

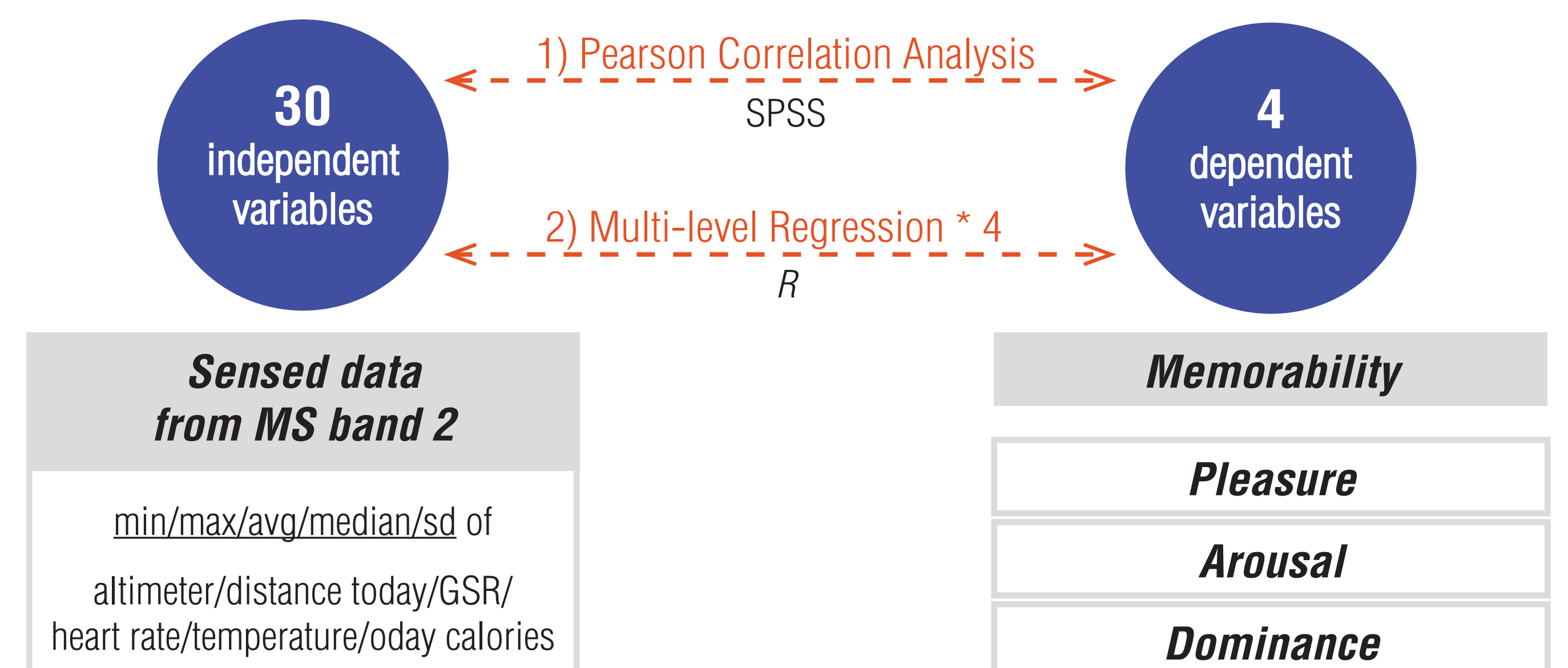


(3) Data pre-processing

- Smoothing the time-series sensor data using an exponential moving average to filter out high frequency noise (by MySQL workbench)

(4) Feature generation and regression analysis

- Windowing approach (a window size of 5 seconds with a 40% overlap)
- Merging the corresponding sensor data and ratings from separate files

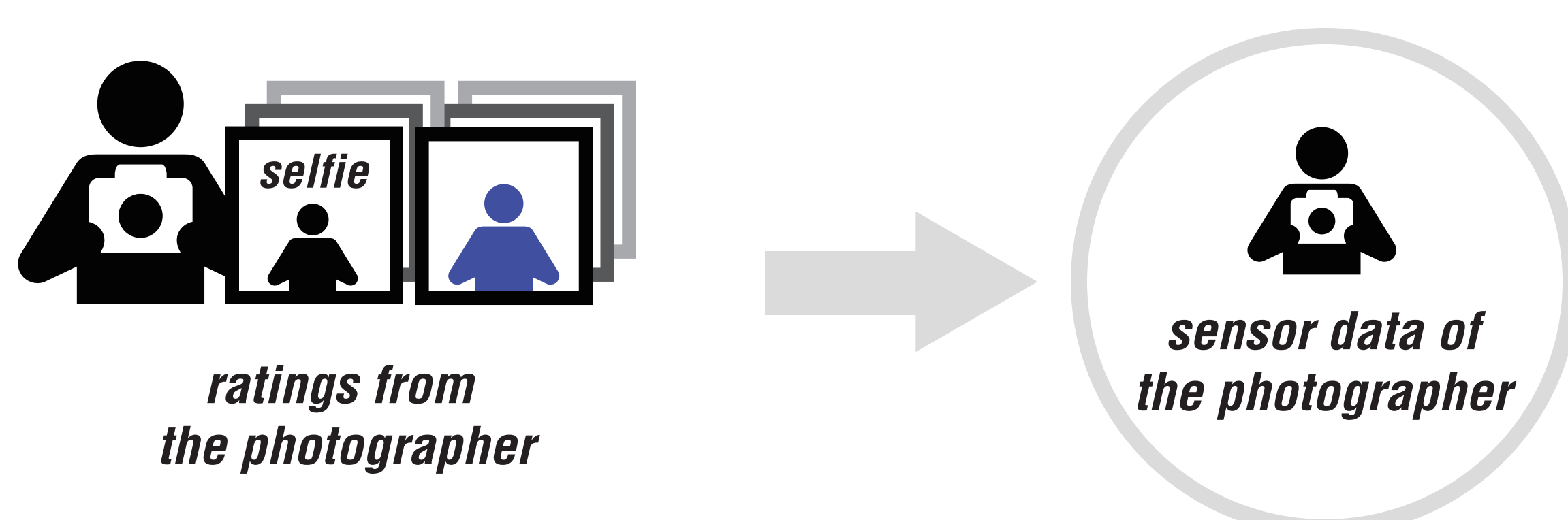


- 1) Analyze how the rating variables are correlated with each other and how they are correlated with the extracted features
- 2) Build a mixed linear (or multi-level regression) model using R and use it to evaluate the predictive power of physiological variables for memorability and emotion

RESULTS & DISCUSSION

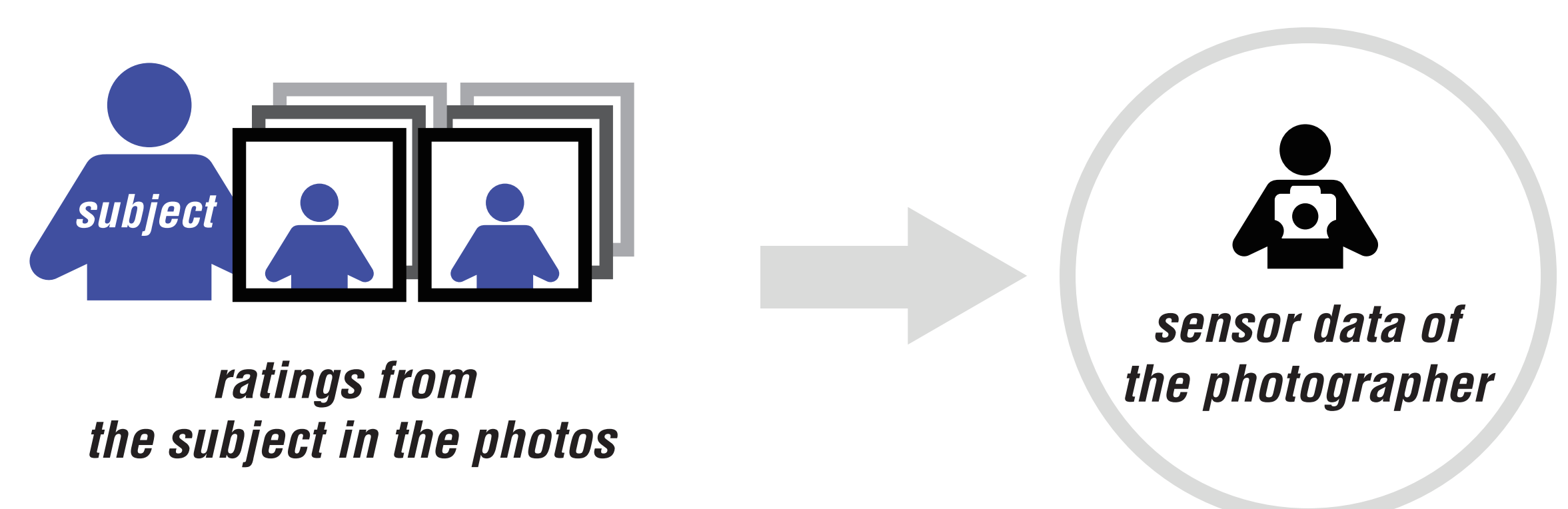
Photographer Focused

Photographer focused means that the sensor data of the photographer is analyzed with the ratings from the photographer; these could be selfies or photos of others.



Subject Focused

Subject focused means that the sensor data of the photographer is analyzed with ratings from the subject in the photo. Subject focus was used to determine if a photographer's biological signals could be used to infer the memorability and emotions of subjects in the photos.



The standard deviation of heart rate and GSR could reliably identify memorable photos from the photographer focus, whereas there were no significant data points from the subject focus.

This indicates that the feelings of the person who takes the photos, rather than the subject of the photo, is a more important factor for photo memorability.

This is likely because the person who takes the photo concentrates more on the scenery and subject while looking for the perfect moment, whereas the subject only cares about how they feel and look in the photo.

Additionally, photographers consider their own opinion and viewpoint when taking memorable photos, and this affects physiological data such as heart rate and GSR.