Image Impression Estimation by Clustering People with Similar Tastes

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Who thinks this 'cute'?

Looks cute!

Not that cute for me...

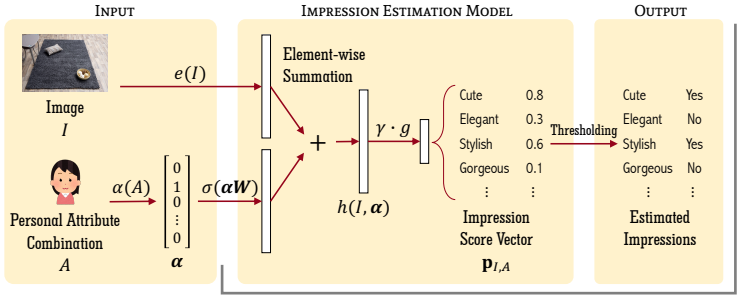
Can we estimate the different impressions for each person?

Yes, if we have "enough" amount of information about the individuals.

No, it is difficult to obtain "enough" amount of information about the individuals.

Estimation from limited amount of data

An individual is abstracted by **pre-defined groups** of personal attributes.



Estimation part is a simple NN architecture.
- FCN
- Regression head
- Thresholding

Personal Attribute Combination Grouping

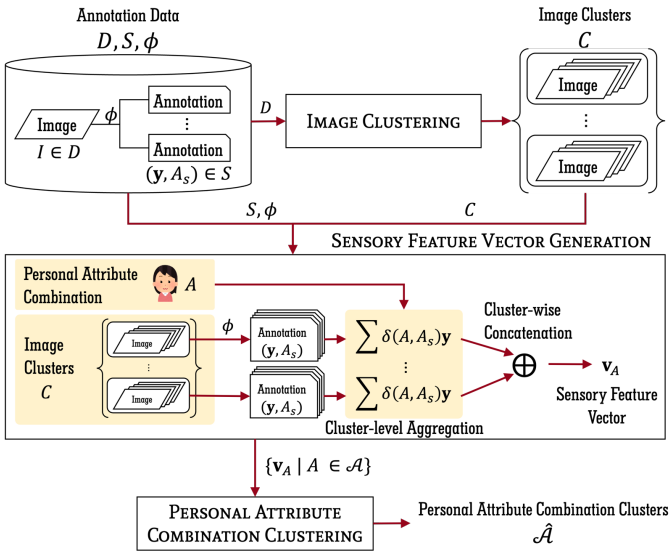


Image Clustering
- To estimate impression tendency to images more accurately, annotations of similar images are aggregated.

Personal Attribute Combination (PAC)
- To characterize a PAC, its feature is represented by the tendency of impressions toward images

Clustering: *k*-means algorithm

Evaluation

- **Images**: 4,000 carpets / curtains / fabrics
- **Annotation**: 273,163 annotations
  - 24 impression words from query logs
- **Metric**: Impression estimation accuracy

Method	#Elements	Accuracy [%] ↑
Proposed	2	**73.1**
All-in-one	1	72.4
Gender-Age [1]	6	71.2
Individual	4,704	68.1

- **All-in-one**: Personal attributes were ignored.
- **Gender-Age**: A heuristic combination [1]
- **Individual**: Each personal attribute combination was regarded separately.

Accuracy [%] ↑

#Image Clusters (k_I) \ #PAC Clusters (k_A)	2	3	6	10	20
100	71.5	71.7	70.7	69.6	68.3
200	72.4	71.8	71.3	70.8	69.4
300	72.6	71.8	71.0	69.6	69.9
400	**73.1**	71.9	72.1	69.9	70.1
500	72.0	71.5	71.2	70.6	69.5
1,000	72.0	71.9	71.3	70.1	70.3
2,000	72.0	71.9	71.3	70.6	70.1
3,000	71.7	71.8	71.5	71.1	69.9
4,000	72.1	70.1	71.6	69.2	68.8

[1] M. Nakamoto, et al., "A study on product image impression estimation considering the customer's attributes (in Japanese)," IEICE 2021 Annual Convention, D-12-5, 2021.

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