

An Attention Model for Group-Level Emotion Recognition

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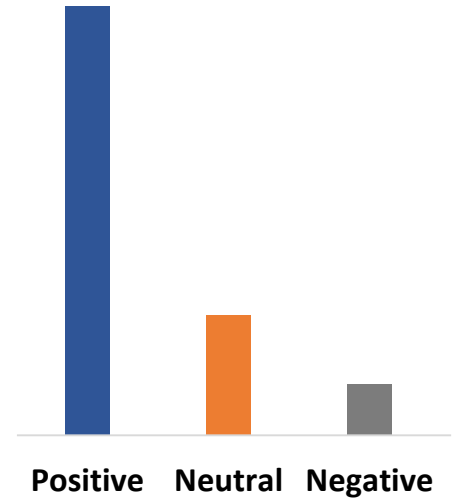
Problem Statement



Input Image



Our Model



**Output Emotion
Predictions**

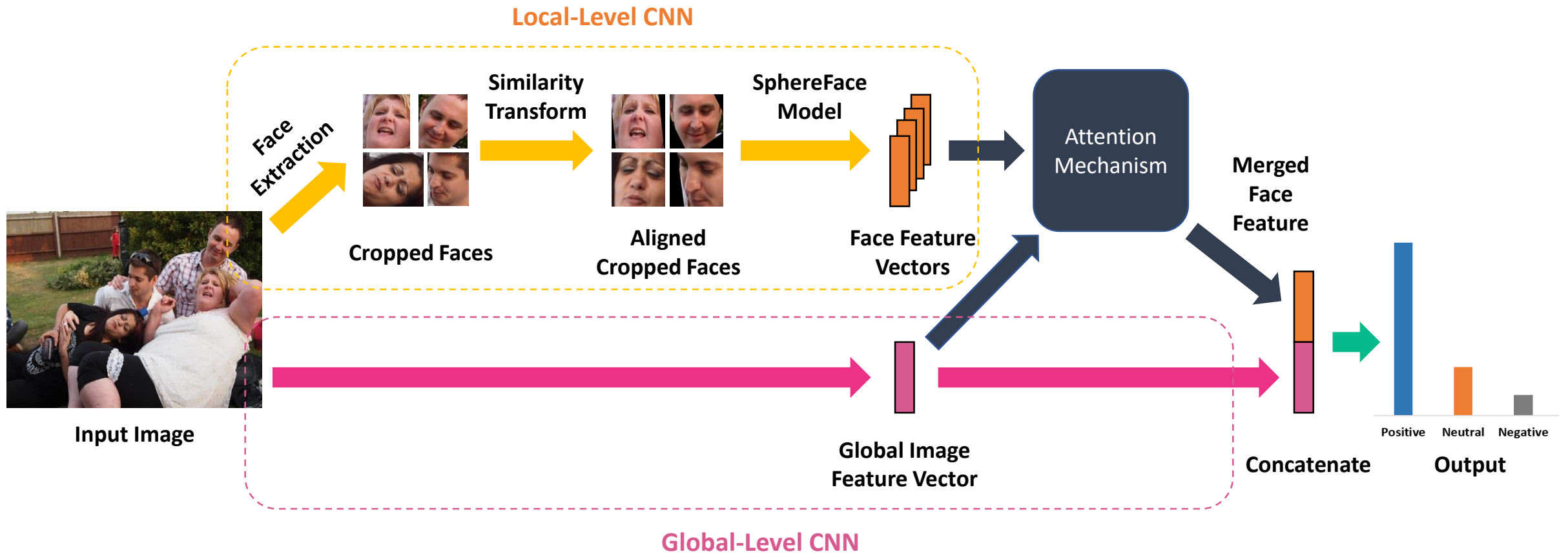
Motivation

- Sophisticated models

Motivation

- Sophisticated models
- Some faces may be misleading

Proposed Model



Global-Level CNN



Input Image

Global-Level CNN



Global-Level CNN



Input Image

Global-Level CNN

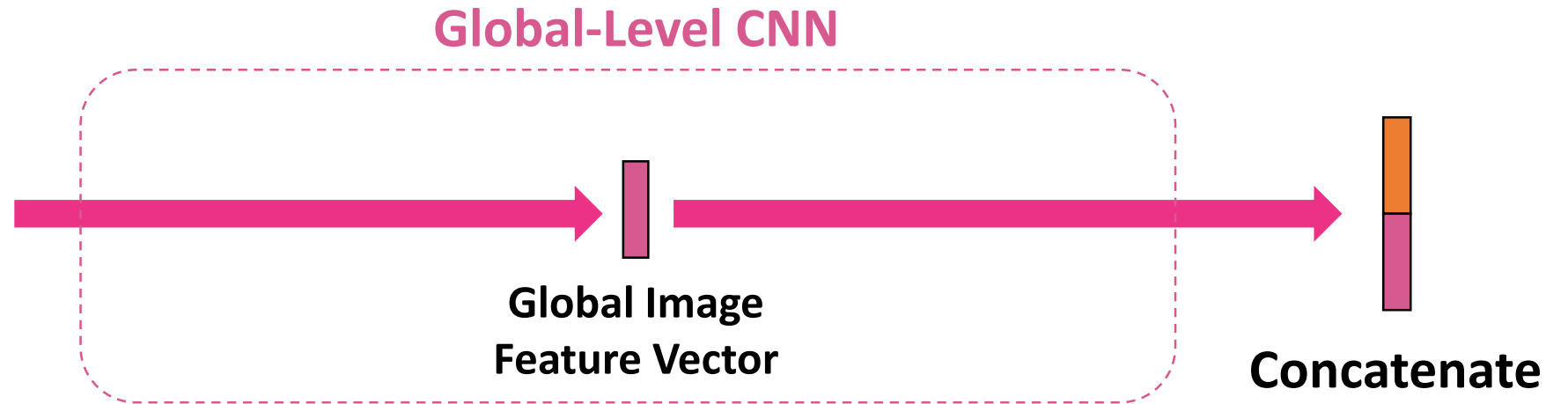


**Global Image
Feature Vector**

Global-Level CNN



Input Image



Local-Level CNN

Local-Level CNN



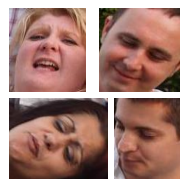
Input Image

Local-Level CNN



Input Image

**Face
Extraction**



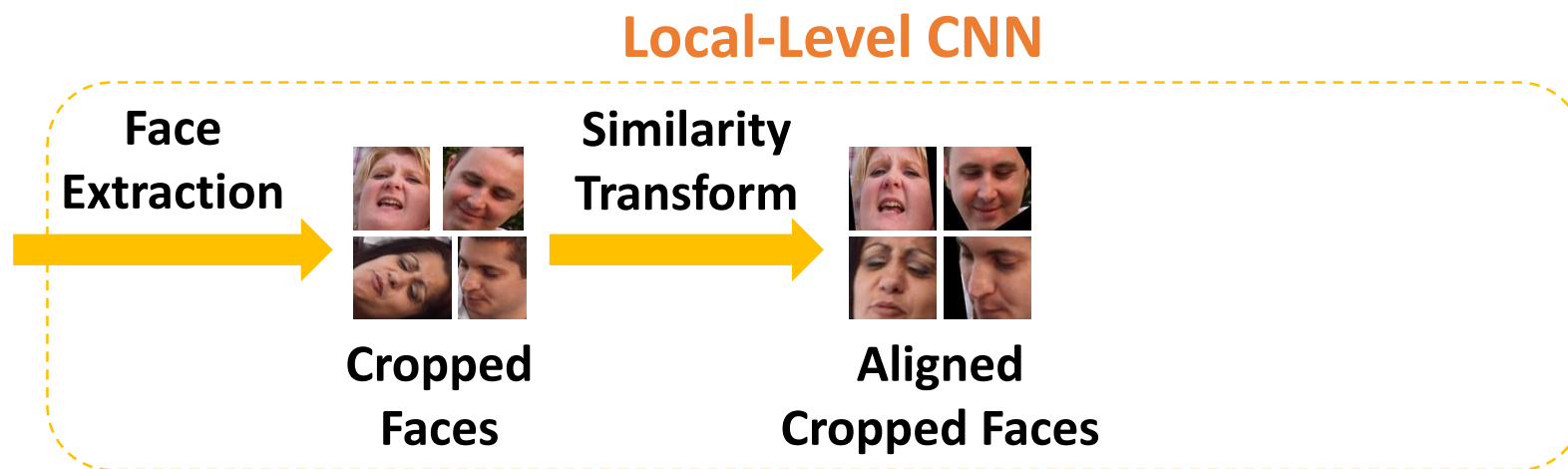
**Cropped
Faces**

Local-Level CNN

Local-Level CNN



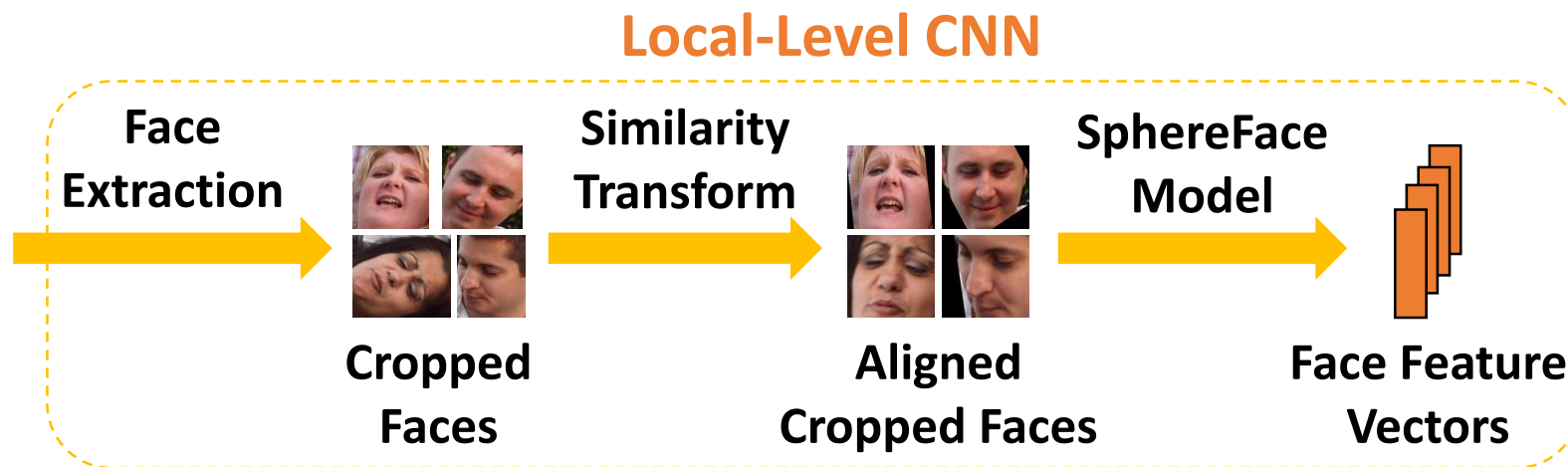
Input Image



Local-Level CNN



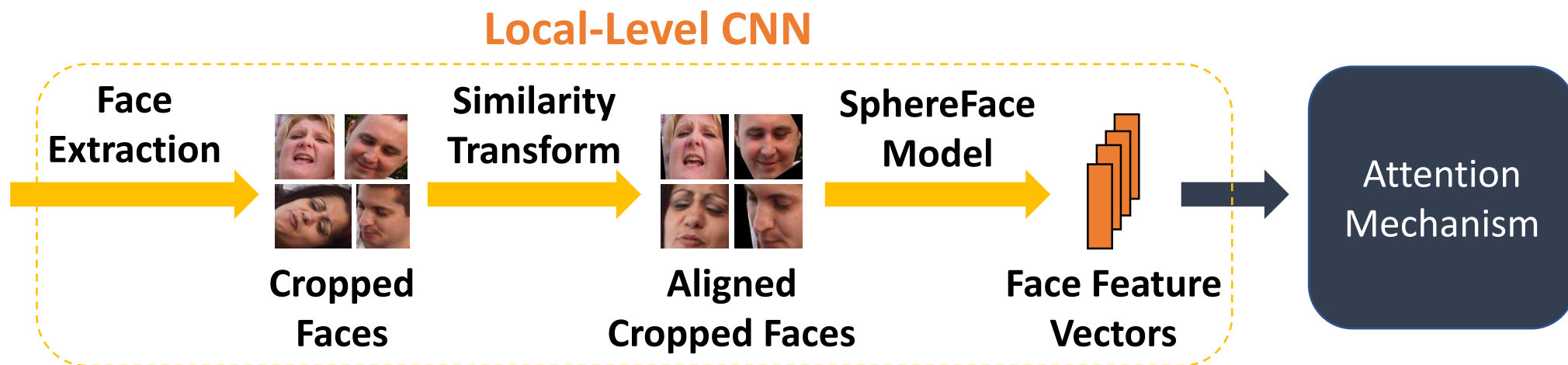
Input Image



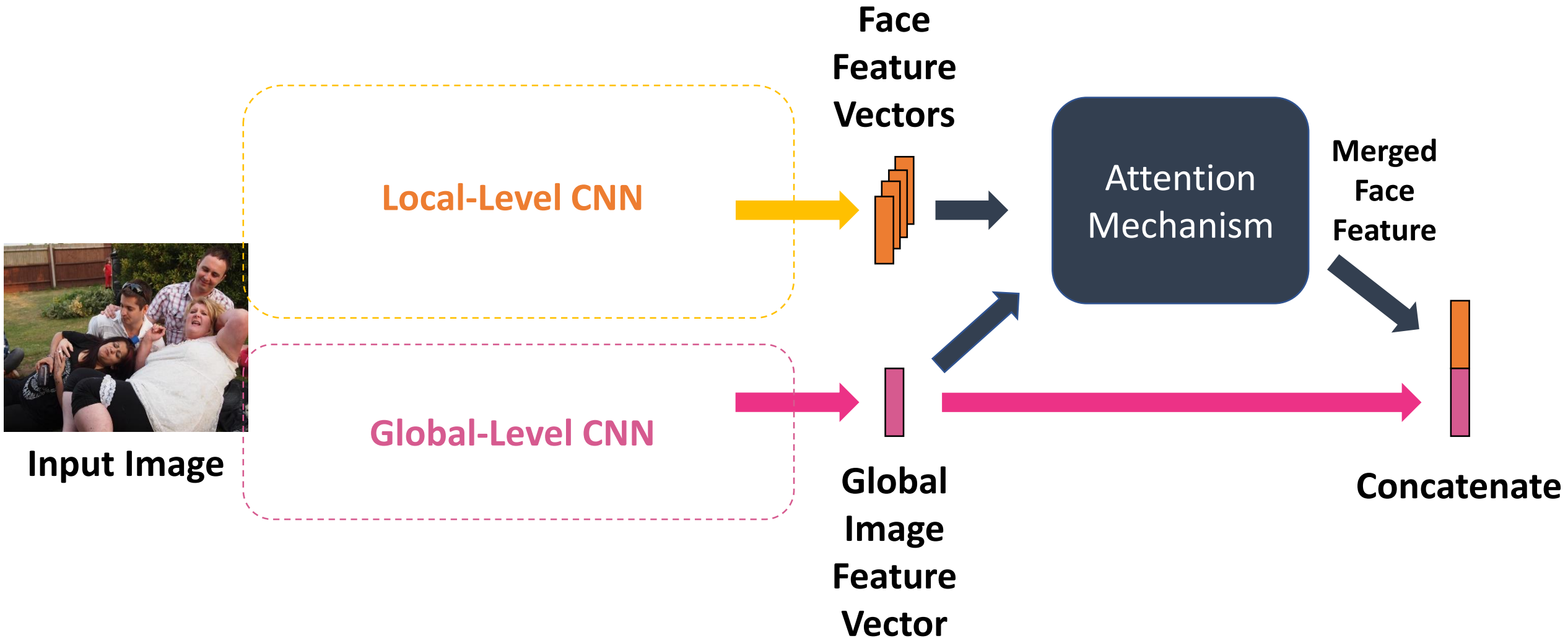
Local-Level CNN



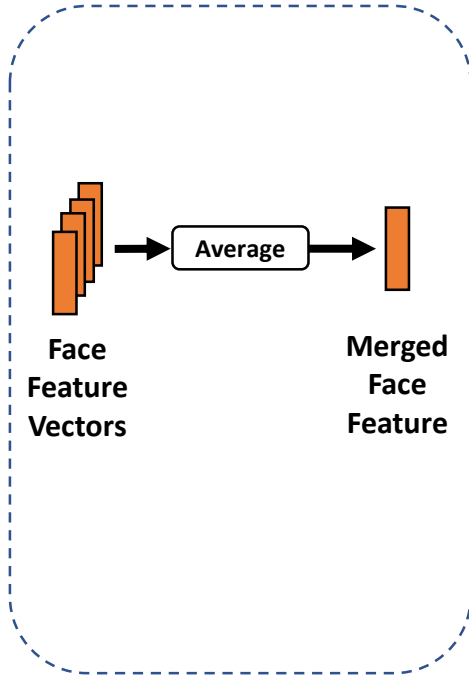
Input Image



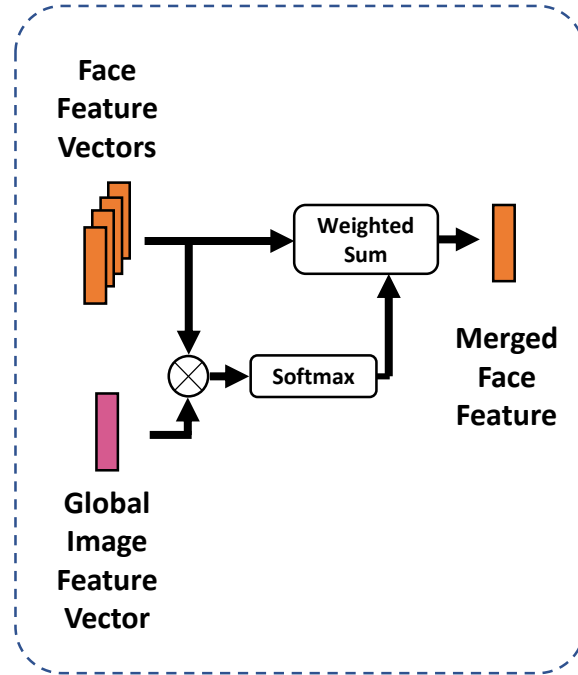
Attention Mechanisms



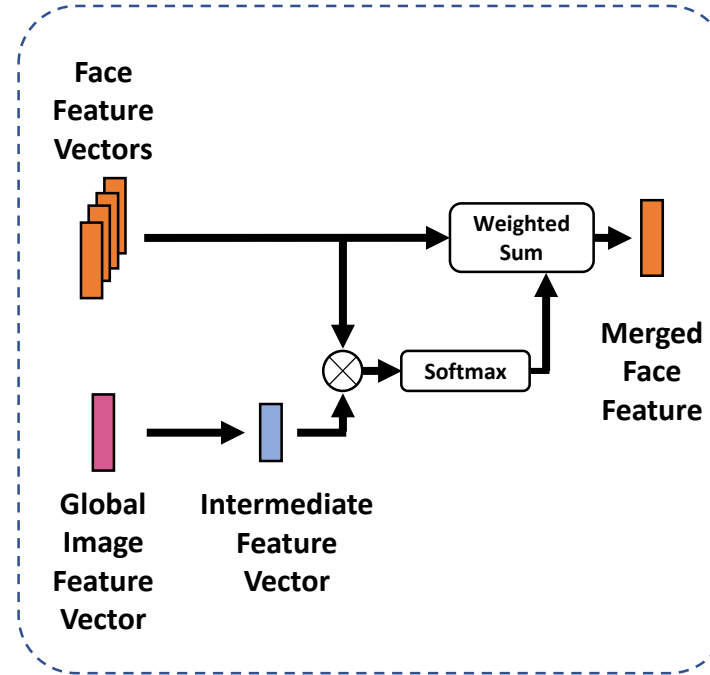
Attention Mechanisms



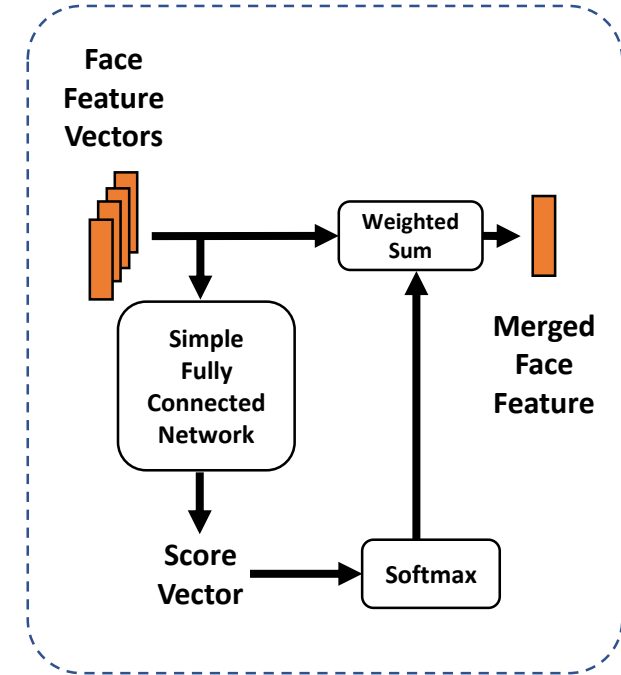
(i)



(ii)

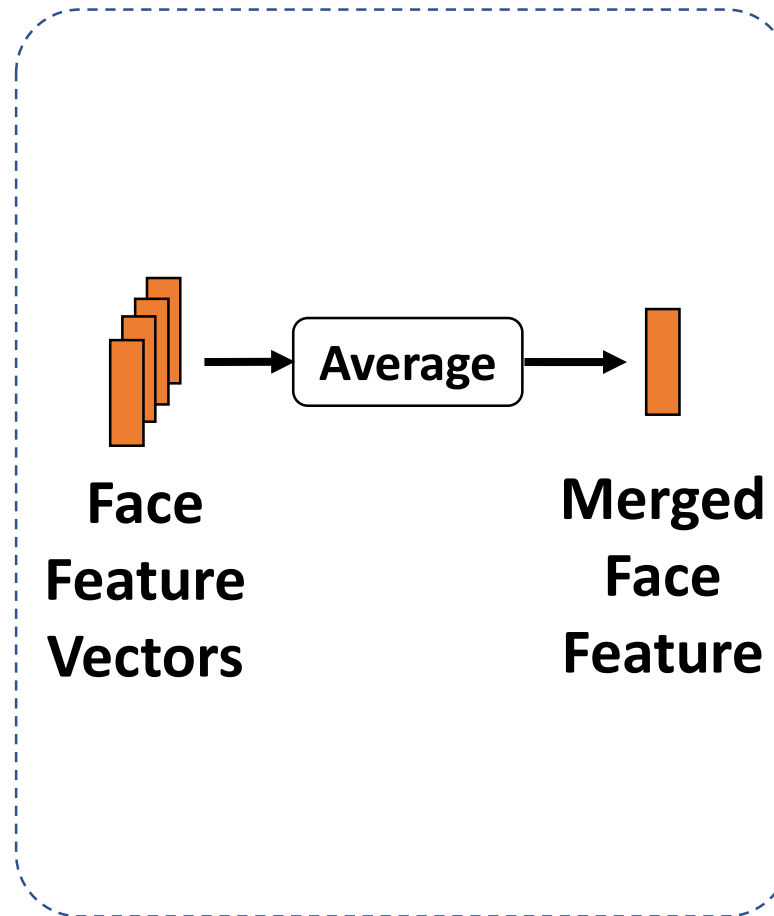


(iii)



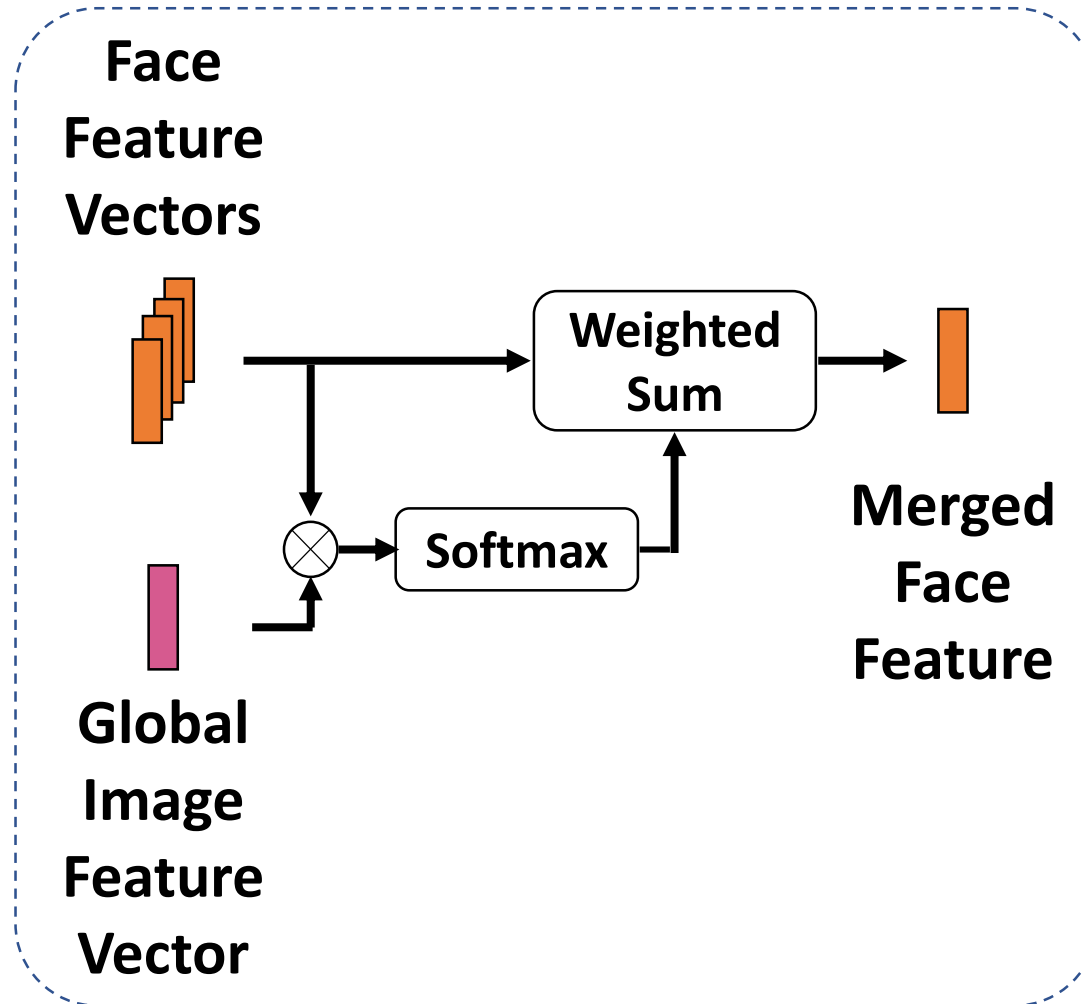
(iv)

Average of Facial Feature Vectors



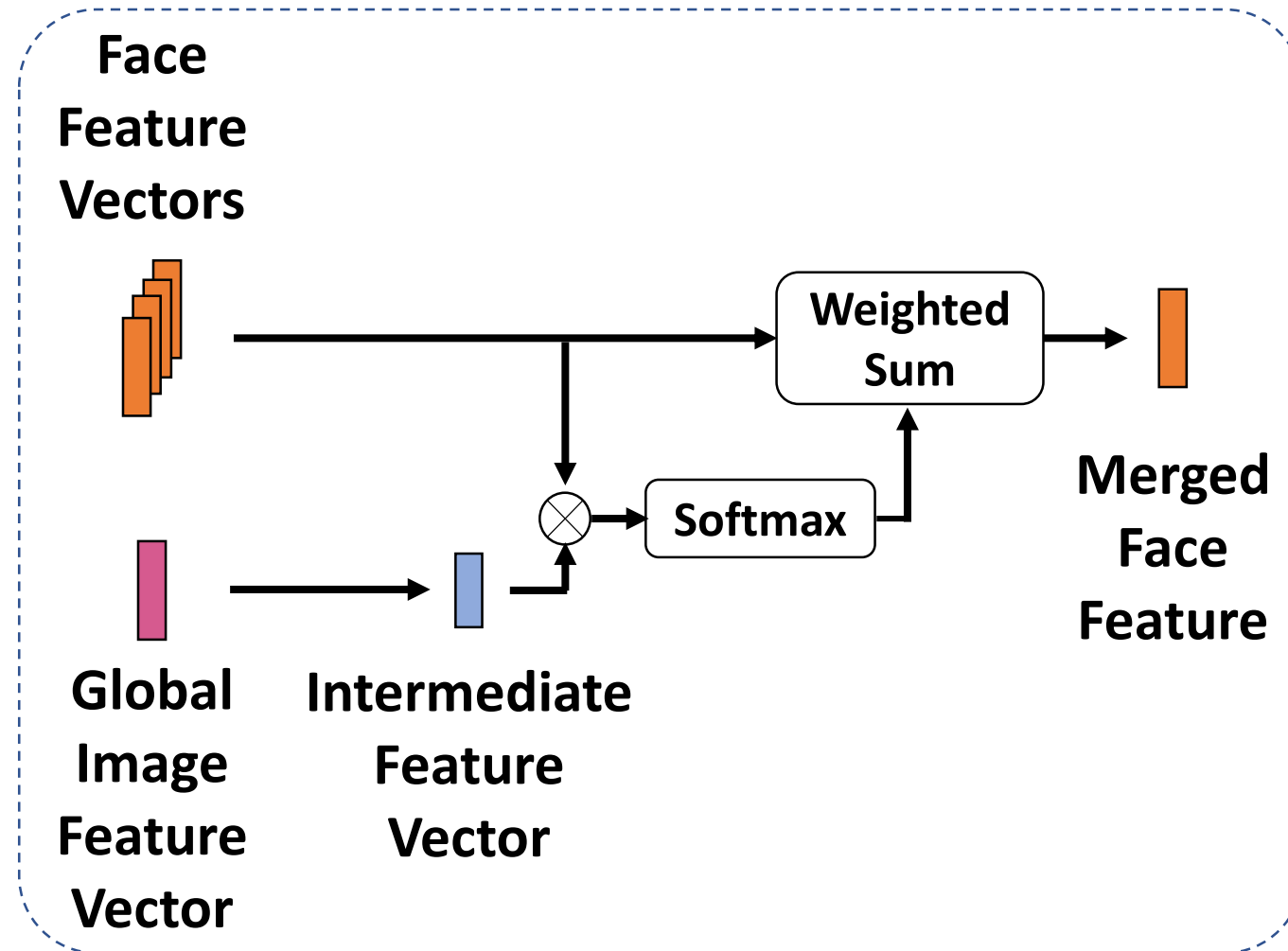
(i)

Attention Weights based on Global Image Vector

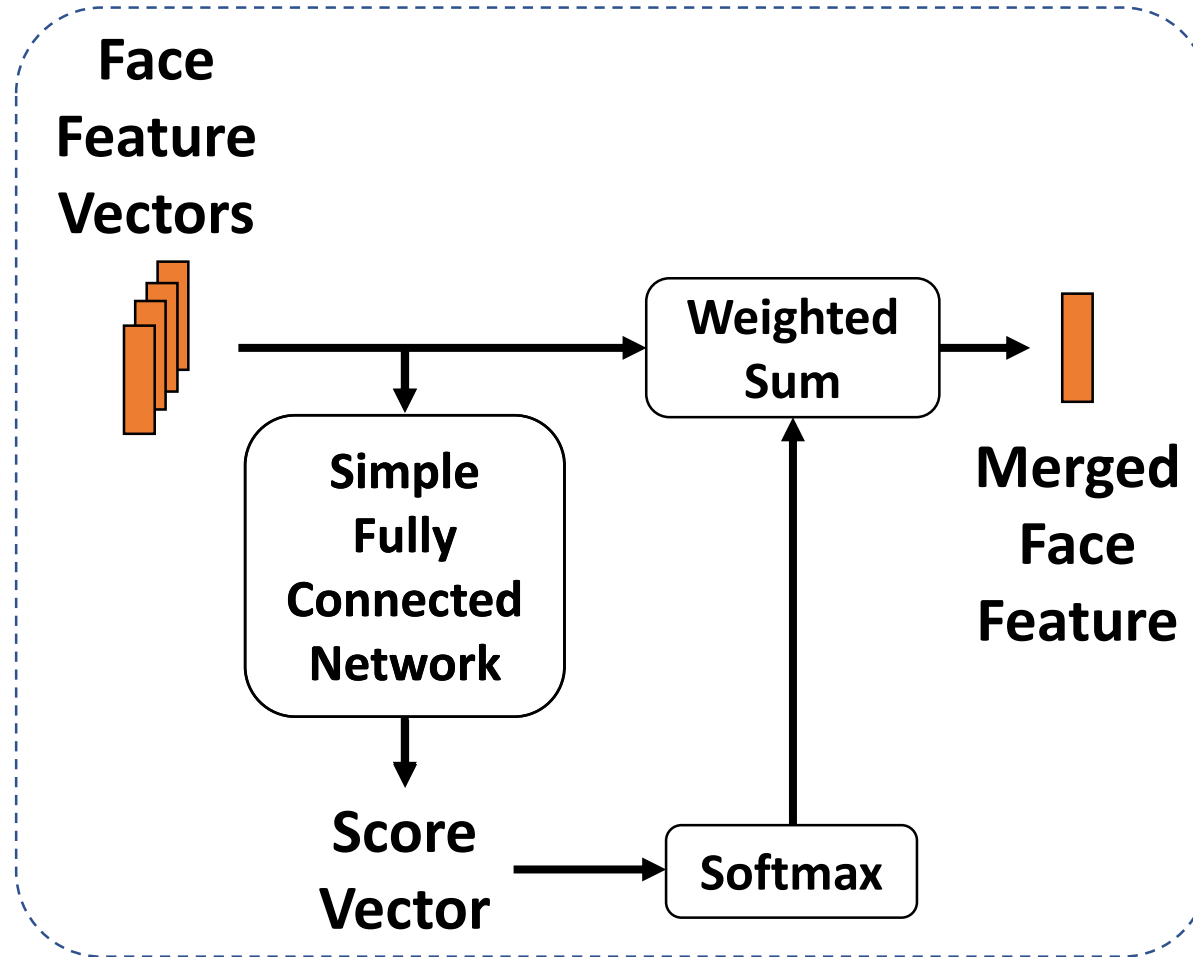


(ii)

Attention Weights based on Intermediate Global Image Vector



Attention Weights from a Small Neural Network



(iv)

Datasets

- EmotiW Dataset
 - 9,815 train images
 - 4,346 validation images
 - VAL – 3346 images
 - EVAL – 1000 images
 - 3,011 test images

TRAIN



Negative



Neutral



Positive

VALIDATION



Negative



Neutral



Positive

Datasets

- EmotiC Dataset
 - Data Augmentation
 - Valence Scores to Labels



Valence: 1
Label: Negative



Valence: 3
Label: Negative



Valence: 4
Label: Neutral



Valence: 5
Label: Neutral



Valence: 5
Label: Neutral



Valence: 7
Label: Positive



Valence: 8
Label: Positive



Valence: 9
Label: Positive

Model Results

	Model	VAL	EVAL
	Global	69.50%	70.80%
	Local	71.18%	72.40%
	Average	73.03%	73.90%
Attention Models	Attention_A	73.18%	73.00%
	Attention_B	74.26%	75.20%
	Attention_C	73.66%	76.20%

Quantitative Results

Model	EVAL	EmotiW 2018 Test Dataset			
		Positive	Neutral	Negative	Overall
Baseline	—	75.00%	50.00%	53.00%	61.00%
Single	78.20%	66.59%	57.97%	58.87%	61.84%
Ensemble	80.90%	71.33%	60.48%	59.71%	64.83%

Qualitative Results



Negative



Neutral



Positive

Conclusion

- Attention Mechanism

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- Larger Datasets

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- Combinations of various models

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Conclusion

- Attention Mechanism
- Larger Datasets
- Combinations of various models
- Future work
 - Pose
 - Context