

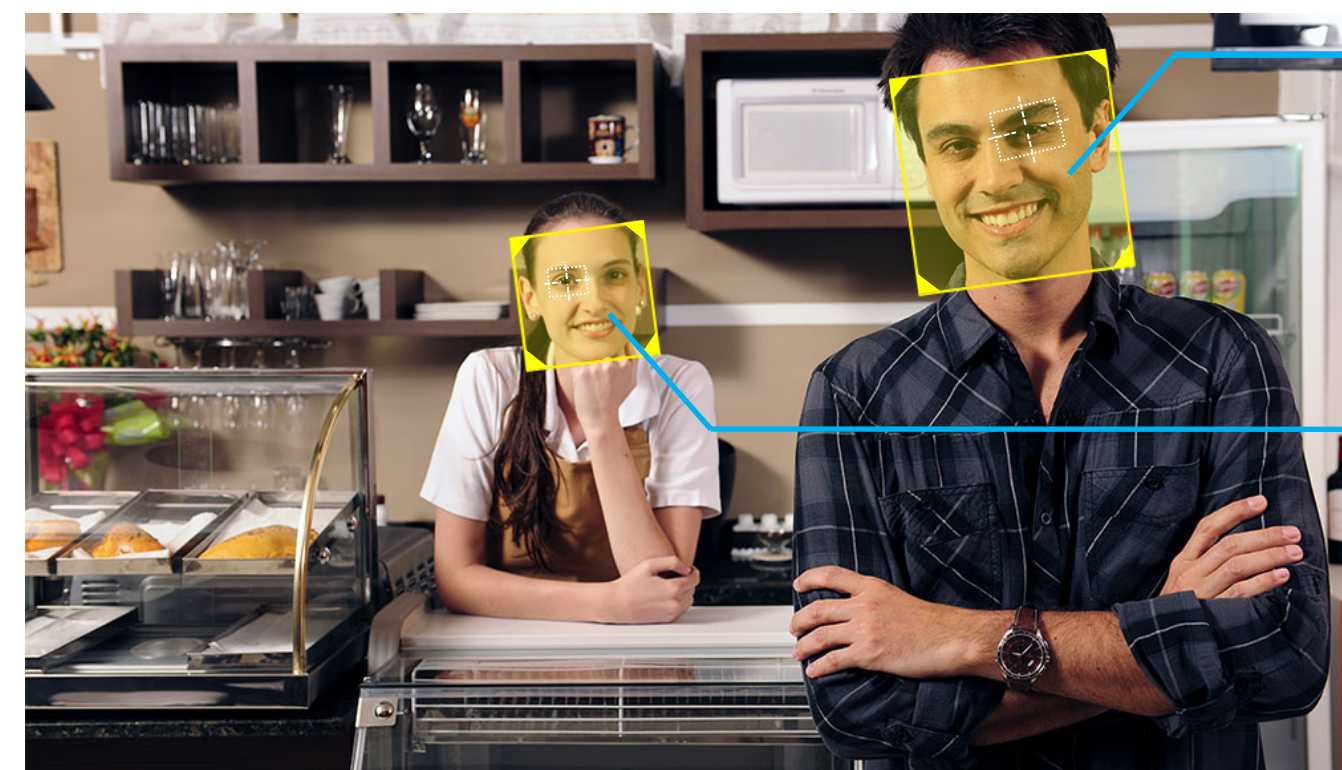
Automated Estimation of Human Age, Gender and Expression

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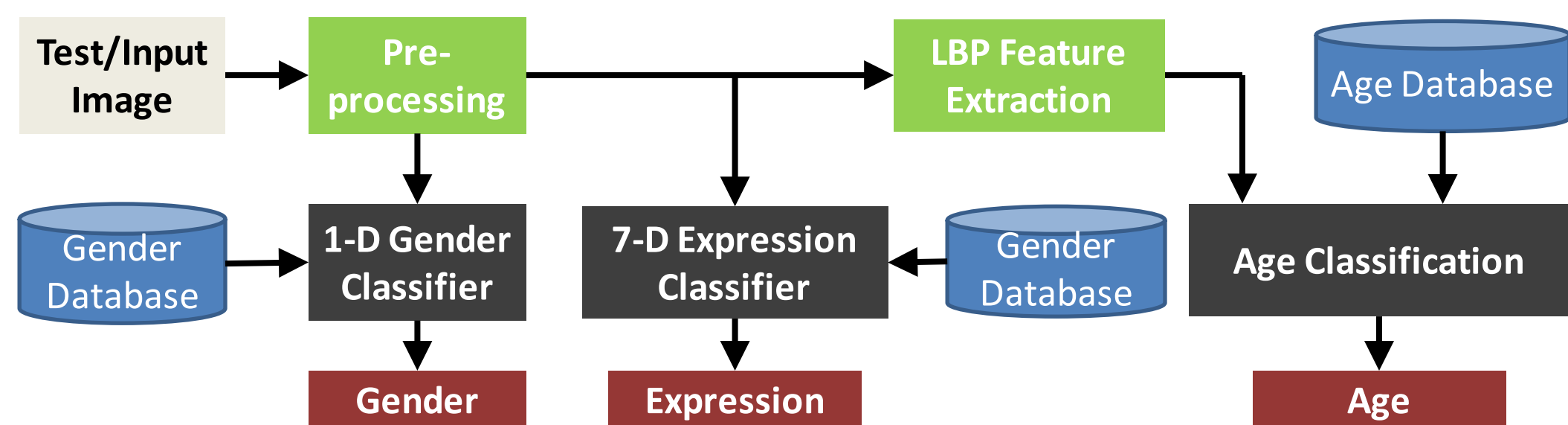
Motivation

- Human can accurately determine face attributes such as age, gender and expression



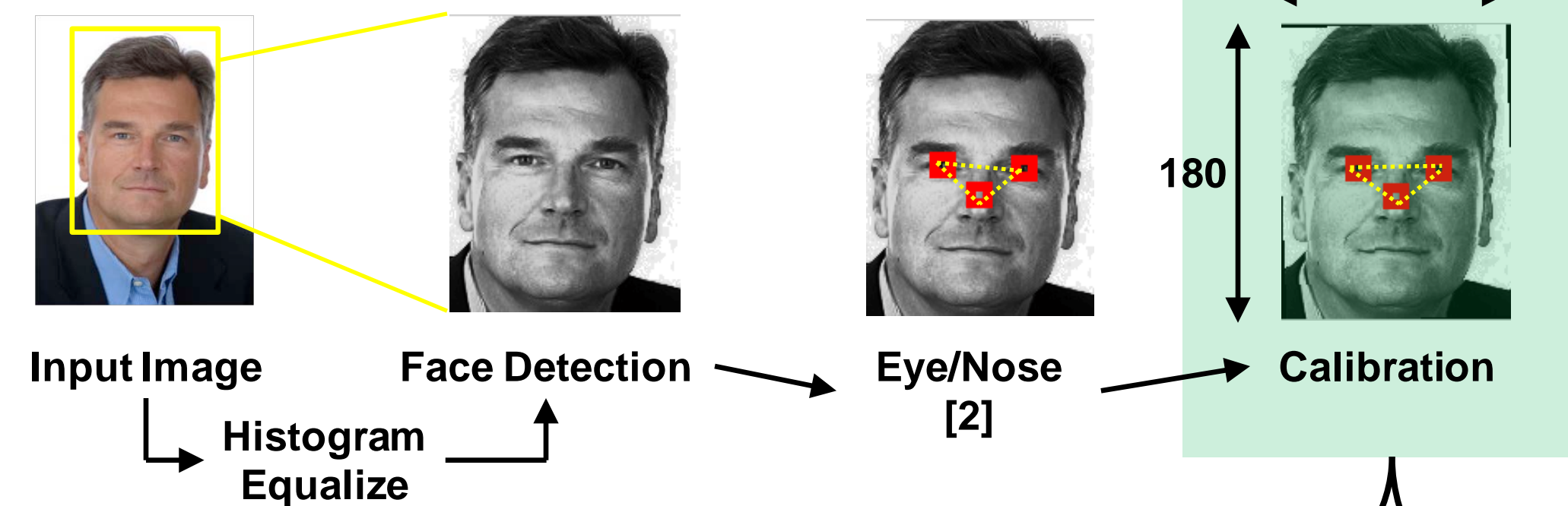
Attributes
age: 29 [+/-5]
gender: male (94%)
expression: smile (88%)
glass: no (99%)
.....
Attributes
age: 27 [+/-4]
gender: female (92%)
expression: smile (76%)
glass: no (96%)
.....

- We want a machine that can do the same job!

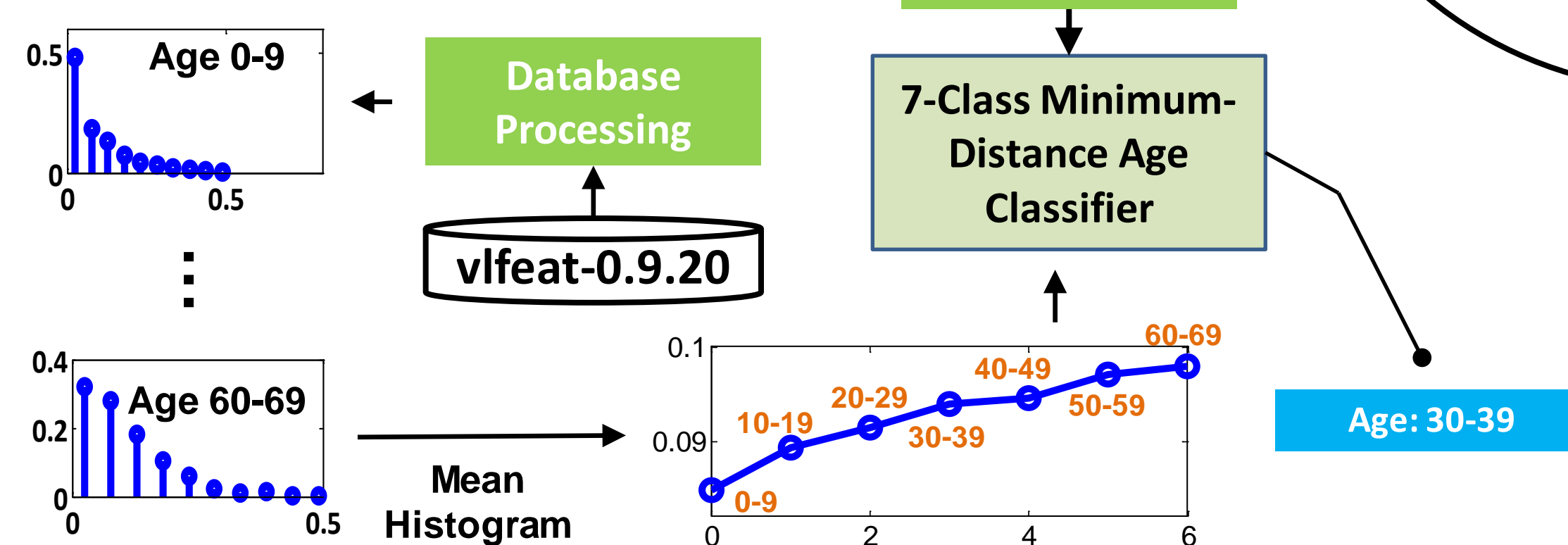


Methodology

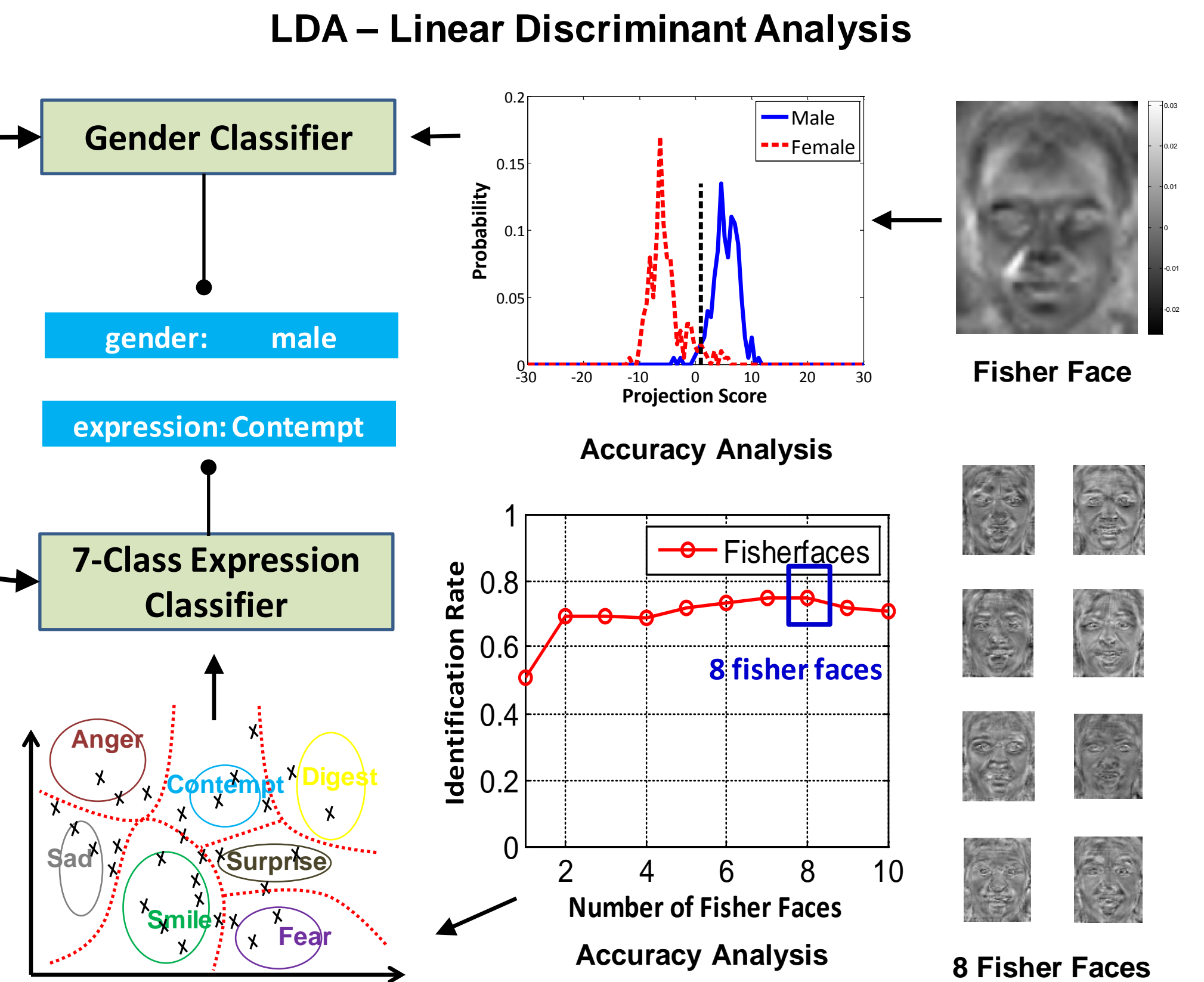
- Step 1: Input Pre-processing



- Step 2: Age Estimation

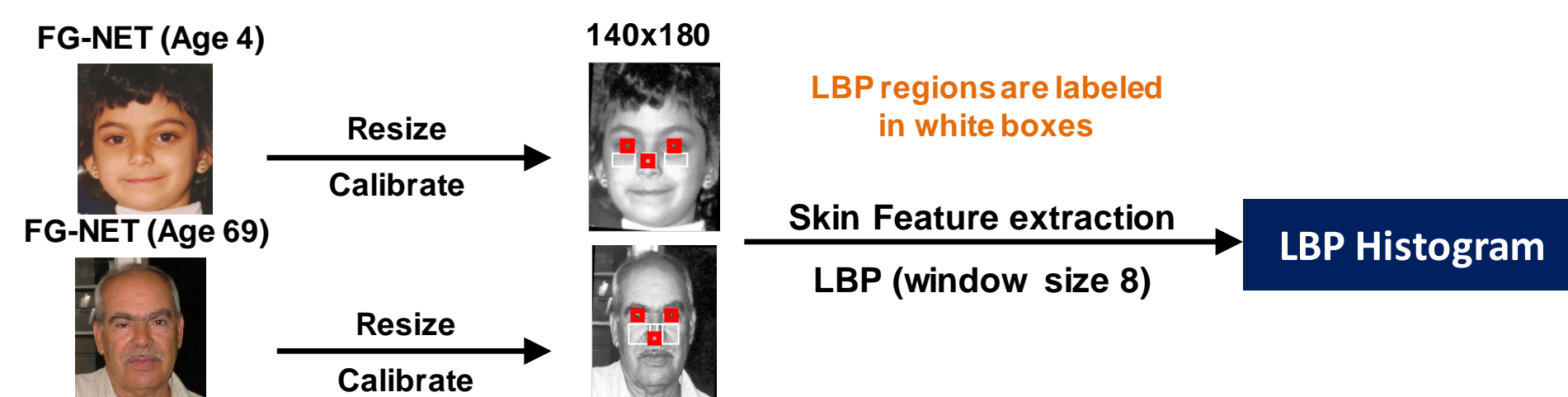


- Step 3: Gender/Expression Recognition



Database Processing

Database	Class #	Image #	Image Size	Notes			
FG-NET Aging	7	1002	444x489	68 points/image			
Range	0-9	10-19	20-29	30-39	40-49	50-59	60-69
%	37.03	33.83	14.37	7.88	4.59	1.50	0.8
Gender	2	400	201x246	Generate 1 fisher face			
Expression	7	147	120x150	Generate 8 fisher face			
Range	Smile	Anger	Contempt	Digest	Fear	Sad	Surprise
%	23.8	16.3	3.4	21.8	7.5	6.8	32.0



Experimental Results

- Experiment 1- Estimation accuracy based on database images

Class/Accuracy	Age Database Images	Gender Database Images	Expression Database Images
Age	51.2%	37.2%	39.7%
Gender	81.3%	95.1%	83.4%
Expression	N/A	N/A	74.2%
All (exclude Expression if N/A)	46.5%	30.8%	30.5%

- Experiment 2 - Estimations with input image



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[3] S.E Choi, Y.J. Lee, S.J. Lee, K.R. Park, J. kim, "Age Estimation Using a Hierarchical Classifier based on Global and Local Facial Features", *Journal of Pattern Recognition*, 44(6), 2011

[4] Xin Geng; Zhi, Hua Zhou; Smith Miles, K., "Automatic Age Estimation Based on Facial Aging Patterns," *Pattern Analysis and Machine Intelligence, IEEE Transactions on*, vol.29, no.12, pp.2234,2240, Dec. 2007