BY TEAM 6

Bosch's Age and Gender Detection

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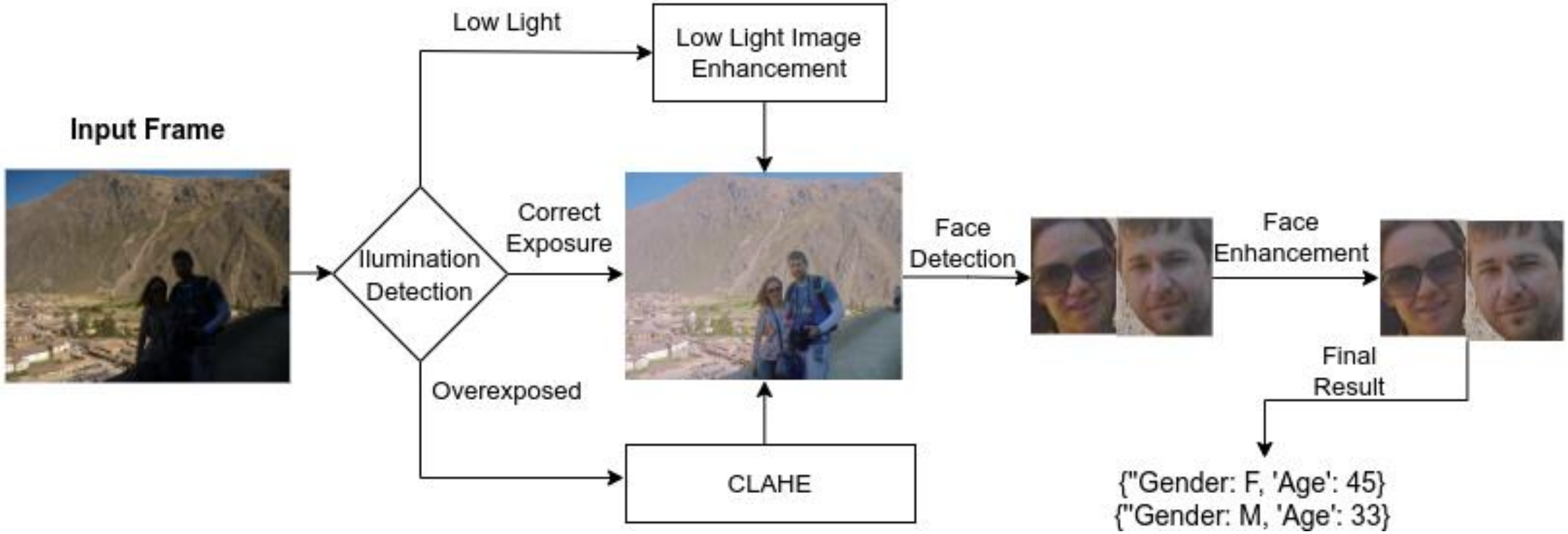
Pipeline Overview



Annotated Output

Our Dataset

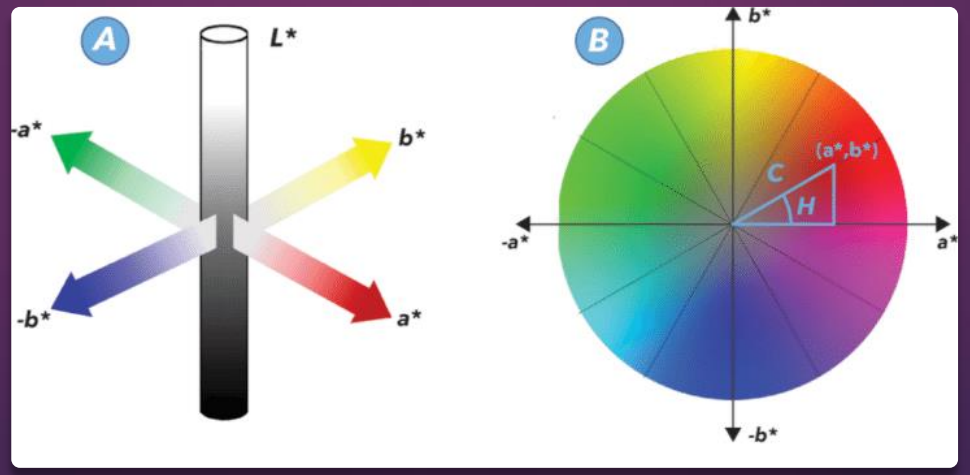
- Dataset scraped while checking for commercial license
- Scraped faces passed through Face Extraction Model

Statistic	Value
Number of Samples	6529
Age Range	2-88
Mean	32.48
Median	30
Number of Male Samples	2573
Number of Female Samples	3956

Dataset Samples

Illumination Detection

- RGB → LAB Color Space Conversion
- Brightness Thresholding into 3 categories
- Different Preprocessing based on Image Illumination

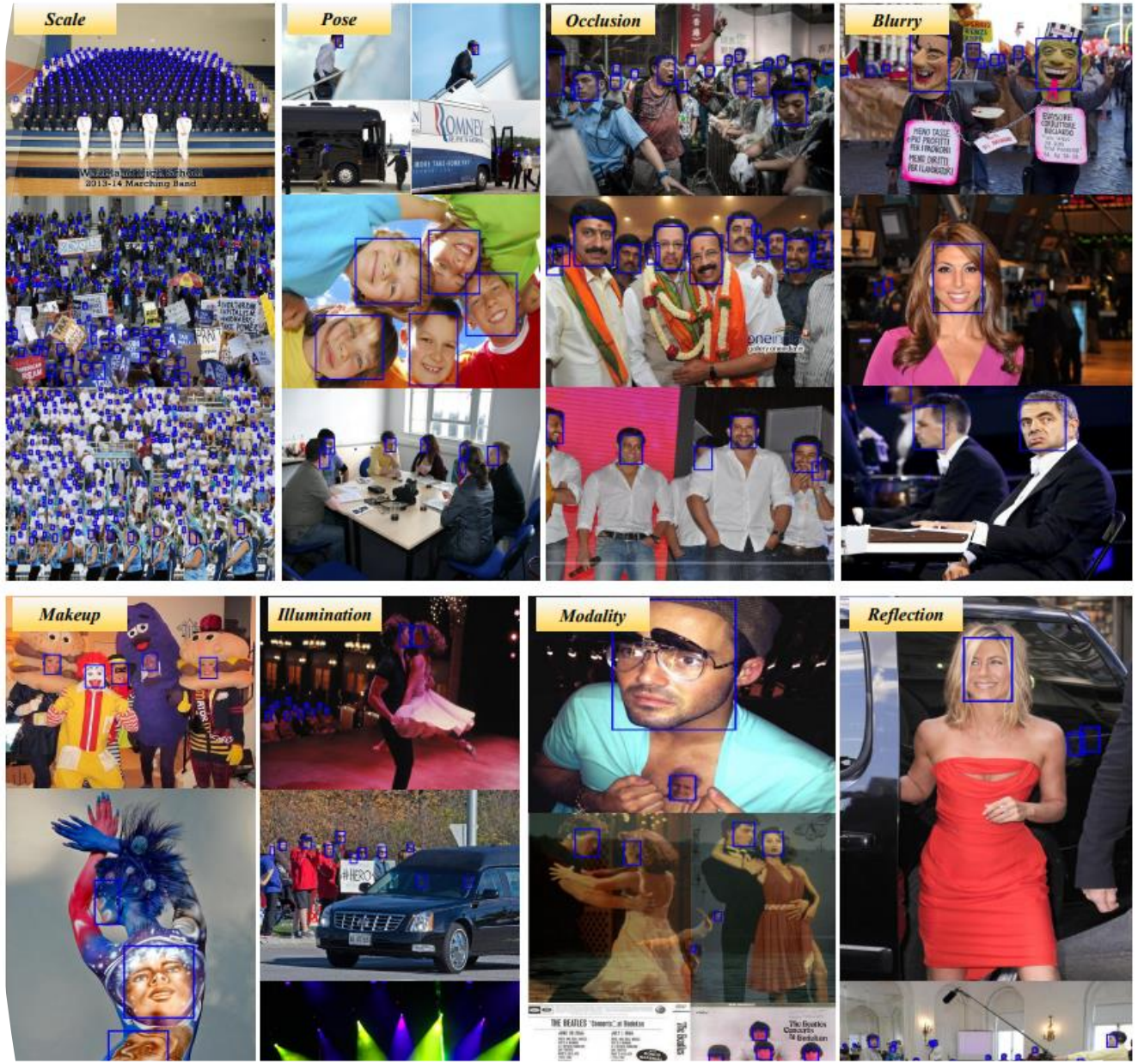


Low Light Enhancement

- Enhancing Low light image for better face detection
- Zero DCE with 8 iterations of Low Light Enhancement

Face Detection

- DSFD for Face Detection
- Robust to different real life scenarios
- Faster Inference Time



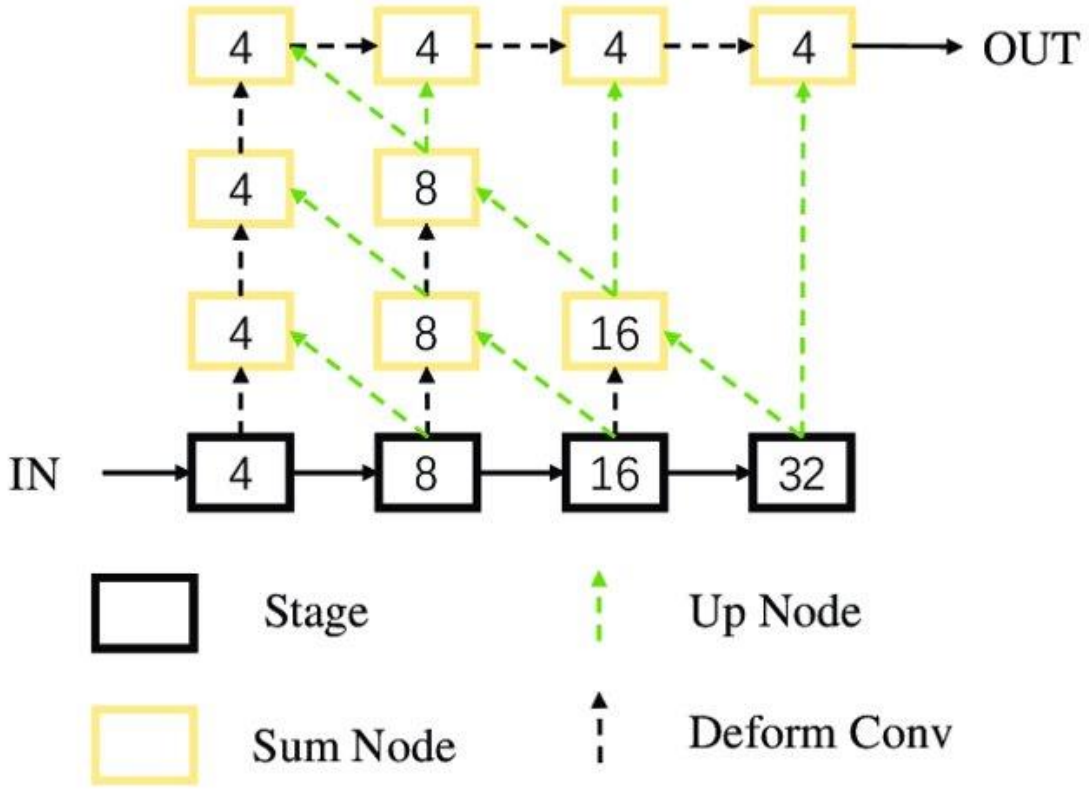
Face Super Resolution

- Helps tackling Low Resolution Settings
- GFPGAN reconstructs facial features without any age bias

Gender Detection

- Pretrained EfficientnetV2 on Imagenet-21K
- Finetuned on our dataset
- Achieves 94.38% accuracy on our validation set

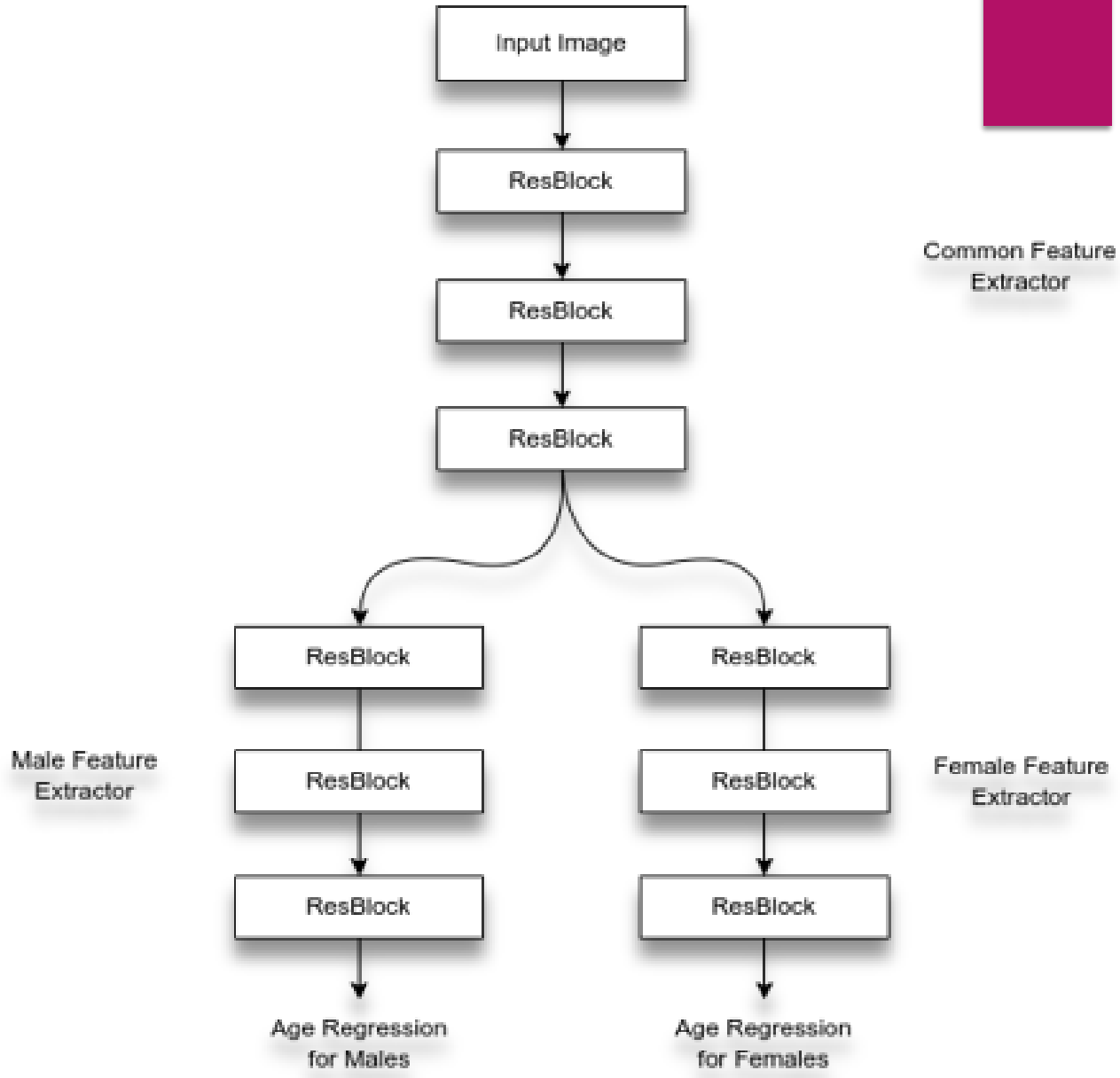
Age Regression



- DLA-34 to perform age regression
- Aggregating hierarchical features
- RMSE of 7.21 on an Age Scale of 2-88

Alternate Approaches Tried

- Retina Face for Face Extraction
- GPEN for Face Super Resolution
- Custom model for Age Regression



Age Regression Experiments

Model Name	MAE	RMSE
Resnet-34	6.31	7.86
Custom Model	6.07	7.53
DLA-34 (same as paper)	5.94	7.41
DLA-34 (Ours)	**5.73**	**7.21**

Further Scope

- Calibrating multiple views for better facial feature extraction
- Scraping and training our models on a larger dataset
- Single network with multiple heads for Age and Gender prediction
- Training our models on full bodies instead of just faces

Improvements Made (since code submission)

- Batch Processing to make Inference Time>30 fps
- Face Tracking
- Annotating an Input Video