



Namast AI

# NamastAI

Your AI  
buddy for  
Yoga

# Why this project?

## Use Case Scenario

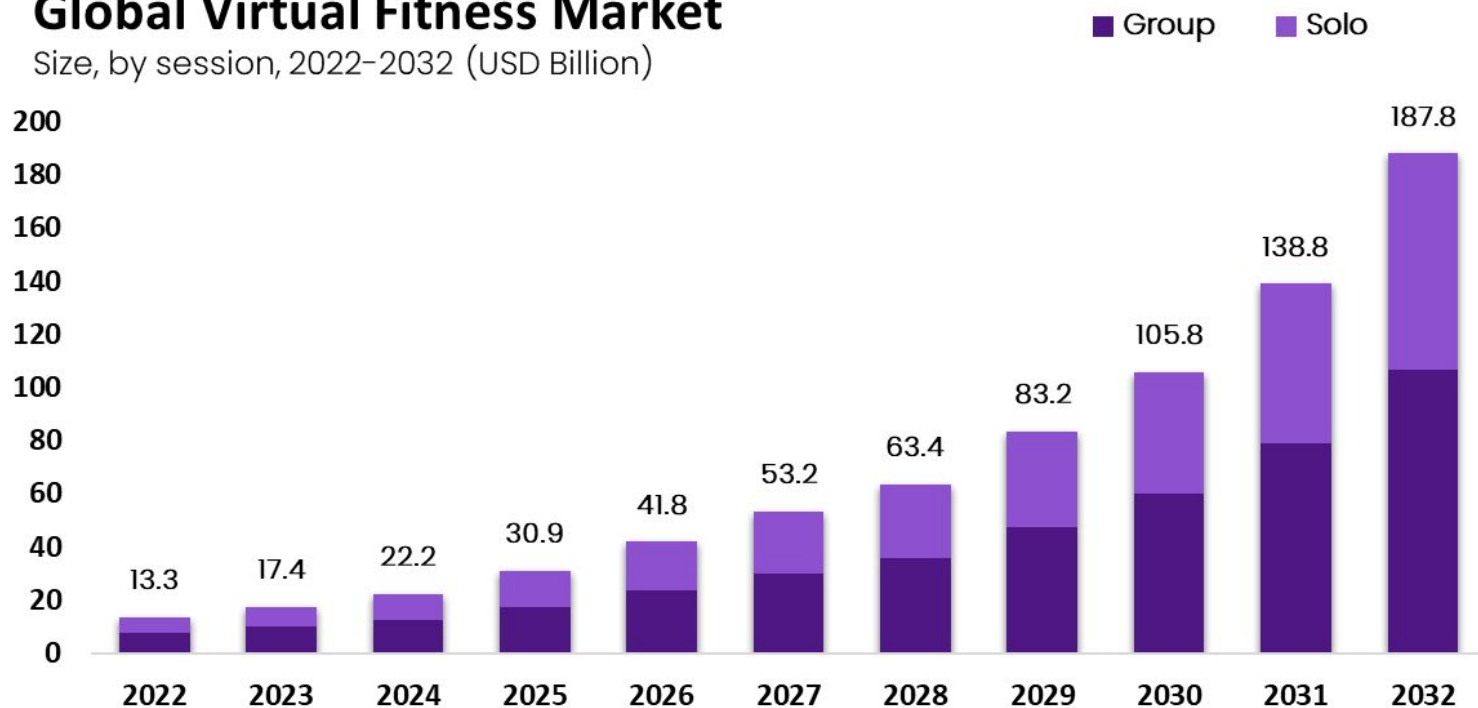
Yoga Studio	Price / hour
Yoga common	\$23.75
skyting	\$30
Harlem Yoga Studio	\$20
Average	\$ 24.6

**Classes range from \$300 upto \$3000 .**



# Global Virtual Fitness Market

Size, by session, 2022-2032 (USD Billion)



The Market will Grow  
At the CAGR of:

**31.2%**

The forecasted market  
size for 2032 in USD:

**\$187.8B**

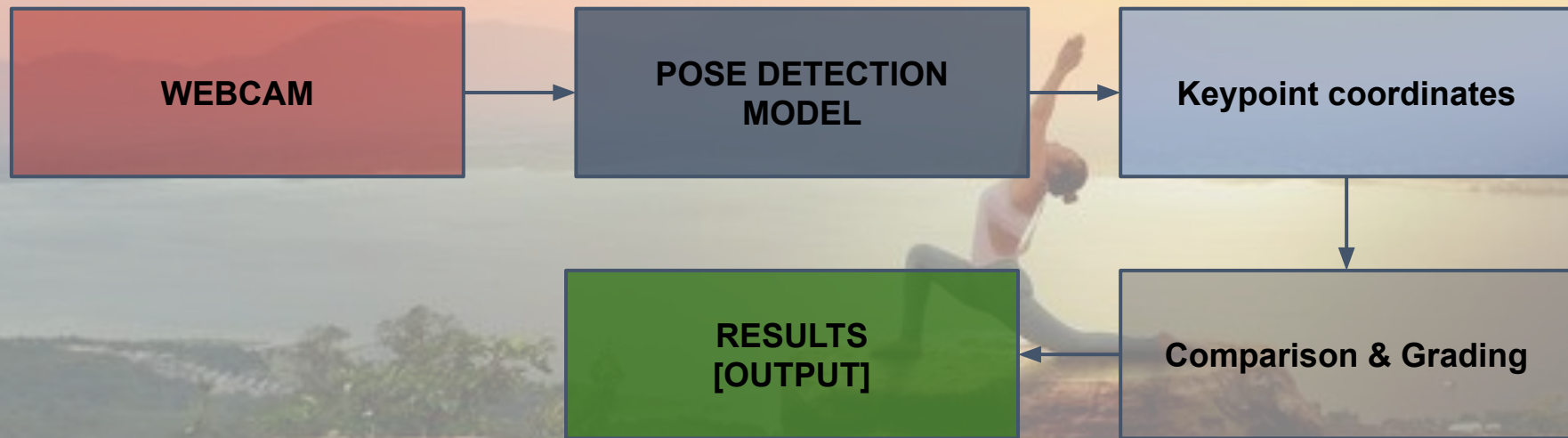


**market.us**  
ONE STOP SHOP FOR THE REPORTS

## What do you want to achieve?

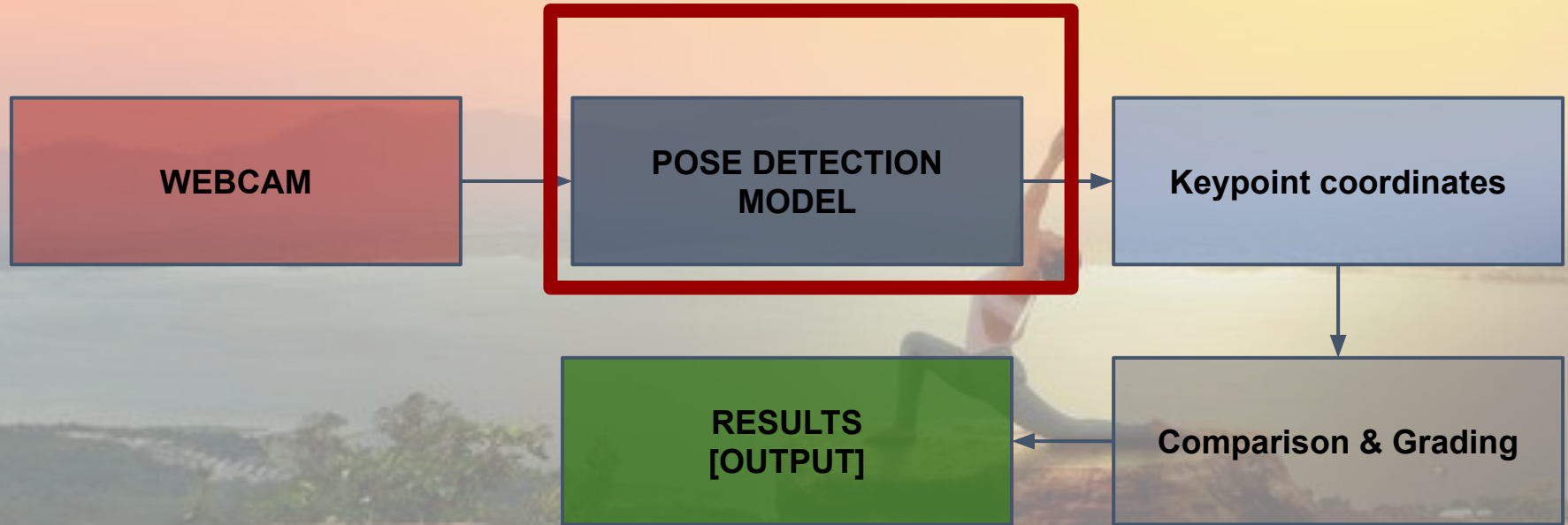
- Handling live stream and superimposing the coordinates.
- To implement web based pose estimation model to detect the yoga pose.
- Based on the pose, correct the user by giving a score.

# METHODOLOGY



**EXPERIMENTATION**

# METHODOLOGY





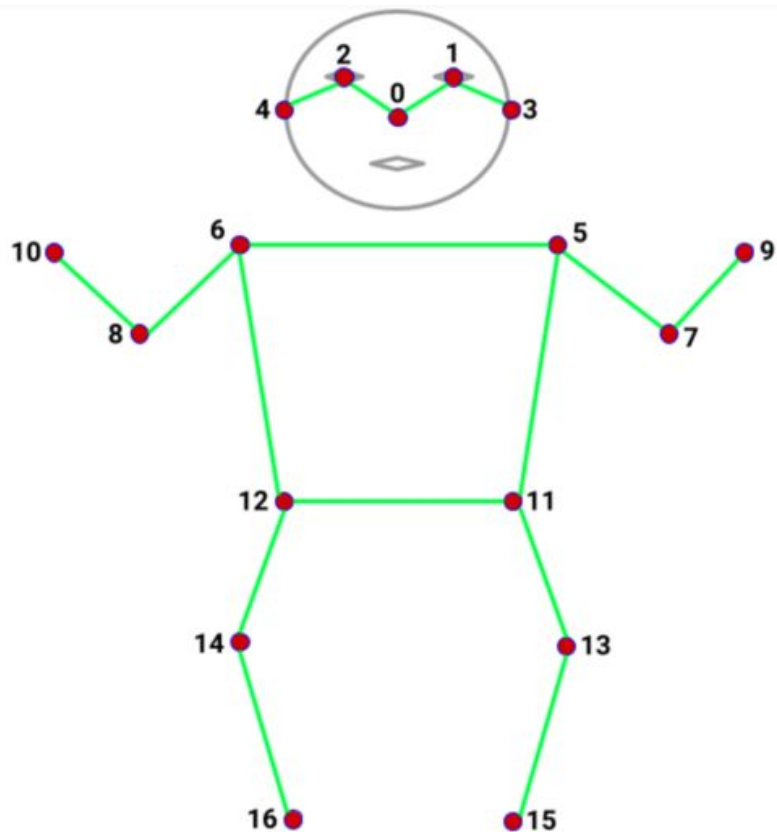


MOVENET

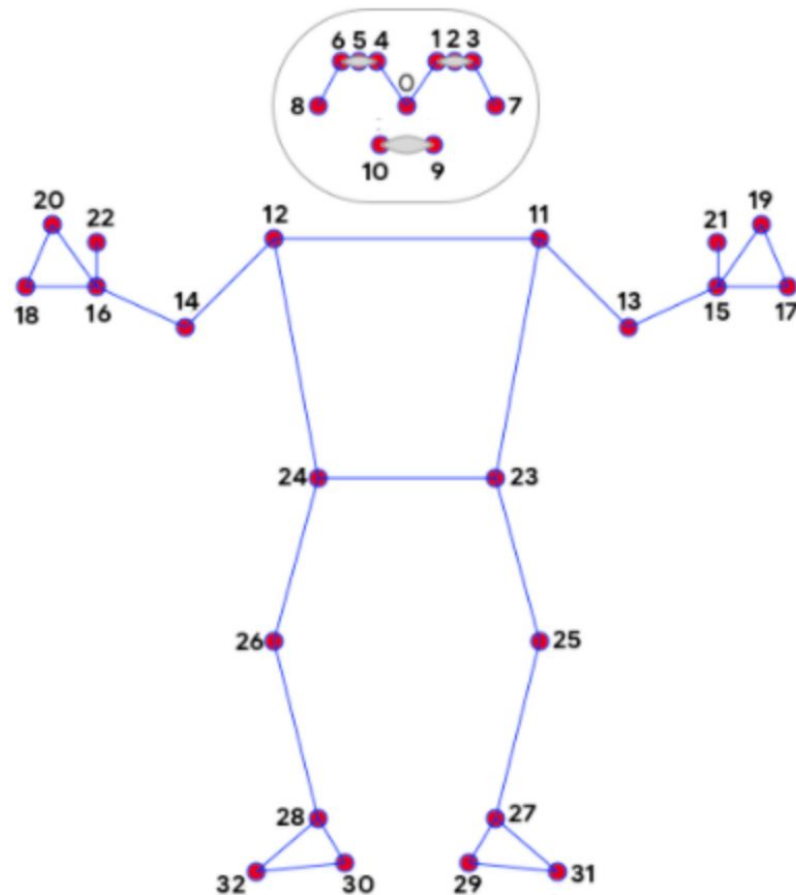
MODEL

BLAZEPOSE

POSENET



MOVENET /  
POSENET



BLAZEPOSE

A photograph of a person on a skateboard riding down a paved sidewalk. A light-colored dog is running alongside the skateboarder. The person is wearing a blue hoodie and dark pants. Overlaid on the person is a blue skeleton keypoint model with 15 circular markers at the joints. The background shows a residential street with trees, utility poles, and mountains in the distance under a clear sky.

## DATASET

### **MPII Human Dataset:**

2015

40,000 Images

15 Keypoints

720 p - (1280 x 720)

Mat file

### **COCO Dataset:**

2017

164,000 Images

17 Keypoints

Different sizes

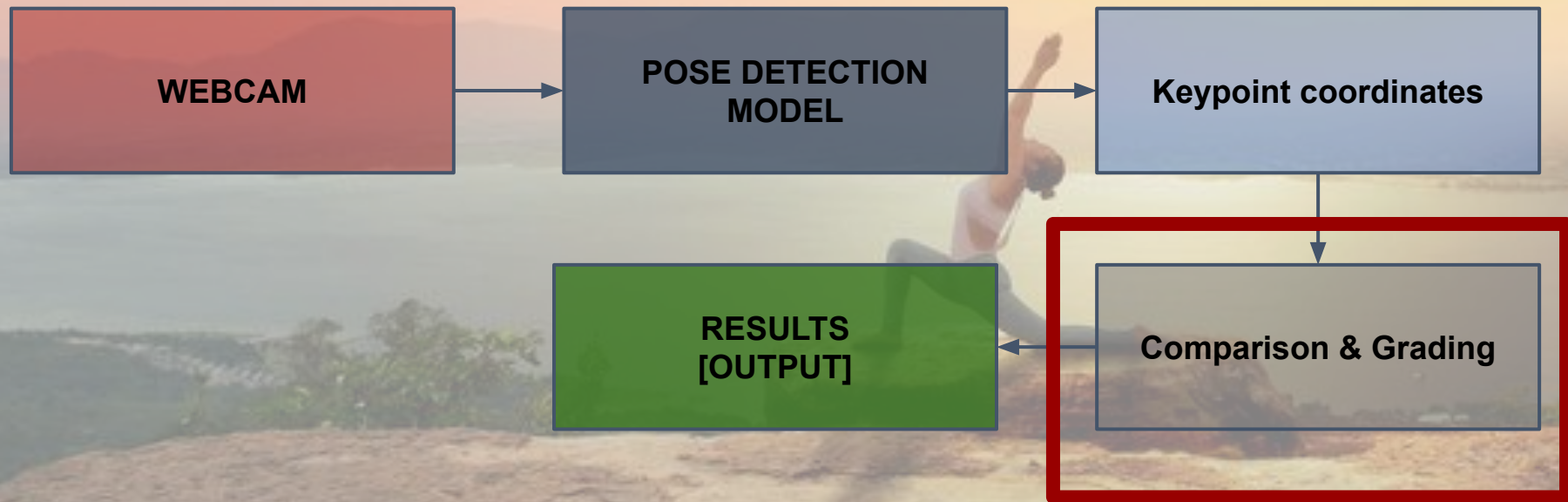
JSON file

# Pose Detection Model Comparison

METRIC	POSENET	MOVENET THUNDER	MOVENET LIGHTNING
ACCURACY	97.6	79.6	78.7
PDJ	87.34	99.01	95.42
FPS	12	16	30



# METHODOLOGY



# WHICH YOGA SEQUENCE?



A person in a yoga pose (Tree Pose) is silhouetted against a vibrant sunset sky with orange and yellow clouds. The person's arms are raised, and they are balancing on one leg. Overlaid on this image is a flowchart with four boxes. The top box is orange and contains the text 'DATASET COLLECTION'. Below it, there are three boxes in a horizontal row: a red box on the left with 'Sample Images from YouTube Videos', a light blue box in the center with 'MoveNet Lightning', and a green box on the right with 'Annotation for each pose'. Arrows point from the red box to the blue box, and from the blue box to the green box.

**DATASET  
COLLECTION**

**Sample Images from  
YouTube Videos**

**MoveNet Lightning**

**Annotation for each pose**

## VIDEO SCRAPPING

- > 1080p videos
- > 9 videos
- > 6 poses
- > Only Side View
- > Diverse set of Images
- > **ENTIRE BODY**
- > **Data Preprocessing**





## Sample Frame



## After Data pre-processing

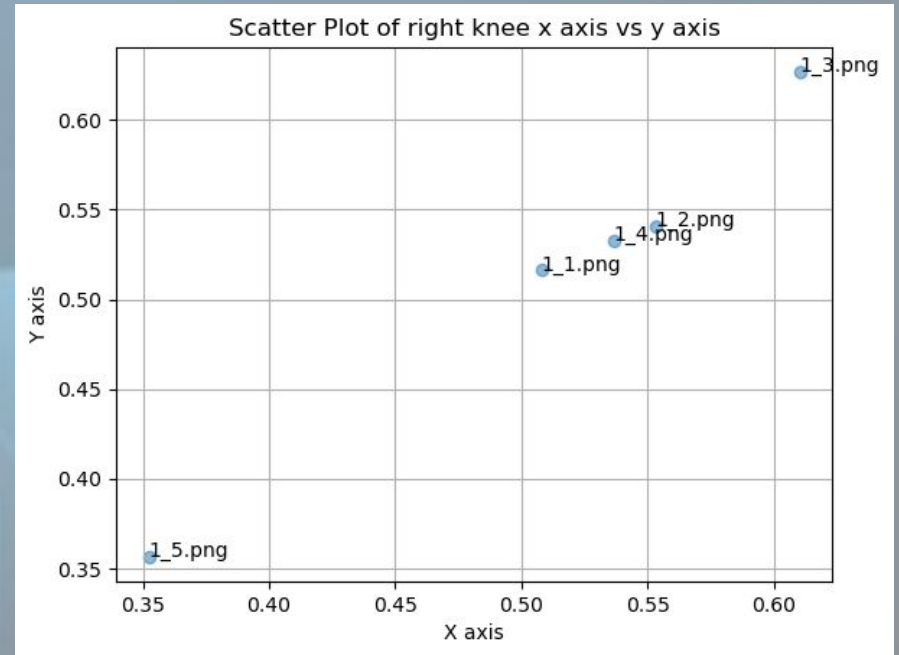
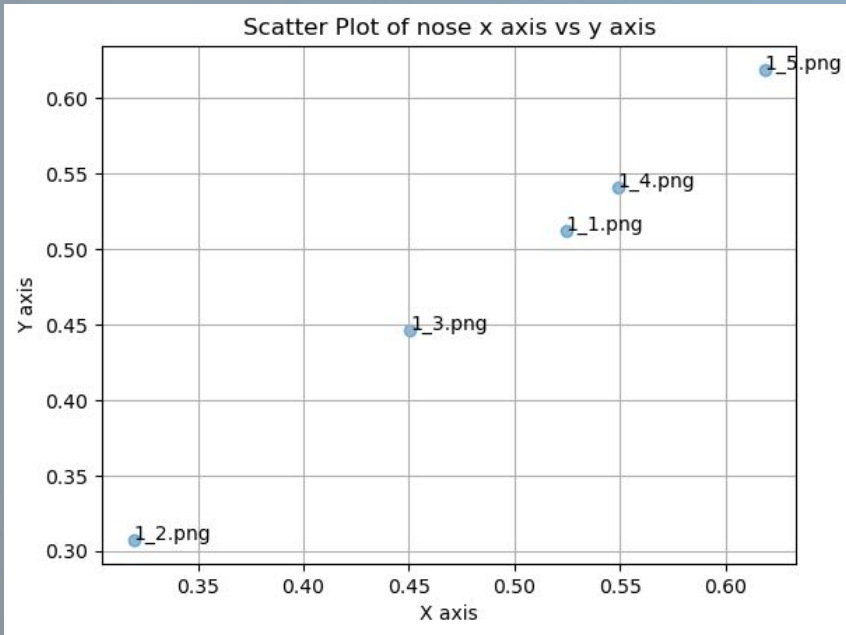


Input



Output

## Post Analysis





## X AND Y COORDINATES OF NOSE

<b>Image id</b>	<b>X coordinate</b>	<b>Y coordinate</b>
<b>1_1</b>	0.5243973	0.5121068
<b>1_2</b>	0.31955463	0.30726406
<b>1_3</b>	0.45065394	0.44655707
<b>1_4</b>	0.54897845	0.5407847
<b>1_5</b>	0.618625	0.618625
<b>Standard deviation</b>	0.11377	0.11701



**DATASET  
COLLECTION**



```
graph TD; A[Sample Images from YouTube Videos] --> B[HUMAN DETECTION]; B --> C[Movenet Lightning]; C --> D[Annotation for each pose]; E[DATASET COLLECTION];
```

The diagram illustrates a dataset collection workflow. It begins with 'Sample Images from YouTube Videos' (red box), which leads to 'HUMAN DETECTION' (dark purple box). From 'HUMAN DETECTION', the process moves to 'Movenet Lightning' (light blue box), which then leads to 'Annotation for each pose' (olive green box). Finally, the 'DATASET COLLECTION' (orange box) is shown at the top, representing the final stage of the process. The background features a silhouette of a person in a yoga pose against a sunset sky.

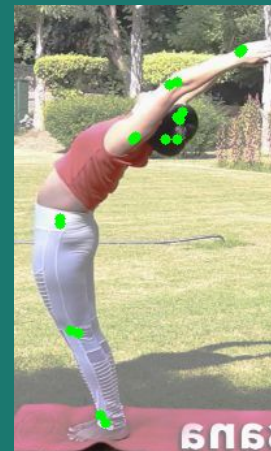
**Sample Images from  
YouTube Videos**

**Movenet Lightning**

**Annotation for each pose**

**HUMAN DETECTION**

Input

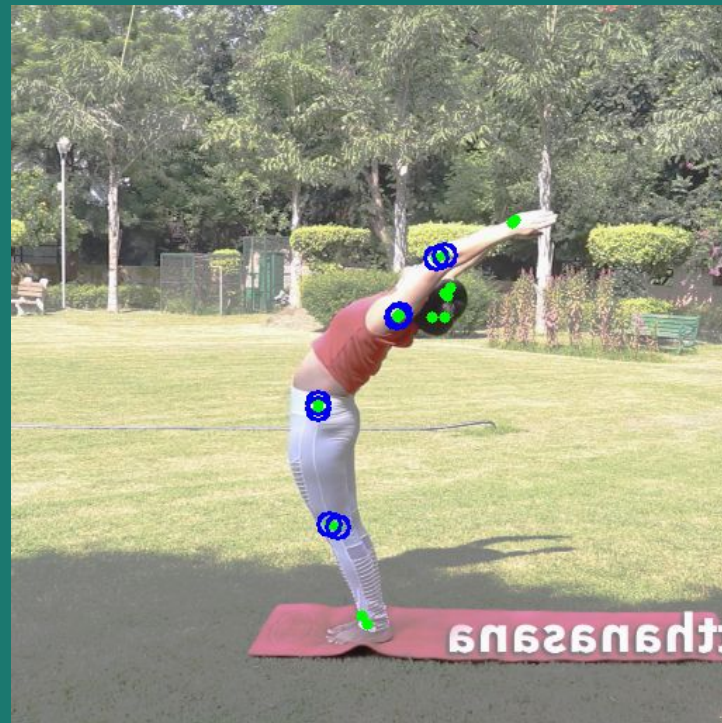


Output

## DISADVANTAGES:

- > FPS was reduced by half
- > Still inconsistent with each images because of aspect ratio

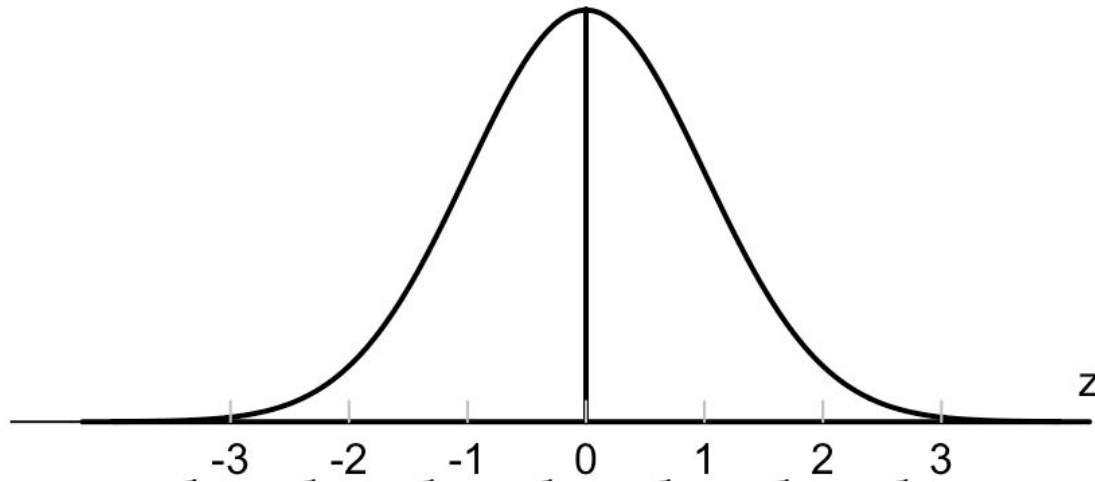
## JOINT ANGLES



**Mean Standard Deviation in**  
angle = 16.82 = 0.046



# GRADING:



$\pm 1$  SD = A

$\pm 2$  SD = B

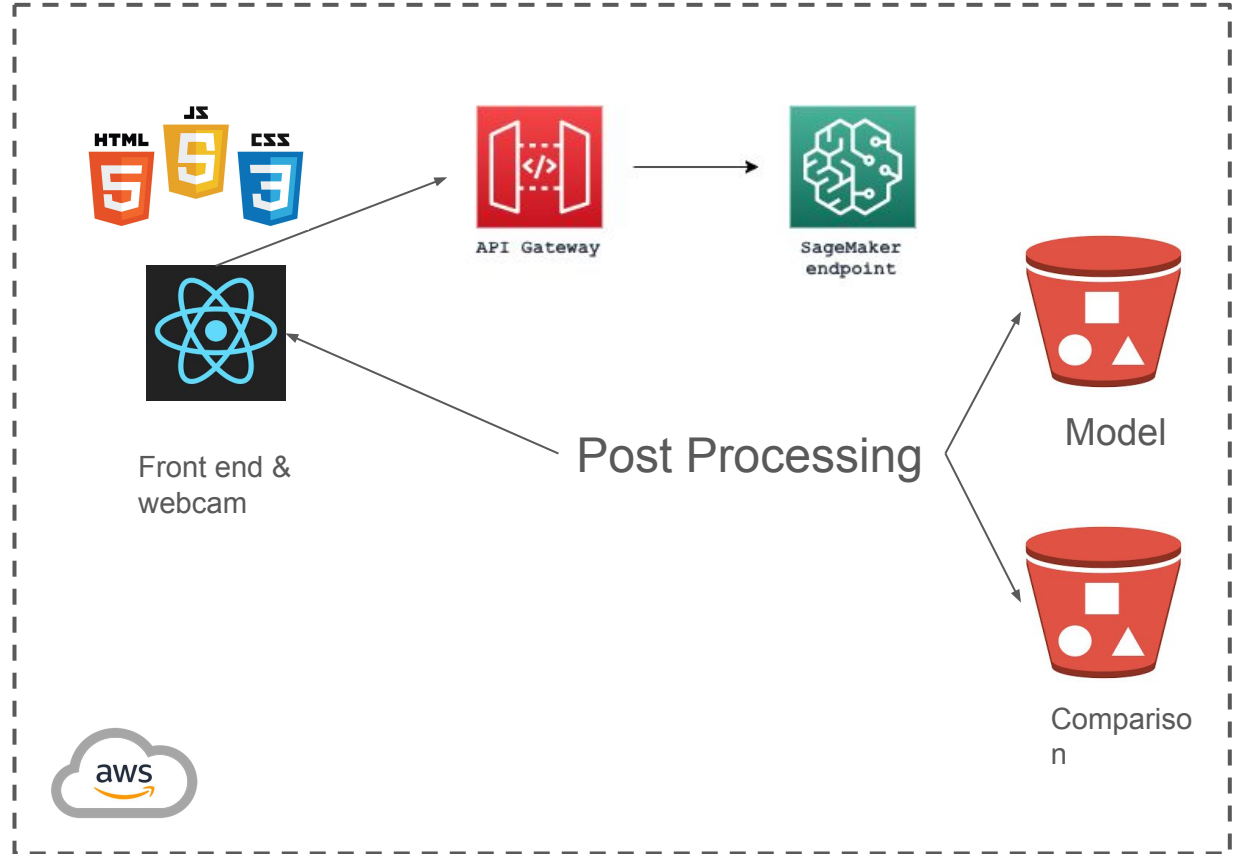
$\pm 3$  SD = C

$\pm 4$  SD = D

Else F

Image Dataset availability: [Sample Dataset](#)

# System Architecture



# NamastAI - Streamlit APP

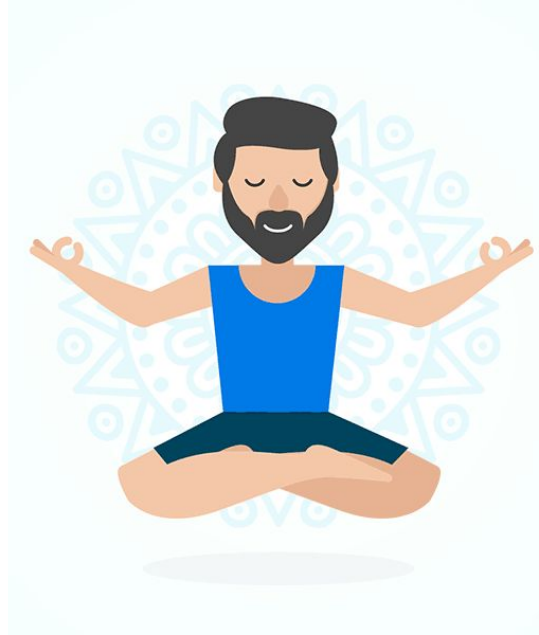


<https://namastai.streamlit.app>

# Literature Review

1. Grishchenko, Ivan, et al. "**Blazepose** ghum holistic: Real-time 3d human landmarks and pose estimation." arXiv preprint arXiv:2206.11678 (2022).
2. Chen, Yu, et al. "Adversarial **posenet**: A structure-aware convolutional network for human pose estimation." Proceedings of the IEEE international conference on computer vision. 2017.
3. Cao, Zhe, et al. "Realtime multi-person 2d pose estimation using part affinity fields." Proceedings of the IEEE conference on computer vision and pattern recognition. 2017.
4. Goyal, Gaurvi, et al. "**MoveEnet**: Online High-Frequency Human Pose Estimation with an Event Camera." Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition. 2023.
5. Bolaños, Cristina, et al. "A **comparative analysis** of pose estimation models as enablers for a smart-mirror physical rehabilitation system." Procedia Computer Science 207 (2022): 2536-2545

# QUESTIONS?



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