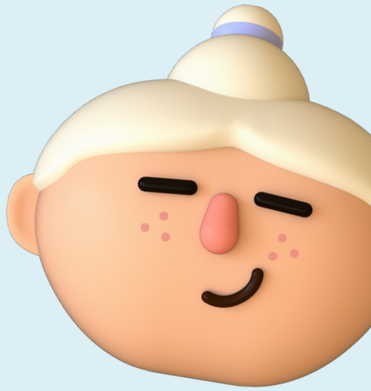
AI APPLICATION

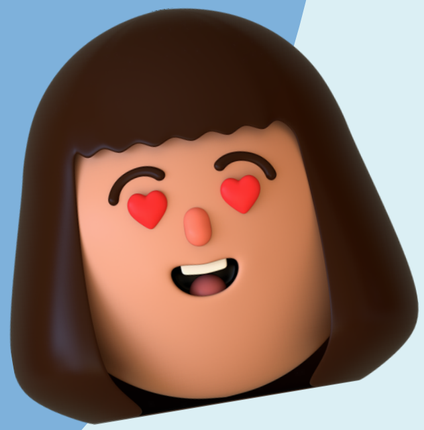
Pose estimation with mediapipe

MediaPipe

PREVIEW

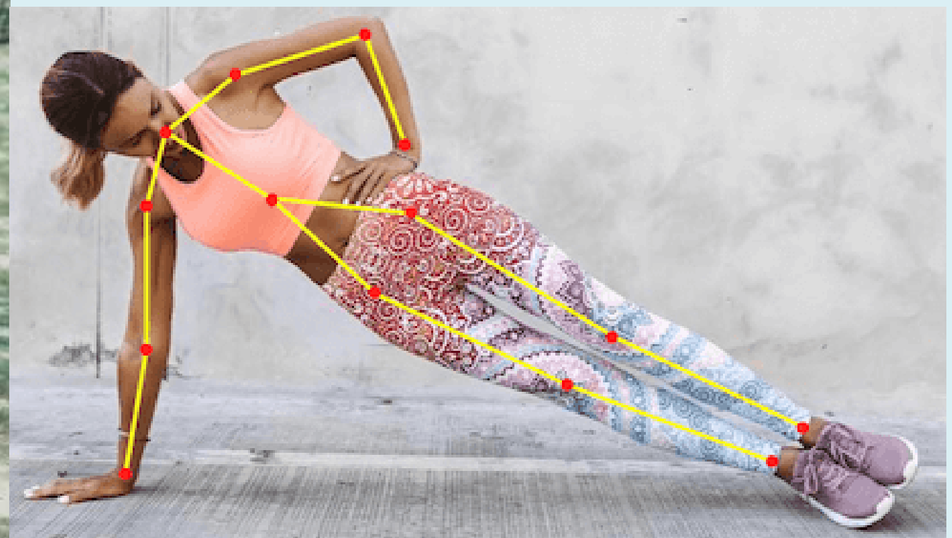


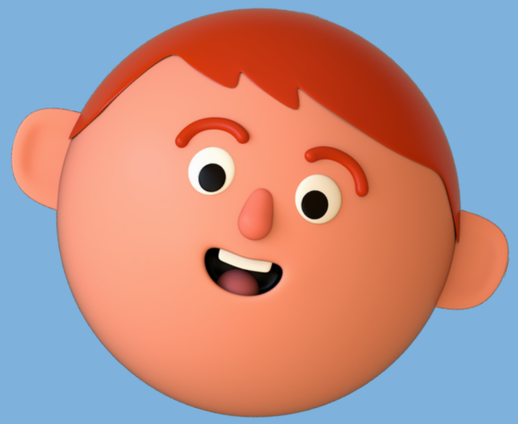
1. What is the pose estimation?
2. Introduction to Mediapipe
3. Pose estimation in Mediapipe
4. Application of pose estimation in Mediapipe



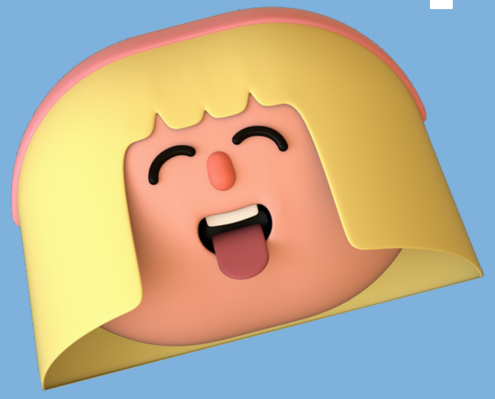
WHAT'S IS THE POSE ESTIMATION?

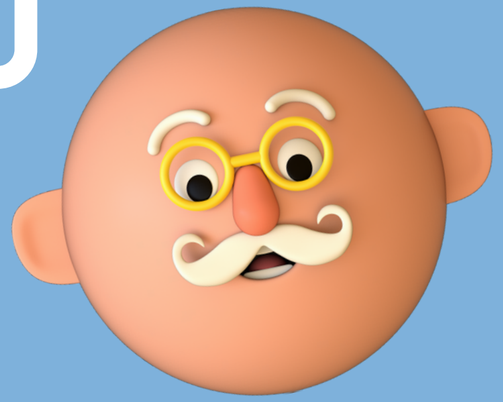
Pose Estimation is the technique used to detect the motivation of humans or objects. Pose Estimation is the branch of computer vision. It uses the AI algorithm to calculate the location that is detected. (e.g. Machine or Deep Learning)

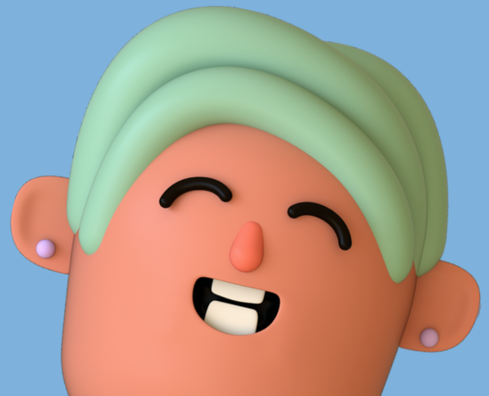




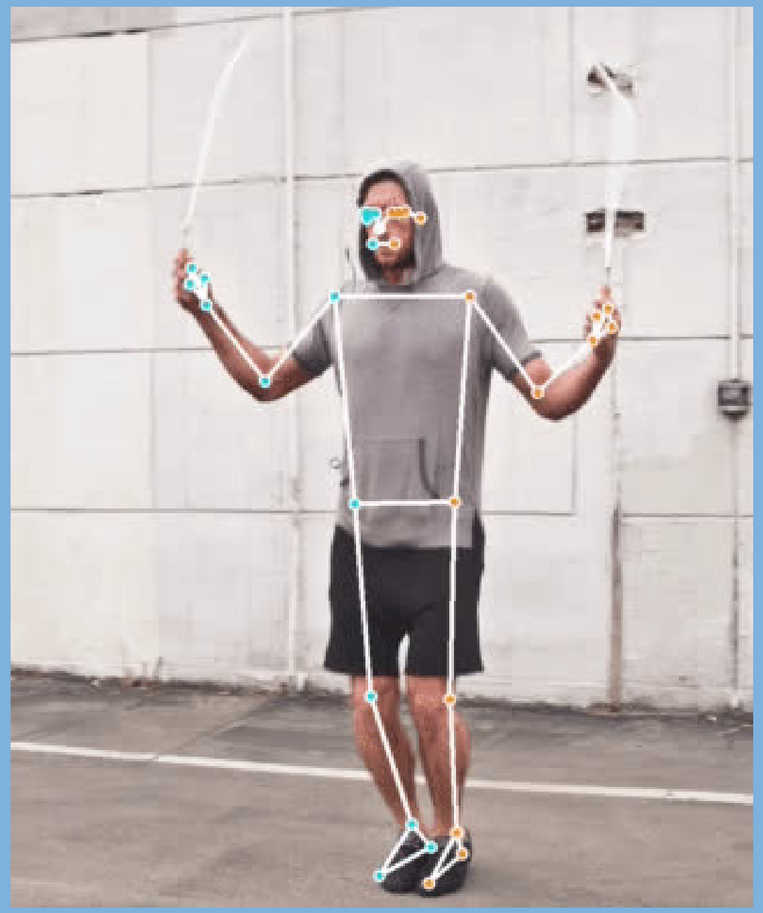
MANY POSE ESTIMATION PAPERS IN THE WORLD



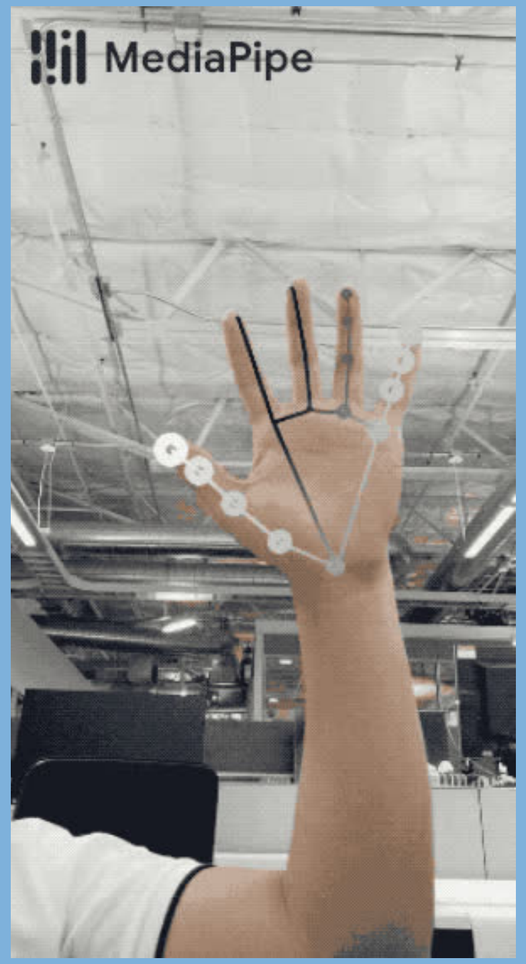




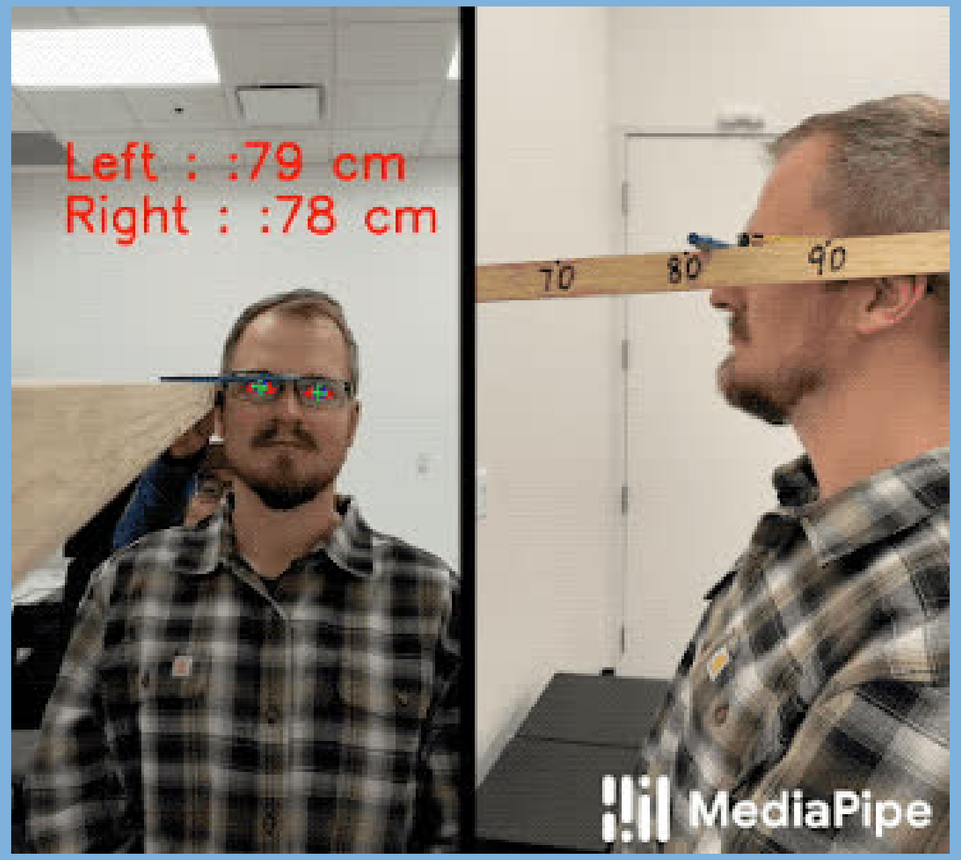
TODAY WE FOCUS OF THIS



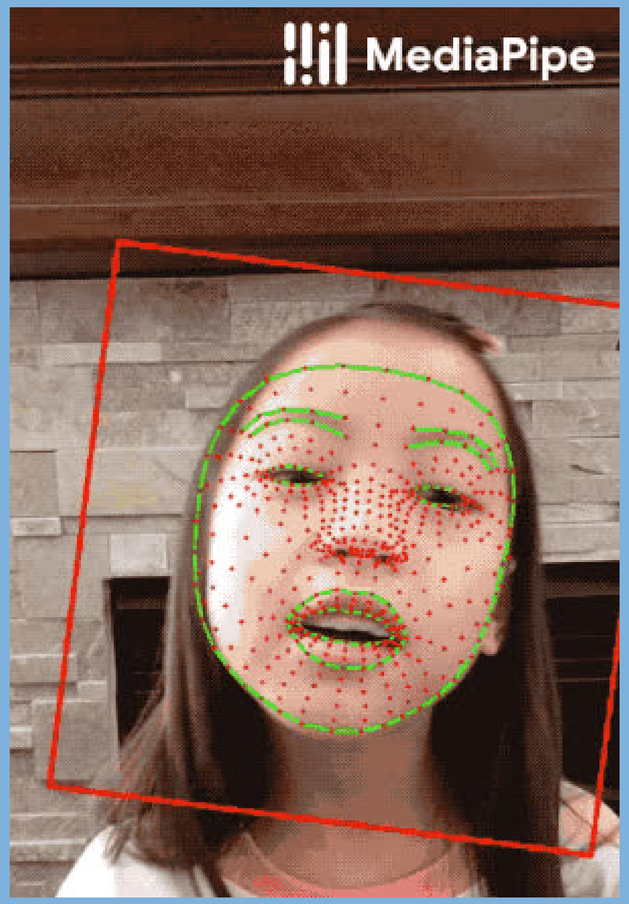
POSE



HAND

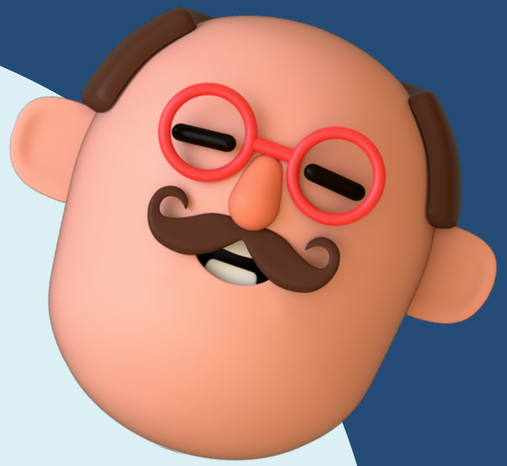


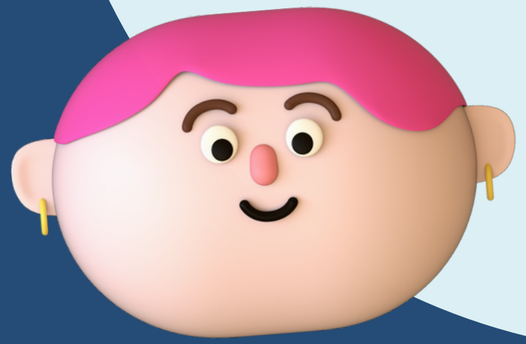
IRIS



FACE

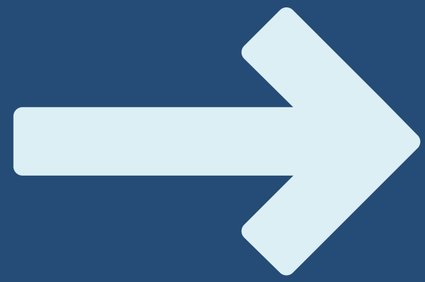
FOCUS IN POSE





HOW TO WORK?

Video of Human's motivation.



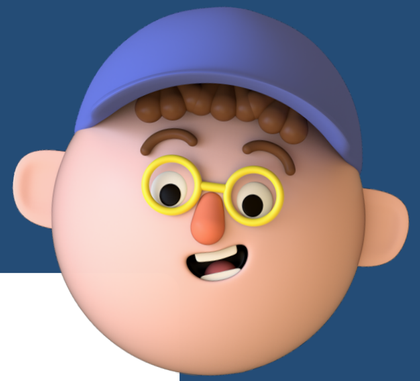
PROCESS OF MEDIAPIPE

Result of detection

INPUT

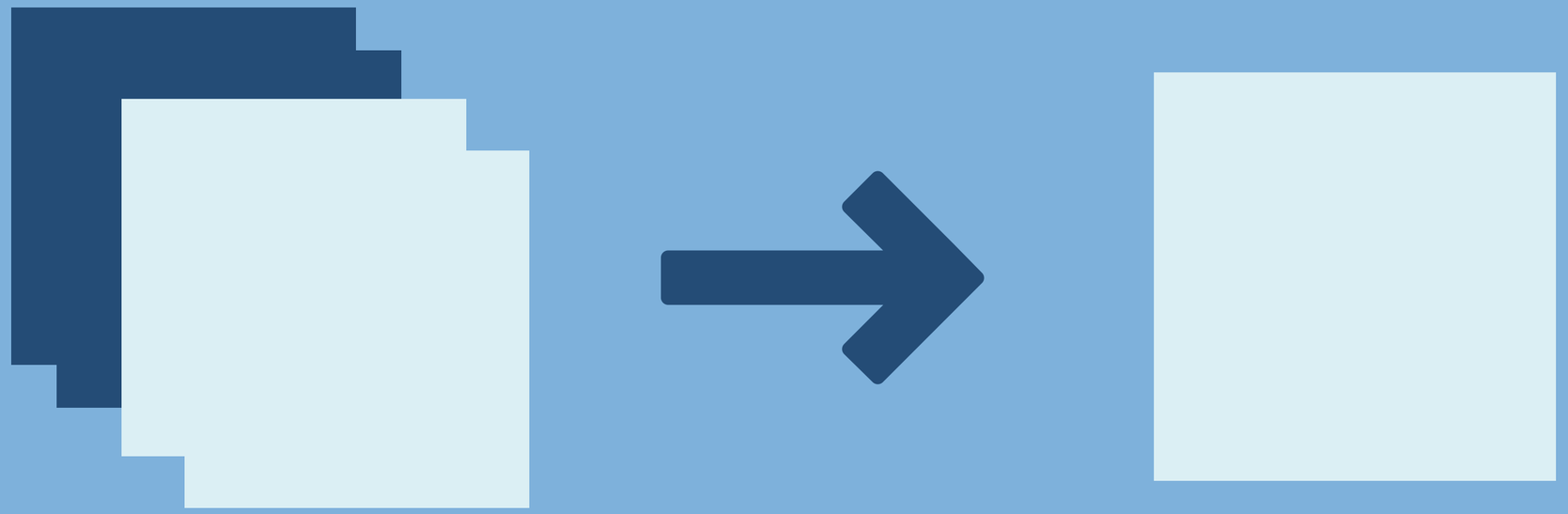
OUTPUT

INPUT



PREPAREING VIDEO

- Some described video: Video is a multi-picture put it together
- Video type: .mp4, .mov, .avi, etc.
- Video requires: Full body of humans, Motivation part of the body of human
- Helper Library: OpenCV

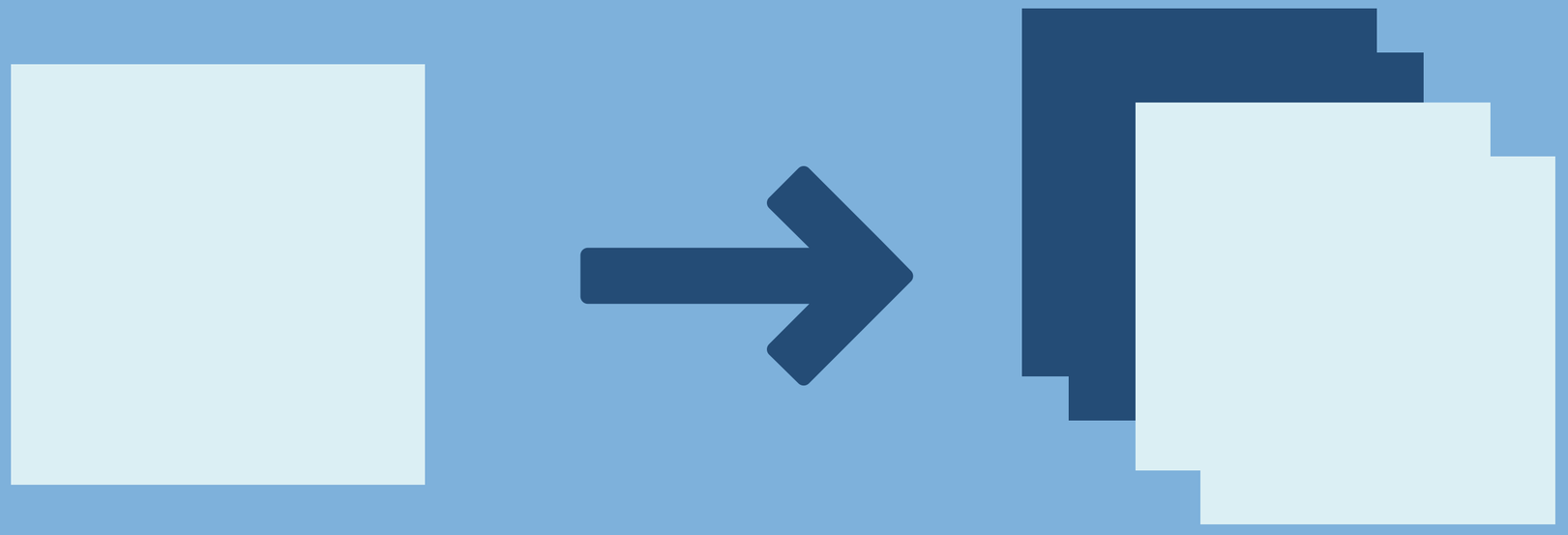


MULTI-PICTURE (FRAMES)

I VIDEO

DIVIDING VIDEO

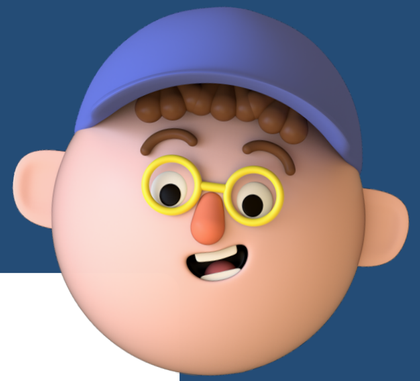
- Helper Library: OpenCV
- Assign speed (frame rate) to split video into each frame.



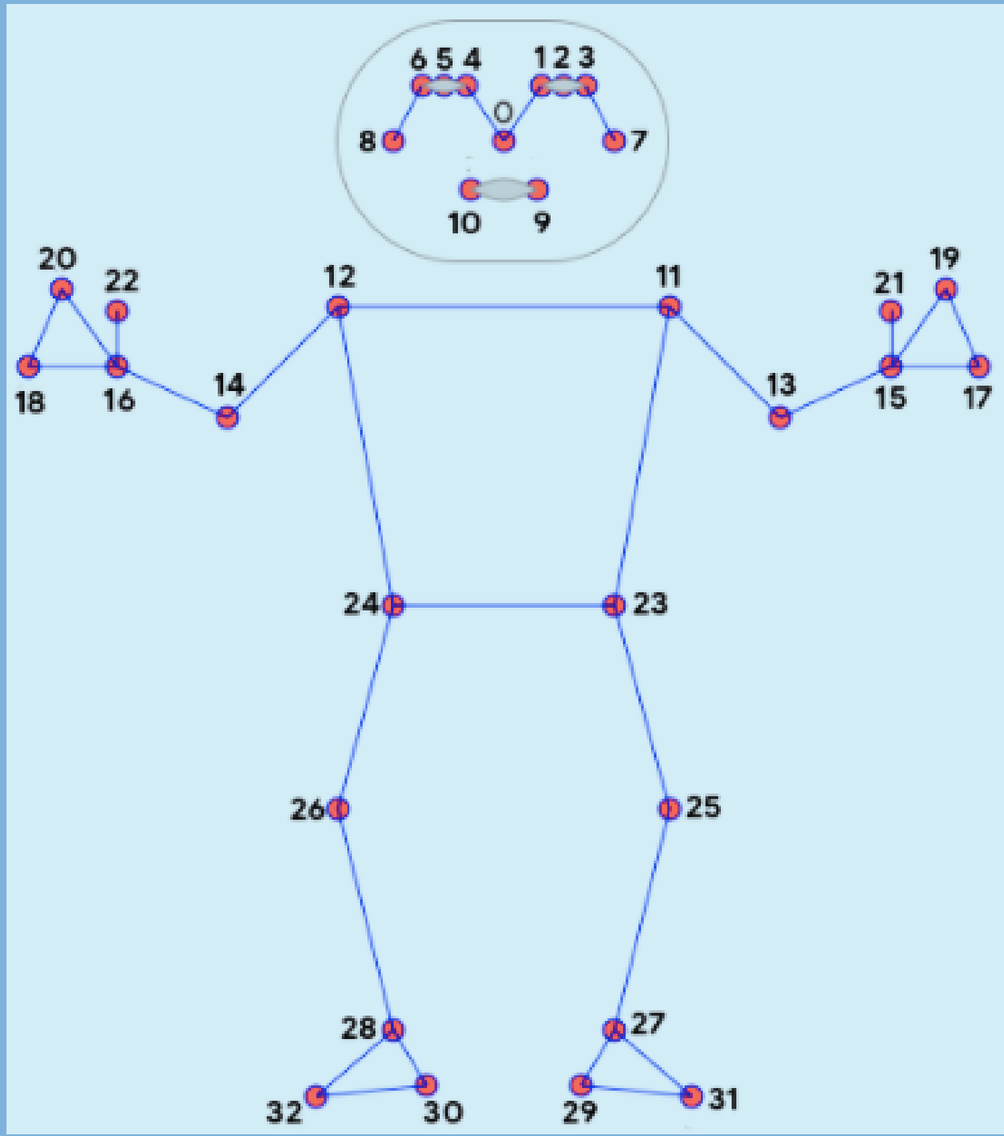
1 VIDEO

MULTI-PICTURE (FRAMES)

PROCESSING

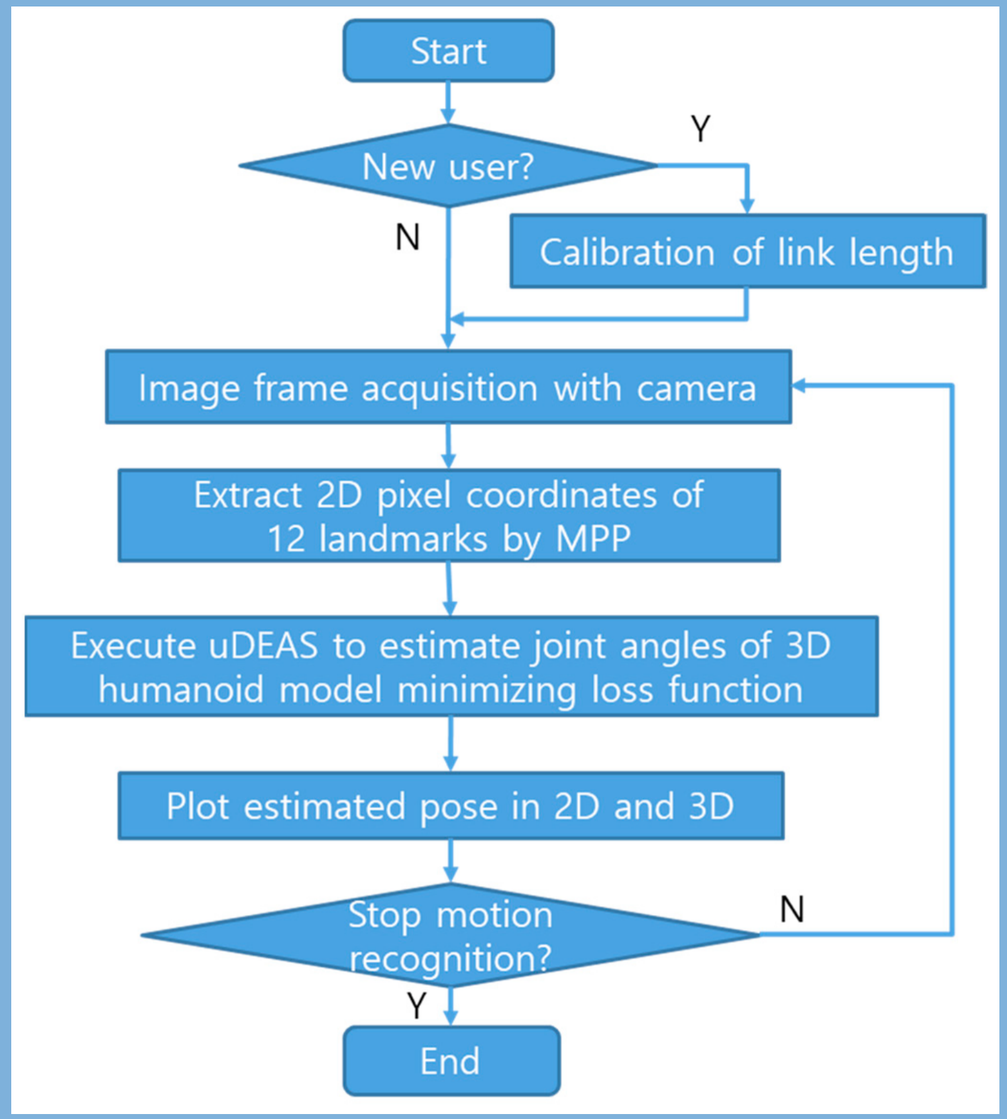


COMPONENT OF BODIES NODE



0. nose
1. left_eye_inner
2. left_eye
3. left_eye_outer
4. right_eye_inner
5. right_eye
6. right_eye_outer
7. left_ear
8. right_ear
9. mouth_left
10. mouth_right
11. left_shoulder
12. right_shoulder
13. left_elbow
14. right_elbow
15. left_wrist
16. right_wrist
17. left_pinky
18. right_pinky
19. left_index
20. right_index
21. left_thumb
22. right_thumb
23. left_hip
24. right_hip
25. left_knee
26. right_knee
27. left_ankle
28. right_ankle
29. left_heel
30. right_heel
31. left_foot_index
32. right_foot_index

HOW TO GET BODIES NODE?

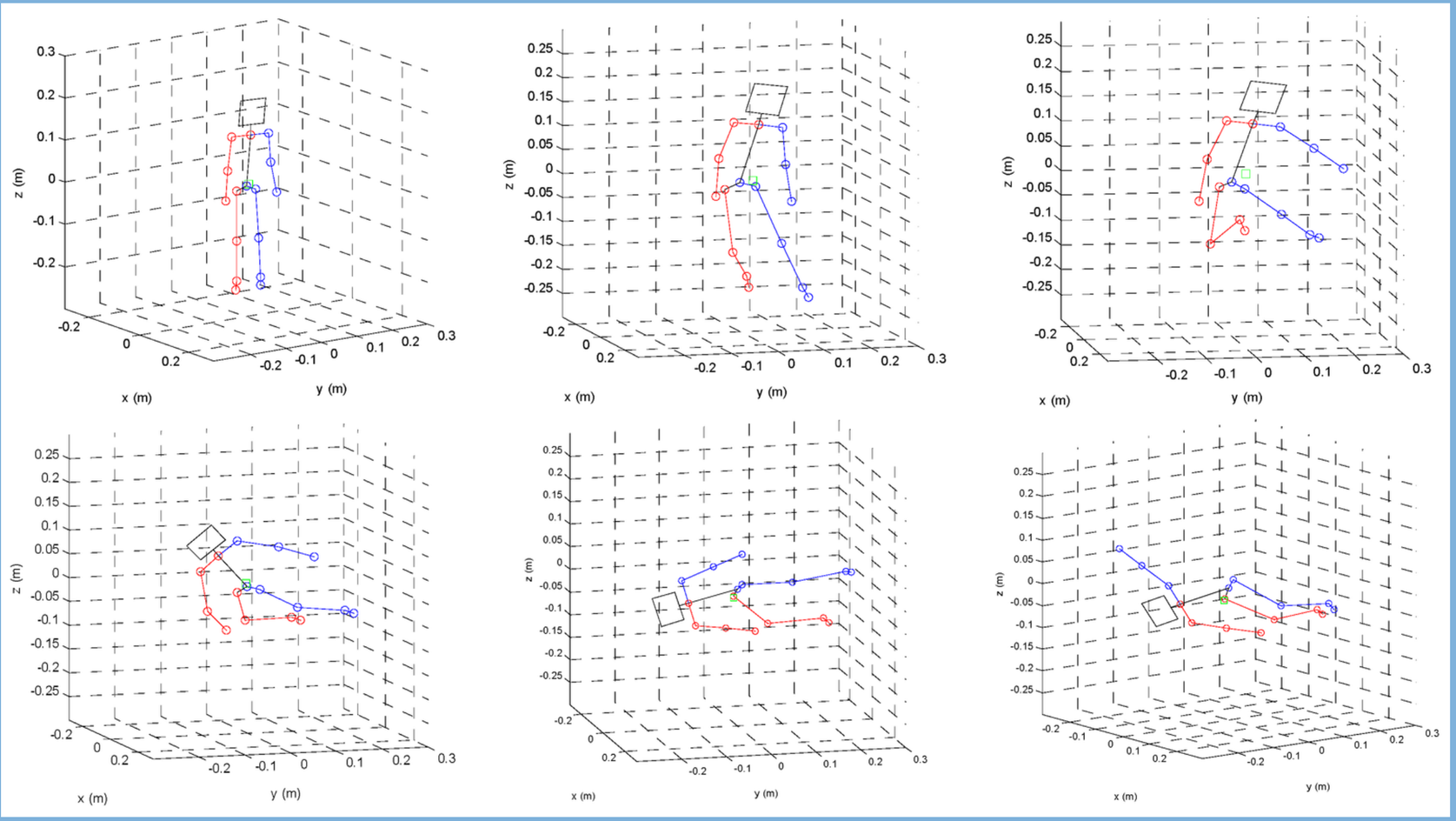


Human Pose Estimation Using MediaPipe Pose and Optimization Method Based on a...

Seniors who live alone at home are at risk of falling and injuring themselves and, thus, may need a mobile robot that monitors and recognizes their pos...

DETECTION AXIS

- Contain 3D axis (x, y, z).



Human Pose Estimation Using MediaPipe Pose and Optimization Method Based on a...

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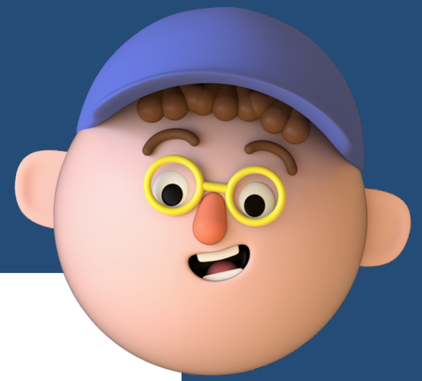
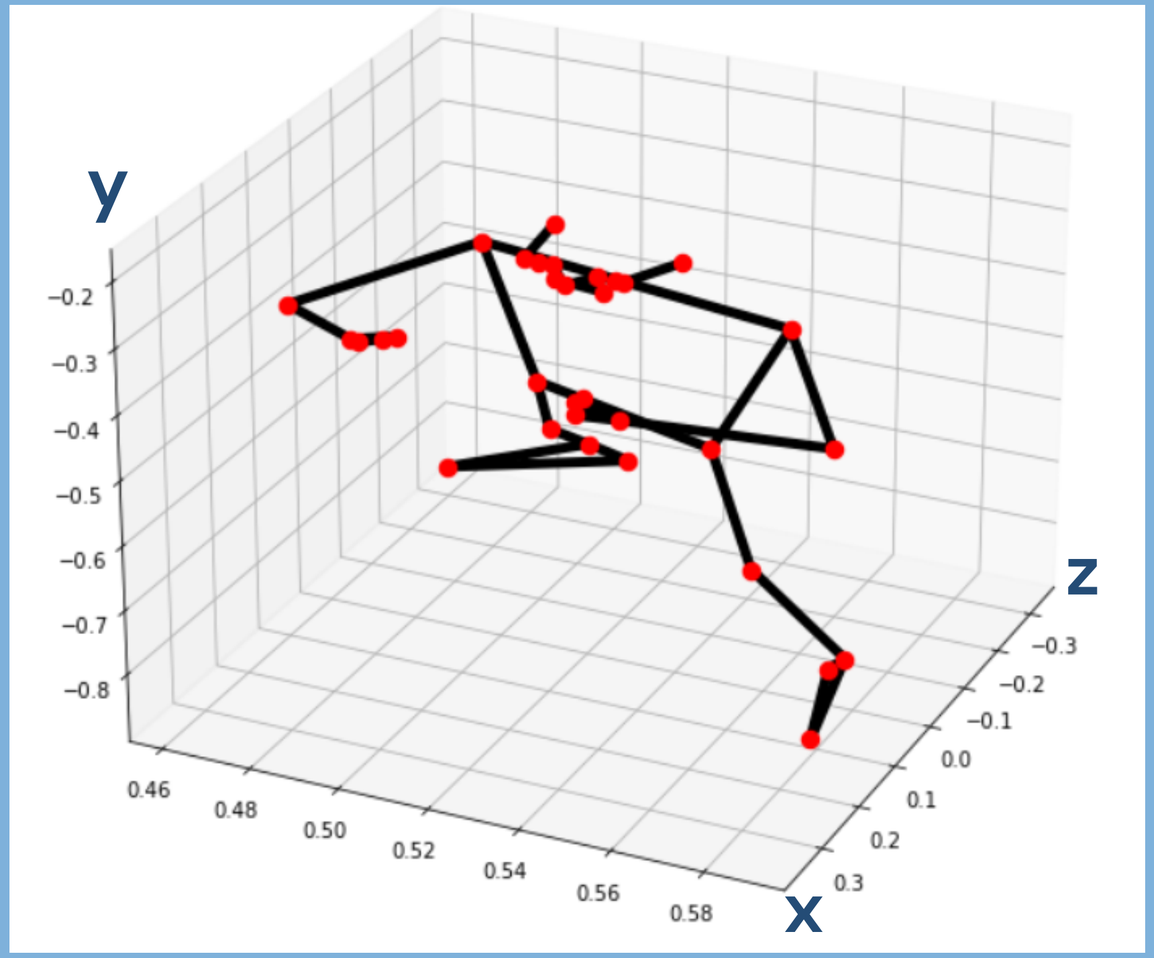
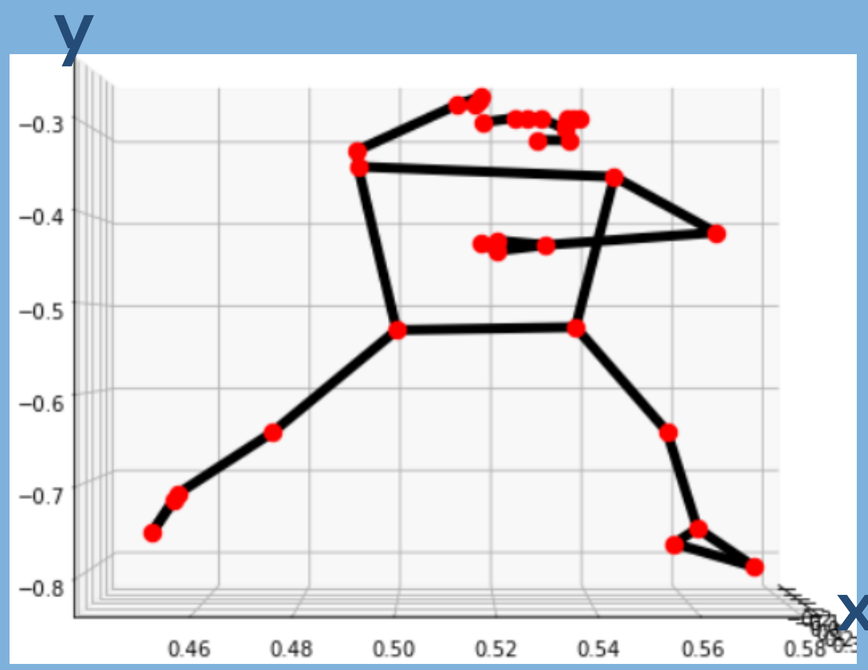
OUTPUT



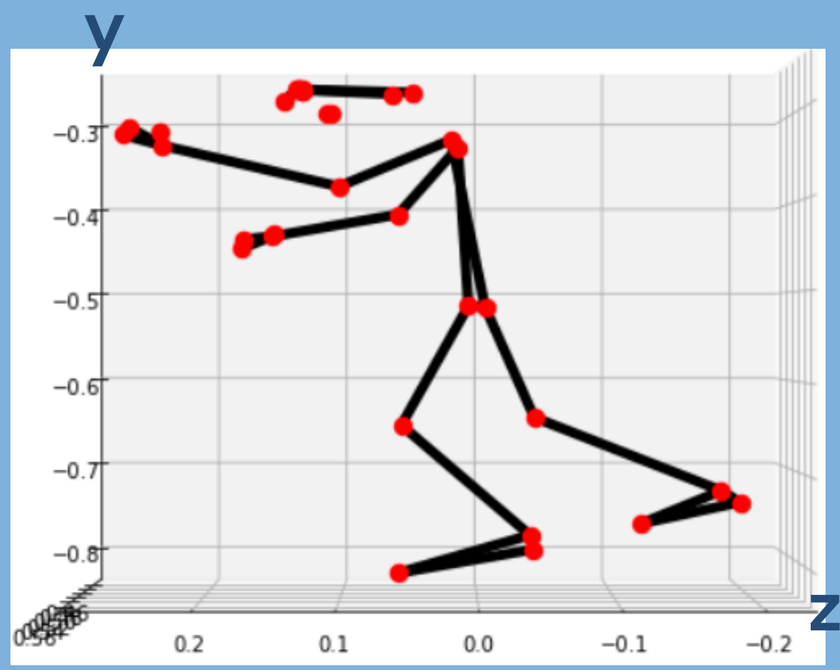
3D GRAPH


y
−0.2
−0.3
−0.4
−0.5
−0.6
−0.7
−0.8
0.46
0.48
0.50
0.52
0.54
0.56
0.58
x
z
−0.3
−0.2
−0.1
0.0
0.1
0.2
0.3

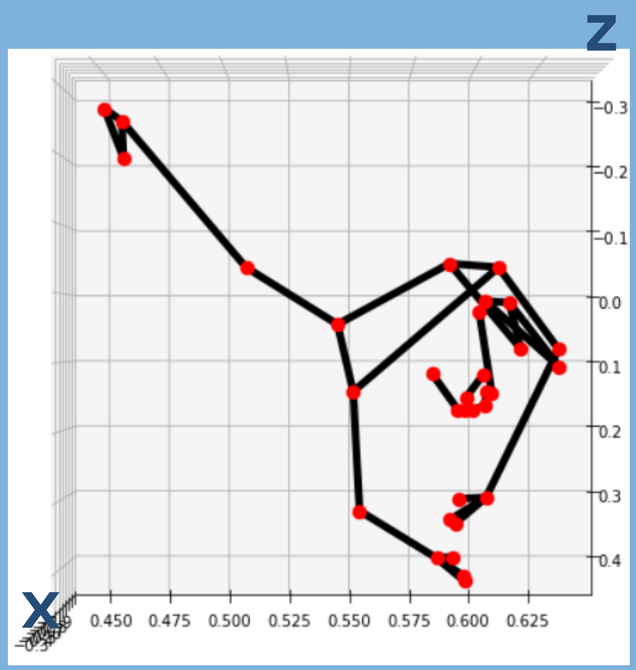
2D GRAPH



xy graph



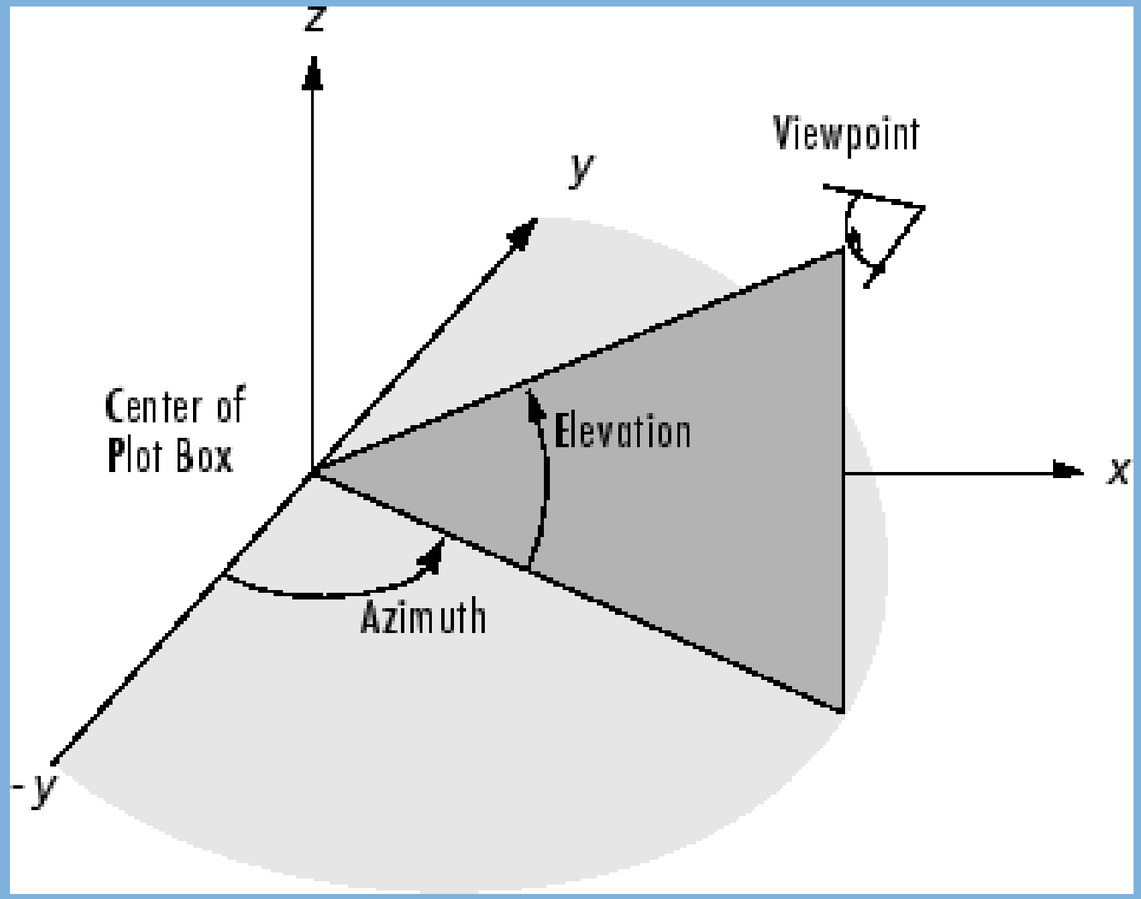
yz graph



xz graph

ABOUT 3D GRAPH

- Focus in azimuth angle and elevation angle.



Setting the Viewpoint with Azimuth and Elevation - MATLAB & Simulink

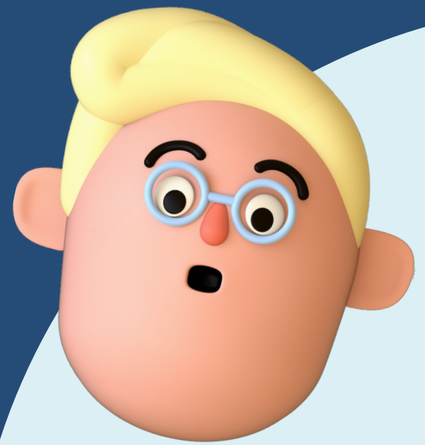
You can control the orientation of axes using graphics functions.

mathworks.com

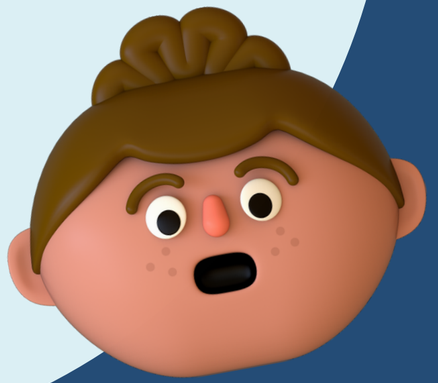
RESULTING TABLE

- Helper Library: pandas, numpy

	clip_name	threshold	0_x	0_y	0_z	1_x	1_y	1_z	2_x	2_y	...	29_z	30_x	30_y	30_z	31_
0	13_1	4	0.483073	0.267570	-0.160818	0.488414	0.255846	-0.153102	0.491420	0.255884	...	-0.011050	0.473899	0.768750	0.313901	0.55367
1	13_1	8	0.481735	0.268568	-0.162833	0.486960	0.256857	-0.155354	0.490113	0.256714	...	-0.008377	0.473716	0.768747	0.318858	0.55412
2	13_1	12	0.480401	0.269997	-0.172104	0.485391	0.257863	-0.164192	0.488556	0.257565	...	0.002123	0.473699	0.768894	0.321036	0.55419
3	13_1	16	0.479870	0.271257	-0.175288	0.484801	0.258582	-0.167658	0.487957	0.258271	...	0.002449	0.473524	0.768583	0.331362	0.55449
4	13_1	20	0.476521	0.278326	-0.153319	0.479919	0.266635	-0.144698	0.482835	0.266258	...	0.015882	0.473383	0.766609	0.239515	0.55528
5	13_1	24	0.456259	0.344345	-0.115523	0.460014	0.329982	-0.118146	0.462258	0.328882	...	-0.071193	0.474229	0.770205	0.227957	0.55579
6	13_1	28	0.448798	0.395028	-0.097799	0.451471	0.380157	-0.099139	0.453886	0.378312	...	-0.123478	0.474637	0.774189	0.187060	0.55590
7	13_1	32	0.460650	0.377007	-0.083336	0.463625	0.363349	-0.084740	0.465828	0.361793	...	-0.078505	0.472585	0.773822	0.194660	0.55590
8	13_1	36	0.505462	0.298192	-0.169089	0.507401	0.286558	-0.153761	0.509751	0.286026	...	0.105123	0.444923	0.750110	0.172321	0.56617
9	13_1	40	0.533807	0.293210	-0.175679	0.533105	0.282297	-0.159251	0.533865	0.282374	...	0.096313	0.428082	0.743388	0.195109	0.57748
10	13_1	44	0.537454	0.287350	-0.171365	0.538736	0.277427	-0.156606	0.540142	0.278027	...	0.107524	0.433036	0.737564	0.211454	0.57723
11	13_1	48	0.510835	0.272625	-0.117573	0.517323	0.263157	-0.105092	0.520840	0.263485	...	0.088606	0.459599	0.752729	0.169654	0.57587
12	13_1	52	0.485343	0.272826	-0.158073	0.490576	0.260839	-0.147258	0.493382	0.260977	...	-0.013316	0.470410	0.770245	0.325186	0.57299
13	13_1	56	0.471808	0.271953	-0.125668	0.476446	0.258544	-0.118546	0.479337	0.258237	...	-0.027671	0.470883	0.769325	0.303636	0.55676
14	13_1	60	0.474515	0.272709	-0.135013	0.479847	0.259957	-0.130475	0.482905	0.259763	...	-0.040958	0.471480	0.770954	0.294893	0.55131
15	13_1	64	0.488996	0.273237	-0.153613	0.494996	0.260859	-0.146403	0.497550	0.260718	...	-0.027259	0.471938	0.770540	0.308044	0.55026
16	13_1	68	0.496547	0.270747	-0.170020	0.502708	0.257959	-0.163455	0.505498	0.258337	...	-0.007685	0.478540	0.769726	0.289658	0.55121
17	13_1	72	0.495763	0.268818	-0.161923	0.501872	0.257247	-0.153724	0.504662	0.257869	...	-0.022916	0.478400	0.770035	0.265581	0.55167
18	13_1	76	0.489751	0.268139	-0.136026	0.495569	0.256775	-0.129554	0.498877	0.257240	...	-0.032273	0.478227	0.771174	0.260256	0.55068
19	13_1	80	0.489131	0.266315	-0.140505	0.495092	0.255430	-0.132605	0.498363	0.255815	...	-0.020209	0.477486	0.770520	0.286713	0.55142



APPLICATION



COMMENDATION

1st

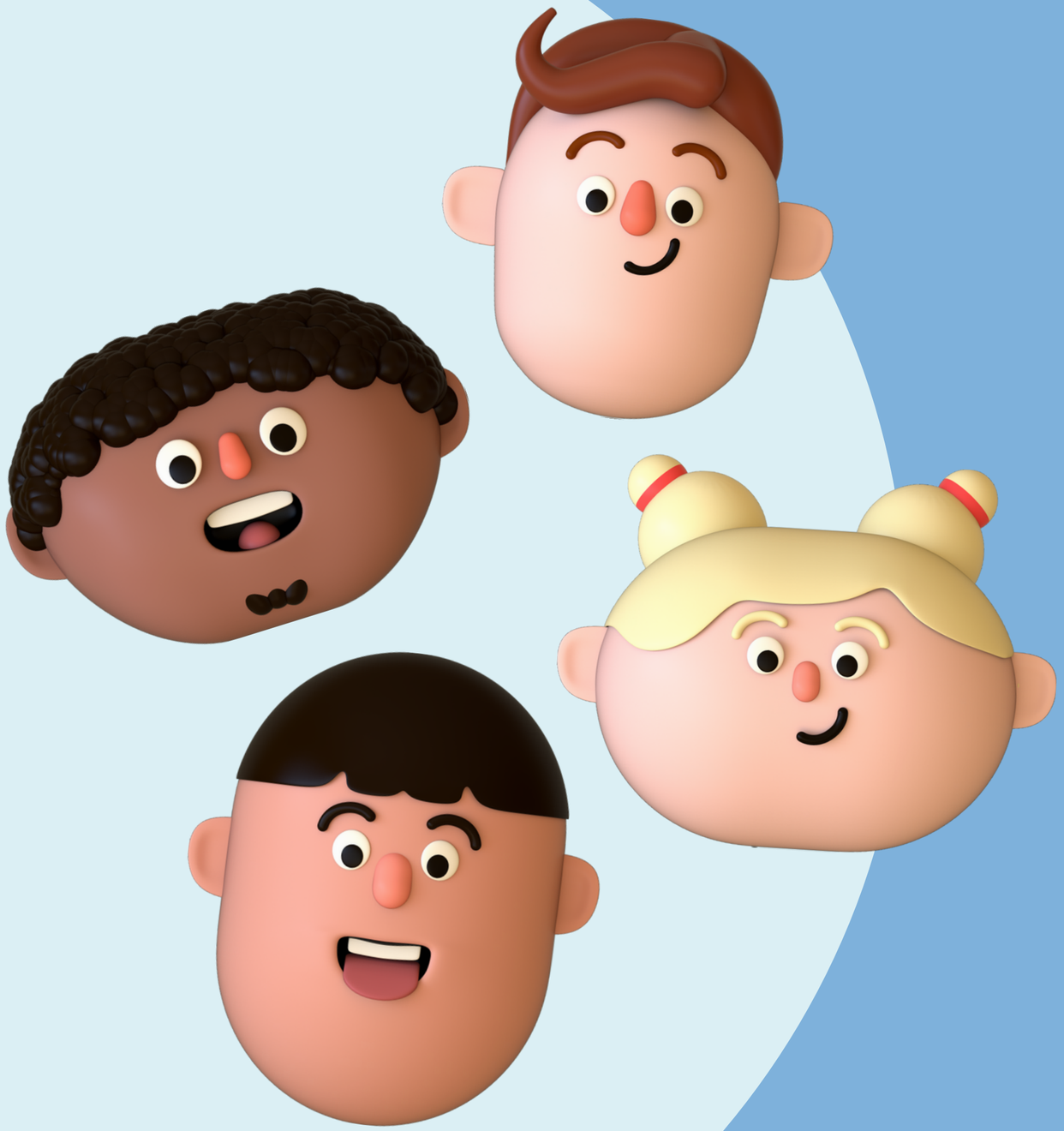
MEDIAPIPE DOCUMENTATION

https://google.github.io/mediapipe/

2nd

NICHOLAS RENOTTE

https://www.youtube.com/@NicholasRenotte



THANK YOU FOR YOUR ATTENTION!