## **ROC-2021**

RoboAnalyzer

We certify that this project was undertaken by us for the RoboAnalyzer based online competition (ROC) as a virtual summer internship conducted by Dr. Nayan M. Kakoty of Tezpur University in collaboration with Prof. Subir.K. Saha of Indian Institute of Technology, Delhi, Mr. Rajeevlochan C.G. of Amrita Vishwa Vidyapeetham, Bengaluru and Embedded Systems and Robotics Lab, Tezpur University from May 2021 to June 2021.







ROBOANALYZER BASED ONLINE COMPETITION (ROC-21) AS VIRTUAL SUMMER INTERNSHIP

TEAM – A2

PRADIPTA BARMAN (TEZPUR UNIVERSITY), COORDINATOR

ABBURI DIVYA VANI (JNTUH), CO - COORDINATOR

## **PROCEDURE**



RoboAnal<del>yz</del>er

1)
Getting an image
in .png or .jpeg
format or make a
3d- model.

3) Tracing the vector image and resizing it. 5)
We get the coordinates of the traced points by opening the obj or iges file in notepad.

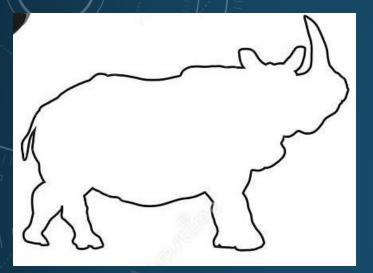
7)
We play the .csv
file in virtual
robots module.

2) Converting the image into vector image. 4)
Saving the traced image into an object file i.e..obj (3d-model) and .iges (2D-shapes) or convert it into .xyz file.

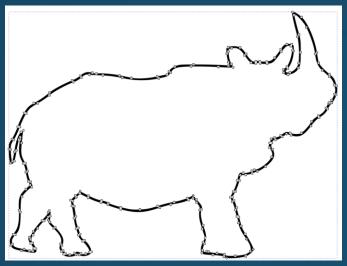
We enter the coordinates into excel file(as specified for the robotic manipulators) and save it as .csv file.



## METHOD



Reference Image



Vector Image

116, -31, 08035688, 150, 41, 639840501,;       1750       118.0287       439.7061       180       0         116, -60, 387635988, 150, 8, 297895777,;       1750       116.9214       437.0593       180       0       0         116, -60, 387635988, 150, 41, 639840501,;       1750       115.83       433.7304       180       0       0         116, -60, 387635988, 121, 333297731, -41, 639840501,;       1750       114.7546       247.077       180       0       0         116, -60, 387635988, 0., -41, 639840501,;       1750       114.7546       245.027       180       0       0         116, -24, 180906834, 0., -41, 639840501,;       1750       112,6518       419,6523       180       0       0         116, 60, 387635988, 0., -41,639840501,;       1750       112,6518       419,6523       180       0       0         116, 60, 387635988, 0., -41,639840501,;       1750       110,6127       406.8571       180       0       0         116, 60, 387635988, 0., -18, 368535114,;       1750       106.027       406.8571       180       0       0         116, 21, 24306116, 0., 41, 639840501,;       1750       109,0937       395.029       180       0       0         116, -60, 387635988, 0., -41, 639840501,;       1750	116,38.196215833,150.,41.639840501,;	1750	119.152	441.671	180	0	0	
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116, 21. 243961116, 0., 41. 639849501;; 1750 108.04 384.5784 180 0 0 116, -23.51447922, 0., 41. 639849501;; 1750 107.4516 375.5055 180 0 0 0 116, -60.387635988, 0., 41. 639849501;; 1750 107.3284 367.8101 180 0 0 0 116, -60.387635988, 0., 41. 639849501;; 1750 107.3284 367.8101 180 0 0 0 116, -60.387635988, 0., -41. 639849501;; 1750 107.4641 364.5258 180 0 0 0 116, -60.387635988, 137. 176236253, -41. 639849501;; 1750 107.7253 361.6794 180 0 0 0 116, -60.387635988, 137. 176236253, -41. 639849501;; 1750 107.7253 361.6794 180 0 0 0 116, -60.387635988, 137. 176236253, -41. 639849501;; 1750 108.1119 359.2709 180 0 0 0 116, -60.387635988, 150., -41. 639849501;; 1750 108.6239 357.3003 180 0 0 0 116, 60.387635988, 150., -41. 639849501;; 1750 109.2614 355.7676 180 0 0 116, 60.387635988, 150., -21. 677650433; 1750 109.2614 355.7676 180 0 0 116, 60.387635988, 150., -21. 677650433; 1750 100.243 354.6728 180 0 0 116, 60.387635988, 150., -21. 679650433; 1750 110.0243 354.6728 180 0 0 116, 60.387635988, 150., -41. 639849501; 1750 110.0243 354.6728 180 0 0 116, 60.387635988, 150., 41. 639849501; 1750 110.0243 354.6728 180 0 0 116, 60.387635988, 38. 615946301, 41. 639849501; 1750 110.9127 354.016 180 0 0 116, 60.387635988, 38. 615946301, 41. 639849501; 1750 110.9127 354.016 180 0 0 116, 60.387635988, 38. 615946301, 41. 639849501; 1750 110.9243 354.8188 180 0 0 116, 60.387635988, 110. 941. 639849501; 1750 112.8935 353.943 180 0 0 116, 60.387635988, 111. 897723899, -41. 639849501; 1750 112.8935 353.943 180 0 0 116, 60.387635988, 111. 897723899, -41. 639849501; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 111. 897723899, -41. 639849501; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 111. 897723899, -41. 639849501; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 111. 897723899, -41. 639849501; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 111. 897723899, -41. 639849501; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 111. 897723899, -41. 639849501; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 111. 897723899, -41.	116,60.387635988,0.,18.368535114,;	1750	100 0027	205.020	400	0	0	
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116, -60.387635988, 6., .41.639840501;       1750       107.4516       375.5055       180       0         116, -60.387635988, 0., 14.0020591;       1750       107.3284       367.8101       180       0         116, -60.387635988, 0., -21.792464409;       1750       107.4641       364.5258       180       0         116, -60.387635988, 2., -41.639840501;       1750       107.7253       361.6794       180       0         116, -60.387635988, 137.176236253, -41.639840501;       1750       108.1119       359.2709       180       0         116, -60.387635988, 150., -41.639840501;       1750       108.6239       357.3003       180       0         116, -60.387635988, 150., -41.639840501;       1750       109.2614       355.7676       180       0         116, 60.387635988, 150., -23.677650433;       1750       109.2614       355.7676       180       0         116, 60.387635988, 150., -23.677650433;       1750       110.0243       354.6728       180       0         116, 60.387635988, 150., -24.1639840501;       1750       110.9127       354.016       180       0         116, 60.387635988, 150., -41.639840501;       1750       110.9127       354.016       180       0         116, 60.387635988, 0., -41.639840501;		1750	108.04	384.5784	180	0	0	
116, -60.387635988, 0., 14.0020591,; 1750 107.3284 367.8101 180 0 0 116, -60.387635988, 0., -41.639840501,; 1750 107.7253 361.6794 180 0 0 16, -60.387635988, 150., -41.639840501,; 1750 107.7253 361.6794 180 0 0 0 116, -60.387635988, 130., -41.639840501,; 1750 108.1119 359.2709 180 0 0 0 116, -60.387635988, 150., -41.639840501,; 1750 108.1119 359.2709 180 0 0 0 116, -17.463543828, 150., -41.639840501,; 1750 108.6239 357.3003 180 0 0 0 116, -60.387635988, 150., -41.639840501,; 1750 108.6239 357.3003 180 0 0 0 116, -60.387635988, 150., -21.67650433,; 1750 109.2614 355.7676 180 0 0 0 116, -60.387635988, 150., -23.677650433,; 1750 109.2614 355.7676 180 0 0 0 116, -60.387635988, 150., -23.75110309; 1750 110.0243 354.6728 180 0 0 116, -60.387635988, 150., -41.639840501,; 1750 110.9127 354.016 180 0 0 116, -60.387635988, 38.615946301, 41.639840501,; 1750 110.9127 354.016 180 0 0 116, -60.387635988, 0., -41.639840501,; 1750 111.9265 353.797 180 0 0 116, -60.387635988, 0., -41.639840501,; 1750 112.8935 353.943 180 0 0 116, -60.387635988, 0., -41.639840501,; 1750 112.8935 353.943 180 0 0 116, -60.387635988, 111.897723899, -41.639840501,; 1750 114.189 354.3809 180 0 0 116, -60.387635988, 111.897723899, -41.639840501,; 1750 114.189 354.3809 180 0 0 116, -60.387635988, 111.89723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, -60.387635988, 111.89723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, -60.387635988, 111.89723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, -60.387635988, 111.89723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, -60.387635988, 111.89723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, -60.387635988, 111.89723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, -60.387635988, 111.89723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, -60.387635988, 111.89723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, -60.387635988, 111.89723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, -60.387635988, 111.89723899, -41.639840501,; 1750 115.53		1750	107.4516	375.5055	180	0	0	
116, -60.387635988, 0., -21.792464409;       1750       107.3264       364.5258       180       0         116, -60.387635988, 0., -41.639840501;       1750       107.7253       361.6794       180       0         116, -60.387635988, 132.7.176236233, -41.639840501;       1750       107.7253       361.6794       180       0       0         116, -60.387635988, 1350., -41.639840501;       1750       108.1119       359.2709       180       0       0         116, -17.463543828, 150., -41.639840501;       1750       108.6239       357.3003       180       0       0         116, 60.387635988, 150., -41.639840501;       1750       109.2614       355.7676       180       0       0         116, 60.387635988, 150., -23.677650433,       1750       109.2614       355.7676       180       0       0         116, 60.387635988, 150., -23.75110309;       1750       110.0243       354.6728       180       0       0         116, 60.387635988, 150., -24.639840501;       1750       110.9127       354.016       180       0       0         116, 60.387635988, 38.615946391, 41.639840501;       1750       111.9265       353.797       180       0       0         116, 60.387635988, 6., -41.639840501;       1750       112.8935<							-	
116, -60.387635988, 0., -41.639840501,;       1750       107.4641       364.5258       180       0         116, -60.387635988, 137.176236253, -41.639840501,;       1750       107.7253       361.6794       180       0         116, -60.387635988, 137.176236253, -41.639840501,;       1750       108.1119       359.2709       180       0         116, -60.387635988, 150., -41.639840501,;       1750       108.6239       357.3003       180       0         116, 25.660588735, 150., -41.639840501,;       1750       109.2614       355.7676       180       0         116, 60.387635988, 150., -41.639840501,;       1750       109.2614       355.7676       180       0         116, 60.387635988, 150., -41.639840501,;       1750       110.0243       354.6728       180       0         116, 60.387635988, 150., -41.639840501,;       1750       110.9127       354.016       180       0         116, 60.387635988, 38.6.15946381, 41.639840501,;       1750       111.9265       353.797       180       0         116, 60.387635988, 30., -41.639840501,;       1750       112.8935       353.943       180       0         116, 60.387635988, 311.8972389, -41.1639840501,;       1750       114.189       354.3809       180       0         116, 60.3876359		1/50	107.3284	367.8101	180	U	U	
116, -60.387635988, 137.17623625, -41.639840501;       1750       107.7253       301.6794       180       0         116, -60.387635988, 150., -41.639840501;       1750       108.1119       359.2709       180       0         116, -25.660585735, 150., -41.639840501;       1750       108.6239       357.3003       180       0         116, 60.387635988, 150., -241.639840501;       1750       109.2614       355.7676       180       0         116, 60.387635988, 150., -23.677650433;       1750       110.0243       354.6728       180       0       0         116, 60.387635988, 150., -23.677650433;       1750       110.0243       354.6728       180       0       0         116, 60.387635988, 150., -21.679650433;       1750       110.0243       354.6728       180       0       0         116, 60.387635988, 150., -41.639840501;       1750       110.9127       354.016       180       0       0         116, 60.387635988, 0., 41.639840501;       1750       111.9265       353.797       180       0       0         116, 60.387635988, 0., -41.639840501;       1750       112.8935       353.943       180       0       0         116, 60.387635988, 111.897723899, -411.639840501;       1750       114.189       354.3809       <		1750	107.4641	364.5258	180	0	0	
116, -60.387635988, 150., -41.639840501,; 1750 108.1119 359.2709 180 0 0 0 116, -17.463543828, 150., -41.639840501,; 1750 108.6239 357.3003 180 0 0 0 116, 60.387635988, 150., -41.639840501,; 1750 109.2614 355.7676 180 0 0 0 116, 60.387635988, 150., -23.677650433,; 1750 109.2614 355.7676 180 0 0 0 116, 60.387635988, 150., -23.677650433,; 1750 110.0243 354.6728 180 0 0 0 116, 60.387635988, 150., 41.639840501,; 1750 110.0243 354.6728 180 0 0 0 116, 60.387635988, 38.615964301, 41.639840501,; 1750 110.9127 354.016 180 0 0 0 116, 60.387635988, 38.615964301, 41.639840501,; 1750 111.9265 353.797 180 0 0 0 116, 60.387635988, 0., -41.639840501,; 1750 112.8935 353.943 180 0 0 116, 60.387635988, 0., -41.639840501,; 1750 112.8935 353.943 180 0 0 116, 60.387635988, 111.897723899, -41.639840501,; 1750 114.189 354.3809 180 0 0 116, 60.387635988, 111.897723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 111.897723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 111.897723899, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 115.95942313, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 115.95942313, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 115.95942313, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 115.95942313, -41.639840501,; 1750 115.5392 354.8188 180 0 0 116, 60.387635988, 115.95942313, -41.639840501,; 1750 115.5393 354.8188 180 0 0 116, 60.387635988, 115.95942313, -41.639840501,; 1750 115.5393 354.8188 180 0 0 116, 60.387635988, 115.95942313, -41.639840501,; 1750 115.5393 354.8188 180 0 0 116, 60.387635988, 115.95942313, -41.639840501,; 1750 115.5393 354.8188 180 0 0 116, 60.387635988, 150., -41.639840501,; 1750 115.5393 354.8188 180 0 0 116, 60.387635988, 150., -41.639840501,; 1750 115.5393 354.8188 180 0 0 116, 60.387635988, 150., -41.639840501,; 1750 115.5393 354.8188 180 0 0 116, 60.387635988, 150., -41.639840501,; 1750 115.5393 354.8188 180 0 0 116, 60.387635988, 150., -41.639840501,; 1750 115.53		1750	107 7253	361 6794	180	0	0	
116, -17. 463543828, 150., -41. 639840501;       1750       108.6239       357.3003       180       0         116, 60. 387635988, 150., -41. 639840501;       1750       109.2614       355.7676       180       0       0         116, 60. 387635988, 150., -23. 677650433,;       1750       110.0243       354.6728       180       0       0         116, 60. 387635988, 150., 21. 75110309;       1750       110.0243       354.6728       180       0       0         116, 60. 387635988, 150., 241. 639840501;       1750       110.9127       354.016       180       0       0         116, 60. 387635988, 38. 615946391, 41. 639840501;       1750       111.9265       353.797       180       0       0         116, 60. 387635988, 0., -9. 648106666;       1750       112.8935       353.943       180       0       0         116, 60. 387635988, 10., -41. 639840501;       1750       114.189       354.3809       180       0       0         116, 60. 387635988, 111. 897723899, -41. 639840501;       1750       115.5392       354.8188       180       0       0         116, 60. 387635988, 111. 897723899, -41. 639840501;       1750       115.5392       354.8188       180       0         116, 60. 387635988, 1131. 639840501;       1750						-	_	
116, 25. 660988735, 150., -41. 639840501;       1750       108.6239       357.3003       180       0         116, 60. 387635988, 150., -41. 639840501;       1750       109.2614       355.7676       180       0         116, 60. 387635988, 150., -23. 677650433;       1750       110.0243       354.6728       180       0         116, 60. 387635988, 150., -41. 639840501;       1750       110.9127       354.016       180       0         116, 60. 387635988, 150., -41. 639840501,;       1750       111.9265       353.797       180       0         116, 60. 387635988, 0., -94. 648106666;       1750       112.8935       353.943       180       0         116, 60. 387635988, 31.7.16650426, -41. 639840501;       1750       114.189       354.3809       180       0         116, 60. 387635988, 111. 89772389, -41. 639840501;       1750       115.5392       354.8188       180       0         116, 60. 387635988, 111. 8972339, -41. 639840501;       1750       115.5392       354.8188       180       0         116, 60. 387635988, 1151,-41. 639840501;       1750       115.5245       354.9648       180       0         116, 60. 387635988, 150., -41. 639840501;       1750       116.5245       354.9648       180       0		1/50	108.1119	359.2709	180	0	0	
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116,60.387635988,150.,23.75110309;     1750     101.0243     354.6728     180     0       116,60.387635988,150.,241.639840501;     1750     110.0243     354.016     180     0     0       116,60.387635988,150.,411.639840501;     1750     110.9127     354.016     180     0     0       116,60.387635988,38.0.,41.639840501;     1750     111.9265     353.797     180     0     0       116,60.387635988,0.,41.639840501;     1750     112.8935     353.943     180     0     0       116,60.387635988,51.716650426,-41.639840501;     1750     114.189     354.3809     180     0       116,60.387635988,111.897723899,-411.639840501;     1750     115.5392     354.8188     180     0       116,60.387635988,115.195942313,-41.639840501;     1750     115.5295     354.9648     180     0       116,60.387635988,150.,-41.639840501;     1750     116.5245     354.9648     180     0       116,60.387635988,150.,-41.639840501;     1750     116.5245     354.9648     180     0					100	0	0	
116,60.387635988,150.,23.75110309,;     1750     110.0243     354.6728     180     0       116,60.387635988,150.,41.639840501,;     1750     110.9127     354.016     180     0       116,60.387635988,38.615946301,41.639840501,;     1750     111.9265     353.797     180     0       116,60.387635988,0.,941.639840501,;     1750     112.8935     353.943     180     0       116,60.387635988,51.716650426, 41.639840501,;     1750     114.189     354.3809     180     0       116,60.387635988,111.897723899, 41.639840501,;     1750     115.5392     354.8188     180     0       116,60.387635988,135.195942313, -41.639840501,;     1750     115.5392     354.8188     180     0       116,60.387635988,150.,-41.639840501,;     1750     116.5245     354.9648     180     0       116,30.474506369,150.,-41.639840501,;     1750     116.5245     354.9648     180     0						U	U	
116,60.387635988,38.615946301,41.639840501,; 1750 110.9127 534.010 0 0 0 116,60.387635988,0.,-91.648106666,; 1750 111.9265 353.797 180 0 0 116,60.387635988,0.,-91.648106666,; 1750 112.8935 353.943 180 0 0 116,60.387635988,0.,-91.648106660,; 1750 112.8935 353.943 180 0 0 0 116,60.387635988,51.716650426,-41.639840501,; 1750 114.189 354.3809 180 0 0 116,60.387635988,135.195942313,-41.639840501,; 1750 115.532 354.8188 180 0 0 116,60.387635988,150.,-41.639840501,; 1750 116.5245 354.9648 180 0 0 116,30.474506369,150.,-41.639840501,; 1750 116.5245 354.9648 180 0 0 0 1		1750	110.0243	354.6728	180	0	0	
116,60.387635988,38.615946301,41.639840501;     1750     111.9265     353.797     180     0       116,60.387635988,0.,41.639840561;     1750     112.8935     353.943     180     0     0       116,60.387635988,0.,41.639840501;     1750     112.8935     354.3809     180     0     0       116,60.387635988,51.716650426,41.639840501;     1750     114.189     354.3809     180     0     0       116,60.387635988,115.89542313,41.639840501;     1750     115.5392     354.8188     180     0       116,60.387635988,150.,41.639840501;     1750     116.5245     354.9648     180     0       116,30.474506369,150.,41.639840501;     477.044506369,150.,41.639840501;     375.0468     180     0		1750	110.9127	354.016	180	0	0	
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116,60.387635988,6.,-41.639849501,;     1750     112.8933     353.943     180     0       116,60.387635988,51.716659426,-41.639840501,;     1750     114.189     354.3809     180     0     0       116,60.387635988,111.897723899,-41.639840501,;     1750     115.5392     354.8188     180     0       116,60.387635988,135.195942313,-41.639840501,;     1750     116.5245     354.9648     180     0       116,36.474566369,150.,-41.639840501,;     4750     417.1633     354.9688     180     0						U	U	
116,60.387635988,51.716650426, -41.639840501;     1750     114.189     354.3809     180     0       116,60.387635988,113.897723899, -41.639840501;     1750     115.5392     354.8188     180     0       116,60.387635988,135.195942313, -41.639840501;     1750     115.5245     354.9648     180     0       116,36.474506369,150., -41.639840591;     1750     116.5245     354.9648     180     0		1750	112.8935	353.943	180	0	0	
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116,60.387635988,150.,-41.639846501; 1750 116.5245 354.9648 180 0 0 116,36.474506369,150.,-41.639846501; 1750 447.4633 354.9648 180 0 0							-	
116,36.474506369,150.,-41.639840501,;	116,60.387635988,135.195942313,-41.639840501,;	1/50	115.5392	354.8188	180	Ü	O	
		1750	116.5245	354.9648	180	0	0	
115,0.,150.,-41.639840501; 1750 117.1032 354.6503 160 0 0		1750	117 1632	354 8963	180	0	0	
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116, -40. 2563 32145, 150. , -41. 639846501 , 1750 117.6193 354.6911 180 0 0 16, -60. 387635988, 150. , -41. 639846591 , 1		1/50	117.6193	354.6911	180	0	0	
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Coordinates

.csv file





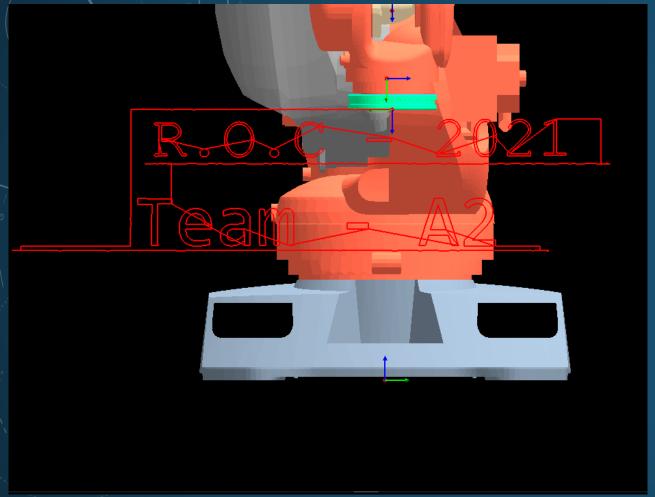




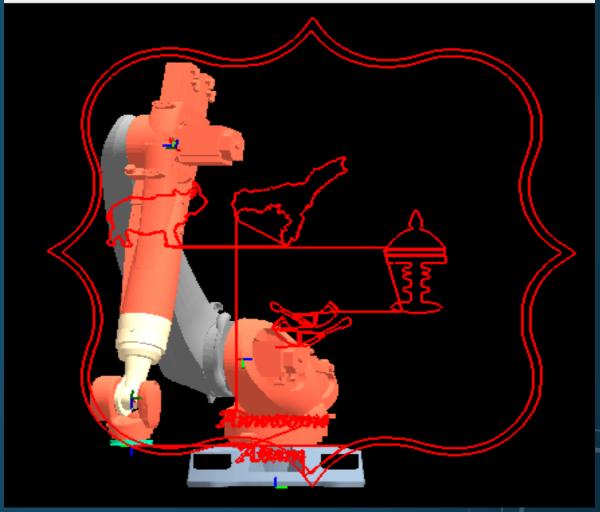
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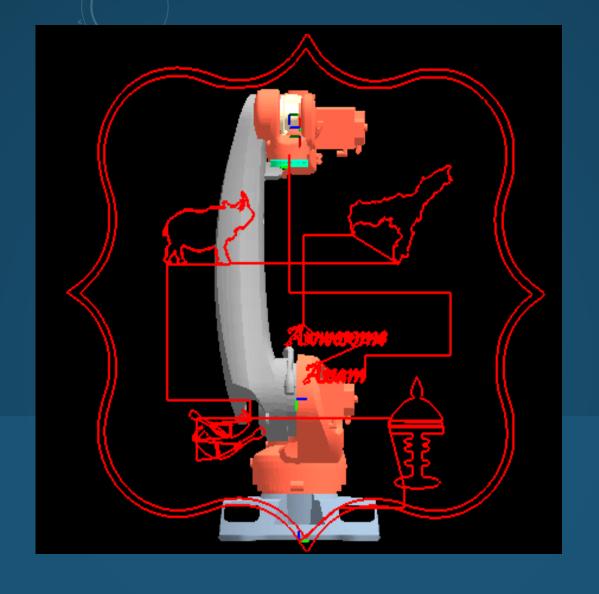


Sometime we need manually enter coordinates to obtain smooth images



Final results





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RoboAnalyzer

Thank You