Graphic User Interface
User Guide
Version 1.0

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This document is the User Guide for Matlab generated Graphic User Interface. This document will include three sections.

a. Introduction: introduce the interface and detail steps for use. Arm 2 is always the camera arm.

b. Arm setup: with estimate clinical setup. How to get actual setup.

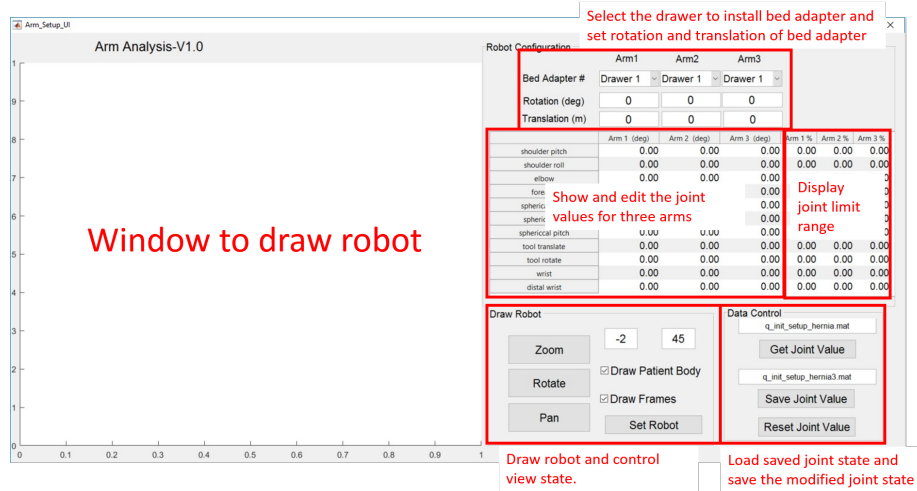c. Future features

1 Introduction

Figure 1: Function blocks of the GUI

For Matlab users, please check out the rouxeny/arm_analysis from github, locate to **haoran_model** folder and run **StartUp.m** to initialize. Then in command window, type **Arm_Setup_UI** to run the GUI. Figure 1 shows the introduction of the GUI panels.

In the **Robot Configuration** panel, the user can select the drawer, change the rotation and translation of table adapter and set all 11 active joints for each arm. The unit for all revolute joints are in degrees and the tool translation is in meters. Column 1 to 3 of the table are joint values and Column 4 to 6 are current joint percentage inside the joint limits (0% means at lower bound and 100% means at upper bound).

In the **Data Control** panel, user can load existing robot configuration by specifying the file name ("q_init_setup_hernia.mat" for example) and click **Get Joint Value** to load the robot configuration into the bed adapter and table. Similary, one can also type file name and save all the current values into the specified file. **Reset Joint Value** will reset all the joint value to 0.

In the **Draw Robot** panel, **Set Robot** will take the values from Robot configuration and draw the robot in display window. User can rotate, zoom and pan like viewing a Matlab figure. Two values in the edit box can set the original view state of the Matlab figure using command view(az,el).
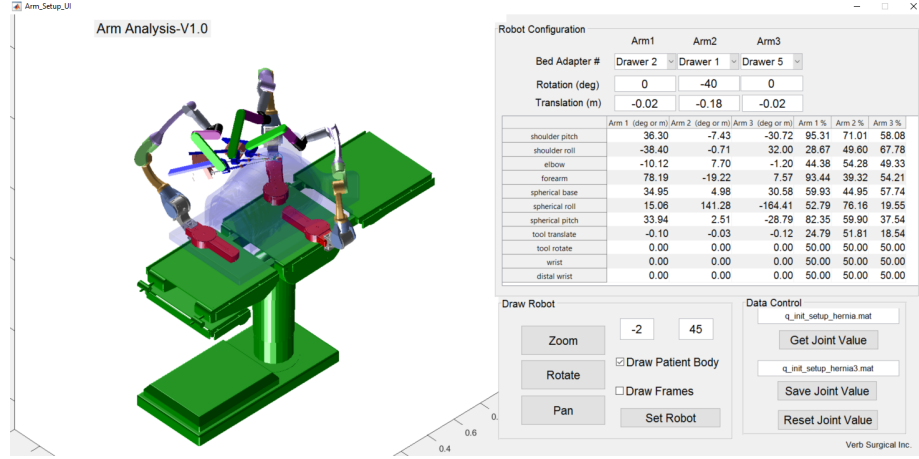

Robot Configuration

	Arm1	Arm2	Arm3
Bed Adapter #	Drawer 2	Drawer 1	Drawer 5
Rotation (deg)	0	-40	0
Translation (m)	-0.02	-0.18	-0.02

	Arm 1 (deg or m)	Arm 2 (deg or m)	Arm 3 (deg or m)	Arm 1 %	Arm 2 %	Arm 3 %
shoulder pitch	36.30	-7.43	-30.72	95.31	71.01	58.08
shoulder roll	-38.40	-0.71	32.00	28.67	49.60	67.78
elbow	-10.12	7.70	-1.20	44.38	54.28	49.33
forearm	78.19	-19.22	7.57	93.44	39.32	54.21
spherical base	34.95	4.98	30.58	59.93	44.95	57.74
spherical roll	15.06	141.28	-164.41	52.79	76.16	19.55
spherical pitch	33.94	2.51	-28.79	82.35	59.90	37.54
tool translate	-0.10	-0.03	-0.12	24.79	51.81	18.54
tool rotate	0.00	0.00	0.00	50.00	50.00	50.00
wrist	0.00	0.00	0.00	50.00	50.00	50.00
distal wrist	0.00	0.00	0.00	50.00	50.00	50.00

Figure 2: GUI with the robot

2 Arm Setup

The Matlab GUI will help the user visualize the setup and choose an estimated setup. Then the user can open the matlab script "AnalysisHerniaProcedureSetup.m" and load the data file saved from GUI. This script also needs the user to modifiy the file "InitHerniaSetup.m" if the procedure setup such as target region and trocar position change. User can run the script "Analy-

sisHerniaProcedureSetup.m" to generate the actual robot setup and save it to
"file_name_you_choose.mat" by running command
"save('data\q_init_setup_hernia.mat','q_init_setup','q_bed_adapter','selected_bed_adapter')"

3 Future features

Future features if needed could include:

    a. functionality to run automatic arm setup with given input.

    b. load collision analysis data and display.

    c. plot other things such as: joint velocity and etc.