MTRN4230: ROBOTICS

Assignment 2

Supporting Documentation

Group 6

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GUI REFERENCE MANUAL:

Robot Managment Section:

Control Mode: Selection in this category determine whether the user operates the simulation in robot studio or the actual robot

Connection status: This is an indicator light to show the connection status between Matlab to Robot Studio (Green = Connected, Red = Disconnected).

Reconnect: Allows the user to attempt to re-establish a connection between Matlab and Robot Studio if lost.

Start Up Robot : Displays a screen containing instructions to help the user activate the robot.

Shutdown Robot: Displays a screen containing instructions to help the user activate the robot.

Jogging Section:

Jog Speed: Allows the user to choose the size of the increment/decrement in the coordinate values or joint angles.

Linear Mode: Allows user to first choose between movement with respect to the base of the robot or the End Effector. Once a frame is chose the user can then increase and decrease X,Y or Z coordinate values using the “X+”,”Y+”,”Z+” and “X-“,”Y-“,”Z-“ buttons to increase and decrease the values respectively.

Joint Mode: Allows the user to choose a joint out of the six joints and then increase and decrease the joint’s angle using the “+” and “–“respectively.

Move To Home Position: This a toggle button that commands the robot to move back to default position. Additionally, the button resets all other jogging buttons to default states, overrides current movement path and the movement can be paused if the button is toggled off.

Input Method: Offers options for the user to reposition the robot either using End Effector Position, Joint Angles or Orientation of the End

Relative Home: This setting relates the input X,Y and Z values to be either relative to the table or the Conveyor

Move: This toggle button allows the input values to be used to reposition the robot and can be toggled off to pause the robot’s movement. If toggled again after being paused the robot will continue on its previous path.

Reset: Allows the user to stop current movement, cancel the current path and reset the input fields for new input. Does not return the robot to home position.

DIOs Section:

Indication Lights:

> Emergency stop and Execution error: The indicators stay green until an emergency stop is called or an Execution error occurs. When either of the events occur a message will be displayed with information and will not close until the user has managed the event.
>
> All Other Lights: These indicators remain red until the specific function has been enabled by the user

Conveyor Sliders : Allow the user to choose the direction of operation of the conveyor belt

Vaccuum Slider: Allow the user to switch on the Vacuum prior to using the Vaccuum.

ConRun and Vac Run: Toggle buttons to run and stop converyor and vacuum functionality.

Reset IO's : Resets the all current outputs to Default. This does not change the state of the Emergency stop and Execution error indicators.

Command Windows:

These windows display the commands issued to Matlab and RobotStudio respectively.

Robot status Section:

This section displays the live Joint Angles, End Effector Position and End Effector Orientation.

Robot Ready : This indicator is green if the robot isready to take a new instruction, else red if the robot is currently running an instruction.

Quit: closes the GUI

Table Camera feed/Conveyor Camera Feed:

Enable Camera: Starts the video feed

Enable camera movement control check box: Enables user reposition the end effector by clicking on the video feed.

Cancel Movement : Cancel Current Movement, halts the robot in the middle of current movement.

Letters detected : Letters detected in the current frame are displayed in this field.

Task Planning, Distribution and Completion:

Displayed below are the Gant chart, Task distribution chart and Task Completion table for the group members for Assignment 2:

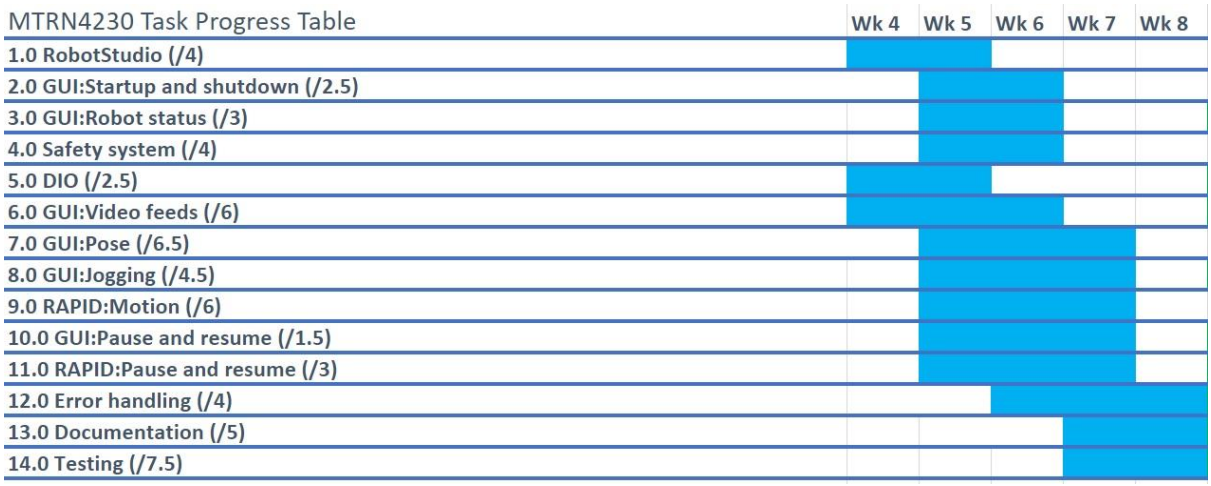


Figure 1: Gant Chart for Group 6 Assignment 2

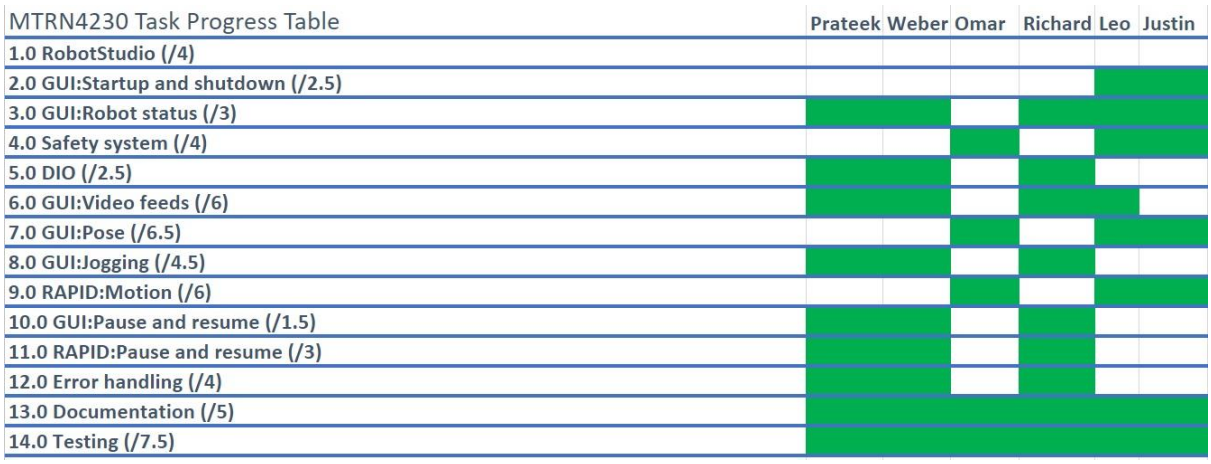
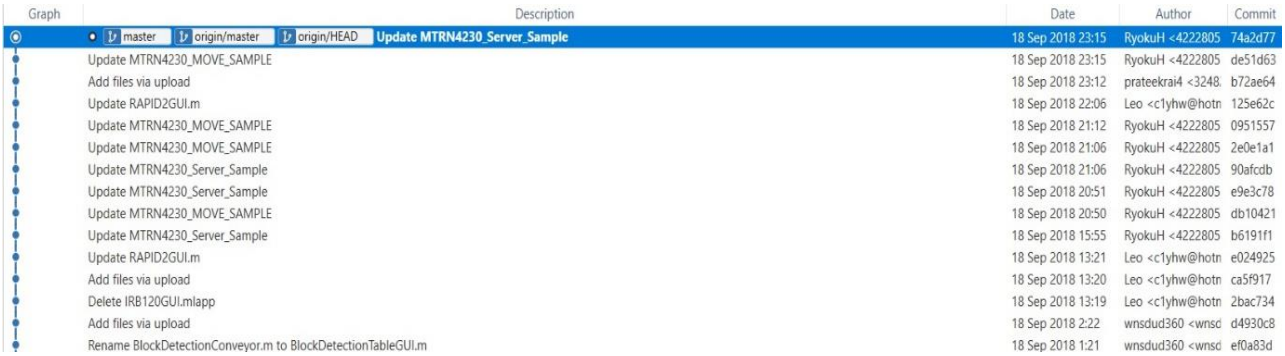


Figure 2: Chart displaying the Roles assigned to members of the group

TASK	COMPLETION PERCENTAGE
ROBOT STUDIO	*100%*
GUI: START-UP AND SHUTDOWN	*80%*
GUI: ROBOT STATUS	*100%*
SAFETY SYSTEM	*100%*
DIO	*100%*
GUI: VIDEO FEEDS	*62.5%*
GUI: POSE	*100%*
GUI: JOGGING	*100%*
RAPID: MOTION	*100%*
GUI: PAUSE AND RESUME	*100%*
RAPID: PAUSE AND RESUME	*100%*
ERROR HANDLING	*50%*
DOCUMENTATION	*80%*
TESTING	*40%*

Version Management:

Version management for the code and other files was done using Git Hub. Below is a small snippet of the version changes that took place in this project. Please note that this is only a small fraction version changes done by group members to provide evidence of version management and hence, does not contain some group members' names.



Graph	Description	Date	Author	Commit
	master origin/master origin/HEAD **Update MTRN4230_Server_Sample**	18 Sep 2018 23:15	RyokuH <4222805	74a2d77
	Update MTRN4230_MOVE_SAMPLE	18 Sep 2018 23:15	RyokuH <4222805	de51d63
	Add files via upload	18 Sep 2018 23:12	prateekrai4 <3248.	b72ae64
	Update RAPID2GUI.m	18 Sep 2018 22:06	Leo <c1yhw@hotn	125e62c
	Update MTRN4230_MOVE_SAMPLE	18 Sep 2018 21:12	RyokuH <4222805	0951557
	Update MTRN4230_MOVE_SAMPLE	18 Sep 2018 21:06	RyokuH <4222805	2e0e1a1
	Update MTRN4230_Server_Sample	18 Sep 2018 21:06	RyokuH <4222805	90afcdb
	Update MTRN4230_Server_Sample	18 Sep 2018 20:51	RyokuH <4222805	e9e3c78
	Update MTRN4230_MOVE_SAMPLE	18 Sep 2018 20:50	RyokuH <4222805	db10421
	Update MTRN4230_Server_Sample	18 Sep 2018 15:55	RyokuH <4222805	b6191f1
	Update RAPID2GUI.m	18 Sep 2018 13:21	Leo <c1yhw@hotn	e024925
	Add files via upload	18 Sep 2018 13:20	Leo <c1yhw@hotn	ca5f917
	Delete IRB120GUI.mlapp	18 Sep 2018 13:19	Leo <c1yhw@hotn	2bac734
	Add files via upload	18 Sep 2018 2:22	wnsdud360 <wnsd	d4930c8
	Rename BlockDetectionConveyor.m to BlockDetectionTableGUI.m	18 Sep 2018 1:21	wnsdud360 <wnsd	ef0a83d

Figure 3 : SourceTree of the GitHub repository showing implementation and use of version management