MATLAB GUIDE To App Designer GUI

Migration For High Level Applications

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Introduction
This summer I got the great opportunity to intern with Stanford Linear Accelerator Center (SLAC) and work with the High Level Applications team.

At LCLS, the electron beam is controlled and monitored mainly using MATLAB Graphical User Interface (GUIs). This electron beam is used to generate Free Electron Laser (FEL). The fully functionality of the GUIs is of utmost importance. I mainly investigated the feasibility of transitioning from MATLAB GUIDE to App Designer for the design and maintenance of GUIs.

Keywords: MATLAB, GUI, GUIDE, App Designer

Research
The monitoring and controlling of the electron beam relies on the use of about 40-60 GUIs written with MATLAB GUIDE; GUIDE is the old drag and drop option for the creation of GUIs. Additionally, there are about 201 total *.fig files on the main production directory.

MathWorks officially announced that GUIDE will not be supported in future MATLAB releases, which means that the only alternative for editing GUIs would be to do it programmatically.

In order to still support the drag-and-drop GUI editors, MathWorks released App Designer. Basically, this new editor has all the functionality and GUI components that the old GUIDE had.

It is possible to migrate GUIs from GUIDE to App Designer utilizing the Migration Tool.

Fig. 2 shows the steps taken to migrate the GUI. The extensions of the two files needed to migrate the GUI from GUIDE to App Designer are: *.m and *.fig. Then the Migration Tool outputs a single *.mlapp file that contains the whole GUI.

At first, I had a lot of issues trying to run the GUI after utilizing the Migration Tool; nearly all callback functions had to be manually updated for them to become compatible with the new way that data was being shared within the GUI.

App Designer is more object oriented; the different components and variables needed inside the GUI are now called properties.

These properties must be declared at the beginning of the GUI; this new approach of using data within the GUI is very intuitive. The entire GUI is now a class that can be instantiated.

The new and improved App Designer counts with many more components, such as a lamps, switches, gauges, and rocker switches.

Additionally, a tab to switch between code and design view was added. You are now able to look at all that’s happening with your GUI.

The App Designer for the MATLAB 2020a release comes with a very useful feature; this feature allows you to split the GUI into different panels that are later automatically resized to fit the device’s screen.

Conclusions
GUIs can be migrated from GUIDE to App Designer seamlessly using the MATLAB 2020 Migration Tool. The GUI may need some manual code updated; the migration process cannot be automated.

As a direct result of this project, the High Level Application team decided to transition from 2019a to 2020a.

More work is needed to migrate GUIs and additional testing is required.

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