GUI STYLE GUIDE FOR CONTROL SYSTEM APPLICATIONS AT ESS

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Abstract

To help developers create consistent-looking control system application GUIs, the European Spallation Source Integrated Control Systems group asked Cosylab to develop a Style Guide (SG) document.

Its purpose is to avoid that GUIs needlessly diverge and make the end-result of all screens combined look harmonious, even if GUIs have been developed over several years by many contributors.

Also it will speed up development, by letting developers start from design patterns, rather than starting "from a blank page".

The document defines a set of basic panel sizes, containing a 960px-style grid for consistent organization of content. It also defines a color scheme and font usage, in-line with the overall ESS corporate communications manual, with the addition of signal colors.

In addition it shows example screens to serve as GUI design patterns for typical screen types such as engineering screens, control applications and synoptic screens.

It concludes by setting rules and recommendations for the usage of automation symbols and display of engineering and physical units.

The document is further complemented by a separate document with Usability Guidelines for Human-Machine interfaces.

CONTROL SCREENS MATCHING ESS BRAND

The GUI colors and fonts that the SG defines were chosen to match he ESS color scheme as defined in the ESS corporate communications manual.

The ESS corporate style has a blue hue as the main color. This is a very suitable color for styling GUI elements. The choice to be in line with the ESS corporate style can enable the control GUIs to look nice and consistent by themselves.

An additional benefit is that this way the GUIs will also be harmonious when used in conjunction with web-based applications that are made in style of (use cascading stylesheet templates similir to) the ESS website itself.

DEFAULT PANEL SIZES AND A GRID

A grid is a proven technique for creating consistent looking GUIs e.g. in web-design.

The style guide defines a "960 pixel grid" in 12 colums.

From this basis, 2, 3, 4 and 6 column layouts can be derived and combined.

The style guide also provides patterns for smaller screens/dialogs. For full screen applications it recommends combining smaller grid-based elements.

SIGNALS STAND OUT FROM BACKGROUND

Alarms and signal changes should be very noticable. Their full saturated colors clearly stand out from the *by-design* subdued backgrounds.

The included design patterns illustrate how to use moderate-sized LEDs and other indicators. This keeps a balance of bright colored signals versus the more sober backgrounds and it maintains the overall easthetics. (A Control GUI should by no means a Christmas Tree)

TITILLIUM + OPEN SANS FONTS

The SG defines Titillium [1] for titles (but for titles only). This Open Source font is the ESS corporate font and has nice distinctive features.

But to maximise readability for the body of the GUIs, also at smaller sizes, the more standard-styled Open Sans is chosen. This Google font is a modern, humanist sans-serif. It is designed for good readability at various font sizes. It is NOT just another Arial. It has more font weights (10 in total) then the old normal + italic + bold + bold-italic set that OS standard true type fonts used to provide.

DESIGN PATTERNS AND OTHER REUSE

Various design patterns reuse best practices from other projects on the design of

- Control screens: task oriented screens, either for monitoring and control of a single device or a contral application employing a combination of physical equipment / devices.
- Diagnostics screens, such as a beam current monitor.
- Synoptic views, showing machine overview in a graphical way.

The style guide also defines the way automation symbols are used. In this project we decided to reuase the efforts done on incorporating a symbols database in the EPICS CS Studio tool by the ITER CODAC initiative.

Some effort was spent on making recommendations for implementing efficient and user friendly machine browsing and naviation. This is often a painpoint in control systems of large machines.

TYPE OF GUIDELINES

The document's guidelines are organized in three categories or levels:

- RULE: these must be followed. Exceptions must be treated on a case-by-case basis

- RECOMMENDATION: It is strongly advised to follow these. Less strong then RULE, the application developer can deviate on his own discretion.

- TIP: Design advice that can improve the visual appeal of the GUI.

It is advisable to make this distinction. Stating all guidelines as must-follow rules does not give the software developer the freedom to make good designs for the specific job at hand. At the same time we must make sure important guidelines can be enforced by the quality control team. So they should not be stated in a vague fashion.

SUMMARY AND CONCLUSION

A (20 or so page) style guide is the right first step towards designing for high usability. It is a must to achieve consistent looking GUIs.

A logical next step is a Usability Guidelines Document to also cover dynamic behavior of GUIs. Page count can range for 30-100 pages depending on the project. Cosylab also delivered this at the request of ESS.

The final step in high usability design is applying the principles of goal directed interaction design consistently throughout the software development project.

REFERENCES

Note: for GUI screenshots, see the poster.

[1] http://www.campivisivi.net/titillium/