

# Building GUIs for *S-PLUS for Windows* Vertical Applications

B. D. Ripley

*Professor of Applied Statistics*  
*University of Oxford*

`ripley@stats.ox.ac.uk`

`http://www.stats.ox.ac.uk/~ripley`

# Overview

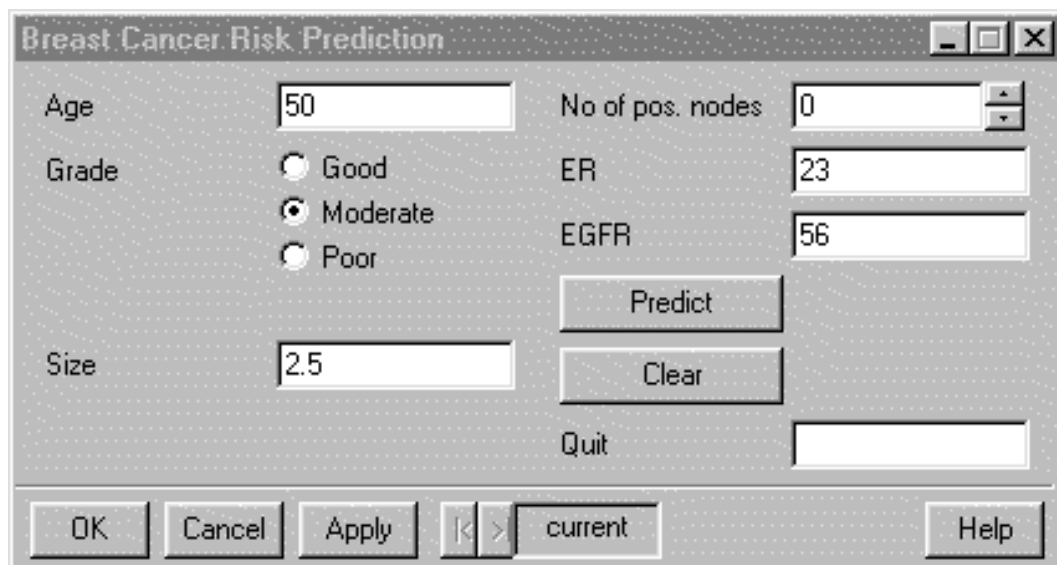
Goal is user-friendly interfaces, for those who have never used **S-PLUS** nor a command-line, maybe have only ever used a Mac.

- **S-PLUS**'s internal programmable menus and dialog boxes
- Communicate from another Windows application by DDE
- Communicate from another Windows application by 'ActiveX Automation' (formerly 'OLE Automation').

Programming guide planned for V&R3 vol 2 – see handout.

# Breast Cancer Prognosis

Neural-network based relapse predictions for a sub-class of primary breast cancer patients at the Churchill Hospital, Oxford. By Dr Ruth Ripley and Professors Adrian Harris and Lionel Tarassenko.

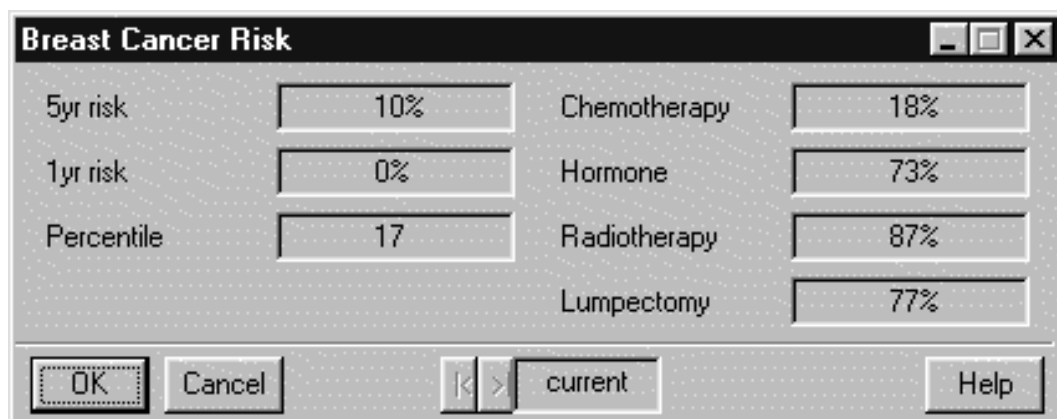


A screenshot of a Windows-style dialog box titled "Breast Cancer Risk Prediction". It contains input fields for Age (50), No of pos. nodes (0), Grade (radio buttons for Good, Moderate, Poor with Moderate selected), ER (23), EGFR (56), and Size (2.5). There are buttons for Predict, Clear, and a Quit field. At the bottom are OK, Cancel, Apply, navigation arrows, a "current" label, and a Help button.

Age	50	No of pos. nodes	0
Grade	<input type="radio"/> Good <input checked="" type="radio"/> Moderate <input type="radio"/> Poor	ER	23
		EGFR	56
Size	2.5		

Predict  
Clear  
Quit

OK Cancel Apply < > current Help

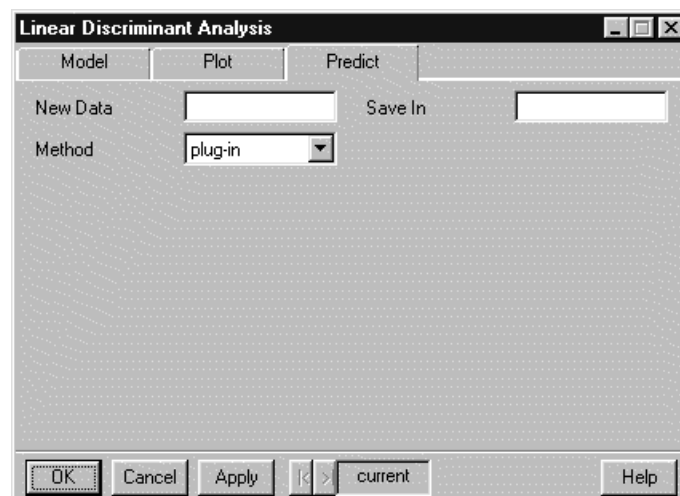
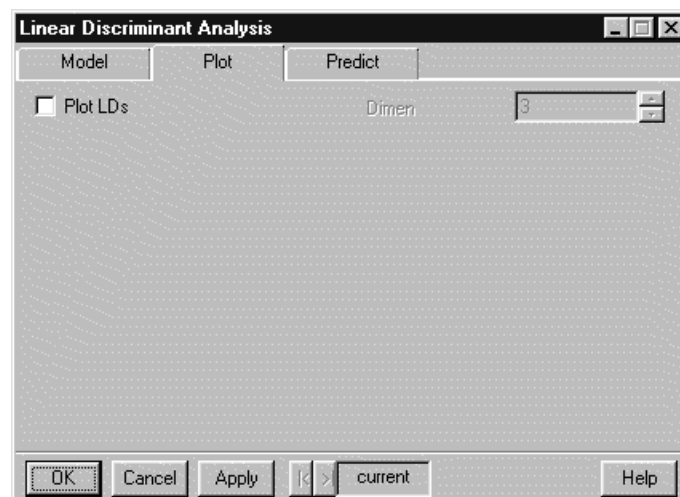
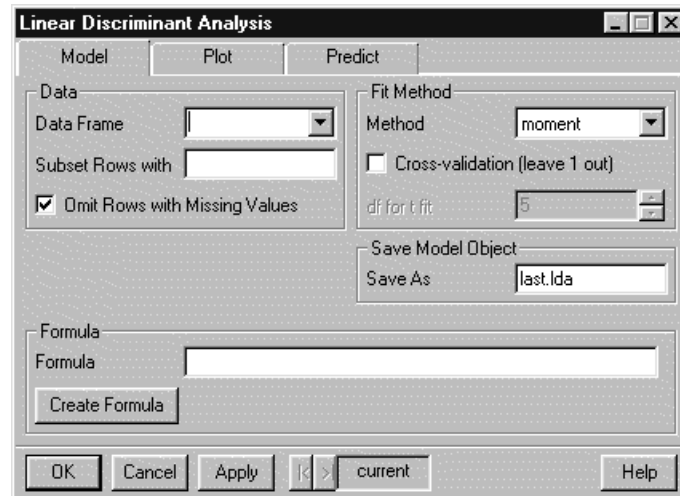


A screenshot of a Windows-style dialog box titled "Breast Cancer Risk". It displays calculated risks: 5yr risk (10%), 1yr risk (0%), and Percentile (17). It also shows treatment probabilities: Chemotherapy (18%), Hormone (73%), Radiotherapy (87%), and Lumpectomy (77%). The bottom has OK, Cancel, navigation arrows, a "current" label, and a Help button.

5yr risk	10%	Chemotherapy	18%
1yr risk	0%	Hormone	73%
Percentile	17	Radiotherapy	87%
		Lumpectomy	77%

OK Cancel < > current Help

# S-PLUS front end for LDA

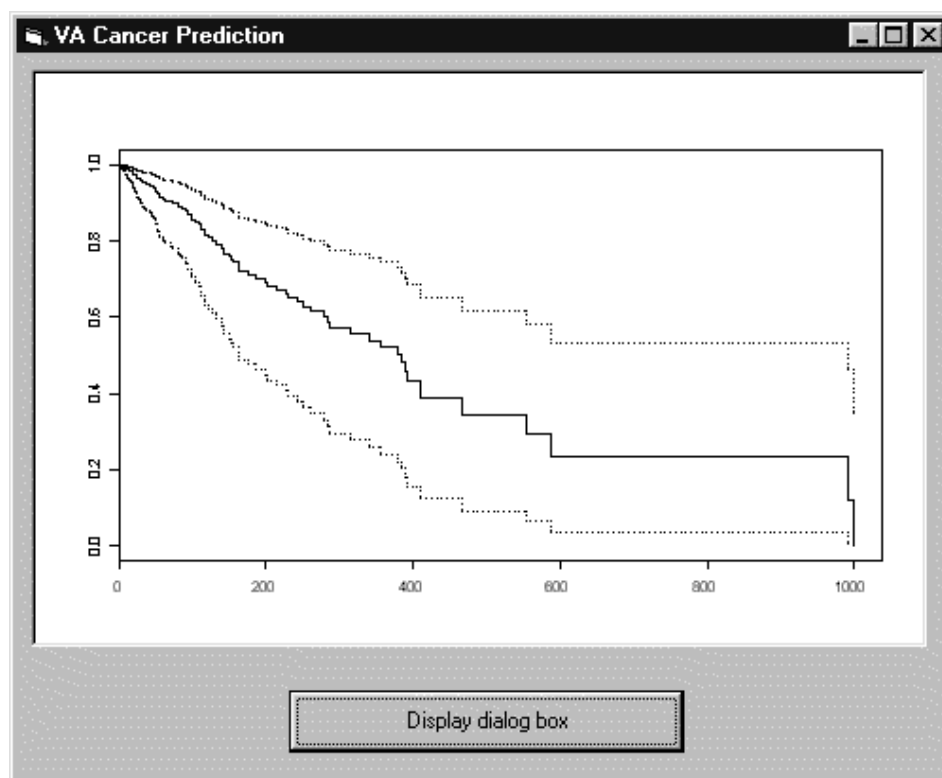


Customized dialog box for LDA.

# Survival Prediction from Lung Cancer

Classic data set from Kalbfleisch & Prentice.

1) Interface built in Visual Basic with an embedded graphsheet, using ActiveX.



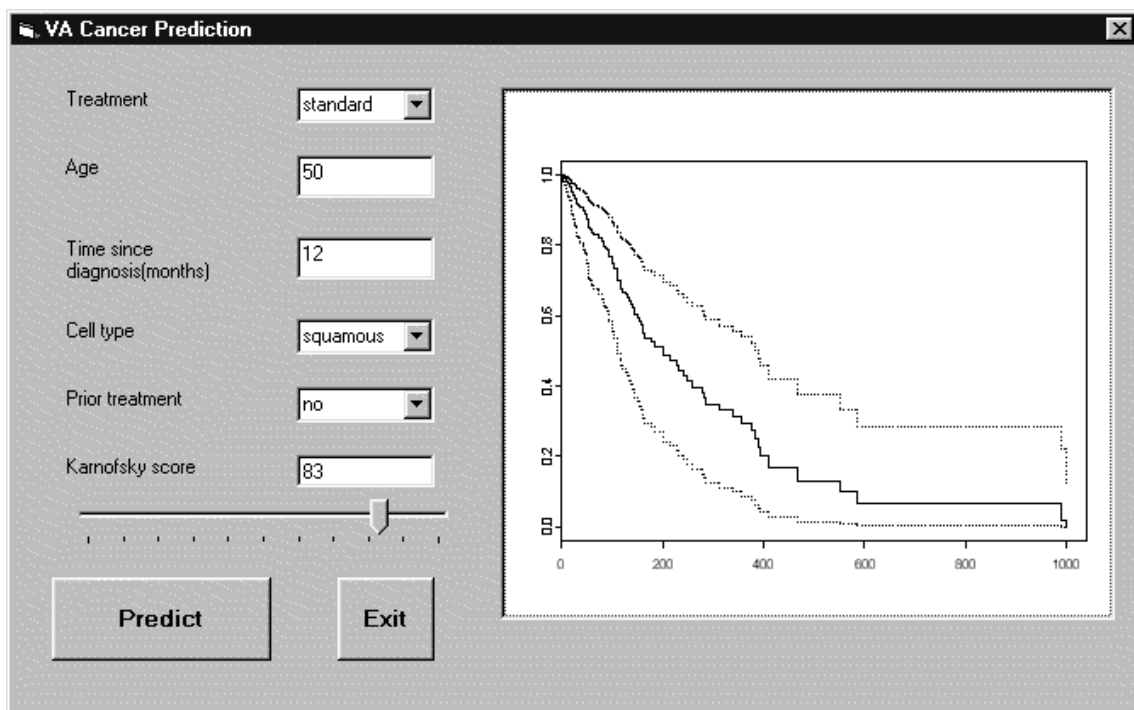
The screenshot shows a window titled "VA Cancer Prediction" with a dialog box for input. The dialog box contains the following fields and controls:

- Treatment:
- Time since diagnosis (months):
- Age (years):
- Karnofsky score:
- Cell type:
- Prior treat:

At the bottom of the dialog box are buttons for "OK", "Cancel", "Apply", "K", "current", and "Help".

# Visual Basic front-end

2) Complete interface in VB with an embedded graphsheet.



# Issues

- *Input validation:* may need to communicate with the statistical application and/or databases.
- *Callbacks:* The hard work is writing the callbacks to enable / disable items, set limits, ....
- *Details:* Getting the interface details intuitive is tedious even in Visual Basic, utterly tedious and error prone at a low level (*cf* Guido's R console and graphics' windows).
- *Distribution:* Speed matters even on today's PCs, and ActiveX applications are often embedded rather than distributed even on a single machine.
- *Education:* It seems very hard to write a programmer's guide to this sort of thing.

# Future R for Windows?

This sort of thing needs to be written in standard toolkits if to be done in reasonable time.

- Build R engine as a DLL which will accept commands asynchronously.
- Build an alternative front-end in VC++ than conforms to Windows 'standards' and so is an ActiveX automation server.
- Build 'glue' to make an embeddable ActiveX in-process server that calls the R engine.

[Not yet discussed fully with Guido.]