

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

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# 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.

**Breast Cancer Risk Prediction**

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

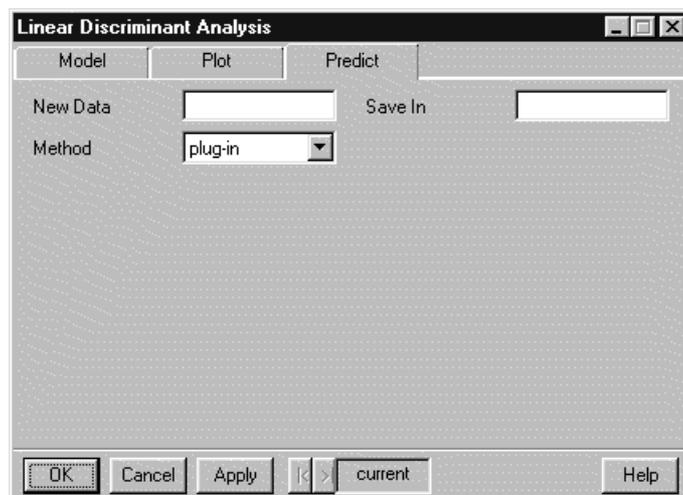
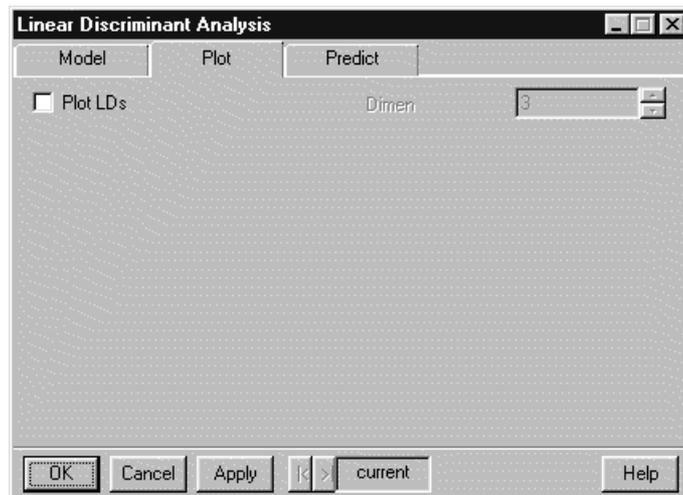
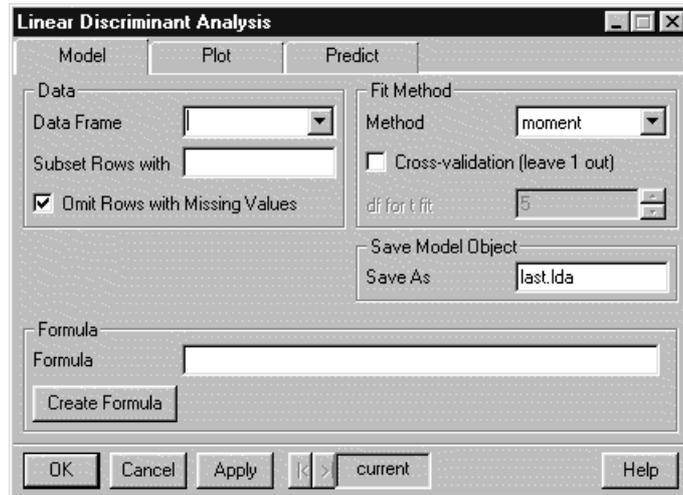
OK Cancel Apply   current Help

**Breast Cancer Risk**

5yr risk	<input type="text" value="10%"/>	Chemotherapy	<input type="text" value="18%"/>
1yr risk	<input type="text" value="0%"/>	Hormone	<input type="text" value="73%"/>
Percentile	<input type="text" value="17"/>	Radiotherapy	<input type="text" value="87%"/>
		Lumpectomy	<input type="text" value="77%"/>

OK Cancel   current Help

# S-PLUS front end for LDA

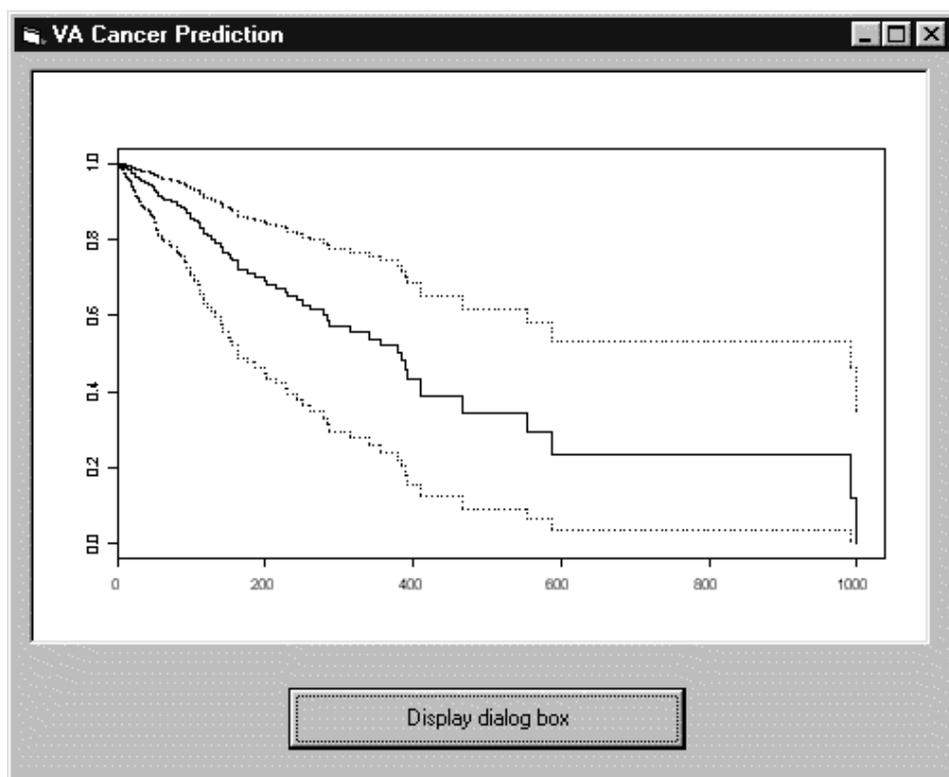


Customized dialog box for LDA.

# Survival Prediction from Lung Cancer

Classic data set from Kalbfleisch & Prentice.

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

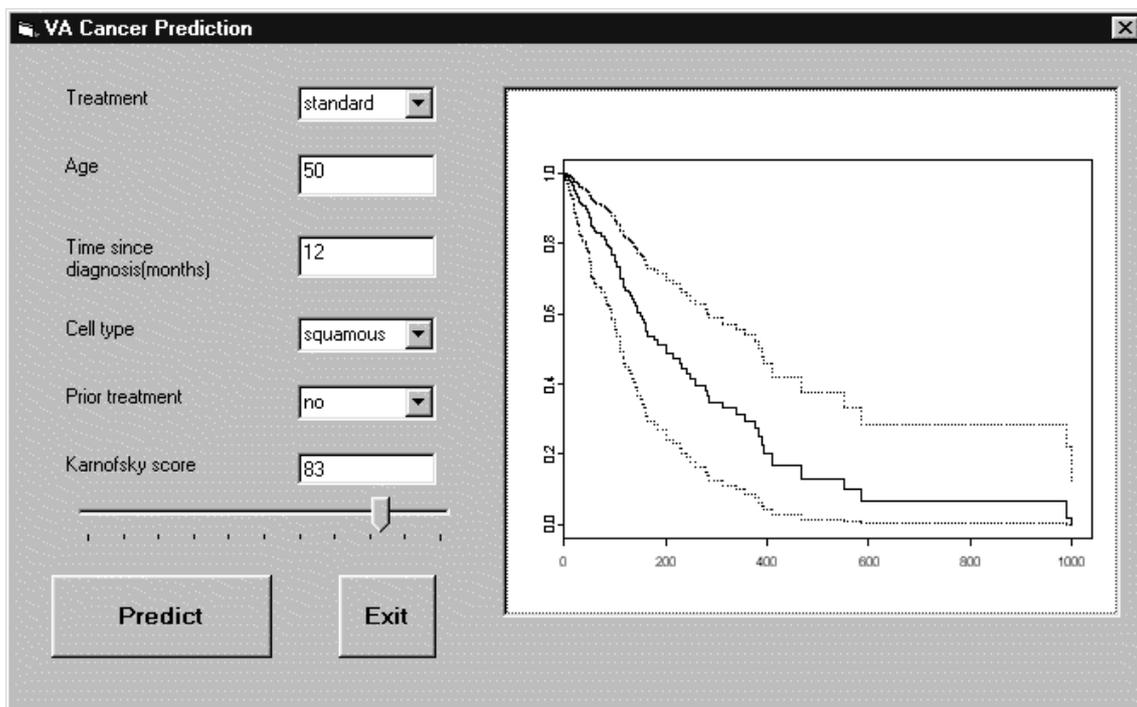


The screenshot shows the "VA Cancer Prediction" dialog box. It contains the following fields and controls:

- Treatment: dropdown menu with "standard" selected.
- Age (years): text box containing "53".
- Karnofsky score: empty text box.
- Time since diagnosis (months): empty text box.
- Cell type: dropdown menu with "squamous" selected.
- Prior treat: dropdown menu with "no" selected.
- Buttons: OK, Cancel, Apply, a button with "k" and a right arrow, a button with "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.]