St. Jude Children's Research Hospital

St. Jude BioHackathon

Title
R function for generating shiny apps to visualize Cox proportional hazards regression models

Category
GUI Tool Development

Challenge
I want to develop an R function that would automatically generate a shiny R app to visualize the estimates and goodness-of-fit of a Cox proportional hazards regression model.

Benefit
I believe this tool would prove extremely valuable in advancing personalized medicine and understanding the literature on risk factors. The Cox proportional hazards regression is one of the most highly cited scientific papers of all time. For example, it is widely used in oncology to identify subgroups at greatest risk of relapse and define risk-stratification schemes. In the literature, the results of a Cox proportional hazards regression model are presented as hazard ratio estimates from which even professional statisticians cannot directly compute survival probabilities for a given set of patient characteristics. It would be incredibly useful to the scientific community to be able to visualize the predictions and goodness of fit of Cox proportional hazards models on a routine basis. The primary barrier is that development of a shinyR app is time-consuming and labor-intensive.

Helpful Tools, Packages, or Software
I have developed a prototype that works well for some simple examples. I would like help in making it more general, more stable, and to work in a more HIPPA-friendly way (i.e., strip individual level patient data out of the backend).

Test Data
There are several data sets in the supplementary materials of SJ publications, example data sets in R packages, and GEO.