Proposal of literature review of proportional hazards model

Engineering

Proportional hazards model The proportional hazards model, which was proposed by Cox in 1972, has been adoptedprimarily in medical testing analysis to model the effect of secondary variables on survival (Schoenfeld 499). It is more of an acceleration model than a specific life distribution model. It has the capacity to model and test several inferences concerning survival without necessarily making any specific assumptions about the form of the life distribution model.

Brief description

The proportional hazards models are classified under survival models in statistics. Survival analysis involves examination and modeling the time it takes for events to occur. Most survival modeling examines the relationship between survival and one or several predictors. The survival library in R and S-PLUS also holds all of the other commonly used tools of survival analysis. Below is a brief description of the proportional hazards (Schoenfeld 499).

Let z = {x, y …} be a vector of 1 or several explanatory variables supposed to affect lifetime. These variables may be incessant, for example, temperature in engineering studies, or dosage level of a given drug in medical tests or better still, they may be indicator variables with the value 1 when a given factor or condition is present (Schoenfeld 500).

Let the hazard rate for a nominal set z 0 = (x 0, y0…) of the variables be set by h 0 (t), with h0 (t) indicating legitimate hazard function for unspecified life distribution model. In this regard, the proportional hazards model supposes that we can note the modified hazard function for a new value of z as:

H z (t) = g (z) h0 (t)

Expected outcomes

Given a log-linear model assumption for g (z), and with no additional suppositions concerning the life distribution model, it will be possible to analyze investigational data and figure out utmost likelihood estimates. Additionally, it would be possible to use likelihood ratio tests to decide which explanatory variables will are extremely significant. In this study, a series of trials on treatment of cancer will be conducted. The study will seek to assess the importance of chemotherapy and radiation therapy over radiation therapy alone. The following data from the study group will be used for the purpose of elucidating the effect of chemotherapy and radiation therapy.

Prognostic subgroups in brain tumors

Group

Number of patients

Survivals

Age < 30, no necrosis

20

Age < 30, necrosis

20

Age > 50, no necrosis

20

Age > 50, necrosis

20

A total of 80 patients will be treated with radiation therapy alone in the first round, while the same patients will be treated with chemotherapy and radiation therapy. Prognostic factors will be age and whether patients will have necrosis in their surgical specimens.

Works cited:

Schoenfeld, David. Sample size formula for the proportional hazards regression model. Biometrics, 39, 2 (1983): 499-503.