Introduction:

Climate model is constructed based on parameter values taken from atmosphere, oceans, land, and other reservoirs of the Earth system. Here I will construct classification to predict simulation outcomes (fail or succeed) from input parameter values, and to use sensitivity analysis and feature selection to determine the causes of simulation crashes.

For constructing the classification model, I will use cart algorithm, caret and CA Tools packages and build the Decision tree. Some of the simulations failed for numerical reasons at combinations of parameter values. I have to predict the attributes which are leading the failure in decision trees by analysing the probability value which are more for attributes which lead to failure. Our failure analysis method will be benificial for quantifying and determining the causes of these crashes.

Dataset:

Microsoft Excel Worksheet

Attachment 1:Climate Dataset

Attribute Information:

The goal is to predict climate model simulation outcomes for given scaled values of climate model input parameters (columns 3-20).

Column 1: Latin hypercube study ID (study 1 to study 3)

Column 2: simulation ID (run 1 to run 180)

Columns 3-20: values of 18 climate model parameters scaled in the interval [0, 1]

Column 21: simulation outcome (0 = failure, 1 = success)