Student retention is an essential part of many enrollment management systems. It affects university rankings, school reputation, and financial wellbeing. Student retention has become one of the most important priorities for decision makers in higher education institutions. Improving student retention starts with a thorough understanding of the reasons behind the attrition. Such an understanding is the basis for accurately predicting at-risk students and appropriately intervening to retain them. In this study, using student demographic and institutional data along with several business intelligence techniques (Decision tree, Naïve bayes, multilayer perceptron and support vector machine), we developed prototype to predict and to explain the reasons behind student attrition. This study used classification models generated using Waikato Environment for Knowledge Analysis (WEKA). The model was built using the 10-fold cross validation, and holdout method (60% of the data was used as training and the remaining as test and validation). Random sampling techniques were used in selecting the datasets. The sensitivity analysis of the models revealed that the student age on entry, parent occupation, health of student and financial variables are among the most important predictors of the phenomenon. Results of the classifiers were compared using accuracy level, confusion matrices and speed of model building benchmarks. The study shows that identifying the relevant student background factors can be incorporated to design a prototype that can serve as valuable tool in predicting student withdrawal as well as recommend the necessary intervention strategies to adopt.