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PROJECT - AutoInsurance Fraud DETECTION Using IBM SPSS Modeler

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Auto Insurance Fraud Detection Using C&R Tree Algorithm

Agenda / Definition

The project aims to detect fraudulent insurance claims using the C&R Tree (Classification (Classification and Regression Tree) method in IBM SPSS Modeler.
By analyzing claim data (such as vehicle details, claim amount, and customer info), the model identifies patterns and predicts whether a claim is fraudulent (Y) or non-fraudulent (N).

Outcomes / Learning

- Import and explore a dataset in IBM SPSS Modeler
- Perform data cleaning (remove irrelevant columns, handle missing values)
- Partition data into training and testing samples
- Build and evaluate a C&R Tree classification model
- Generate and interpret prediction results and graphs

This project demonstrates the full data mining workflow — from preparation to model evaluation.

Required Tools

The tool used for this project is IBM SPSS Modeler.

Working

- **The project involves:**
- Importing the insurance claim dataset
  Cleaning and preparing the data
  Setting variable roles and partitioning data
  Configuring and running the C&R Tree model
- Viewing prediction results in a table and histogram
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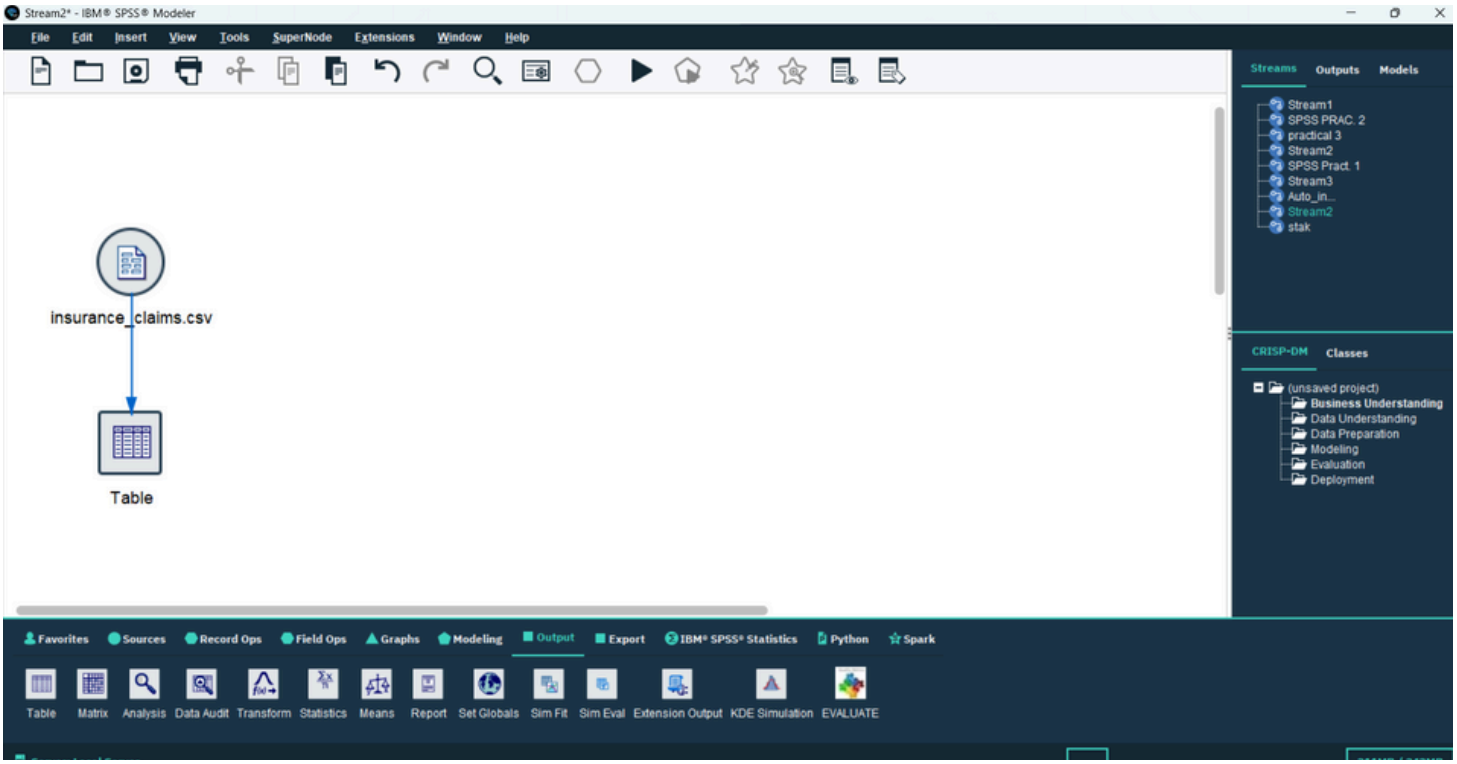
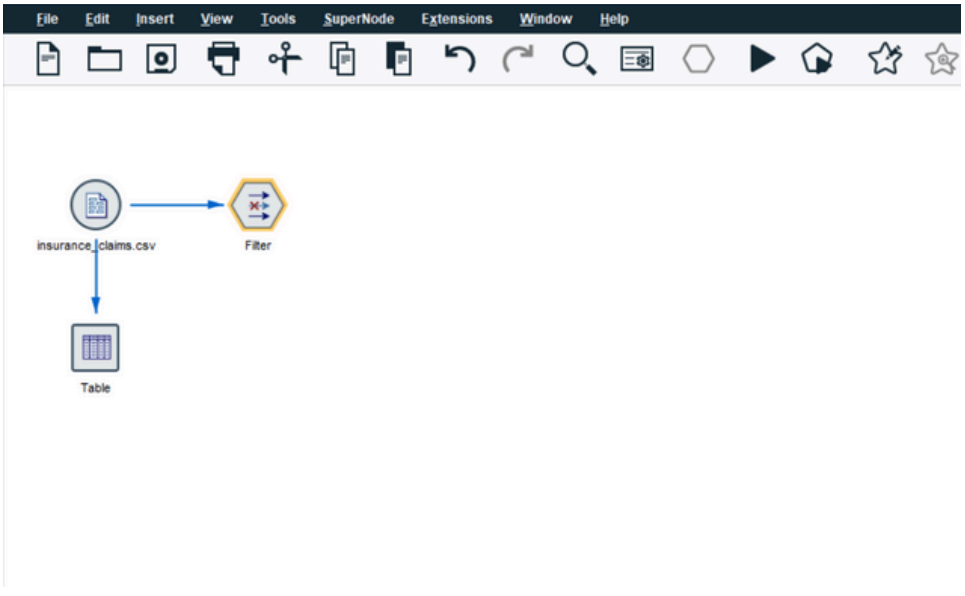
Step 1: Import Data

Loaded the dataset (insurance_claims.csv) into SPSS Modeler using the Var.File Node under Sources palette After reading metadata, all fields were correctly recognized.



Step 2: Remove unecessary Data

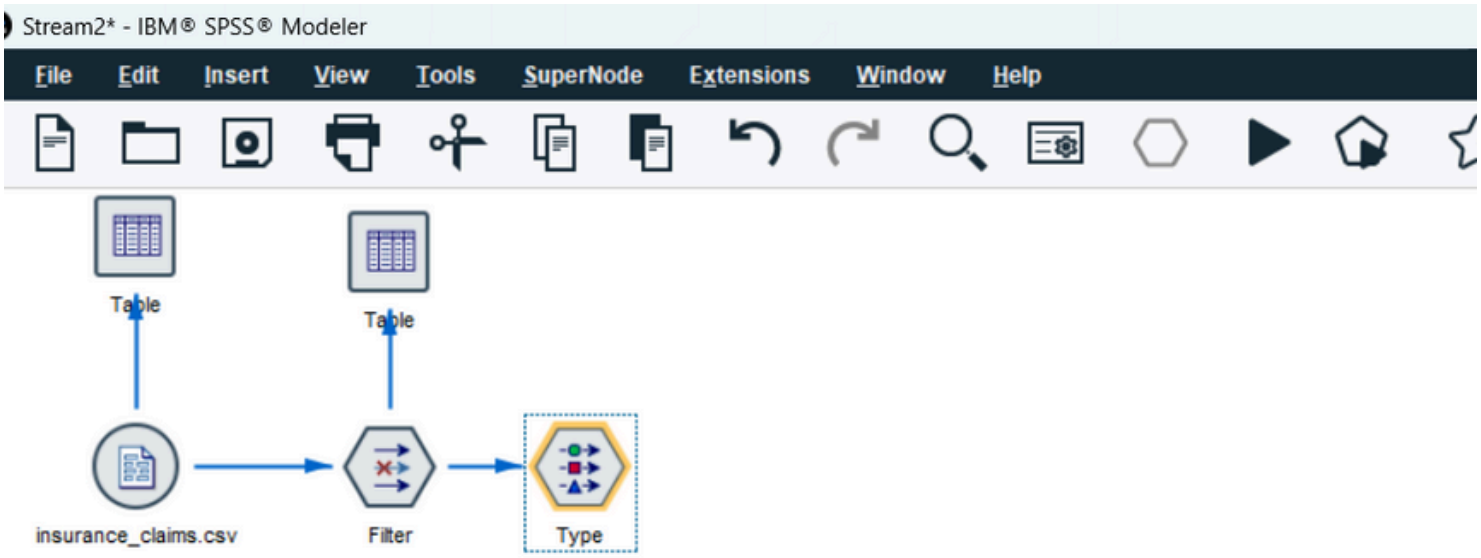
The Filter Node was used to exclude the irrelevant column _c39 from the dataset.
This column contained empty or meaningless values that could interfere with model accuracy.
By filtering it out, we ensured that only useful fields (such as claim amount, vehicle claim, auto make, model, year, and fraud status) were retained for analysis.

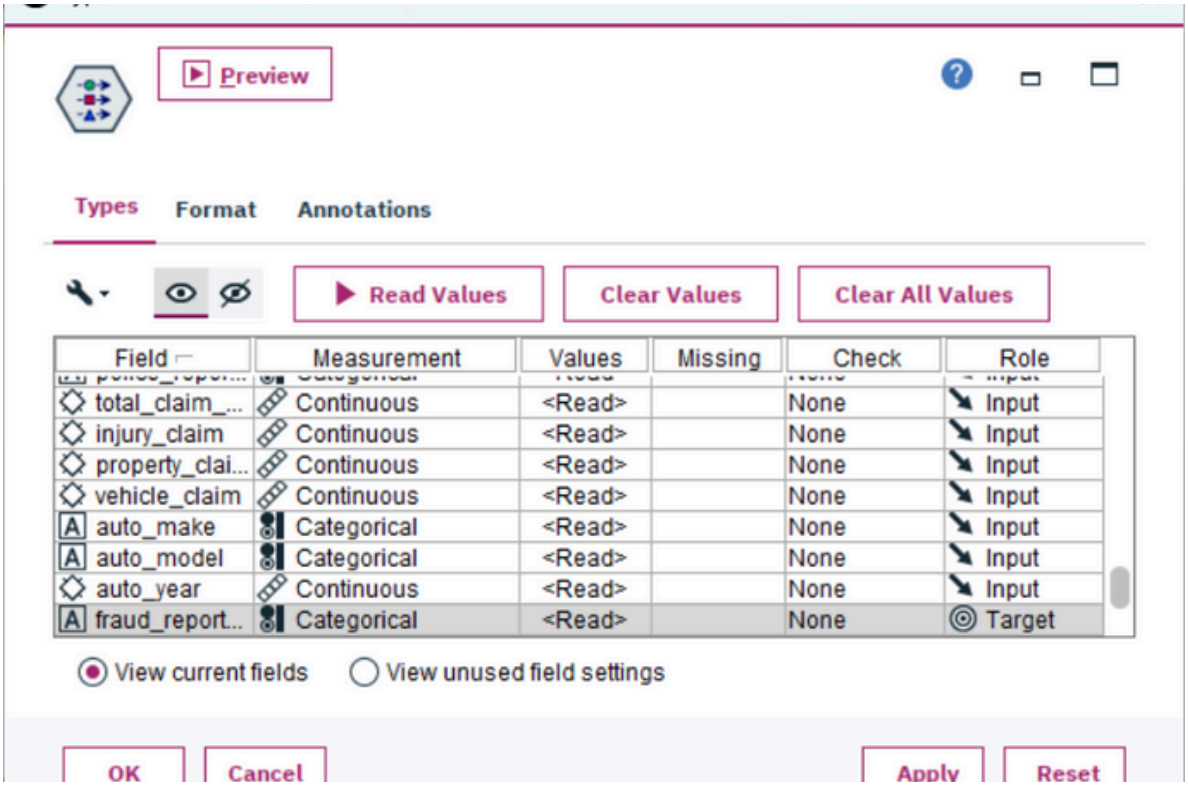


Step 4 : Type Node

Defined roles for each field:

- Input Fields: Claim amount, incident severity, age, etc.
- Target Field: fraud_reported





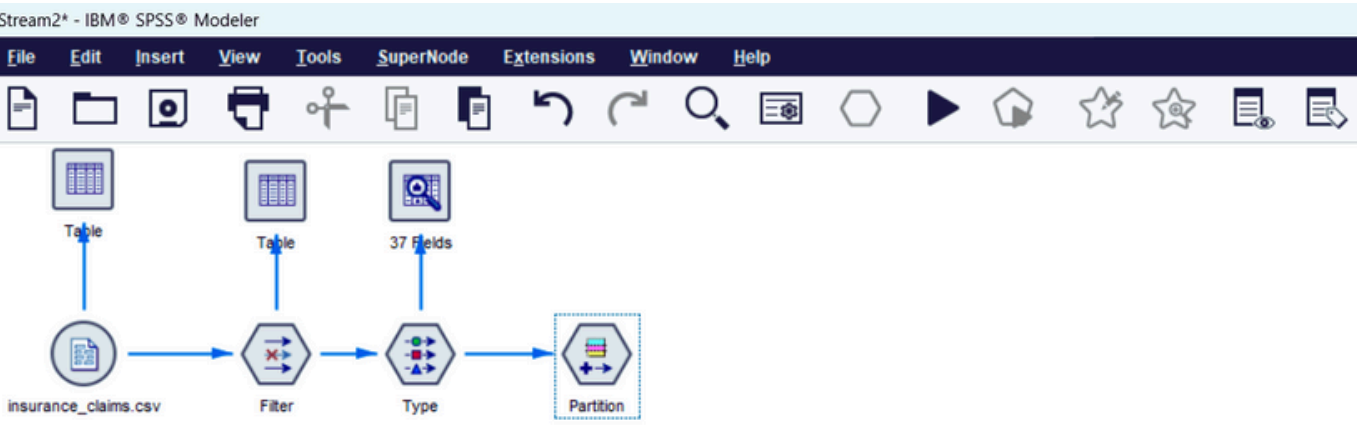
Step 4 : Partition Data

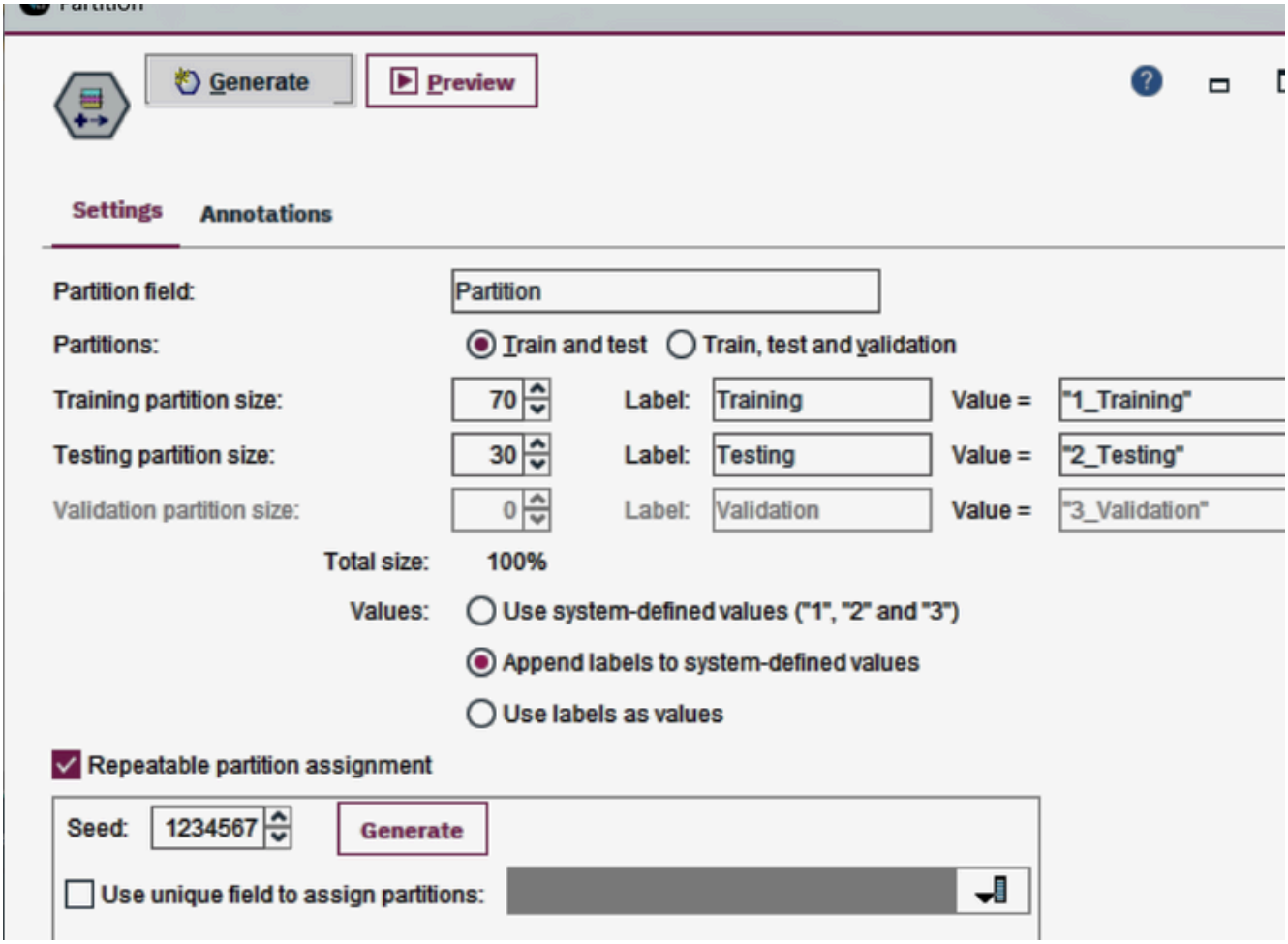
Added Partition Node to split data:

70% for Training

30% for Testing

This allows model evaluation on unseen data

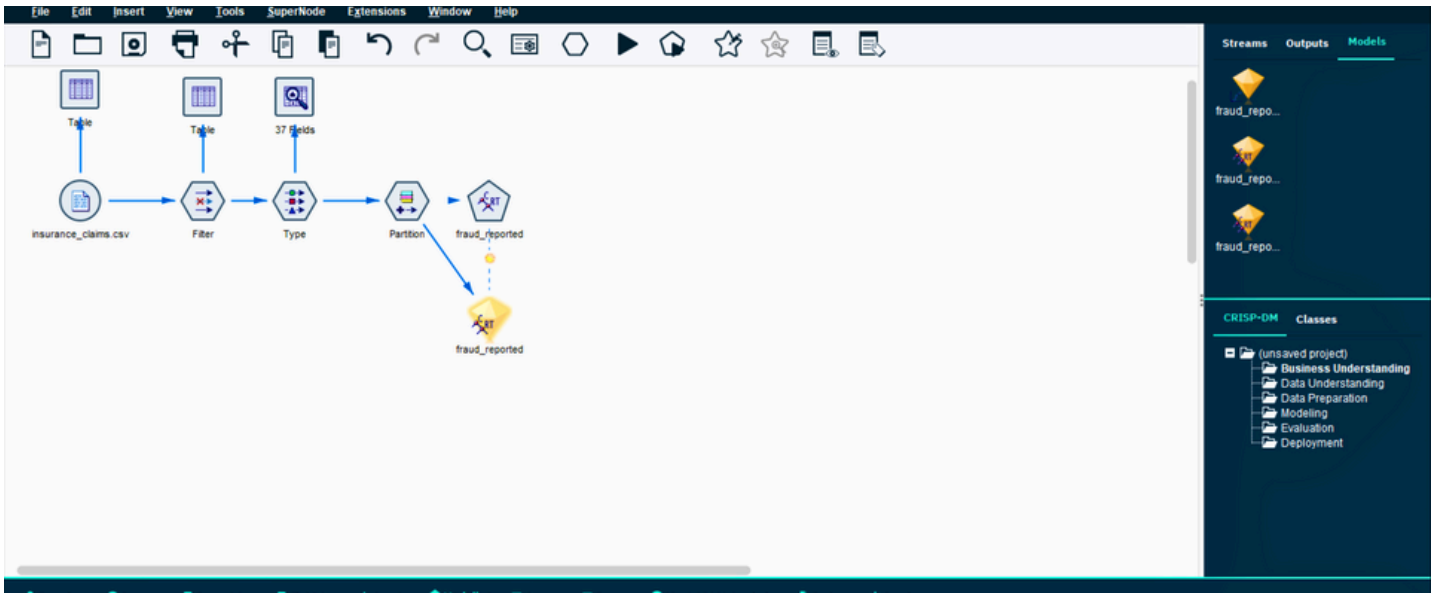




Step 5 : Build Models

Model - C&R Tree

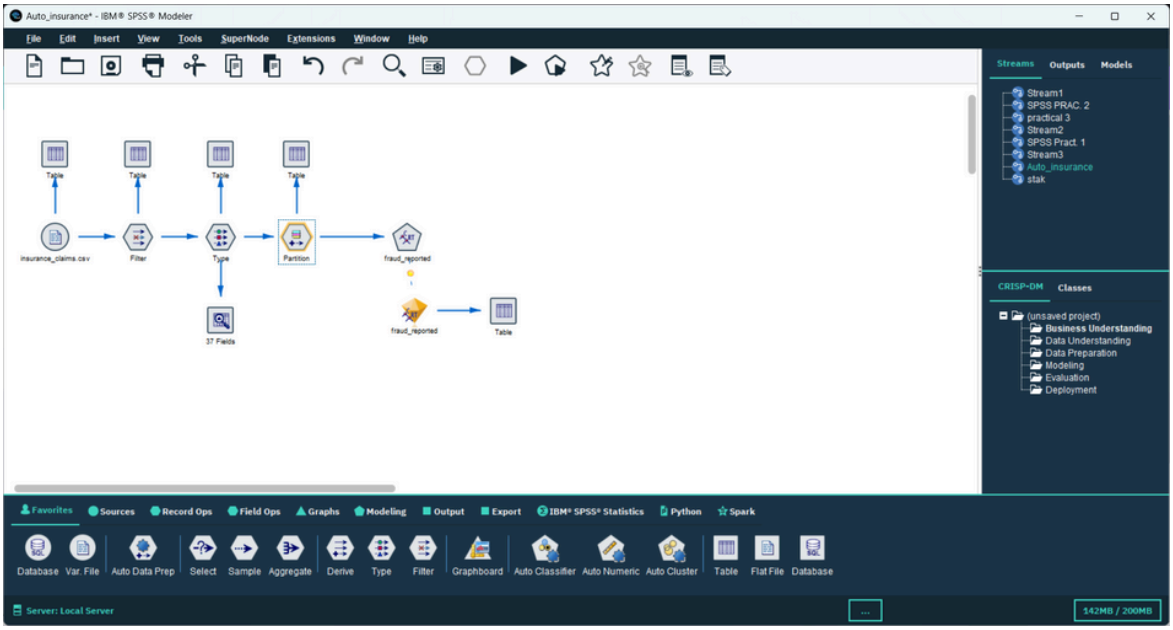
- From the Modeling palette, drag a C&R Tree Node.
- Connect it to the Partition Node.
- Open it → confirm:
- Target: fraud_reported
- Inputs: Auto-selected.
- Click Run → view the decision tree output (splits, accuracy, etc.).



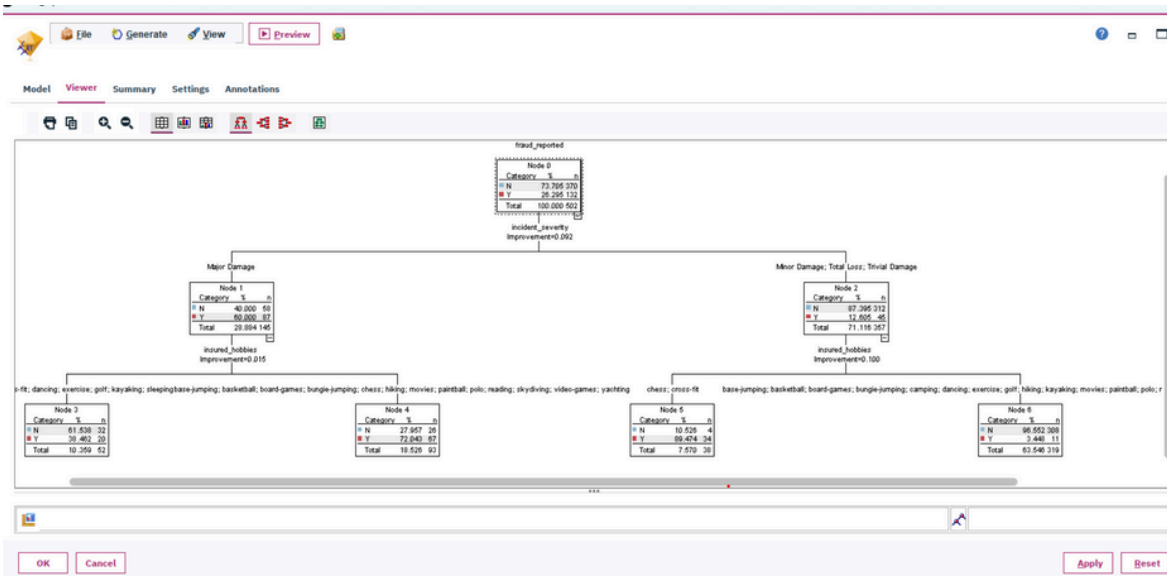
Insights :

- *Major Damage and High Claim Amounts are the most common indicators of fraud.*
- *Customers with risky hobbies (like skydiving or motor racing) are more prone to fraudulent claims.*
- *Fraud detection is better when combining C&R Tree visualization*

FINAL VIEW



OUTPUT:



Conclusion :

The project successfully built and evaluated two models to detect insurance fraud using IBM SPSS Modeler.

The models help the insurance company:

- *Identify potential fraudulent claims early.*
- *Save costs by reducing false claims.*
- *Improve the reliability of claim verification systems.*

Overall, the C&R Tree and Logistic Regression models provided valuable insights into fraudulent behavior patterns.