Asteroid Classification

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➢ **Introduction**

➢ In the vast expanse of our solar system, asteroids roam freely, some of them potentially on a collision course with Earth.

➢ NASA, the renowned space agency, plays a critical role in safeguarding our planet from these celestial intruders.

➢ One of their essential tasks is classifying asteroids to determine whether they pose a threat or are harmless visitors to our cosmic neighborhood.

➢ Join us as we explore NASA's asteroid classification system, the first line of defense in identifying and assessing potential hazards from the depths of space.

➢ **Problem Statement**:

➢ The task of classifying asteroids to determine their potential threat level to Earth is a critical challenge faced by NASA and the broader scientific community.

➢ With an ever-increasing understanding of our solar system and the growing awareness of potential asteroid impacts, it is imperative to develop a robust and efficient system for accurately categorizing these celestial bodies as either hazardous or non-hazardous.

➢ **Methodology**

➢**Data Collection**:
  ➢Gather information about an asteroid's size, speed, and orbit.
➢**Hazard Assessment**:
  ➢Calculate how much damage the asteroid could cause if it hit Earth.
➢**Risk Evaluation**:
  ➢Determine how likely it is for the asteroid to hit Earth.
➢**Classification**:
  ➢If the hazard and risk are high, classify the asteroid as hazardous.
  ➢If the hazard and risk are low, classify it as non-hazardous.
➢**Monitoring**:
  ➢Keep an eye on hazardous asteroids and update their status as needed

➢ **Algorithm – Logistic Regression**

➢ Logistic regression is a statistical method that helps us answer yes-or-no questions by estimating the probability of a "yes" answer based on input data.

➢ It's like a tool for predicting binary outcomes, such as whether a student will pass (yes) or fail (no) an exam based on factors like study hours and past performance.

➢ Results:

Before Tuning

	precision	recall	f1-score	support
0	0.84	1.0	0.91	3140
1	0.33	0.01	0.02	609
acc	-	-	0.84	3749
macro avg	0.59	0.50	0.46	3749
weighted avg	0.76	0.84	0.77	3749

After Tuning

	GridSearchCV	RandomizedSearchCV
Accuracy	0.845	0.845
Precision	0.666	0.666
Recall	0.013	0.013
F1Score	0.026	0.026
ROC_AUC	0.506	0.506

CONCLUSION

- We can see that the model accuracy is 84% before and 84.31% after tuning so that model is a good fit.
- These results suggest that the model is effective in predicting whether an asteroid is hazardous or not

THANK YOU