Let me simplify this for you in **short and easy steps** with an example.

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1. What is Happening Here? This process calculates a **fraud score** for transactions. It uses: - Fraud **probability** (likelihood of fraud) - **Expected fraud amount** (amount of money at risk)

The **decision boundary** and **diagonal length** help determine how "fraudulent" a transaction is.

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2. Key Concept – Decision Boundary Imagine a graph: - X-axis: **Expected Fraud Amount** - Y-axis: **Fraud Probability**

Each **boundary** (e.g., 99- Transactions **above the line** are more likely to be fraud. - The **diagonal** is a line from the origin (0,0) to a point on the boundary.

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3. Simple Steps to Calculate Fraud Score

Step 1: Find the Fraud Probability and Amount Example: - Fraud Probability = **0.8** (80- Expected Fraud Amount = **4000**

Step 2: Calculate the Diagonal Length The diagonal length is the distance from (0,0) to the transaction point:

$$DiagonalLength = \sqrt{(Probability^2 + Amount^2)}$$

Here:

$$DiagonalLength = \sqrt{(0.8)^2 + (4000)^2} \approx 4000.8$$

Step 3: Normalize the Diagonal Length - Normalize it by dividing by the **99th percentile diagonal length** (say it's 5000):

$$NormalizedLength = \frac{DiagonalLength}{DiagonalLengthat99thPercentile}$$

Here:

$$NormalizedLength = \frac{4000.8}{5000} = 0.8$$

Step 4: Apply the Transformation Function Use the formula to calculate the fraud score:

$$FraudScore = 1000 \times \frac{\exp(NormLength) - 1}{\exp(NormLength) + 1}$$

Substitute **Normalized Length = 0.8**:

$$FraudScore = 1000 \times \frac{\exp(0.8) - 1}{\exp(0.8) + 1}$$

After calculation: - Fraud Score **468**

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4. What Does the Score Mean? - The fraud score tells you how risky the transaction is. - **Higher scores** mean higher fraud risk.

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Summary

1. Find the fraud probability and expected fraud amount. 2. Calculate the diagonal length. 3. Normalize it using the 994. Use the formula to calculate the fraud score.

Example Result: Fraud Score = **468** → Moderate Risk

Let me know if you want me to break down any step further!

fraud

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1 Introduction