

Artificial Intelligence(AI101B) Medical Diagnosis with Naive Bayes PRESENTED MSE-2

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PRESENTED

TO-
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Problem Statement

Early and accurate detection of breast cancer significantly increases the chances of successful treatment and survival. Traditional diagnostic procedures may be time-consuming, subjective, and error-prone. Therefore, there is a pressing need for a computational model that can assist healthcare professionals by providing rapid, data-driven decisions. This project aims to build a machine learning-based diagnostic system that uses the **Gaussian Naive Bayes algorithm** to classify tumors based on features



Objective

To develop an accurate and efficient breast cancer diagnosis system using the **Gaussian Naive Bayes** algorithm that analyzes cellular features from the **Wisconsin Breast Cancer Dataset**, and classifies tumors as **malignant** or **benign**.



Methodology



Data Collection

Gather relevant data from diverse sources.



Preprocessing

Clean, normalize, and engineer data.



Data Visualization

Compare multiple AI models to determine the most accurate and efficient one.

Result and Impact



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Breast Cancer Diagnosis Tool

Naive Bayes-powered early breast cancer screening assistant

Diagnosis Tool | Model Performance | Education

About Features | About The Tool | When To Seek Help

When to Seek Medical Help

Warning Signs of Breast Cancer

- A new lump or mass in the breast
- Thickening or swelling of part of the breast
- Irritation or dimpling of breast skin
- Redness or flaky skin in the nipple area or the breast
- Pulling in of the nipple or pain in the nipple area
- Nipple discharge other than breast milk
- Any change in the size or the shape of the breast
- Pain in any area of the breast

Remember

Early detection is key in breast cancer treatment. Regular self-examinations and screenings as recommended by your healthcare provider are essential.

This tool is for educational purposes only and does not replace professional medical advice.

Use via API | Built with Gradio | Settings

37°C Haze | Search | [Icons]

Result and Impact



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Breast Cancer Diagnosis Tool

Naive Bayes-powered early breast cancer screening assistant

Diagnosis Tool Model Performance Education

Input Tumor Measurements

Radius Mean	10.2	↕
Concavity Mean	0.026	↕
Perimeter Worst	75	↕
Area Mean	280	↕
Concave Points Mean	0.02	↕

Analyze

Analysis Results

Diagnosis Results

Prediction: ● Benign **Probability of Malignancy:** 0.00 (0%) **Recommendation:** ✔ No malignancy detected. Continue routine checkups.

Value Analysis

- Radius Mean: 10.20 (Closer to typical benign value)
- Concavity Mean: 0.03 (Closer to typical benign value)
- Perimeter Worst: 75.00 (Closer to typical benign value)
- Area Mean: 280.00 (Closer to typical benign value)
- Concave Points Mean: 0.02 (Closer to typical benign value)

Probability Analysis

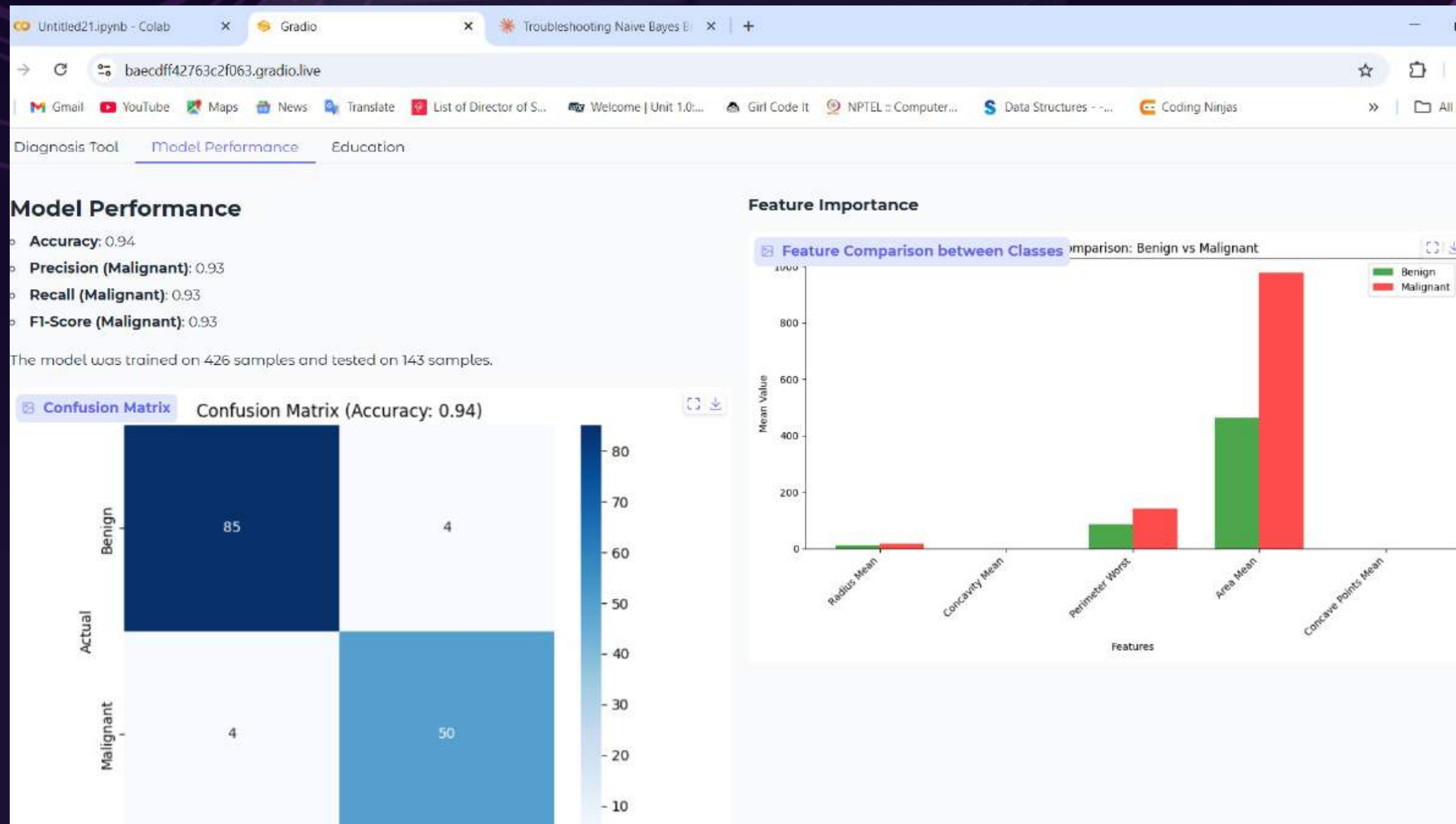
Malignancy Probability

Malignant

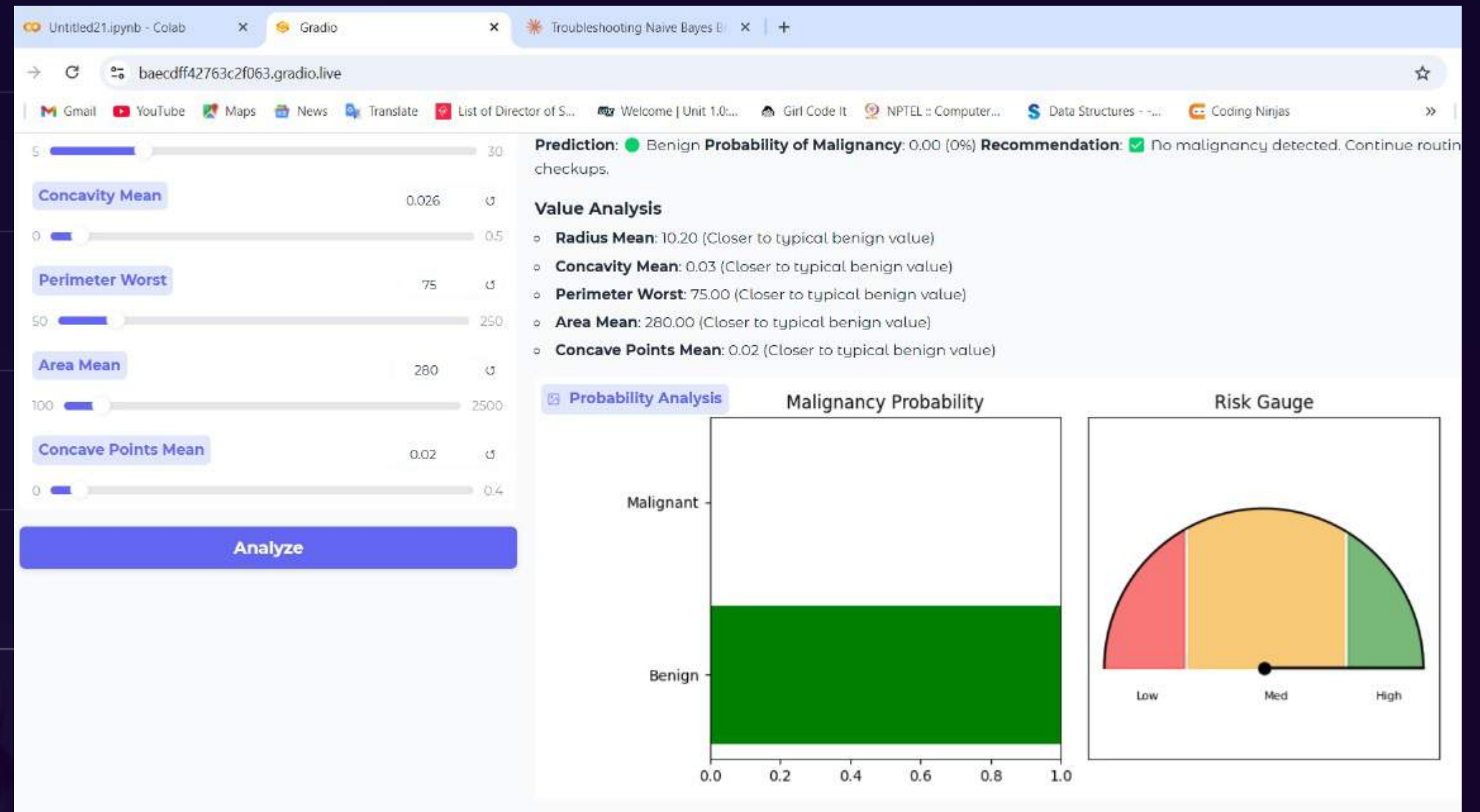
Risk Gauge

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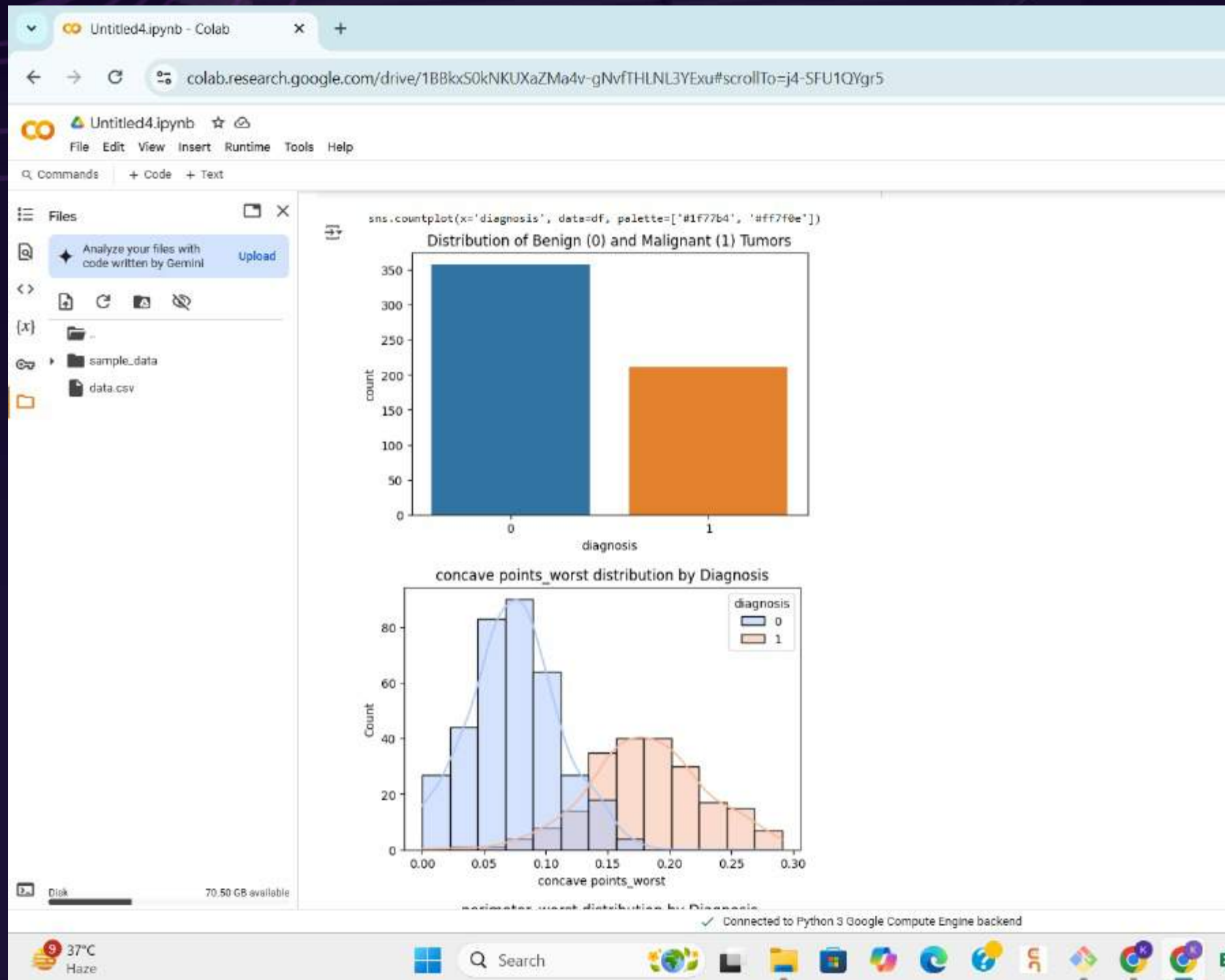
Result and Impact



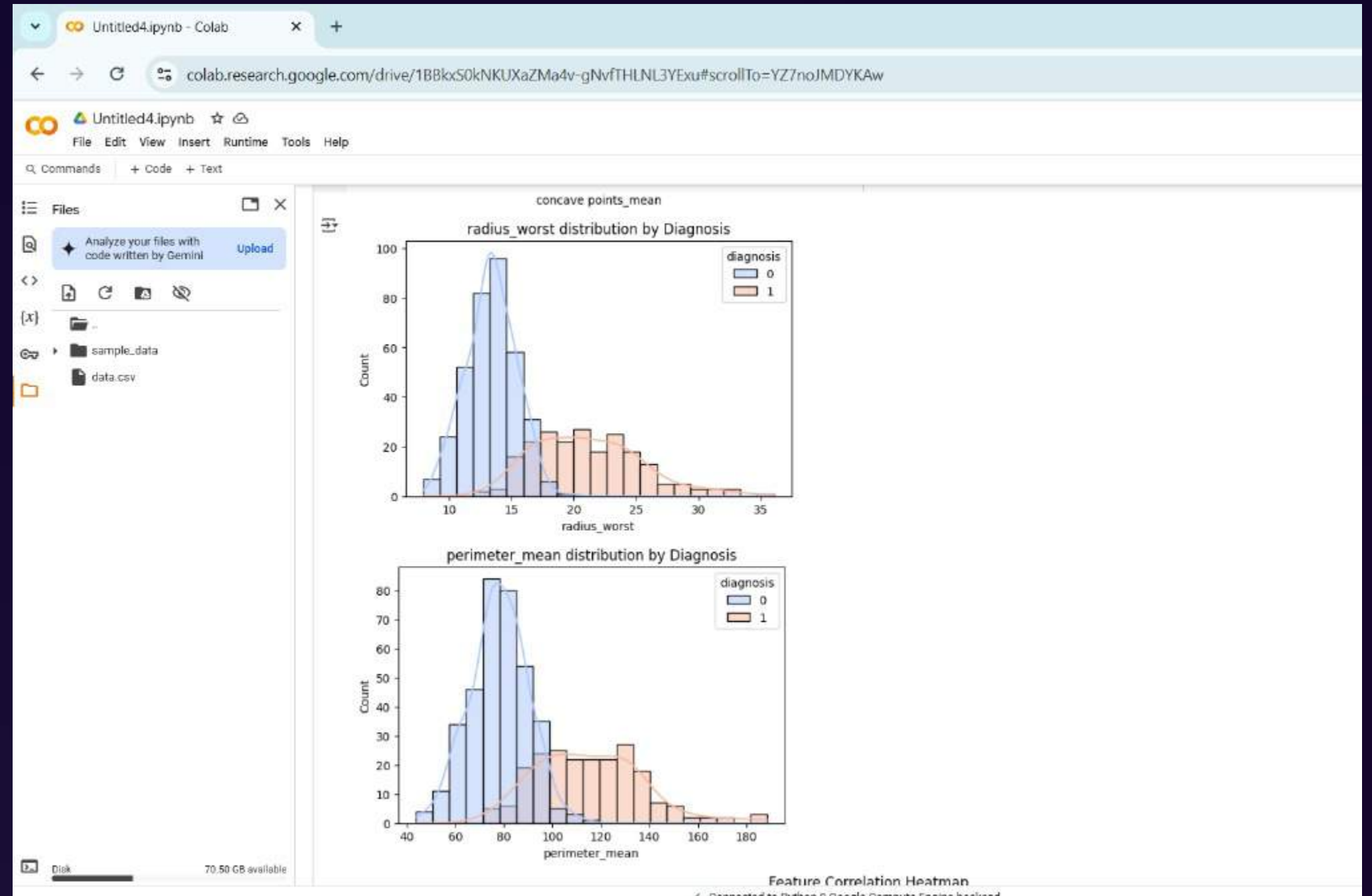
Result and Impact



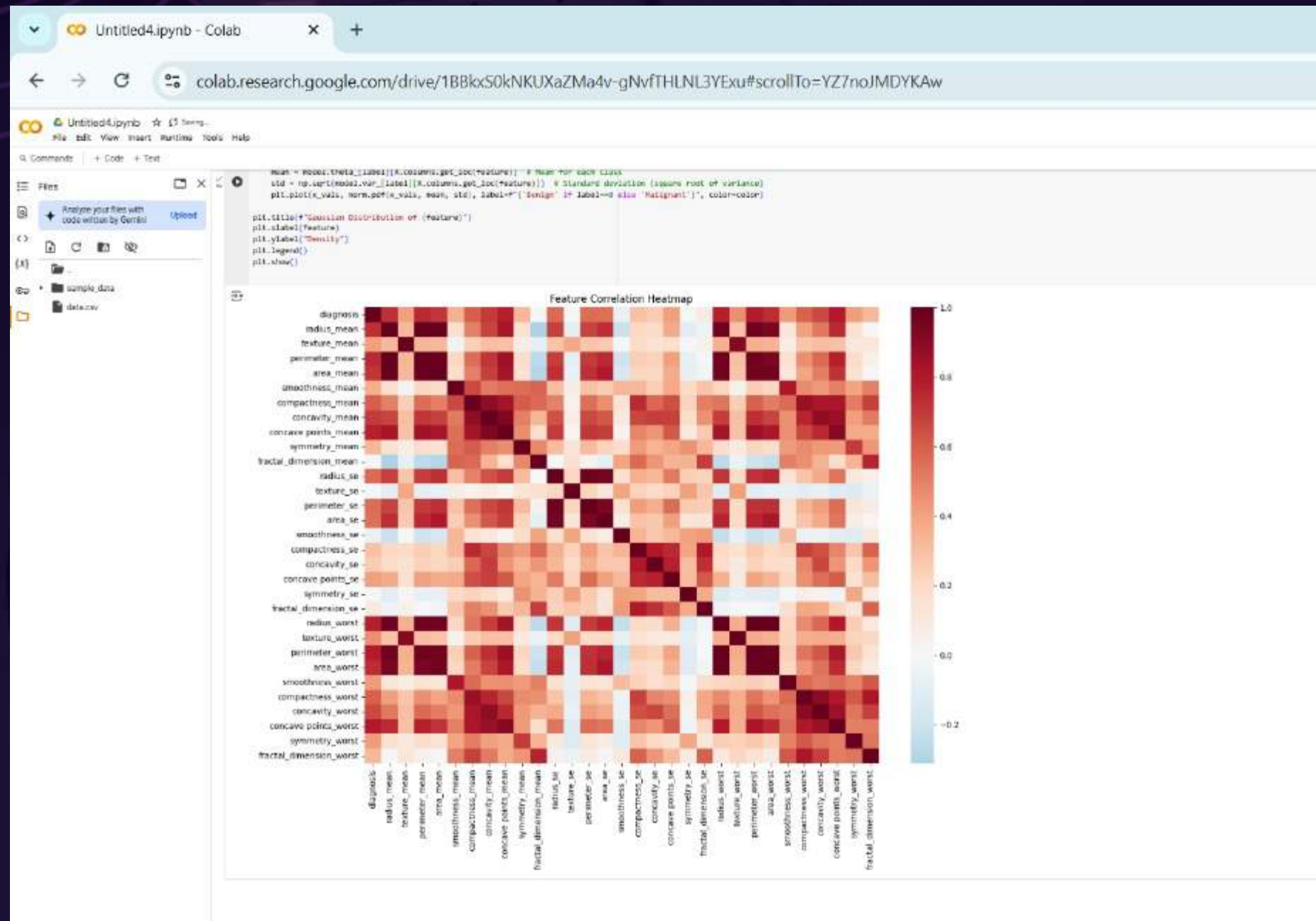
Result and Impact



Result and Impact



Result and Impact



A woman is wearing a VR headset, looking directly at the camera. The word "Insights" is written in large, white, sans-serif font across the center of her face. The background is dark and slightly blurred, showing the VR headset and some light reflections.

Insights

- **High Accuracy:** Gaussian Naive Bayes achieved ~96% accuracy, showing strong performance in classifying tumors as benign or malignant.
- **Fast & Efficient:** The model trains and predicts quickly, making it suitable for real-time or resource-limited settings.
- **False Negatives Are Low:** The model showed high recall for malignant cases — crucial in medical diagnosis.
- **Performs Well Despite Assumptions:** Even though it assumes feature independence and normal distribution, it still performs robustly

Recommendation

Based on the findings, the following recommendations were made:

- **Clinical Integration:** Use the model as a decision-support tool in diagnostic workflows.
- **Validate on Real-World Data:** Test with diverse and noisy datasets to ensure reliability beyond the benchmark dataset.
- **Confidence Thresholding:** Flag low-confidence predictions for manual review to reduce risk.
- Enhance SEO efforts to maximize organic traffic acquisition



Thank You!