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**Breast Cancer Analysis Using Power BI**

**🔷 1. Problem Statement**

Breast cancer remains one of the leading causes of death among women worldwide. Detecting the disease at an early stage is critical to improving patient outcomes. However, large medical datasets can be difficult to interpret manually. There is a growing need for an interactive, visual solution to help clinicians, researchers, and decision-makers understand complex medical data quickly and accurately.

**🔷 2. Project Abstract**

This project aims to develop a comprehensive and interactive **Power BI dashboard** for visualizing and analyzing breast cancer data. Using a dataset that includes multiple clinical measurements of tumor characteristics, the dashboard categorizes tumors as benign or malignant. It helps uncover patterns through visualizations such as bar charts, pie charts, scatter plots, and key performance indicators (KPIs). This solution enhances data understanding, supports medical analysis, and provides a strong foundation for future clinical decision-making tools.

**🔷 3. Proposed Solution**

We propose using **Microsoft Power BI** to create a visual and interactive dashboard for breast cancer data analysis. The main steps include:

* Importing and cleaning the dataset
* Converting categorical and numeric fields for analysis
* Creating key indicators such as total patients and diagnosis counts
* Building meaningful charts to display relationships between features
* Applying a custom medical-themed color palette
* Enabling slicers/filters for dynamic interaction

**🔷 4. Database Design / Dataset Structure**

The dataset contains 569 patient records and the following columns:

| **Column Name** | **Description** |
| --- | --- |
| id | Unique Patient Identifier (excluded) |
| diagnosis | Diagnosis (B = Benign, M = Malignant) |
| radius\_mean | Average radius of the tumor |
| texture\_mean | Average texture |
| perimeter\_mean | Average perimeter |
| area\_mean | Average area |
| smoothness\_mean | Average smoothness |
| compactness\_mean | Average compactness |
| concavity\_mean | Average concavity |
| symmetry\_mean | Average symmetry |
|  |

**🔷 5. DAX Measures Used**

Total Patients = COUNTROWS('Table')

Total Malignant = CALCULATE(COUNT('Table'[diagnosis]), 'Table'[diagnosis] = "M")

Total Benign = CALCULATE(COUNT('Table'[diagnosis]), 'Table'[diagnosis] = "B")

These measures are displayed using **Card visuals**.

**🔷 6. Dashboard Output**

The Power BI Dashboard includes the following visuals:

| **Feature** | **Description** |
| --- | --- |
| **KPI Cards** | Shows Total Patients, Malignant, and Benign counts |
| **Pie Chart** | Distribution of diagnosis (B vs. M) |
| **Bar Charts** | Average of radius\_mean and texture\_mean by diagnosis |
|  |  |

**🔷 7. Future Scope**

* **Integrate Machine Learning**: Predict diagnosis based on input features using models like Random Forest or SVM.
* **Live Clinical Integration**: Connect with real-time hospital EMRs (Electronic Medical Records).
* **Multi-Disease Dashboard**: Extend the same format to other datasets such as lung, liver, or cervical cancer.
* **Mobile Optimization**: Design a mobile-friendly dashboard for healthcare professionals on the go.
* **Power BI Cloud Service**: Publish and share the dashboard across organizations securely.

**🔷 Conclusion**

This breast cancer analysis dashboard simplifies complex medical data into an intuitive and interactive format. With its clear visualization and dynamic features, it can help medical professionals gain insights, assist in early diagnosis, and serve as a strong foundation for AI-based clinical tools in the future.