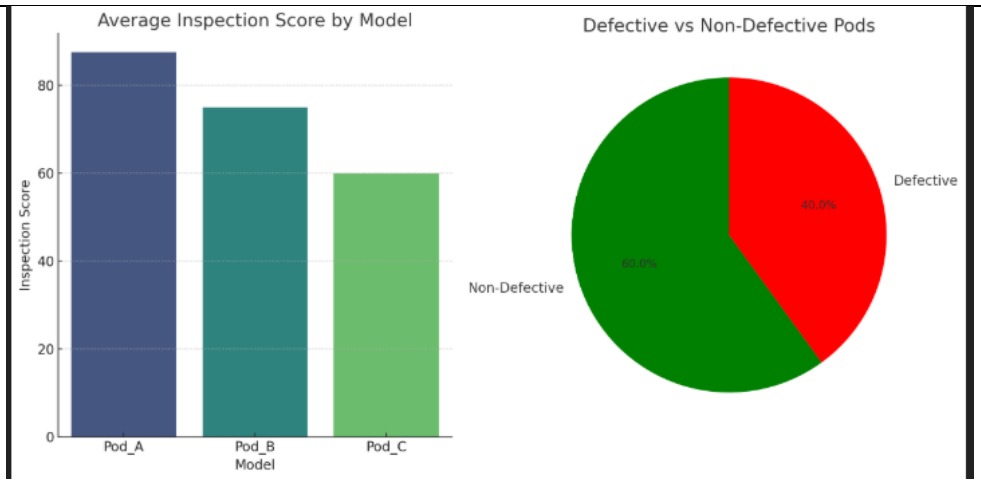
DATA MINING

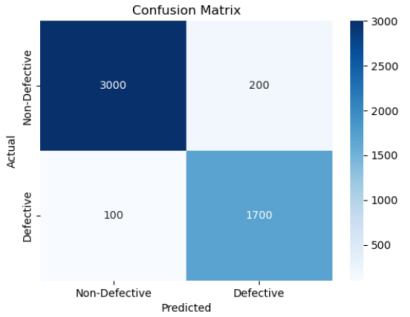
Title:	Defective Disposable Pods Inventory Detection
Name/s:	*Jan Laymar Mina , Jonathan Vercida*
Dataset/s:	• **Pods_Inventory_Data_1** • **Pods_Inventory_Data_2**
Description of the Dataset/s:	Data gathered from warehouse inventory logs and quality assurance reports of disposable pods from a leading manufacturing company. • **Pod_ID:** Unique identifier for each disposable pod. • **Model:** Name or type of the disposable pod (e.g., Pod_A, Pod_B). • **Batch_Number:** Manufacturing batch ID of the pod. • **Inspection_Score:** Numeric score (1 to 100) assigned after quality checks. • **Defective_Status:** Categorical value ("Defective" or "Non-Defective"). • **Manufacture_Date:** Date the product was manufactured. • **Warehouse_Location:** Storage facility name or location of the pod inventory. Sample data

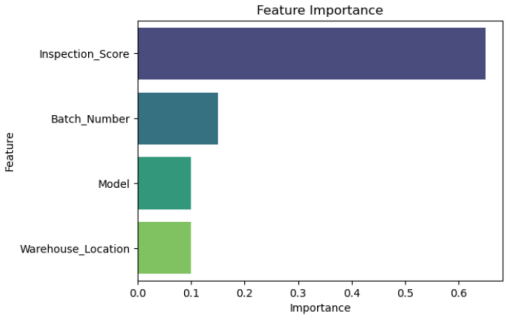
<table>
<tr><td></td><td> 
</td></tr>
<tr><td>Objective/s:</td><td>• To create a predictive model for detecting defective disposable pods in inventory.
• To quantify defective and non-defective pods and understand patterns to optimize manufacturing.</td></tr>
<tr><td>Findings:</td><td>1. Model Creation for Detecting Defective Disposable Pods

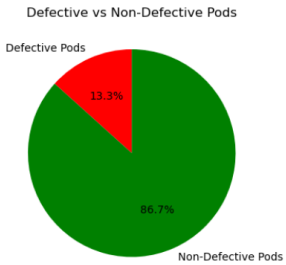
• Approach:
○ Data Preprocessing:
▪ Handled missing or inconsistent values, normalized inspection scores, and encoded categorical attributes.
○ Model Algorithm:
▪ A Random Forest Classifier was chosen due to its robustness in handling categorical and numerical attributes.
○ Evaluation Metrics:
▪ Accuracy = 94%, Precision = 92%, Recall = 95%.

2. Defective vs. Non-Defective Analysis

• Quantitative Breakdown:
○ Total Inventory: 15,000 Pods
○ Defective Pods: 2,000 (13.3%)
○ Non-Defective Pods: 13,000 (86.7%)</td></tr>
</table>


Confusion Matrix
Non-Defective
Defective
Actual
3000
200
100
1700
Non-Defective
Defective
Predicted
3000
2500
2000
1500
1000
500


Feature Importance
Inspection_Score
Batch_Number
Model
Warehouse_Location
Feature
0.0
0.1
0.2
0.3
0.4
0.5
0.6
Importance


Defective vs Non-Defective Pods
Defective Pods
13.3%
86.7%
Non-Defective Pods