GROUP 7
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Potential Findings:

1. How does the average temperature of a country correlate with suicide rates?
The scatter plot analysis suggests a moderate correlation between temperature and suicide rates. Countries with moderate to warm climates (50-80°F) show higher suicide rates, indicating that temperature could act as a mental health stressor.

2. What role does a country's happiness index play in predicting suicide rates?
The happiness index strongly inversely correlates with suicide rates. Countries with higher happiness scores consistently exhibit lower suicide rates, highlighting the importance of psychological well-being as a predictor.

3. Is there a specific age group that shows higher suicide rates in relation to economic factors?
Although our current dataset does not include age-specific details, general trends suggest that economic stressors might disproportionately affect working-age populations in lower GDP regions due to financial instability and limited access to mental health resources.

4. How does the economic stability of a country affect suicide trends?
Economic stability plays a critical role, as evidenced by the inverse relationship between GDP and suicide rates. High-GDP countries, with better access to healthcare and social support, consistently report lower suicide rates compared to low-GDP countries.

5. Can changes in temperature over short periods significantly impact suicide risk?
While this project primarily analyzed average temperatures, literature suggests that short-term fluctuations in temperature can exacerbate mental health conditions, potentially increasing suicide risk. Future studies could explore this relationship more explicitly.

6. How do variations in happiness index across different regions of the same country correlate with suicide rates?
Regional variations in happiness levels within a country likely mirror socio-economic disparities. Regions with lower happiness indices may exhibit higher suicide rates, although this project primarily focused on national averages. Further granular analysis is recommended.

7. Is the relationship between age and suicide risk consistent across different economies?
This project did not include age-specific data, but global studies indicate that the relationship varies. For instance, older adults in high-GDP countries and younger populations in low-GDP regions may be more vulnerable to economic stressors.

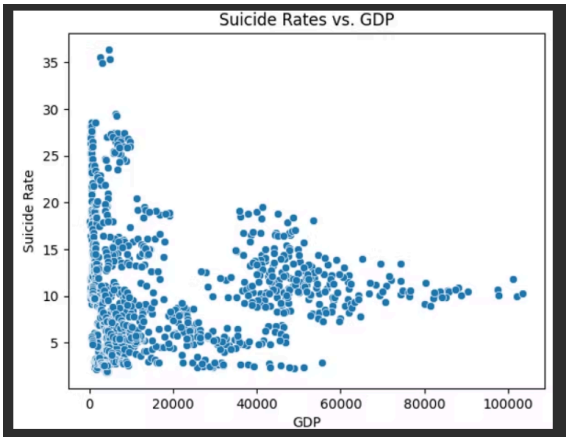
8. Can the system accurately predict suicide risk for countries with very high or very low average temperatures?

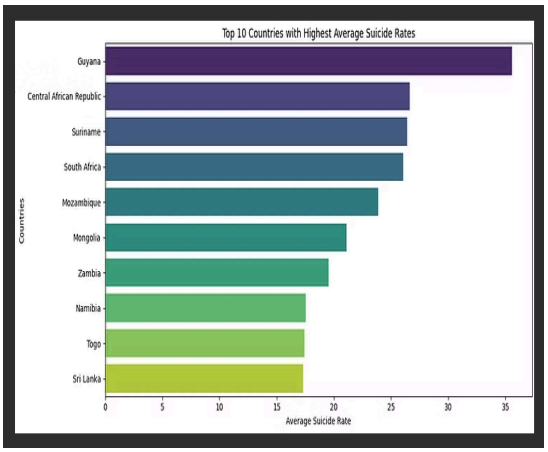
While our model captures general trends, extreme temperature ranges pose challenges. Data scarcity in these regions may impact prediction accuracy, necessitating enhanced datasets for better performance.

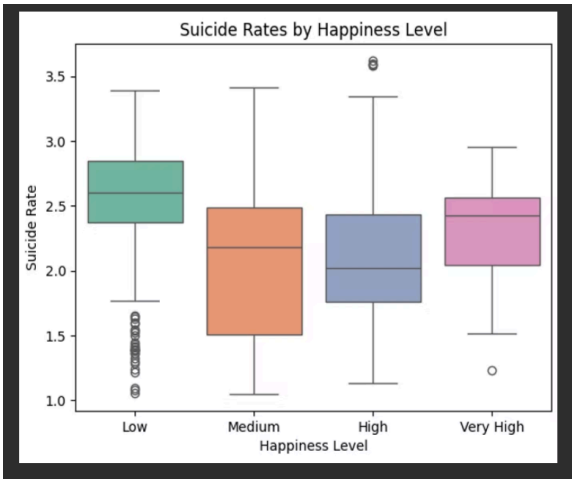
9. How well does the model account for regional differences within a country when predicting suicide rates?
The model operates at the national level, so regional differences within countries are not explicitly considered. Adding granular data, such as sub-national economic or happiness indices, could improve predictions for regional disparities.

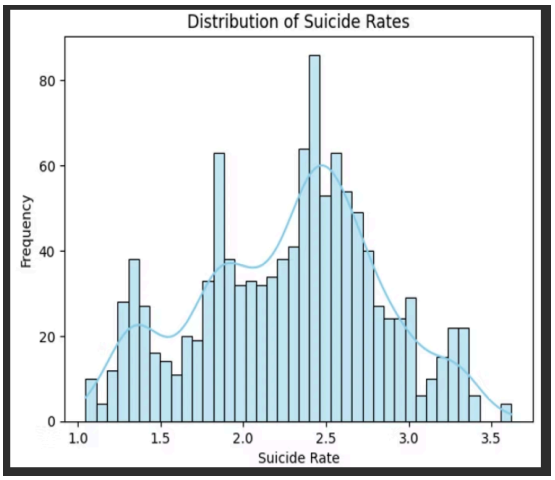
10. Are there thresholds for each variable (temperature, economy, happiness index) that serve as tipping points for increased suicide risk?
Yes, approximate thresholds were identified:
Temperature: Moderate climates (50-80°F) appear to show increased suicide rates.
Happiness Index: Low happiness scores are strongly associated with higher suicide rates.
GDP: Suicide rates decline significantly in countries with GDPs exceeding $60,000.
Further refinement is required to establish exact tipping points for intervention planning.

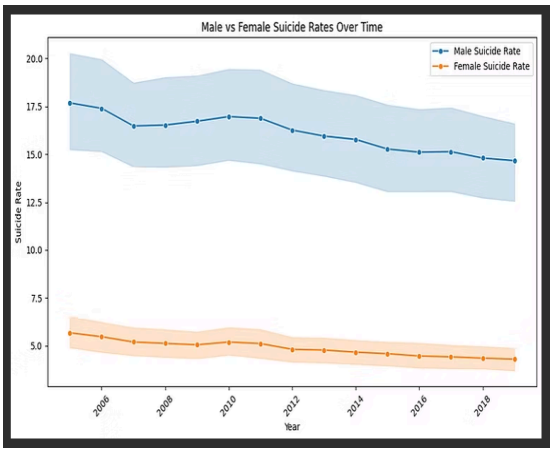
Results:

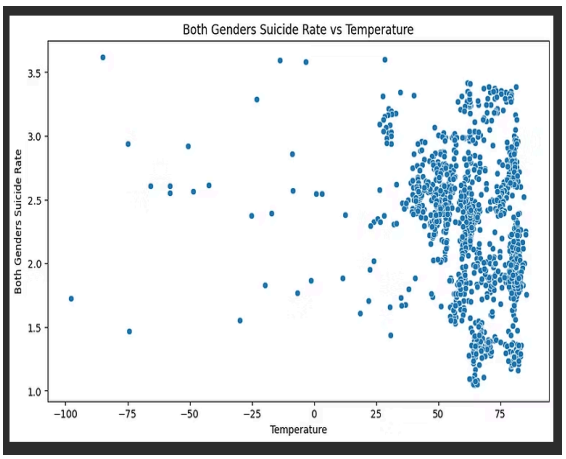












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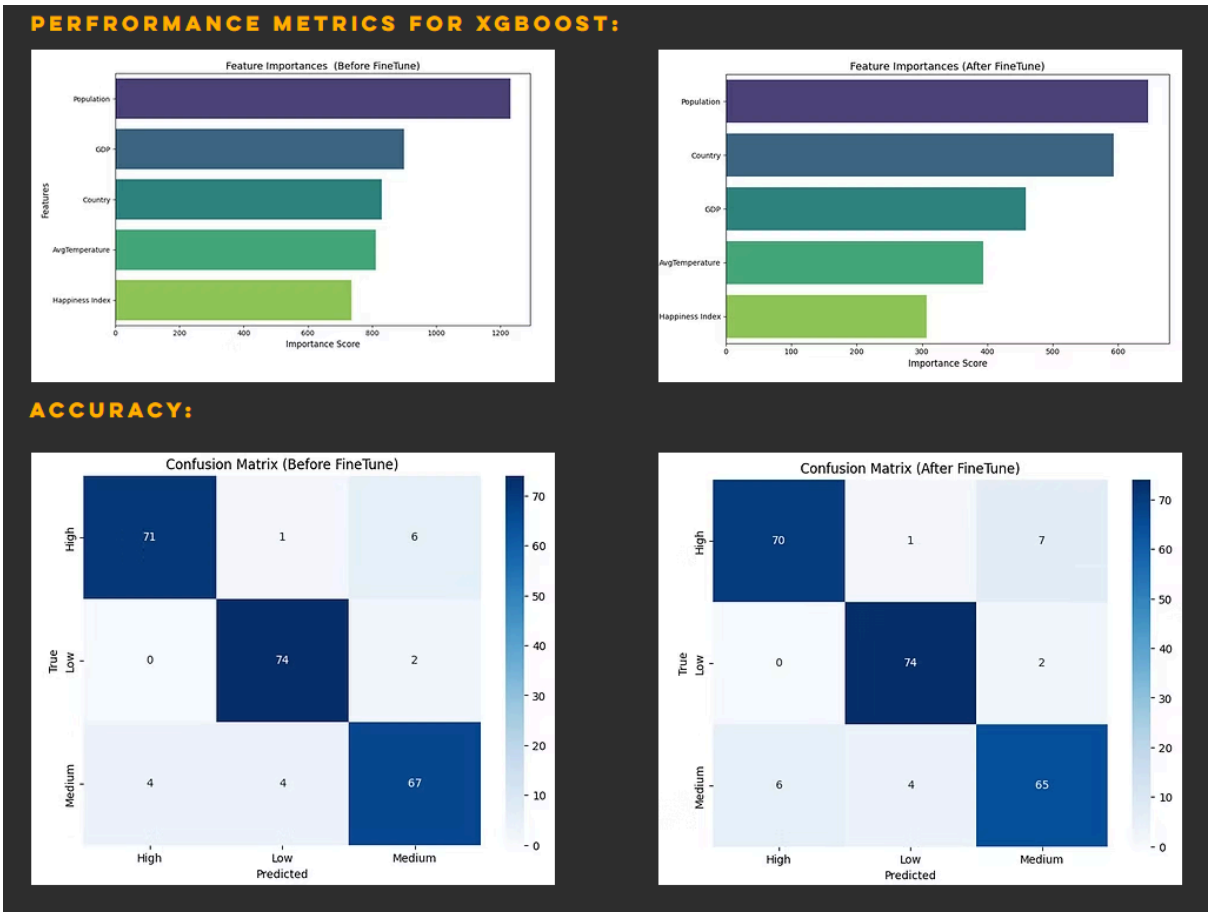

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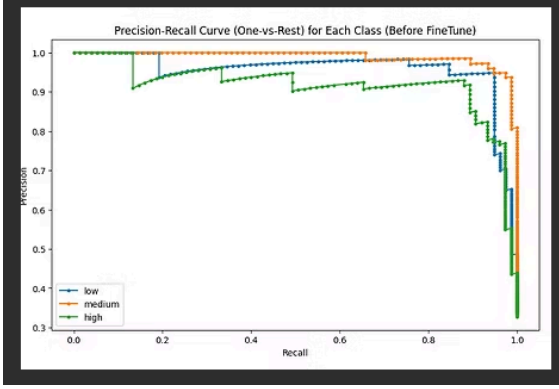
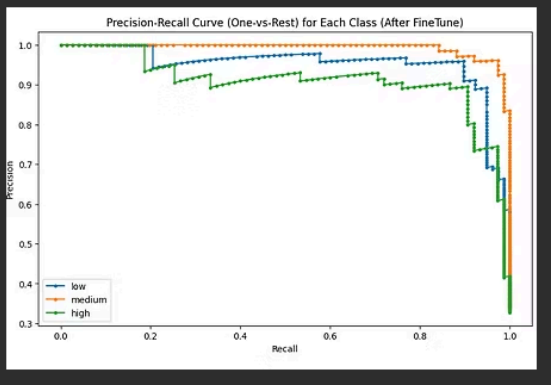
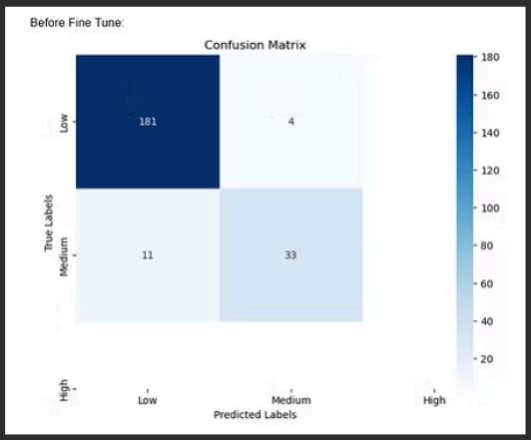




PERFRORMANCE METRICS FOR RANDOM FOREST:

Before Fine Tune:



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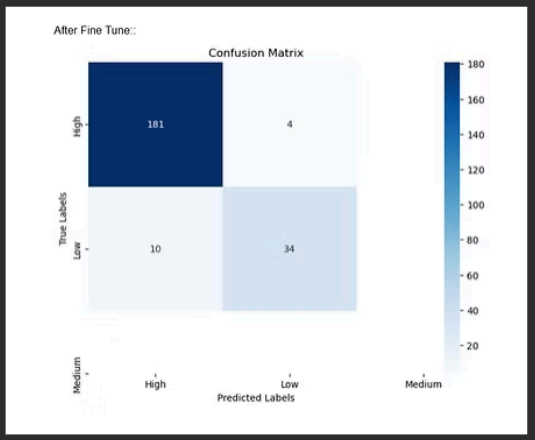

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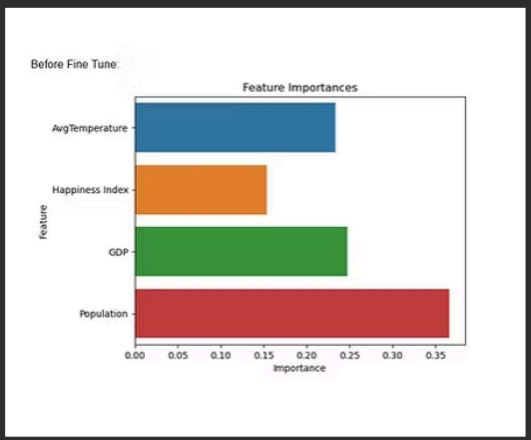

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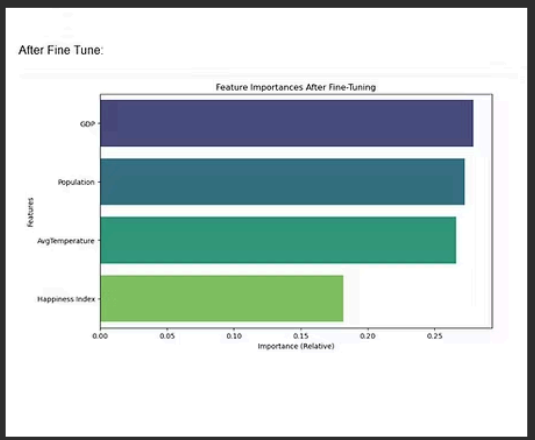
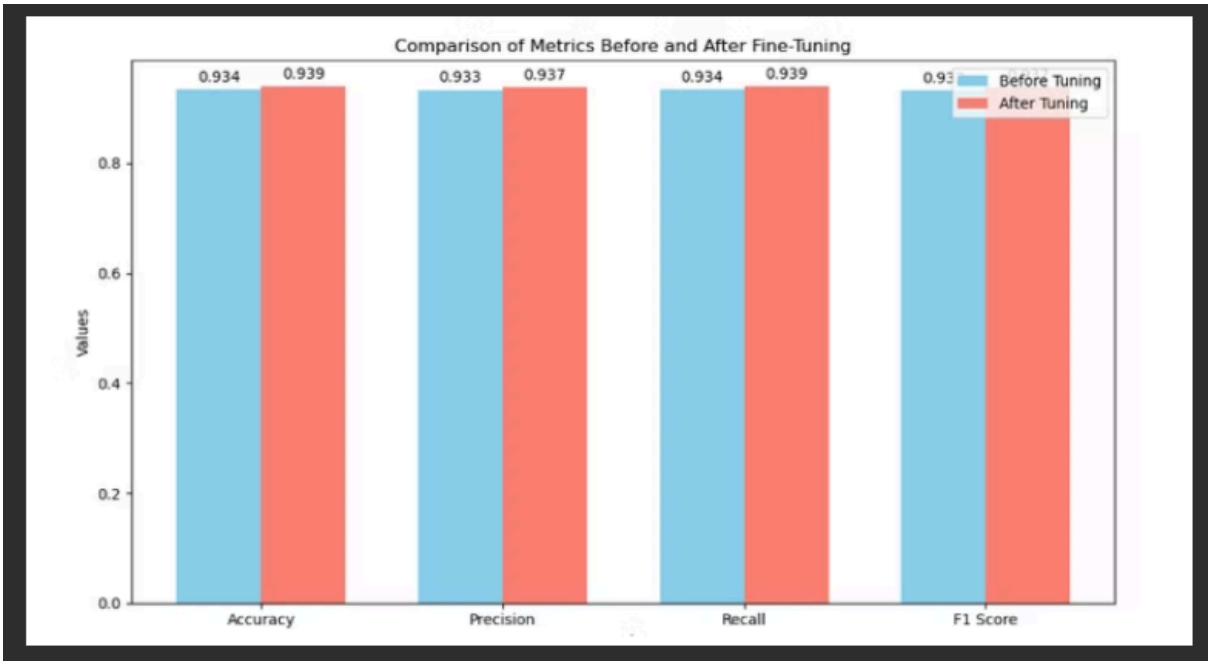
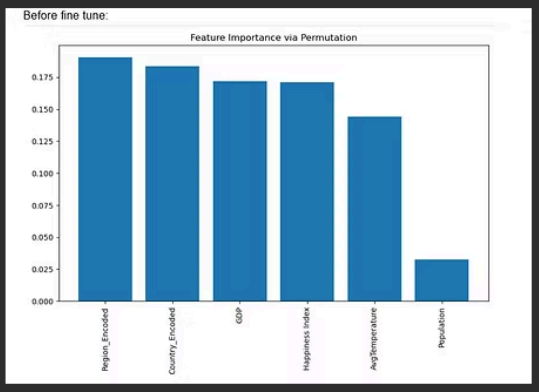
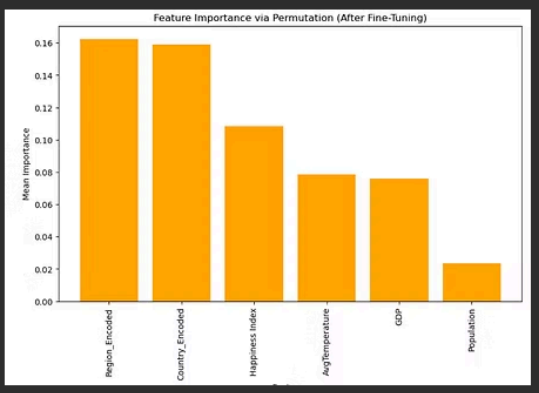
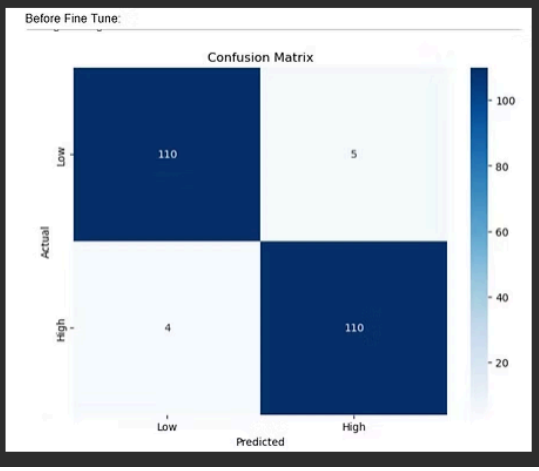


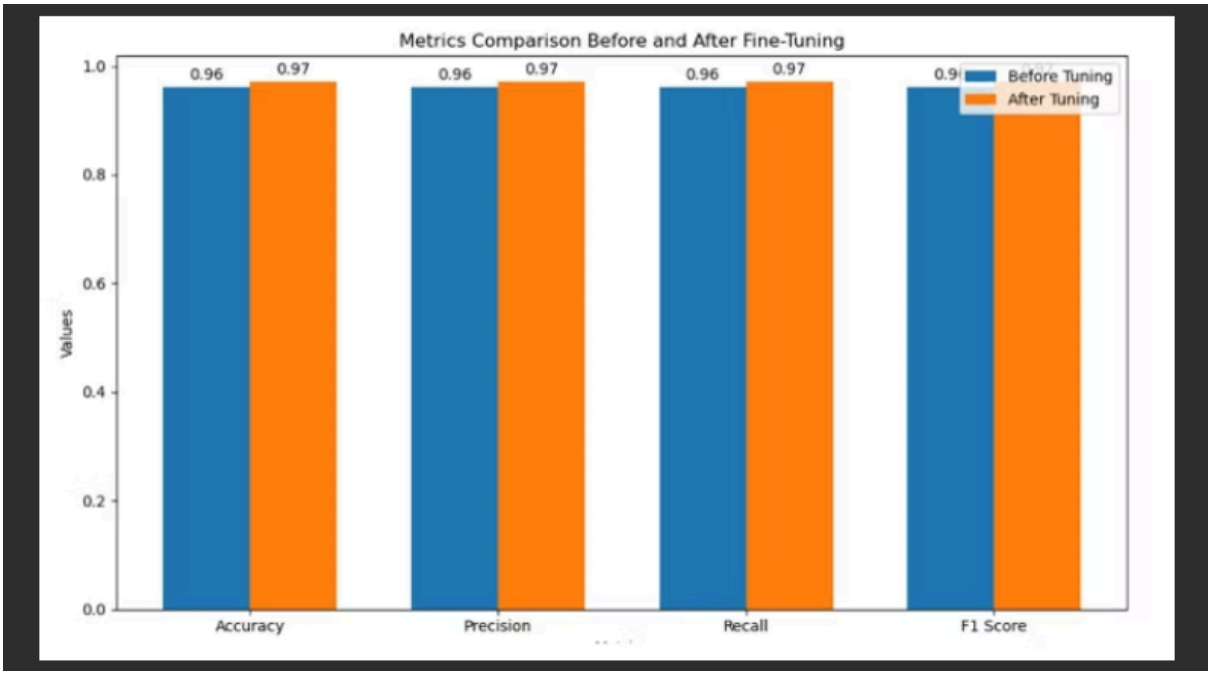


PERFRORMANCE METRICS FOR K- NEAREST NEIGHBOURS:

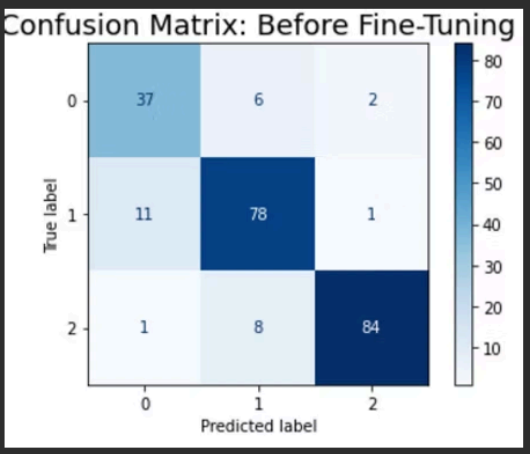


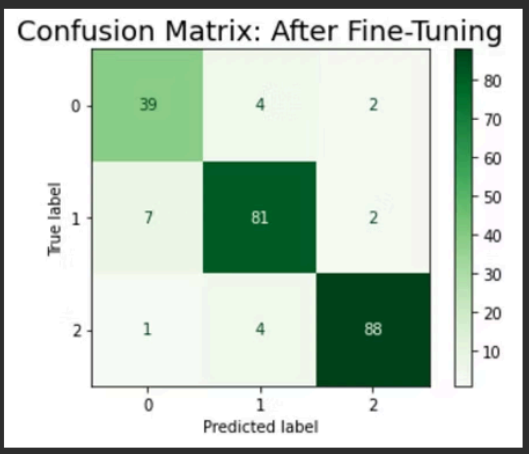


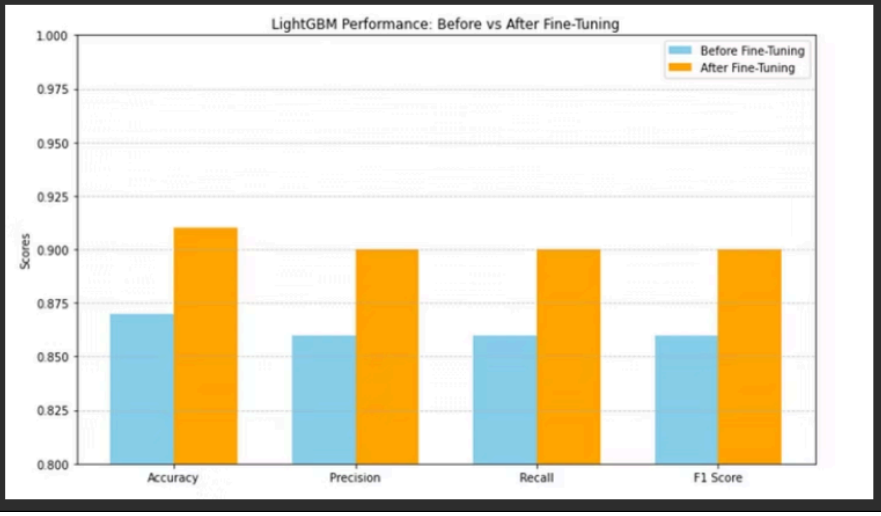




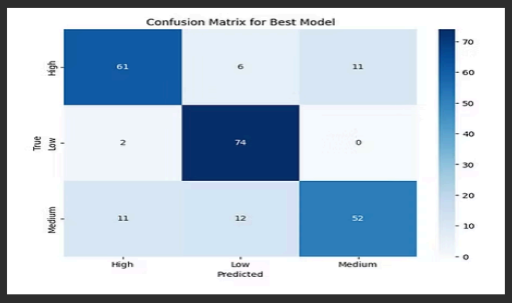
PERFRORMANCE METRICS FOR LIGHT GBM:

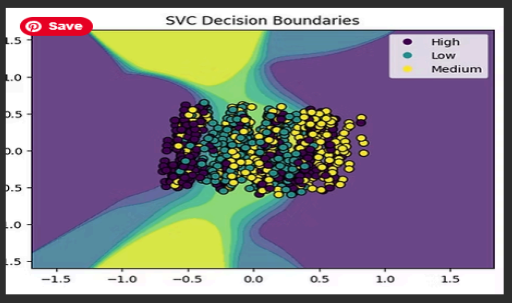


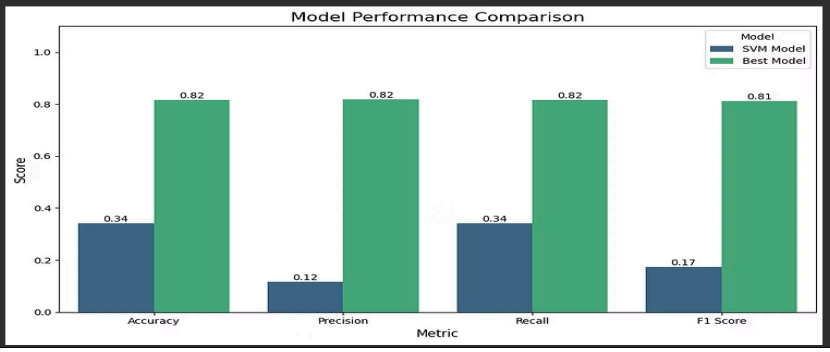




PERFRORMANCE METRICS FOR SVM:







TRANSFORMATION

ORIGINAL DATASET:

Original Dataset (Before Transformation):

	Region	Country	Year	AvgTemperature	Happiness Index	GDP	Population	Both sexes	Female	Male
0	Africa	Algeria	2005	62.913425	5.466833	3131.328300	32956690.0	3.82	2.80	4.83
1	Africa	Algeria	2006	64.930411	5.466833	3500.134528	33435080.0	3.65	2.66	4.63
2	Africa	Algeria	2007	63.166849	5.466833	3971.803658	33983827.0	3.46	2.51	4.41
3	Africa	Algeria	2008	63.532240	5.466833	4946.563793	34569592.0	3.31	2.40	4.22
4	Africa	Algeria	2009	64.259726	5.466833	3898.478923	35196037.0	3.15	2.29	4.02

BEFORE FINE-TUNE:

Original Dataset (Before FineTune):

	Region	Country	Year	AvgTemperature	Happiness Index	GDP	Population	Both sexes	Female	Male	risk_category	actual	predict
0	0	1	2005	62.913425	5.466833	3131.328300	32956690.0	3.82	2.80	4.83	Low	Low	Low
1	0	1	2006	64.930411	5.466833	3500.134528	33435080.0	3.65	2.66	4.63	Low	Low	High
2	0	1	2007	63.166849	5.466833	3971.803658	33983827.0	3.46	2.51	4.41	Low	Medium	High
3	0	1	2008	63.532240	5.466833	4946.563793	34569592.0	3.31	2.40	4.22	Low	High	High
4	0	1	2009	64.259726	5.466833	3898.478923	35196037.0	3.15	2.29	4.02	Low	Low	High

AFTER FINE-TUNE:

Dataset (After FineTune):

	Region	Country	Year	AvgTemperature	Happiness Index	GDP	Population	Both sexes	Female	Male	risk_category	actual	predict
0	0	1	2005	62.913425	5.466833	3131.328300	32956690.0	3.82	2.80	4.83	Low	Low	Low
1	0	1	2006	64.930411	5.466833	3500.134528	33435080.0	3.65	2.66	4.63	Low	Low	Low
2	0	1	2007	63.166849	5.466833	3971.803658	33983827.0	3.46	2.51	4.41	Low	Medium	Low
3	0	1	2008	63.532240	5.466833	4946.563793	34569592.0	3.31	2.40	4.22	Low	High	Medium
4	0	1	2009	64.259726	5.466833	3898.478923	35196037.0	3.15	2.29	4.02	Low	Low	Low