Parallel & Distributed Computing Project Report

Date: 2026-01-04 04:30

Dataset Snapshot

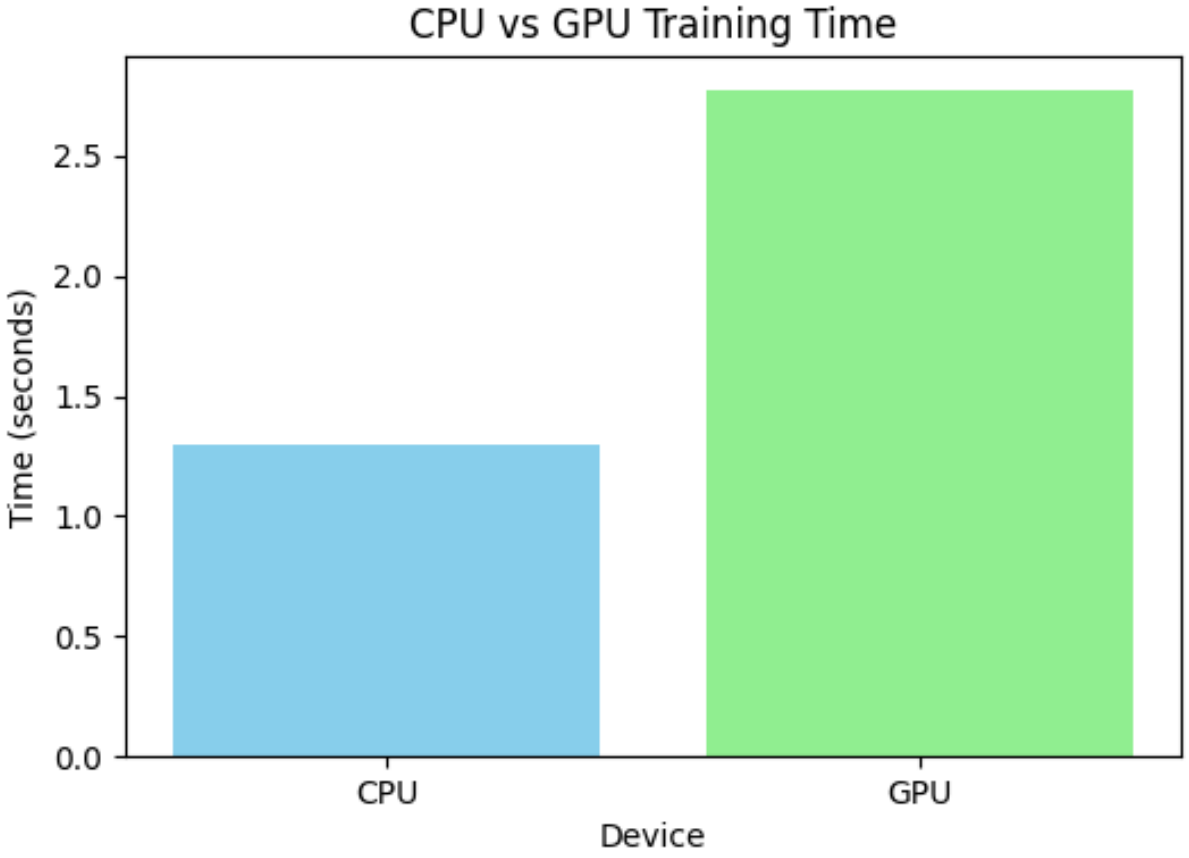
	gender	age	hypertension	heart_disease	ever_married	work_type	Residence_type	avg_glucose_level	bmi	smoking_status	stroke	split
0	-0.840344	0.205661	-0.327962	-0.239061	0.71699	-0.161118	0.987843	-0.819973	0.538479	0.589225	1.0	train
1	1.187594	-1.254901	-0.327962	-0.239061	-1.39472	-0.161118	-1.012307	0.352075	-1.020641	0.589225	1.0	train
2	-0.840344	1.046590	-0.327962	-0.239061	0.71699	0.756224	-1.012307	0.090662	-0.518114	0.589225	1.0	train
3	1.187594	0.028623	-0.327962	-0.239061	0.71699	-0.161118	0.987843	-0.903944	-0.531000	1.522127	1.0	train
4	1.187594	-1.299160	-0.327962	-0.239061	-1.39472	-1.995803	0.987843	-0.529834	0.345200	-1.276579	1.0	train

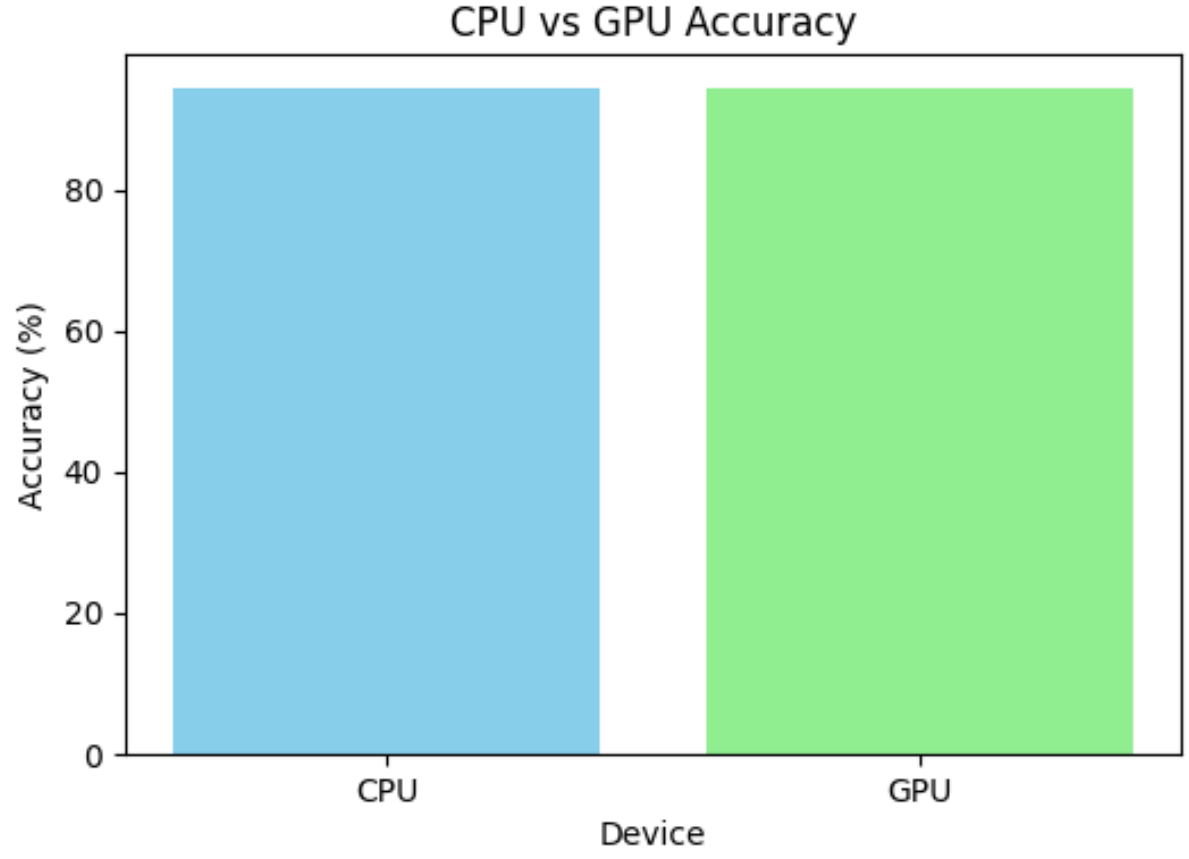
CPU & GPU Results

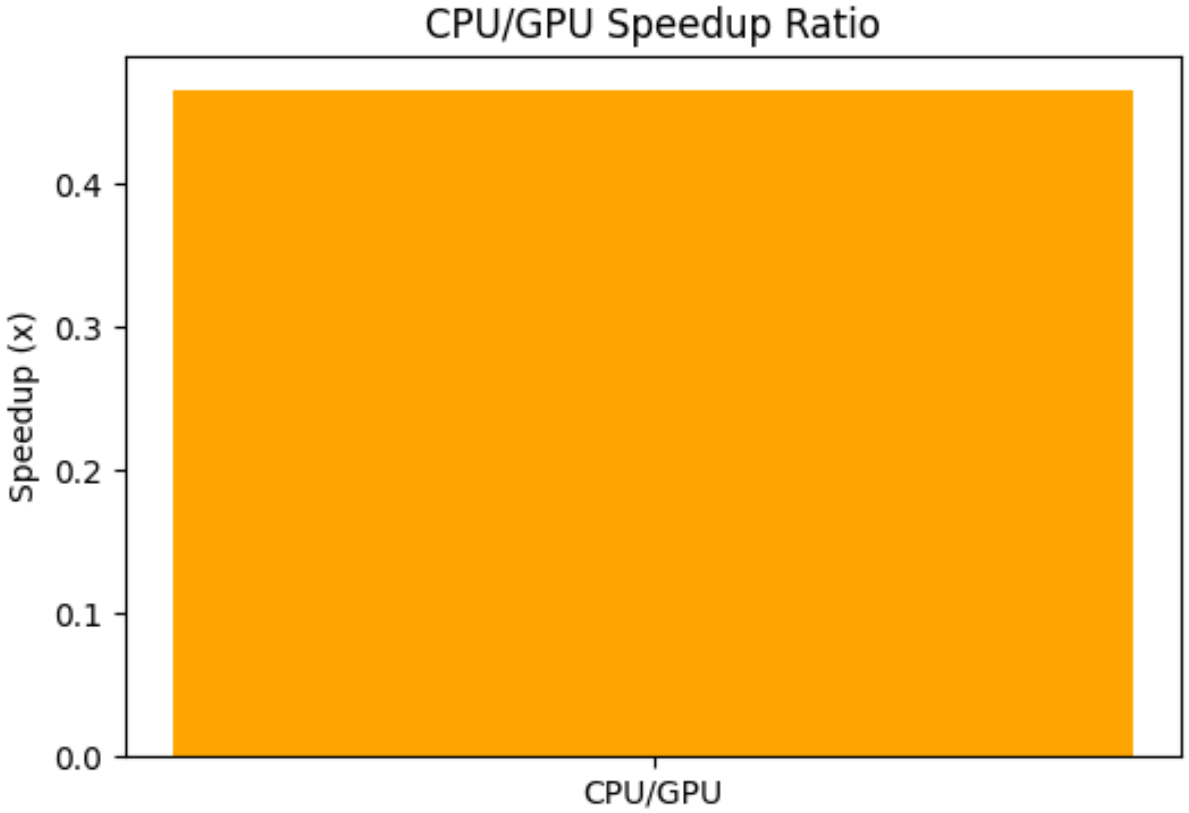
Model: LightGBM
Device: CPU
Training Time (s): 1.2930
Accuracy (%): 94.42
F1 Score: 0.12
Processor/GPU: AMD64 Family 25 Model 33 Stepping 0, AuthenticAMD

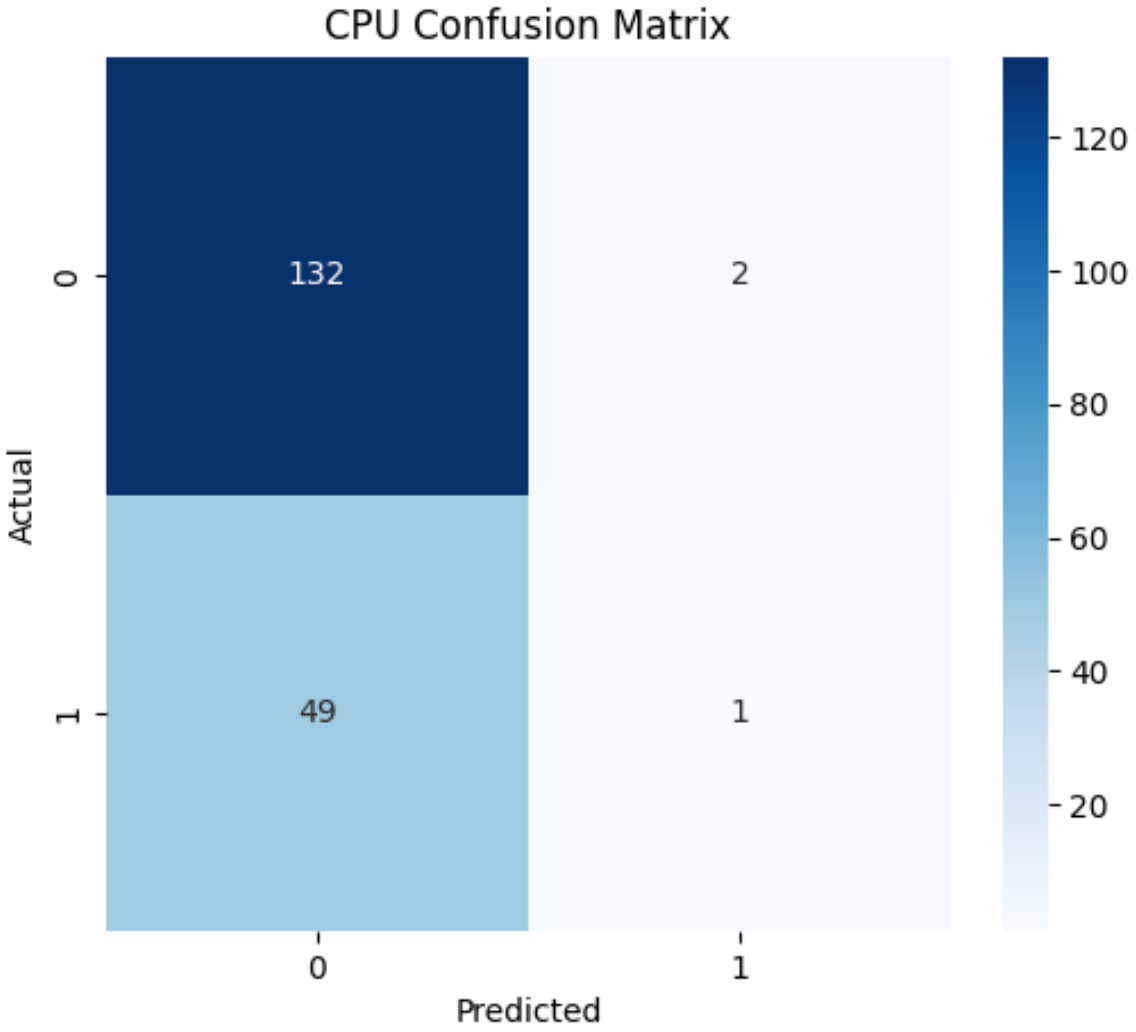
Model: LightGBM
Device: GPU
Training Time (s): 2.7763
Accuracy (%): 94.52
F1 Score: 0.12
Processor/GPU: gfx1031 | Vendor: Advanced Micro Devices, Inc.

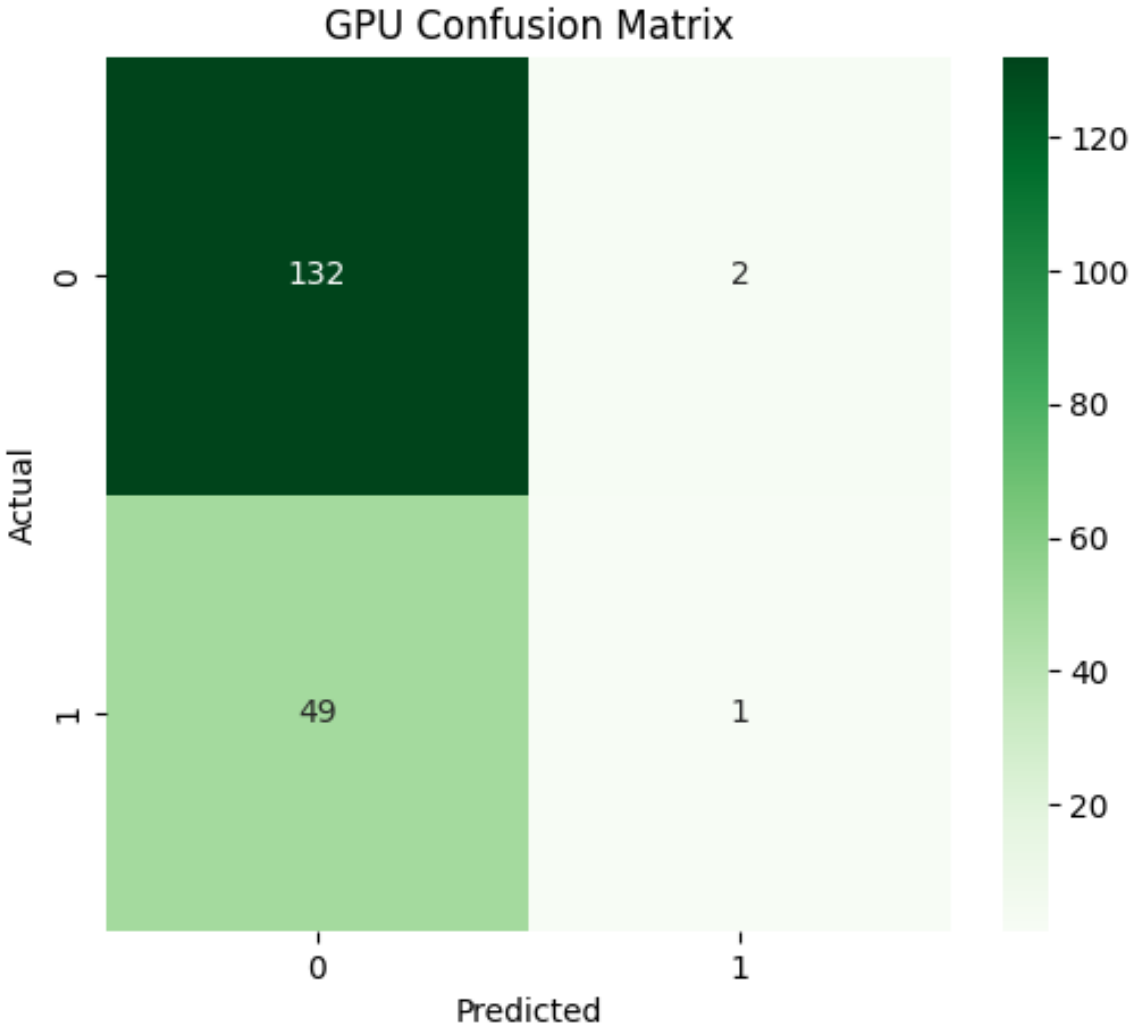
Performance Plots


CPU vs GPU Training Time
Time (seconds)
0.0
0.5
1.0
1.5
2.0
2.5
CPU
GPU
Device


CPU vs GPU Accuracy
Accuracy (%)
0
20
40
60
80
CPU
GPU
Device


CPU/GPU Speedup Ratio
Speedup (x)
0.0
0.1
0.2
0.3
0.4
CPU/GPU


CPU Confusion Matrix
132
2
49
1
0
1
Actual
0
1
Predicted
120
100
80
60
40
20



Conclusion & Observations

1. CPU and GPU models were trained on the preprocessed dataset.
2. CPU training time: 1.2930 seconds.
3. GPU training time: 2.7763 seconds.
4. Accuracy and F1 score of both CPU and GPU models are shown above.
5. Confusion matrices visualize correct vs incorrect predictions.
6. Further improvements could include hyperparameter tuning, feature engineering, and larger datasets.