

# Parallel & Distributed Computing Project Report

Date: 2026-01-04 04:09

## 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					

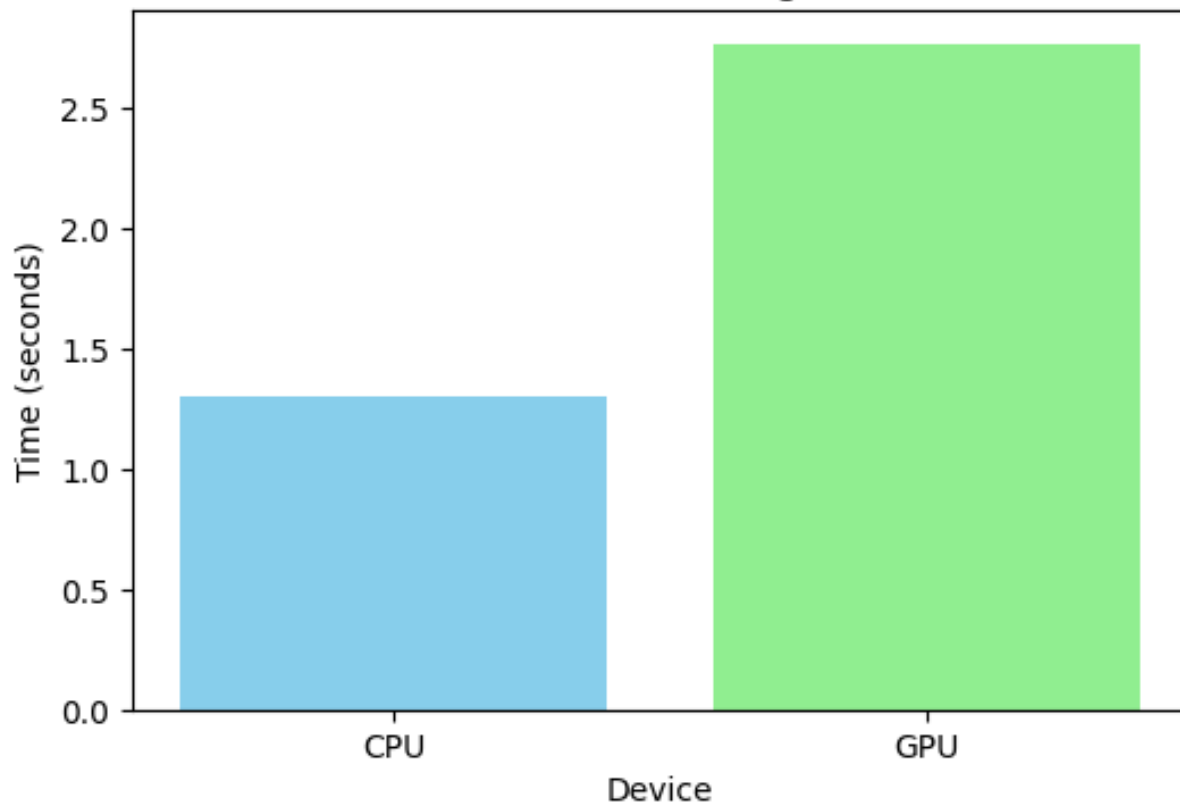
## CPU & GPU Results

Model: LightGBM  
Device: CPU  
Training Time (s): 1.3002  
Accuracy (%): 94.42  
F1 Score: 0.12  
Processor/GPU: AMD64 Family 25 Model 33 Stepping 0, AuthenticAMD

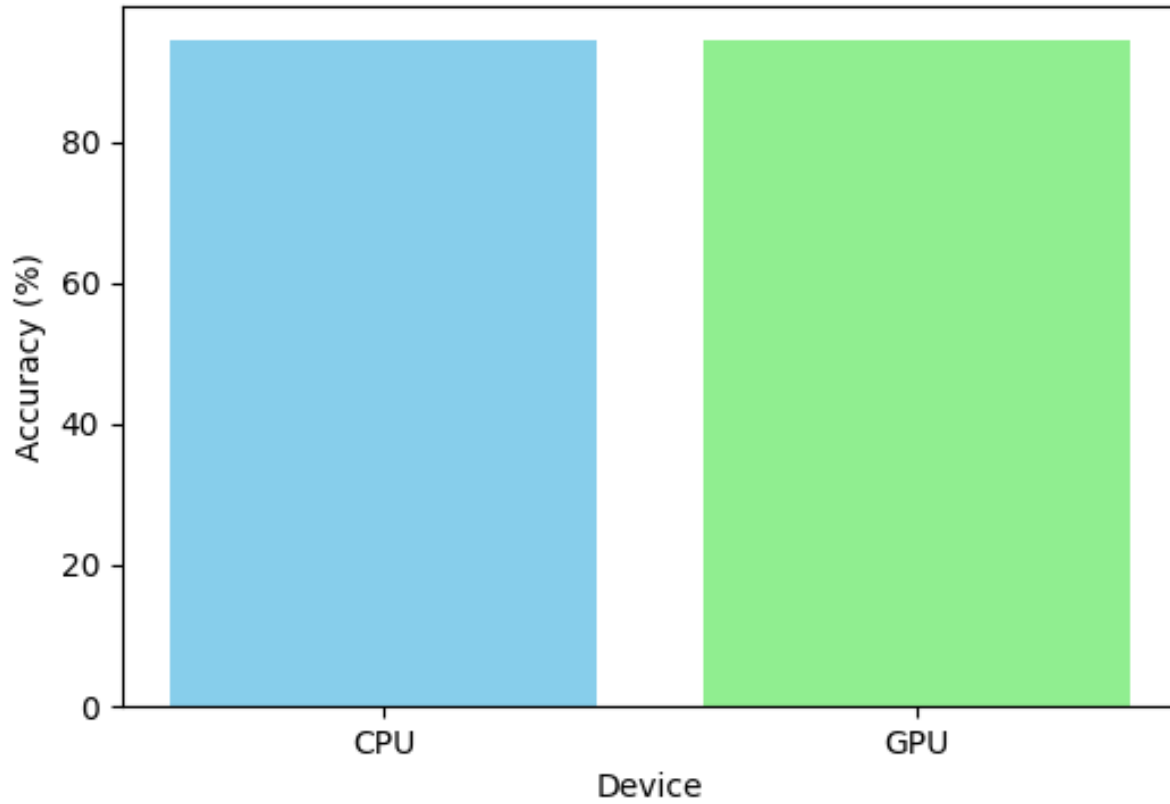
Model: LightGBM  
Device: GPU  
Training Time (s): 2.7676  
Accuracy (%): 94.52  
F1 Score: 0.12  
Processor/GPU: gfx1031 | Vendor: Advanced Micro Devices, Inc.

## Performance Plots

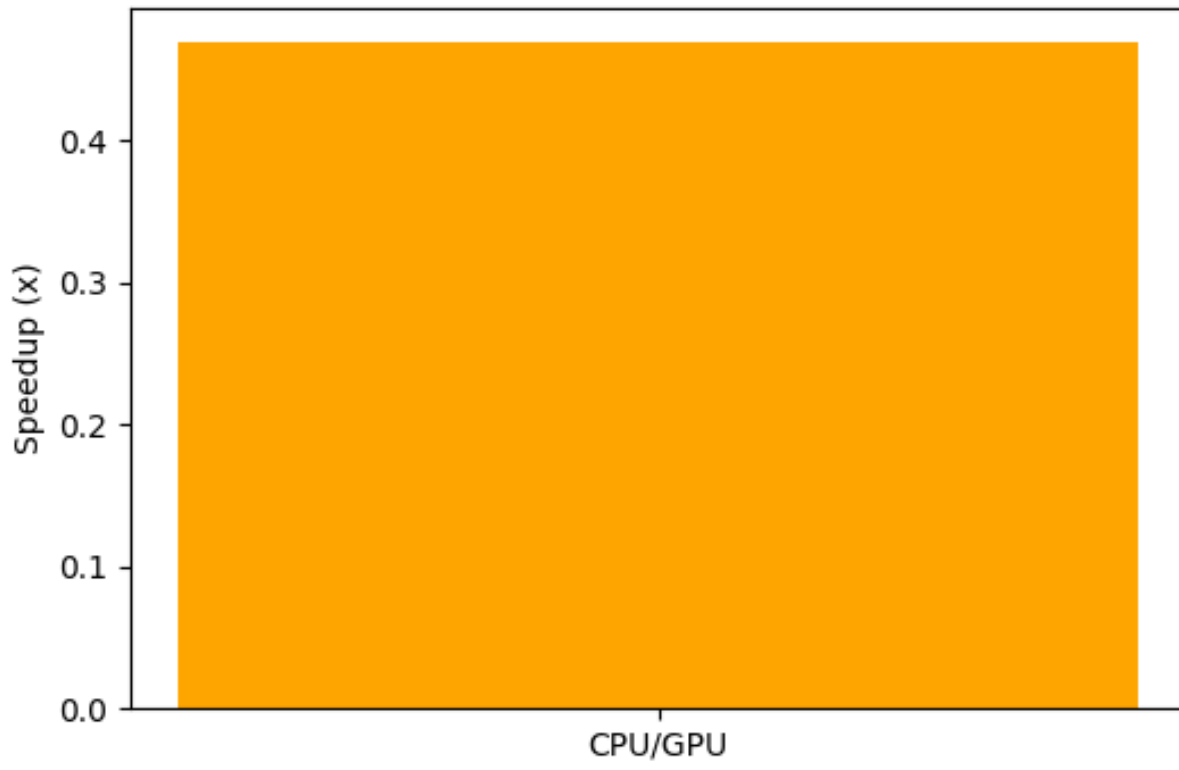
CPU vs GPU Training Time



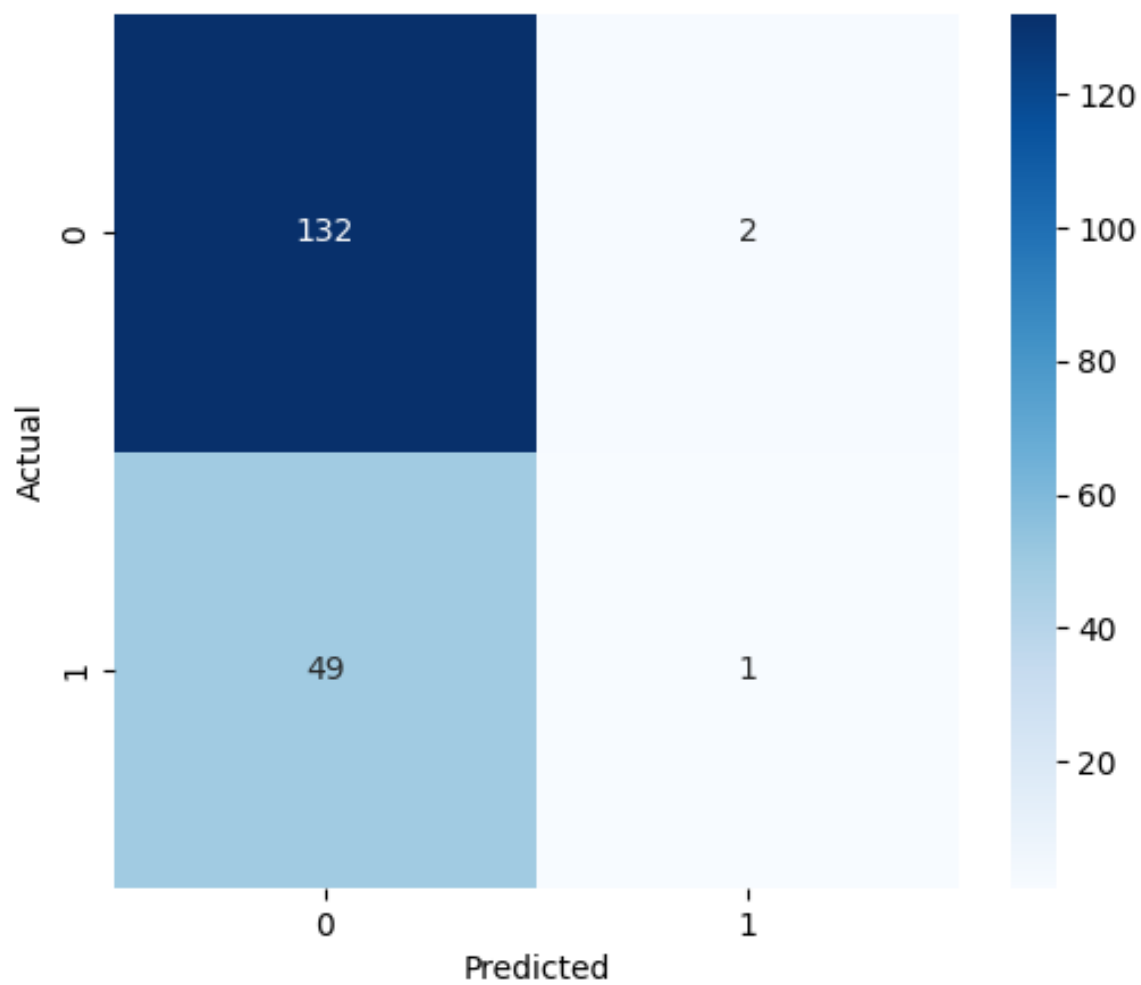
CPU vs GPU Accuracy

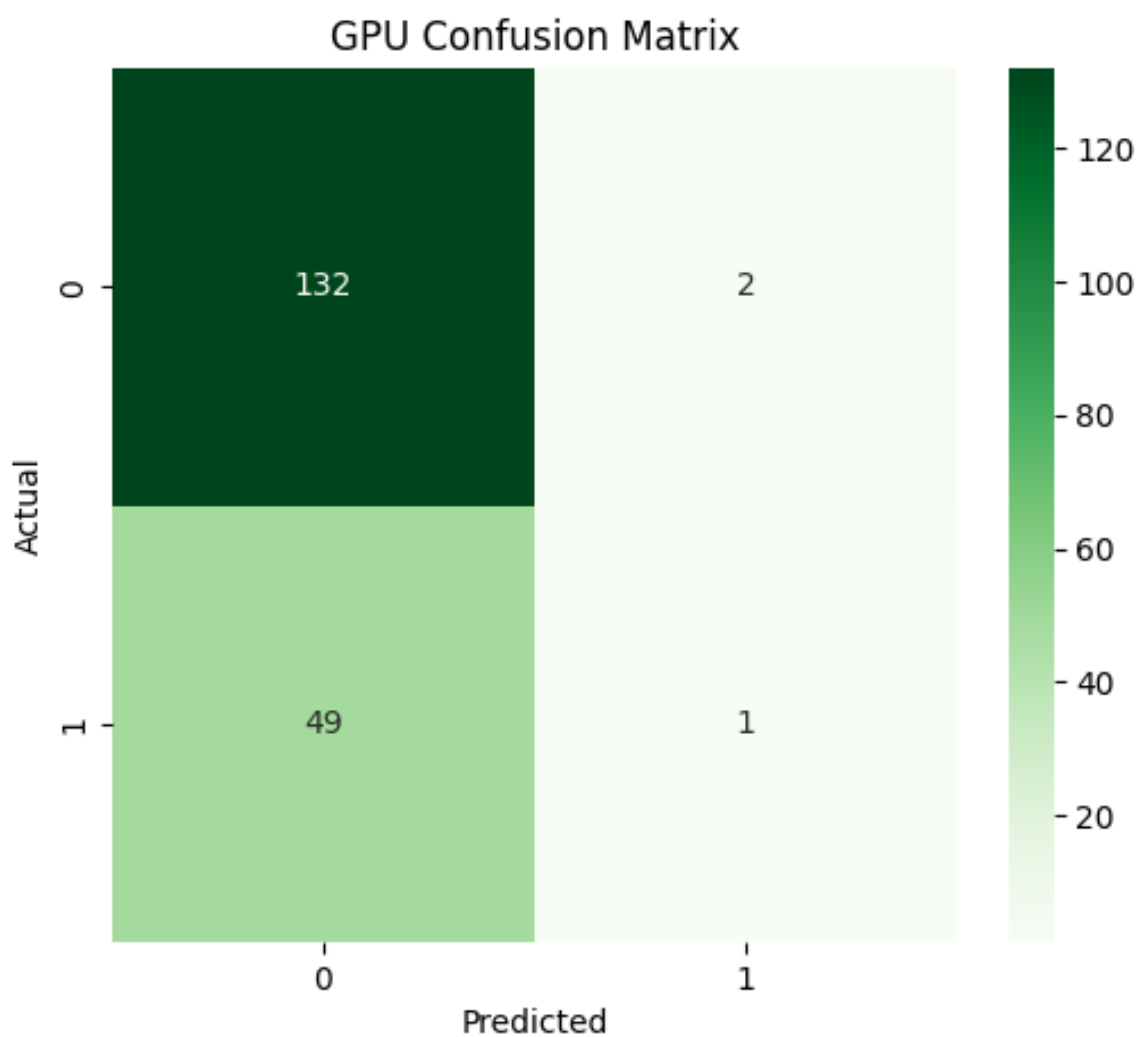


CPU/GPU Speedup Ratio



CPU Confusion Matrix





## Conclusion & Observations

1. CPU and GPU models were trained on the preprocessed dataset.
2. CPU training time: 1.3002 seconds.
3. GPU training time: 2.7676 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.