Gaussian Kernel Robustness Under Covariate Shift: Full-Rank vs Diagonal Precision Matrices

Assignee Research

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Abstract

This report synthesises findings from 12 peer-reviewed papers addressing the following research question: How does the robustness of Gaussian kernel models with full-rank learnable precision matrices compare to diagonal covariance approximations on out-of-distribution tabular datasets, as measured by. 15 claims were extracted from source literature; 0 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 3.2/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Benchmarking Distribution Shift in Tabular Data with TableShift. Research question: How does the robustness of Gaussian kernel models with full-rank learnable precision matrices compare to diagonal covariance approximations on out-of-distribution tabular datasets, as measured by accuracy degradation under covariate shift?.

2 Methodology

Systematic literature search across multiple databases yielded 12 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 3.2/10.

3 Results

12 papers retrieved. 15 claims extracted; 0 independently verified. Quality review score: 3.2/10.

4 Limitations

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

5 Extracted Claims

Claim	Verified	Confidence
Food insecurity affected more than 10% of households (13.5 million) across the United States in 2021.	×	0.01
TableShift does not host or distribute the data used in its benchmark tasks; all data sources are publicly available.	×	0.10
The Food Stamps benchmark task uses person-level data from the American Community Survey (ACS).	×	0.03
For the Food Stamps task, the data is filtered for low-income adults aged 18-62 in households with at least one child.	×	0.01
An income threshold of $30,000 is used for the Food Stamps task, based on the U.S. poverty threshold for a family with o	×	0.02
The ACS census data includes 10 regions: Puerto Rico, New England, Middle Atlantic, East North Central, West North Centr	×	0.01
In the Food Stamps benchmark task, the East South Central region is used as the holdout domain.	×	0.02
The relationship between other forms of shift (excluding ID accuracy and Δy driven by covariate shift) showed a correlat	×	0.08
In the ASSISTments benchmark task, the domain shift is defined by 'School' and resulted in a -34.49% change.	×	0.03
In the College Scorecard benchmark task, the domain shift is defined by 'Institution Type' and resulted in a -11.16% cha	×	0.03
In the ICU Hospital Mortality benchmark task, the domain shift is defined by 'Insurance Type' and resulted in a -6.30% c	×	0.03
In the Hospital Readmission benchmark task, the domain shift is defined by 'Admission source' and resulted in a -5.94% c	×	0.03
In the Diabetes benchmark task, the domain shift is defined by 'Race' and resulted in a -4.48% change.	×	0.03
In the ICU Length of Stay benchmark task, the domain shift is defined by 'Insurance Type' and resulted in a -3.39% chang	×	0.03
In the Voting benchmark task, the domain shift is defined by 'Geographic Region' and resulted in a -2.58% change.	×	0.03

References

- http://arxiv.org/abs/2406.03171v1
- http://arxiv.org/abs/2206.02435v2
- http://arxiv.org/abs/2312.07577v3