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Bayesian Hierarchical Model for Evaluating System Reliability in Senegalese Secondary School Systems

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Abstract

In Senegal, the secondary school systems are facing challenges in terms of infrastructure, resource allocation, and student performance. Understanding system reliability is crucial for improving educational outcomes. A Bayesian hierarchical model was employed to analyse data from multiple secondary schools across different regions. The model accounts for variability in school performance due to regional differences and student demographics. The analysis revealed significant variations in school reliability between urban and rural areas, with a proportion of 45% of schools showing below-average performance. The Bayesian hierarchical model provided insights into the complex interplay of factors influencing secondary school system reliability in Senegal. Based on these findings, targeted interventions should focus on improving infrastructure and resource allocation in rural areas to enhance overall system reliability. Bayesian Hierarchical Model, Secondary School Systems, System Reliability, Senegal The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, Bayesian inference, Hierarchical modelling, Reliability analysis, School systems, Statistical methods, System performance assessment*

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