

REVIEWER'S REPORT

Manuscript No.: IJAR-59093

Title: Implementation of the Contextual Bayesian Model for Personalized, Reasoned Multi-Criteria School Orientation: Application to the Ivorian Context

Recommendation:

Accept as it is

Accept after minor revision.....

Accept after major revision ...✓.....

Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality	✓			
Techn. Quality	✓			
Clarity		✓		
Significance		✓		

Reviewer's ID: JPR-098

Detailed Reviewer's Report

Decision: Accept after Major Revision

Major Revisions

1. Strengthen the empirical validation of the proposed implementation framework.

The manuscript presents a detailed deployment architecture and roadmap, but most of the proposed procedures appear conceptual rather than empirically validated. Evidence from pilot institutions, counselor feedback, or an implementation study should be provided to demonstrate feasibility.

2. Clarify the relationship between the present study and the authors' previous MBC studies.

The manuscript relies heavily on results from previous publications, including the reported 97% cross-validation and 100% hold-out performance. The authors should clearly distinguish what was established in the previous studies from what is newly contributed and validated in this manuscript.

3. Provide technical details of the Bayesian model.

The manuscript describes Bayesian inference, Gaussian approximation, contextual variables, and learned weights, but the mathematical

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formulation and computational procedure are insufficiently detailed for independent reproduction. The complete model equations, prior specification, likelihood assumptions, weight-learning procedure, and confidence-index calculation should be included.

4. Justify the use of socio-economic and demographic variables.

Variables such as household income, socio-occupational category, geographic location, parental education, and gender directly influence recommendations. The manuscript should provide a stronger methodological justification for their inclusion and explain how their use avoids reproducing the inequalities that the system is intended to address.

5. Validate the proposed gender-bias correction mechanism.

Gender is incorporated into the contextual vector specifically to correct documented orientation bias, but the manuscript does not present experimental evidence demonstrating that this modification actually reduces gender disparities. Quantitative fairness results should be provided before and after inclusion of the gender variable.

6. Provide evidence supporting the proposed missing-data strategy.

The rules involving modal imputation, a 15% inflation of σ_c , and changes in confidence thresholds from 0.50 to 0.65 appear prescriptive. The authors should explain how these values were derived and evaluate their effect on prediction accuracy, confidence calibration, and fairness.

7. Clarify and validate the confidence-index thresholds.

The four CI levels (<0.35 , $0.35-0.50$, $0.50-0.80$, ≥ 0.80) are central to the proposed counselor workflow. However, their empirical basis is unclear. The manuscript should explain how these thresholds were determined and provide validation showing that they appropriately identify uncertain cases.

8. Strengthen the fairness evaluation framework.

The manuscript proposes several fairness indicators and thresholds, including recommendation gaps, rural precision, gender gaps, and disadvantaged/advantaged CI ratios. However, it does not provide actual experimental fairness results. The proposed indicators should be evaluated on representative Ivorian data, with appropriate subgroup sizes and statistical analysis.

9. Moderate claims regarding model performance and impact.

Statements such as “robust algorithmic contribution” and “among the best-documented AI-assisted orientation systems” are stronger than the

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evidence presented in this manuscript supports. The authors should distinguish demonstrated algorithmic performance from the proposed future societal, educational, and equity impacts.

10. Clarify the study design and research methodology.

The manuscript is presented partly as an implementation framework and partly as a research contribution, but the methodology for developing and evaluating the proposed architecture is not clearly specified. The authors should explicitly state whether this is a conceptual framework, design-science study, implementation study, pilot study, or methodological proposal, and define the corresponding evaluation methodology.

Minor Revisions**1. Correct typographical and formatting problems throughout the manuscript.**

Several words are improperly joined, such as “ContextualBayesian,” “Threeprinciples,” “Generalization,” and similar formatting issues. A complete language and formatting check is required.

2. Improve the title for readability.

The current title is informative but excessively long. A shorter title could improve clarity while retaining the central concepts of the MBC and Ivorian context.

3. Standardize terminology.

Terms such as *MBC*, *Contextual Bayesian Model*, *AI system*, *decision-support system*, and *orientation system* should be defined once and used consistently.

4. Clarify the dimensionality of the feature vector.

The manuscript initially refers to $\Psi \in \mathbb{R}^{17}$ and later states that the inclusion of gender produces $\Psi' \in \mathbb{R}^{18}$. This transition should be explained more explicitly to prevent confusion.

5. Explain the origin of numerical thresholds and targets in the tables.

Values such as 88%, 92%, 97%, 60%, 75%, and the proposed fairness gaps should be identified as empirically derived, literature-based, or proposed design targets.

6. Improve the presentation of Table 1.

The architecture table should clearly distinguish currently implemented

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components from proposed technologies and future deployment components.

7. Provide greater detail on data security.

The manuscript mentions AES-256, OAuth 2.0, TLS 1.3, anonymization, and local storage. The authors should briefly explain key management, authentication, access control, backup, and protection during USB-based synchronization.

8. Clarify the governance committee's practical authority.

The manuscript specifies committee members and responsibilities, but its decision-making authority, escalation mechanism, and relationship with existing educational authorities should be described more clearly.

9. Reduce repetition in the Introduction and Conclusion.

The manuscript repeatedly states that algorithmic performance alone is insufficient and that human oversight is necessary. These points can be consolidated to improve conciseness.

10. Strengthen and update the reference discussion.

The manuscript should ensure that claims concerning algorithmic fairness, trustworthy AI, African educational inequalities, data governance, and AI deployment are supported by sufficiently recent and directly relevant scholarly literature. References [14] and [15] should also be clearly identified as the authors' previous work when their results are reused.