

REVIEWER'S REPORT

Manuscript No.: IJAR-58128

Title: Advanced Gesture-Based Virtual Mouse Using Mathematical Landmark Mapping

Recommendation:

Accept as it is

Accept after minor revision.....

Accept after major revisionyes.....

Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality			Y	
Techn. Quality			Y	
Clarity			Y	
Significance			y	

Reviewer's ID: JPR-Dr.Shaweta Sachdeva

Detailed Reviewer's Report

1. The manuscript lacks a clear novelty statement. The authors should explicitly differentiate the proposed virtual mouse system from existing MediaPipe-based gesture control solutions and clearly articulate the unique scientific contribution beyond system integration.
2. The literature review is largely descriptive and does not provide a critical comparison of existing virtual mouse systems. A comparative table highlighting methodologies, performance metrics, limitations, and research gaps would strengthen the study.
3. The experimental evaluation is insufficiently rigorous. Performance results are reported only under controlled lighting conditions, while real-world environments with varying illumination, backgrounds, and hand orientations are not considered.
4. The manuscript claims significant improvements in cursor stability and click accuracy; however, no baseline comparison with existing methods or commercial gesture-control systems is provided. Comparative benchmarking is necessary to validate the claimed advantages.
5. The mathematical formulation of the coordinate transformation is not fully explained. The derivation, assumptions, and implementation details of the so-called bilinear affine mapping should be presented more rigorously.
6. The EWMA smoothing parameter (α) is described as empirically tuned, but the tuning procedure, selected value, and sensitivity analysis are absent. The impact of different α values on responsiveness and stability should be investigated.
7. The confusion matrix evaluation appears limited to 1,000 gesture events. The authors should increase the dataset size and include statistical validation to demonstrate the reliability and generalizability of the reported 94% accuracy.
8. The manuscript lacks user-centric evaluation. Usability testing involving multiple participants with different hand sizes, ages, and levels of technical expertise would provide stronger evidence of practical applicability.
9. Accessibility is presented as a major application area, yet no experiments involving motor-impaired users are reported. Validation with the target user population is necessary to support these claims.

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10. The study does not analyze system robustness against occlusions, rapid hand movements, multiple-hand scenarios, or partial visibility conditions, which are common challenges in gesture recognition systems.
11. Hardware specifications are insufficiently detailed. Information regarding processor type, RAM, operating system, and computational resource utilization should be included to facilitate reproducibility.
12. Several performance claims, such as the 62% reduction in positioning error and latency measurements, lack detailed experimental methodology and statistical analysis. Confidence intervals, repeated trials, and error distributions should be provided.
13. The manuscript would benefit from a comprehensive ablation study evaluating the individual contributions of coordinate mapping, EWMA filtering, and debounce logic to the overall system performance.
14. The references are heavily focused on foundational studies, while several recent developments in deep-learning-based hand tracking, vision transformers, and advanced gesture recognition frameworks are missing. Incorporating recent literature from the last 3–5 years would improve the manuscript's relevance.
- 15.** The conclusion overstates the practical deployment readiness of the system. Additional large-scale validation and real-world testing are required before claims regarding clinical, industrial, and accessibility applications can be fully supported.