

Review of: "A Novel Variable Neighborhood Search Approach for Cell Clustering for Spatial Transcriptomics"

Pitakaso Rapeepan¹

¹ Ubonratchathani University

Potential competing interests: No potential competing interests to declare.

Based on the thorough review of the research paper provided, here are five specific comments aimed at enhancing its quality:

1. **Introduction Expansion:** The introduction briefly mentions the significance of spatial transcriptomics and the novel application of the Variable Neighborhood Search (VNS) method but lacks a detailed discussion of the gap it aims to fill within the existing literature. Expanding this section to explicitly state how this method addresses limitations in current approaches would strengthen the foundation of the paper.
2. **Methodology Clarity:** While the mathematical model and VNS method are explained, the transition between explaining the mathematical model and its practical application could be smoother. Specifically, detailing the selection criteria for the initial solution in the VNS approach and how it influences the algorithm's performance would add clarity.
3. **Results Section Detailing:** The results are well-presented but could benefit from a deeper statistical analysis. Adding a discussion on the statistical significance of the findings, possibly through comparison metrics or significance tests between the proposed method and existing methods, would provide a stronger argument for the efficacy of the proposed approach.
4. **Discussion on Limitations and Future Work:** The paper briefly mentions future extensions but lacks a dedicated section discussing potential limitations of the current study and detailed future research directions. Including this could help in setting the context for future studies and acknowledging any constraints in the current methodology.
5. **Enhanced Visualization:** While the paper includes figures and tables, additional visual aids, such as flowcharts illustrating the VNS process or heatmaps displaying clustering results, could significantly enhance understanding and engagement with the material. Improving figure captions to more comprehensively explain what each visual represents and its relevance to the discussion would also be beneficial.

Incorporating these recommendations will likely make the paper more robust, providing clearer insights into the novel contributions of the research and its implications within the field.