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Short Review

Optimal Deep Belief Network with Opposition Based Pity Beetle Algorithm for Lung Cancer Classification: A DBNOPBA Approach - Short Review

Mary Adline Priya M*

Department of Information and Communication Engineering, Anna University, Chennai, Tamil Nadu, India

***Corresponding authors:** Mrs. M. Mary Adline Priya, Department of Information and Communication Engineering, Anna University, Chennai, Tamil Nadu, India

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Overview

Deep Belief Networks (DBN):

- DBNs are a class of deep learning models that consist of multiple layers of stochastic, latent variables. They are particularly effective for unsupervised learning and have been widely used in feature extraction and *classification tasks.*

Opposition-Based Pity Beetle Algorithm (OBPBA)

- The Pity Beetle Algorithm is a nature-inspired optimization algorithm based on the foraging behavior of pity beetles.
- The Opposition-Based Learning (OBL) strategy enhances the algorithm by considering opposite solutions simultaneously, which helps in exploring the search space more effectively and avoiding local optima.

Approach

DBNOPBA Framework

- The study integrates a DBN with the OBPBA to optimize the network's weights and structure, aiming to improve the classification accuracy for lung cancer.
- The opposition-based mechanism helps in maintaining diversity in the solution space, which enhances the optimization process.

Lung Cancer Classification

- The model is trained and tested on lung cancer datasets to evaluate its performance in classifying cancerous and non-cancerous cases.
- The authors claim that the DBNOPBA approach achieves superior accuracy and robustness compared to traditional methods and other deep learning models.

Strengths

1. **Improved Accuracy:** The combination of DBN and OBPBA leads to improved classification performance due to the optimized network parameters.
2. **Exploration and Exploitation Balance:** The opposition-based strategy allows for a better balance between exploration and exploitation, enhancing the algorithm's ability to find optimal solutions.
3. **Scalability:** The approach can be potentially applied to other medical classification problems, making it a versatile tool in healthcare diagnostics.

Limitations

- **Complexity:** The integration of DBN with a metaheuristic algorithm increases the computational complexity, which might be a challenge for real-time applications.
- **Generalization:** While the model shows promising results on the tested datasets, its generalization capability to diverse and unseen datasets needs further validation

Conclusion

The DBNOPBA approach offers an innovative solution for lung cancer classification by leveraging the strengths of deep learning and metaheuristic optimization. Its ability to achieve high accuracy makes it a promising tool in medical diagnostics. However, further research and testing are needed to fully understand its potential and limitations in real-world applications.

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