

Peer Review

Review of: "Synthetic Data Generation of Body Motion Data by Neural Gas Network for Emotion Recognition"

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This paper presents a novel application of the Neural Gas Network (NGN) for synthesizing body motion data to address data scarcity in emotion recognition. Compared to traditional methods (GANs, VAEs, LSTM, etc.), NGN demonstrates superior performance in accuracy (97%), precision (98%), and runtime efficiency (2m42s on CPU) using the 100STYLE dataset. The methodology is well-structured, with a comprehensive evaluation across generative (FID, Diversity) and classification metrics (accuracy, recall).

Strengths:

- **Novelty:** First use of NGN for body motion synthesis in emotion recognition.
- **Strong Results:** Outperforms GANs/VAEs in realism, diversity, and speed.
- **Practical Impact:** Addresses key challenges in dataset scarcity and heterogeneity.
- **Clear Methodology:** Well-explained with supporting figures and tables.

Weaknesses & Suggestions for Improvement:

- **Dataset Limitations:** Only 4 emotions (angry, depressed, neutral, proud) from a single actor (182cm tall).
- **Suggestion:** Expand to more emotions/demographics (age, gender) for generalizability.

Ethical & Reproducibility:

- No discussion of bias in synthetic data.
- Code is shared, but a detailed environment setup (e.g., Docker, Conda) would aid reproducibility.

Presentation:

- Visualizations (e.g., Fig. 2–3) could add quantitative labels/error margins.
- Writing clarity could improve for non-NGN experts (e.g., simplify algorithm explanations).

The work is promising and well-executed but would benefit from:

- Broader dataset coverage,
- Deeper parameter analysis,
- Ethical considerations, and
- Real-world testing.

Final Note: A human evaluation of synthetic motion’s emotional expressiveness (currently missing) would further strengthen the paper’s impact.

Recommendation: Accept with Minor Revisions

Declarations

Potential competing interests: No potential competing interests to declare.