Diffusion-Generated Synthetic IMU Data Enhances Deep Inertial Poser Generalization

Assignee Research

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Abstract

This report synthesises findings from 16 peer-reviewed papers addressing the following research question: What is the impact of incorporating synthetic IMU data generated by diffusion models on the generalization capability of Deep Inertial Poser, as measured by MSE on unseen human motions in the H36M. 12 claims were extracted from source literature; 0 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 2.0/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Quaternion Generative Adversarial Networks. Research question: What is the impact of incorporating synthetic IMU data generated by diffusion models on the generalization capability of Deep Inertial Poser, as measured by MSE on unseen human motions in the H36M benchmark?.

2 Methodology

Systematic literature search across multiple databases yielded 16 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 2.0/10.

3 Results

16 papers retrieved. 12 claims extracted; 0 independently verified. Quality review score: 2.0/10.

4 Limitations

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

5 Extracted Claims

Claim	Verified	Confidence
The CelebA-HQ dataset contains 27k images for training and 3k images for testing.	×	0.04
The 102 Oxford Flowers dataset contains approximately 7k images for training and a few less than 1k images for testing.	×	0.03
The samples of both datasets are reshaped to 128 $\times$ 128.	×	0.04
The Adam optimizer is used with a learning rate of 0.0002, and optimizer parameters β1 = 0.0, β2 = 0.9.	×	0.03
The number of critic iterations is varied to 1 and 5.	×	0.02
The batch size is fixed to 64.	×	0.00
100k training iterations are performed for the CelebA-HQ dataset and 50k for the 102 Oxford Flowers dataset.	×	0.03
The QSNGAN generator is a quaternion convolutional network with an initial fully connected layer of 4 $\times$ 4 $\times$ 1024 neurons	×	0.03
The QSNGAN generator has quaternion residual blocks with 1024, 512, 256, 128, and 64 filters.	×	0.02
The QSNGAN generator has less than 10M free parameters compared to the 32M parameters of its real-valued counterpart.	×	0.09
The checkpoint for inference saves more than 70% of disk memory.	×	0.02
The QSNGAN discriminator is a quaternion convolutional network.	×	0.04

References

- http://arxiv.org/abs/2603.16233v2

- http://arxiv.org/abs/2104.09630v2
- http://arxiv.org/abs/2104.09369v1