

Performance Analysis for Projection-Correction Methods in Motion Deblurring Problems

Sara Casadio, Enrico Ferraiolo, Giovanni Savoca

Alma Mater Studiorum - Università di Bologna
Corso di Laurea in Informatica

19 maggio 2025

- The project analyzes the performance of two **Projection-Correction** algorithms for reconstructing medical images affected by **motion blur**.
- The studied algorithms are:
 - **Diffusion Posterior Sampling (DPS)**
 - **Regularization by Denoising with Diffusion (RED-Diff)**
- Both methods are based on **pre-trained diffusion models**.
- Objective: evaluate the effectiveness of these methods in recovering degraded images.

- **Objective:** Analyze the performance of *Projection-Correction* methods **DPS** and **RED-Diff** for motion blur removal on medical images
- **Phase 1:** Dataset preprocessing (128x128)
- **Phase 2:** Data augmentation to increase dataset diversity
- **Phase 3:** Training a DDIM diffusion model on medical data
- **Phase 4:** Simulation of motion blur and its removal
- **Phase 5:** Implementation and comparison of *Projection-Correction* methods: **DPS** and **RED-Diff**
- **Phase 6:** Quantitative evaluation of performance using metrics such as **PSNR** and **SSIM**

Grazie per l'attenzione