

Denoising Diffusion Probabilistic Models for Image Inpainting

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Declaration of Originality

Proforma

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1 Introduction

Deep learning has enabled...

GANs are popular but have issues...

DDPMs offer a solution...

Applications of DDPMs...

Image inpainting...

2 Preparation

PrepWork...

- logistic distribution
 - normal dist but with heavy tails
 - "increases the robustness of analyses based on it compared with using the normal distribution"
- PixelCNN++
 - openai implementation of PixelCNN
 - tractable likelihood
 - "model fully factorizes the probability density function on an image x over all its sub-pixels"
 - modification to PixelCNN - discretised logistic mixture likelihood rather than softmax
 - modification - conditions on whole pixels rather than rgb vals
 - modification - downsampling to encourage long range dependencies
 - modification - shortcut connections
 - modification - standard binary dropout to prevent overfitting
- DDPMs (modified PixelCNN++)
 - replaced weight normalisation to group normalisation - simplicity
 - 4 resolution levels for 32x32 and 6 for 256x256
 - two convolutional residual blocks per resolution level
 - "self-attention blocks at the 16x16 resolution between the convolutional blocks"
 - dropout rate set by sweeping over values
 - linear beta schedule
 - random horizontal flips
 - Adam rather than RMSProp
 - batch size is 128 for CIFAR
 - EMA set to 0.9999 decay factor

Related works...

Maths behind DDPMs...

Alternative methods of image generation...

Alternative methods of image inpainting...

3 Implementation

4 Evaluation

5 Conclusion

Appendices

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