ErSKS / gans-awesome-applications
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Curated list of awesome GAN applications and demo

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nashory Merge pull request nashory#11 from CaptainTrunky/typos ... Latest commit 4e6827e on Oct 2

jpg	add banner	a year ago
README.md	fixing minor typos	5 months ago

README.md

gans-awesome-applications

Curated list of awesome GAN applications and demonstrations.

Note: General GAN papers targeting simple image generation such as DCGAN, BEGAN etc. are not included in the list. I mainly care about applications.

The landmark papers that I respect.

- Generative Adversarial Networks, [paper], [github]
- Unsupervised Representation Learning with Deep Convolutional Generative Adversarial Networks, [paper], [github]
- Improved Techniques for Training GANs, [paper], [github]
- BEGAN: Boundary Equilibrium Generative Adversarial Networks, [paper], [github]

Contents

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Applications using GANs

Font generation

- Learning Chinese Character style with conditional GAN, [blog], [github]

Anime character generation

- Towards the Automatic Anime Characters Creation with Generative Adversarial Networks, [paper]
- [Project] A simple PyTorch Implementation of Generative Adversarial Networks, focusing on anime face drawing, [github]
- [Project] A simple, clean TensorFlow implementation of Generative Adversarial Networks with a focus on modeling illustrations, [github]
- [Project] Keras-GAN-Animeface-Character, [github]
- [Project] A DCGAN to generate anime faces using custom mined dataset, [github]

Interactive Image generation

- Generative Visual Manipulation on the Natural Image Manifold, [paper], [github]
- Neural Photo Editing with Introspective Adversarial Networks, [paper], [github]

Text2Image (text to image)

- TAC-GAN – Text Conditioned Auxiliary Classifier Generative Adversarial Network, [paper], [github]
- StackGAN: Text to Photo-realistic Image Synthesis with Stacked Generative Adversarial Networks, [paper], [github]
- Generative Adversarial Text to Image Synthesis, [paper], [github], [github]
- Learning What and Where to Draw, [paper], [github]

3D Object generation

- Parametric 3D Exploration with Stacked Adversarial Networks, [github], [youtube]
- Learning a Probabilistic Latent Space of Object Shapes via 3D Generative-Adversarial Modeling, [paper], [github], [youtube]

- 3D Shape Induction from 2D Views of Multiple Objects, [paper]
- Fully Convolutional Refined Auto-Encoding Generative Adversarial Networks for 3D Multi Object Scenes, [github], [blog]

Image Editing

- Invertible Conditional GANs for image editing, [paper], [github]
- Image De-raining Using a Conditional Generative Adversarial Network, [paper], [github]

Face Aging

- Age Progression/Regression by Conditional Adversarial Autoencoder, [paper], [github]
- CAN: Creative Adversarial Networks Generating "Art" by Learning About Styles and Deviating from Style Norms, [paper]
- FACE AGING WITH CONDITIONAL GENERATIVE ADVERSARIAL NETWORKS, [paper]

Human Pose Estimation

- Pose Guided Person Image Generation, [paper]

Domain-transfer (e.g. style-transfer, pix2pix, sketch2image)

- Image-to-Image Translation with Conditional Adversarial Networks, [paper], [github], [youtube]
- Unpaired Image-to-Image Translation using Cycle-Consistent Adversarial Networks, [paper], [github], [youtube]
- Learning to Discover Cross-Domain Relations with Generative Adversarial Networks, [paper], [github]
- Unsupervised Creation of Parameterized Avatars, [paper]
- UNSUPERVISED CROSS-DOMAIN IMAGE GENERATION, [paper]
- Precomputed Real-Time Texture Synthesis with Markovian Generative Adversarial Networks, [paper], [github]
- Pixel-Level Domain Transfer [paper], [github]
- TextureGAN: Controlling Deep Image Synthesis with Texture Patches, [paper], [demo]
- Vincent AI Sketch Demo Draws In Throngs at GTC Europe, [blog], [youtube]
- Deep Photo Style Transfer, [paper], [github]

Image Inpainting (hole filling)

- Context Encoders: Feature Learning by Inpainting, [paper], [github]
- Semantic Image Inpainting with Perceptual and Contextual Losses, [paper], [github]
- SEMI-SUPERVISED LEARNING WITH CONTEXT-CONDITIONAL GENERATIVE ADVERSARIAL NETWORKS, [paper]
- Generative Face Completion, [paper], [github]

Super-resolution

- Image super-resolution through deep learning, [github]
- Photo-Realistic Single Image Super-Resolution Using a Generative Adversarial Network, [paper], [github]
- High-Quality Face Image Super-Resolution Using Conditional Generative Adversarial Networks, [paper]

Image Blending

- GP-GAN: Towards Realistic High-Resolution Image Blending, [paper], [github]

High-resolution image generation (large-scale image)

- Generating Large Images from Latent Vectors, [blog], [github]
- PROGRESSIVE GROWING OF GANS FOR IMPROVED QUALITY, STABILITY, AND VARIATION, [paper], [github]

Adversarial Examples (Defense vs Attack)

- SafetyNet: Detecting and Rejecting Adversarial Examples Robustly, [paper]
- ADVERSARIAL EXAMPLES FOR GENERATIVE MODELS, [paper]
- Adversarial Examples Generation and Defense Based on Generative Adversarial Network, [paper]

Visual Saliency Prediction (attention prediction)

- SalGAN: Visual Saliency Prediction with Generative Adversarial Networks, [paper], [github]

Object Detection/Recognition

- Perceptual Generative Adversarial Networks for Small Object Detection, [paper]
- Adversarial Generation of Training Examples for Vehicle License Plate Recognition, [paper]

Robotics

- Unsupervised Pixel–Level Domain Adaptation with Generative Adversarial Networks, [paper], [github]

Video (generation/prediction)

- DEEP MULTI-SCALE VIDEO PREDICTION BEYOND MEAN SQUARE ERROR, [paper], [github]

Synthetic Data Generation

- Learning from Simulated and Unsupervised Images through Adversarial Training, [paper], [github]

Others

- (Physics) Learning Particle Physics by Example: Location-Aware Generative Adversarial Networks for Physics Synthesis, [paper], [github]
- (Games) STYLE TRANSFER GENERATIVE ADVERSARIAL NETWORKS: LEARNING TO PLAY CHESS DIFFERENTLY, [paper], [github]
- (General) Spectral Normalization for Generative Adversarial Networks, [paper], [github]

Did not use GAN, but still interesting applications.

Real-time face reconstruction

- Model-based Deep Convolutional Face Autoencoder for Unsupervised Monocular Reconstruction, [paper], [github], [youtube]

Super-resolution

- Learning to Simplify: Fully Convolutional Networks for Rough Sketch Cleanup, [paper], [site link], [youtube]

Photorealistic Image generation (e.g. pix2pix, sketch2image)

- The Sketchy Database: Learning to Retrieve Badly Drawn Bunnies, [paper], [youtube]
- PatchMatch: A Randomized Correspondence Algorithm for Structural Image Editing, [paper], [github], [youtube]

Human Pose Estimation

- Knowledge-Guided Deep Fractal Neural Networks for Human Pose Estimation, [paper], [github]

3D Object generation

- 3D-R2N2: A Unified Approach for Single and Multi-view 3D Object Reconstruction, [paper], [github]

GAN tutorials with easy and simple example code for starters

- 1D Generative Adversarial Network Demo
- starter from "How to Train a GAN?" at NIPS2016
- NIPS 2016 Tutorial: Generative Adversarial Networks
- OpenAI - Generative Models
- [paper], [github], [youtube]

Implementations of various types of GANs collection

- nashory/gans-collections.torch, torch7
- hwalsuklee/tensorflow-generative-model-collections, pytorch
- wiseodd/generative-models, both pytorch and tensorflow
- aboev/arae-tf, tensorflow

Trendy AI-application Articles

- Artificial intelligence can say yes to the dress

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Any recommendations to add to the list are welcome :)
Feel free to make pull requests!