**作业:** 每个小组10位成员合作完成对应序号领域（小组序号为2的对应下面的Text-To-Image Synthesis）的一篇大报告和3份代码调试。每个领域下面都有相应的代表论文，同学们可以根据这些论文对相应的领域有所了解。

**注意：** 大报告需要包含至少5篇来自最近两年的顶会论文（例如CVPR，ICCV，ECCV，ICML，ICLR，KDD，ACL，NIPS，NAACL，AAAI，IJCAI，EMNLP，SIGIR），格式自行设计，报告内容需总结论文的动机，方法，实验细节和结果。代码尽可能的去找github高星的项目进行调试。

1. **Image-To-Image Translation**

# 代表论文：《Unpaired Image-to-Image Translation using Cycle-Consistent Adversarial Networks》《Image-to-Image Translation with Conditional Adversarial Networks》《Toward Multimodal Image-to-Image Translation》《DualGAN: Unsupervised Dual Learning for Image-to-Image Translation》《StarGAN: Unified Generative Adversarial Networks for Multi-Domain Image-to-Image Translation》

1. **Text-To-Image Synthesis**

# 代表论文：《StackGAN++: Realistic Image Synthesis with Stacked Generative Adversarial Networks》《StackGAN: Text to Photo-realistic Image Synthesis with Stacked Generative Adversarial Networks》《Generative Adversarial Text to Image Synthesis》《AttnGAN: Fine-Grained Text to Image Generation with Attentional Generative Adversarial Networks》《Controllable Text-to-Image Generation》

1. **Image Inpainting**

# 代表论文：《Deep Image Prior》《EdgeConnect: Generative Image Inpainting with Adversarial Edge Learning》《SC-FEGAN: Face Editing Generative Adversarial Network with User's Sketch and Color》《Free-Form Image Inpainting with Gated Convolution》《Generative Image Inpainting with Contextual Attention》

1. **DeepFake**

代表论文：《DeepFakes and Beyond: A Survey of Face Manipulation and Fake Detection》《Fake Face Detection via Adaptive Residuals Extraction Network》《Deepfake Forensics Using Recurrent Neural Networks》《Detecting Deepfakes with Metric Learning》《Deepfake Video Forensics based on Transfer Learning》

1. **Image Restoration**

代表论文：《Deep Image Prior》《Bringing Old Photos Back to Life》《Noise2Noise: Learning Image Restoration without Clean Data》《Deep Plug-and-Play Super-Resolution for Arbitrary Blur Kernels》《Residual Dense Network for Image Restoration》

1. **Image Captioning**

代表论文：《Show and Tell: A Neural Image Caption Generator》《Bottom-Up and Top-Down Attention for Image Captioning and Visual Question Answering》《Self-critical Sequence Training for Image Captioning》《Unified Vision-Language Pre-Training for Image Captioning and VQA》《Oscar: Object-Semantics Aligned Pre-training for Vision-Language Tasks》

1. **Video Captioning**

代表论文：《VideoBERT: A Joint Model for Video and Language Representation Learning》《Object Relational Graph with Teacher-Recommended Learning for Video Captioning》《Bidirectional Attentive Fusion with Context Gating for Dense Video Captioning》《End-to-End Dense Video Captioning with Masked Transformer》《Controllable Video Captioning with POS Sequence Guidance Based on Gated Fusion Network》

1. **Visual Question Answering**

代表论文：《UNITER: UNiversal Image-TExt Representation Learning》《Multimodal Compact Bilinear Pooling for Visual Question Answering and Visual Grounding》《Multimodal Compact Bilinear Pooling for Visual Question Answering and Visual Grounding》《Show, Ask, Attend, and Answer: A Strong Baseline For Visual Question Answering》《Graph-Structured Representations for Visual Question Answering》

1. **Fine-Grained Image Recognition**

代表论文：《Destruction and Construction Learning for Fine-Grained Image Recognition》《Looking for the Devil in the Details: Learning Trilinear Attention Sampling Network for Fine-grained Image Recognition》《Learning Deep Bilinear Transformation for Fine-grained Image Representation》《Fine-Grained Representation Learning and Recognition by Exploiting Hierarchical Semantic Embedding》《Multi-Attention Multi-Class Constraint for Fine-grained Image Recognition》

1. **Few-Shot Image Classification**

代表论文：《Learning to Remember Rare Events》《Meta-Learning without Memorization》《Leveraging the Feature Distribution in Transfer-based Few-Shot Learning》《Self-Supervised Learning For Few-Shot Image Classification》《Laplacian Regularized Few-Shot Learning》

1. **Semi-Supervised Image Classification**

代表论文：《Semi-Supervised Learning with Context-Conditional Generative Adversarial Networks》《Big Self-Supervised Models are Strong Semi-Supervised Learners》《FixMatch: Simplifying Semi-Supervised Learning with Consistency and Confidence》《EnAET: Self-Trained Ensemble AutoEncoding Transformations for Semi-Supervised Learning》《MixMatch: A Holistic Approach to Semi-Supervised Learning》

1. **Natural Language Adversarial Examples**

代表论文：《Synthetic and Natural Noise Both Break Neural Machine Translation》《HotFlip: White-Box Adversarial Examples for Text Classification》《Generating Natural Language Adversarial Examples》《BAE: BERT-based Adversarial Examples for Text Classification》《Generating Natural Adversarial Examples》

1. **Defenses and Adversarial Training**

代表论文：《Efficient defenses against adversarial attacks》《Obfuscated gradients give a false sense of security: Circumventing defenses to adversarial examples》《Universal adversarial training》《Adversarial Robustness Against the Union of Multiple Perturbation Models》《MACER: Attack-free and Scalable Robust Training via Maximizing Certified Radius》

1. **Gradient Based Attacks**

代表论文：《Intriguing properties of neural networks》《Towards Deep Learning Models Resistant to Adversarial Attacks》《Explaining and Harnessing Adversarial Examples》《Boosting Adversarial Attacks with Momentum》《Towards Evaluating the Robustness of Neural Networks》

1. **Black Box Attacks**

代表论文：《Trust region based adversarial attackon neural networks》《Universal Adversarial Attack on Attention and the Resulting Dataset DAmageNet》《ZOO: Zeroth Order Optimization Based Black-box Attacks to Deep Neural Networks without Training Substitute Models》《Query-efficient Meta Attack to Deep Neural Networks》《Yet another but more efficient black-box adversarial attack: tiling and evolution strategies》

1. **Self-Supervised Learning**

代表论文：《ALBERT: A Lite BERT for Self-supervised Learning of Language Representations》《A Simple Framework for Contrastive Learning of Visual Representations》《Supervised Contrastive Learning》《Revisiting Self-Supervised Visual Representation Learning》《Time-Contrastive Networks: Self-Supervised Learning from Video》

1. **Emotion Recognition**

代表论文：《EEG-Based Emotion Recognition Using Regularized Graph Neural Networks》《A Novel Bi-hemispheric Discrepancy Model for EEG Emotion Recognition》《Conversational Transfer Learning for Emotion Recognition》《ICON: Interactive Conversational Memory Network for Multimodal Emotion Detection》《DialogueGCN: A Graph Convolutional Neural Network for Emotion Recognition in Conversation》

1. **Image Denoising**

代表论文：《Unprocessing Images for Learned Raw Denoising》《Beyond a Gaussian Denoiser: Residual Learning of Deep CNN for Image Denoising》《Learning Deep CNN Denoiser Prior for Image Restoration》《FFDNet: Toward a Fast and Flexible Solution for CNN based Image Denoising》《High-Quality Self-Supervised Deep Image Denoising》

1. **Crowd Counting**

代表论文：《Context-Aware Crowd Counting》《Bayesian Loss for Crowd Count Estimation with Point Supervision》《From Open Set to Closed Set: Counting Objects by Spatial Divide-and-Conquer》《Crowd counting via scale-adaptive convolutional neural network》《Multi-scale Convolutional Neural Networks for Crowd Counting》

1. **Image Super-Resolution**

代表论文：《Learned Image Downscaling for Upscaling using Content Adaptive Resampler》《Second-Order Attention Network for Single Image Super-Resolution》《Densely Residual Laplacian Super-Resolution》《Image Super-Resolution by Neural Texture Transfer》《Learning Parallax Attention for Stereo Image Super-Resolution》

1. **Image Retrieval**

代表论文：《Fine-grained Visual Textual Alignment for Cross-Modal Retrieval using Transformer Encoders》《Combination of Multiple Global Descriptors for Image Retrieval》《Fashion Image Retrieval with Capsule Networks》《Unifying Deep Local and Global Features for Image Search》《Detect-to-Retrieve: Efficient Regional Aggregation for Image Search》

1. **Scene Graph Generation**

代表论文：《Unbiased Scene Graph Generation from Biased Training》《Factorizable Net: An Efficient Subgraph-based Framework for Scene Graph Generation》《Graph R-CNN for Scene Graph Generation》《Scene Graph Generation from Objects, Phrases and Region Captions》《Knowledge-Embedded Routing Network for Scene Graph Generation》

1. **Recommendation Systems**

代表论文：《Neural Collaborative Filtering》《Collaborative Similarity Embedding for Recommender Systems》《Knowledge-aware Graph Neural Networks with Label Smoothness Regularization for Recommender Systems》《Hierarchical Gating Networks for Sequential Recommendation》《Self-Attentive Sequential Recommendation》

1. **Machine Translation**

代表论文：《DeLighT: Very Deep and Light-weight Transformer》《Improving Neural Language Modeling via Adversarial Training》《Multi-Agent Dual Learning》《Multilingual Denoising Pre-training for Neural Machine Translation》《Attention Is All You Need》

1. **Dialogue Systems**

代表论文：《You Impress Me: Dialogue Generation via Mutual Persona Perception》《Controlling Style in Generated Dialogue》《Towards Empathetic Open-domain Conversation Models: a New Benchmark and Dataset》《ERNIE-GEN: An Enhanced Multi-Flow Pre-training and Fine-tuning Framework for Natural Language Generation》《Multiresolution Recurrent Neural Networks: An Application to Dialogue Response Generation》

1. **Relation Extraction**

代表论文：《A Relation-Specific Attention Network for Joint Entity and Relation Extraction》《Adversarial training for multi-context joint entity and relation extraction》《Relation Extraction as Two-way Span-Prediction》《Double Graph Based Reasoning for Document-level Relation Extraction》《Downstream Model Design of Pre-trained Language Model for Relation Extraction Task》

1. **Reading Comprehension**

代表论文：《Robust Reading Comprehension with Linguistic Constraints via Posterior Regularization》《Cognitive Graph for Multi-Hop Reading Comprehension at Scale》《Multi-hop Reading Comprehension through Question Decomposition and Rescoring》《DuReader: a Chinese Machine Reading Comprehension Dataset from Real-world Applications》《Explore, Propose, and Assemble: An Interpretable Model for Multi-Hop Reading Comprehension》

1. **Text Summarization**

代表论文：《Abstractive Summarization of Spoken andWritten Instructions with BERT》《PEGASUS: Pre-training with Extracted Gap-sentences for Abstractive Summarization》《SummAE: Zero-Shot Abstractive Text Summarization using Length-Agnostic Auto-Encoders》《Better Fine-Tuning by Reducing Representational Collapse》《Get To The Point: Summarization with Pointer-Generator Networks》

1. **Question Answering**

代表论文：《Large-scale Simple Question Answering with Memory Networks》《Open Question Answering with Weakly Supervised Embedding Models》《TANDA: Transfer and Adapt Pre-Trained Transformer Models for Answer Sentence Selection》《Hyperbolic Representation Learning for Fast and Efficient Neural Question Answering》《Dense Passage Retrieval for Open-Domain Question Answering》

1. **Text Style Transfer**

代表论文：《Style Transfer for Texts: Retrain, Report Errors, Compare with Rewrites》《Unsupervised Text Style Transfer using Language Models as Discriminators》《Style Transfer from Non-Parallel Text by Cross-Alignment》《Controllable Artistic Text Style Transfer via Shape-Matching GAN》《Disentangled Representation Learning for Non-Parallel Text Style Transfer》

1. **NLP Pre-training**

代表论文：《XLNet: Generalized Autoregressive Pretraining for Language Understanding》《BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding》《Language Models are Unsupervised Multitask Learners》《ALBERT: A Lite BERT for Self-supervised Learning of Language Representations》《RoBERTa: A Robustly Optimized BERT Pretraining Approach》

1. **Vision-Language Pre-training**

代表论文：《Unified Vision-Language Pre-Training for Image Captioning and VQA》《Oscar: Object-Semantics Aligned Pre-training for Vision-Language Tasks》《Towards Learning a Generic Agent for Vision-and-Language Navigation via Pre-training》《VisualBERT: A Simple and Performant Baseline for Vision and Language》《UNITER: UNiversal Image-TExt Representation Learning》

1. **Graph Neural Networks**

代表论文：《Graph Attention Networks》《Asymmetric Transitivity Preserving Graph Embedding》《Graph Embedding Techniques, Applications, and Performance: A Survey》《graph2vec: Learning Distributed Representations of Graphs》《GL2vec: Graph Embedding Enriched by Line Graphs with Edge Features》

1. **Knowledge Graph Alignment**

代表论文：《Cross-lingual Knowledge Graph Alignment via Graph Matching Neural Network》《Cross-lingual Knowledge Graph Alignment via Graph Convolutional Networks》《Knowledge Graph Alignment Network with Gated Multi-hop Neighborhood Aggregation》《Relation-Aware Entity Alignment for Heterogeneous Knowledge Graphs》《Multi-view Knowledge Graph Embedding for Entity Alignment》

1. **Knowledge Base Question Answering**

代表论文：《Modeling Semantics with Gated Graph Neural Networks for Knowledge Base Question Answering》《Improving Multi-hop Knowledge Base Question Answering by Learning Intermediate Supervision Signals》《Bidirectional Attentive Memory Networks for Question Answering over Knowledge Bases》《Learning Representation Mapping for Relation Detection in Knowledge Base Question Answering》《Leveraging Abstract Meaning Representation for Knowledge Base Question Answering》

1. **Open-Domain Question Answering**

代表论文：《Denoising Distantly Supervised Open-Domain Question Answering》《Evidence Aggregation for Answer Re-Ranking in Open-Domain Question Answering》《SPARTA: Efficient Open-Domain Question Answering via Sparse Transformer Matching Retrieval》《Dense Passage Retrieval for Open-Domain Question Answering》《Knowledge Guided Text Retrieval and Reading for Open Domain Question Answering》

1. **Unsupervised Machine Translation**

代表论文：《Phrase-Based & Neural Unsupervised Machine Translation》《Unsupervised Machine Translation Using Monolingual Corpora Only》《Unsupervised Neural Machine Translation》《MASS: Masked Sequence to Sequence Pre-training for Language Generation》《Bilingual Lexicon Induction through Unsupervised Machine Translation》

1. **Multimodal Machine Translation**

代表论文：《Dynamic Context-guided Capsule Network for Multimodal Machine Translation》《Multimodal Machine Translation through Visuals and Speech》《Gumbel-Attention for Multi-modal Machine Translation》《Multimodal Transformer for Multimodal Machine Translation》《Latent Variable Model for Multi-modal Translation》

1. **Document Understanding**

代表论文：《Message Passing Attention Networks for Document Understanding》《》《DocBERT: BERT for Document Classification》《Rep the Set: Neural Networks for Learning Set Representations》《Modular Multimodal Architecture for Document Classification》

1. **Topic Models**

代表论文：《Hierarchical Topic Mining via Joint Spherical Tree and Text Embedding》《Familia: An Open-Source Toolkit for Industrial Topic Modeling》《Top2Vec: Distributed Representations of Topics》《Cross-lingual Contextualized Topic Models with Zero-shot Learning》《Pre-training is a Hot Topic: Contextualized Document Embeddings Improve Topic Coherence》

1. **Multi-Document Summarization**

代表论文：《Multi-Document Summarization with Determinantal Point Process Attention》《Multi-News: a Large-Scale Multi-Document Summarization Dataset and Abstractive Hierarchical Model》《Graph-based Neural Multi-Document Summarization》《Leveraging Graph to Improve Abstractive Multi-Document Summarization》《Hierarchical Transformers for Multi-Document Summarization》

1. **Named Entity Recognition**

代表论文：《FLERT: Document-Level Features for Named Entity Recognition》《Improving Named Entity Recognition by External Context Retrieving and Cooperative Learning》《Application of a Hybrid Bi-LSTM-CRF model to the task of Russian Named Entity Recognition》《TENER: Adapting Transformer Encoder for Named Entity Recognition》《FLAT: Chinese NER Using Flat-Lattice Transformer》

1. **Chinese NER**

代表论文：《Chinese NER Using Lattice LSTM》《FLAT: Chinese NER Using Flat-Lattice Transformer》《Simplify the Usage of Lexicon in Chinese NER》《Adversarial Transfer Learning for Chinese Named Entity Recognition with Self-Attention Mechanism》《ERNIE 2.0: A Continual Pre-training Framework for Language Understanding》

1. **Contrastive Learning**

代表论文：《A Simple Framework for Contrastive Learning of Visual Representations》《Supervised Contrastive Learning》《Momentum Contrast for Unsupervised Visual Representation Learning》《Improved Baselines with Momentum Contrastive Learning》《SimCSE: Simple Contrastive Learning of Sentence Embeddings》

1. **Entity Linking**

代表论文：《Efficient One-Pass End-to-End Entity Linking for Questions》《Multilingual Autoregressive Entity Linking》《Improving Entity Linking by Modeling Latent Relations between Mentions》《Scalable Zero-shot Entity Linking with Dense Entity Retrieval》《End-to-End Neural Entity Linking》

1. **Fake News Detection**

代表论文：《Fake News Detection on Social Media using Geometric Deep Learning》《Defending Against Neural Fake News》《Explainable Tsetlin Machine framework for fake news detection with credibility score assessment》《User Preference-aware Fake News Detection》《Graph Neural Networks with Continual Learning for Fake News Detection from Social Media》

1. **Pose Estimation**

代表论文：《Toward fast and accurate human pose estimation via soft-gated skip connections》《Cascade Feature Aggregation for Human Pose Estimation》《Rethinking on Multi-Stage Networks for Human Pose Estimation》《OmniPose: A Multi-Scale Framework for Multi-Person Pose Estimation》《Learning to Refine Human Pose Estimation》

1. **3D Reconstruction**

代表论文：《Pix2Vox: Context-aware 3D Reconstruction from Single and Multi-view Images》《Robust Attentional Aggregation of Deep Feature Sets for Multi-view 3D Reconstruction》《Atlas: End-to-End 3D Scene Reconstruction from Posed Images》《Weakly supervised 3D Reconstruction with Adversarial Constraint》《Occupancy Networks: Learning 3D Reconstruction in Function Space》

1. **Self-Supervised Learning**

代表论文：《VATT: Transformers for Multimodal Self-Supervised Learning from Raw Video, Audio and Text》《ALBERT: A Lite BERT for Self-supervised Learning of Language Representations》《Supervised Contrastive Learning》《Self-Supervised Relational Reasoning for Representation Learning》《VATT: Transformers for Multimodal Self-Supervised Learning from Raw Video, Audio and Text》

1. **Vision Transformer**

代表论文：《VATT: Transformers for Multimodal Self-Supervised Learning from Raw Video, Audio and Text》《An Image is Worth 16x16 Words: Transformers for Image Recognition at Scale》《Emerging Properties in Self-Supervised Vision Transformers》《End-to-End Object Detection with Transformers》《Swin Transformer: Hierarchical Vision Transformer using Shifted Windows》

1. **Continuous Control**

代表论文：《Near-Optimal Representation Learning for Hierarchical Reinforcement Learning》《Smooth Exploration for Robotic Reinforcement Learning》《Image Augmentation Is All You Need: Regularizing Deep Reinforcement Learning from Pixels》《Sample-Efficient Reinforcement Learning with Stochastic Ensemble Value Expansion》《Trust-PCL: An Off-Policy Trust Region Method for Continuous Control》

1. **Community Detection**

代表论文：《CommunityGAN: Community Detection with Generative Adversarial Nets》《A Non-negative Symmetric Encoder-Decoder Approach for Community Detection》《High Quality, Scalable and Parallel Community Detectionfor Large Real Graphs》《Deep Autoencoder-like Nonnegative Matrix Factorization for Community Detection》《GEMSEC: Graph Embedding with Self Clustering》

1. **Time Series Classification**

代表论文：《Multivariate LSTM-FCNs for Time Series Classification》《Bayesian Learning from Sequential Data using Gaussian Processes with Signature Covariances》《Shallow RNN: Accurate Time-series Classification on Resource Constrained Devices》《Seq2Tens: An Efficient Representation of Sequences by Low-Rank Tensor Projections》《Multiple Instance Learning for Efficient Sequential Data Classification on Resource-constrained Devices》

1. **Speech Recognition**

代表论文：《Pushing the Limits of Semi-Supervised Learning for Automatic Speech Recognition》《Deep Speech 2: End-to-End Speech Recognition in English and Mandarin》《wav2vec 2.0: A Framework for Self-Supervised Learning of Speech Representations》《Self-training and Pre-training are Complementary for Speech Recognition》《fairseq S2T: Fast Speech-to-Text Modeling with fairseq》

1. **Text-To-Sql**

代表论文：《Text-to-SQL in the Wild: A Naturally-Occurring Dataset Based on Stack Exchange Data》《IGSQL: Database Schema Interaction Graph Based Neural Model for Context-Dependent Text-to-SQL Generation》《RAT-SQL: Relation-Aware Schema Encoding and Linking for Text-to-SQL Parsers》《SeaD: End-to-end Text-to-SQL Generation with Schema-aware Denoising》《Seq2SQL: Generating Structured Queries from Natural Language using Reinforcement Learning》

1. **Common Sense Reasoning**

代表论文：《A Hybrid Neural Network Model for Commonsense Reasoning》《A Simple Method for Commonsense Reasoning》《Graph-Based Reasoning over Heterogeneous External Knowledge for Commonsense Question Answering》《Muppet: Massive Multi-task Representations with Pre-Finetuning》《ALBERT: A Lite BERT for Self-supervised Learning of Language Representations》

1. **Medical Image Segmentation**

代表论文：《MSRF-Net: A Multi-Scale Residual Fusion Network for Biomedical Image Segmentation》《CaraNet: Context Axial Reverse Attention Network for Segmentation of Small Medical Objects》《TransFuse: Fusing Transformers and CNNs for Medical Image Segmentation》《UNet++: A Nested U-Net Architecture for Medical Image Segmentation》《DoubleU-Net: A Deep Convolutional Neural Network for Medical Image Segmentation》