**Title: A Review on Deep Learning Techniques Applied to Semantic Segmentation**

**Research Paper Structure:**

Abstract

* Introduction
* Terminology and Background Concepts
  + - Common Deep Network Architectures
      * + AlexNet
        + Visual Geometry Group (VGG)
        + GoogLeNet
        + ResNet
        + ReNet
    - Transfer Learning
    - Data Preprocessing and Augmentation
* Datasets and Challenges
  + - 2D Datasets
      * + PASCAL Visual Object Classes (VOC)
        + PASCAL Context
        + PASCAL Part
        + Semantic Boundaries Dataset (SBD)
        + Microsoft Common Objects in Context (COCO)
        + SYNTHetic Collection of Imagery and Annotations (SYNTHIA)
        + Cityscapes
        + CamVid
        + KITTI
        + Youtube-Objects
        + Adobe’s Portrait Segmentation
        + Materials in Context (MINC)
        + Densely-Annotated VIdeo Segmentation (DAVIS)
        + Stanford background
        + SiftFlow
    - 2.5D Datasets
      * + NYUDv2
        + SUN3D
        + SUNRGBD
        + The Object Segmentation Database (OSD)
        + RGB-D Object Dataset
    - 3D Datasets
      * + ShapeNet Part
        + Stanford 2D-3D-S
        + A Benchmark for 3D Mesh Segmentation
        + Sydney Urban Objects Dataset
        + Large-Scale Point Cloud Classification Benchmark
* Methods
  + - Decoder Variants
    - Integrating Context Knowledge
      * + Conditional Random Fields
        + Dilated Convolutions
        + Multi-scale Prediction
        + Feature Fusion
        + Recurrent Neural Networks
    - Instance Segmentation
    - RGB-D Data
    - 3D Data
    - Video Sequences
* Discussion
  + - Evaluation Metrics
      * + Execution Time
        + Memory Footprint
        + Accuracy
    - Results
      * + RGB
        + 2.5D
        + 3D
        + Sequences
    - Summary
    - Future Research Directions
* Conclusion

REFERENCES

**Title: Methods and datasets on semantic segmentation: A review**

**Research Paper Structure:**

Abstract

* Introduction
* Preliminaries
  + - Superpixels
    - Contextual models
      * + MRF
        + CR
        + Inference and energy minimization
* Hand-engineered features based scene labeling methods
  + - Methods using pixel(superpixel)-wise classification
    - Methods using CRF
      * + Plain CRF
        + Higher order CRF
        + Dense CRF
    - Non-parametric methods
    - 3D scene labeling methods
* Learned features based scene labeling methods
  + - Principle of CNN
    - Scene labeling based on CNN
      * + Naive approach
        + Methods using fully convolutional networks
* Weakly and semi- supervised scene labeling methods
  + - Methods using image-level labels
      * + Weakly supervised learning
        + Label propagation
    - Methods using bounding box annotations
    - Semi-supervised methods
* Public datasets for scene labeling
* Evaluation and comparison
  + - Evaluation of scene labeling methods
    - Comparison of some scene labeling methods
      * + Comparison of representative models
        + Comprehensive comparison of fully supervised methods
        + Weakly supervised methods v.s. fully supervised methods
* Conclusion and future directions

Acknowledgment

References

**Title: Deep-Learning-Based Approaches for Semantic Segmentation of Natural Scene Images: A Review**

**Research Paper Structure:**

Abstract

* Introduction
* Fully Supervised Semantic Segmentation
  + - Region-Proposal-Based Approaches
    - Fully Convolutional Network (FCN)-Based Approaches
      * + Encoder-Decoder Network
        + Dilated/Atrous Convolution
        + Feature Fusion
        + Multi-Scale Feature and Pyramid Architecture
        + Methods Using Recurrent Neural Networks (RNN)
* Weakly Supervised Semantic Segmentation
  + - Bounding Box
    - Image-Level
    - Scribble-Point Leve
* Recent Approaches in Semantic Segmentation
  + - Segment Anything Model (SAM)
    - Unsupervised Domain Adaptive in Semantic Segmentation
* Post-Processing Algorithms in Semantic Segmentation
  + - Conditional Random Fields (CRF)
    - Markov Random Field (MRF)
    - Random Walker
    - Domain Transform
* Datasets
  + - ADE20K
    - COCO Stuff
    - Pascal VOC (Visual Object Classes)
    - Pascal Context
    - NYU-Depth V2 (NYUDv2)
    - SUN RGBD
    - Berkeley Deep Drive (BDD100K)
    - The Cambridge-driving Labeled Video Database (CamVid)
    - Cityscapes
    - DTMR-DVR
    - KITTI
    - GATECH
    - SIFT Flow
    - Stanford Background
* Evaluation
* Discussion and Future Directions
* Conclusions

References

**Title: A review of semantic segmentation using deep neural networks**

**Research Paper Structure:**

Abstract

* Introduction
* Region-based semantic segmentation
* FCN-based semantic segmentation
* Weakly supervised semantic segmentation
* Discussion
  + - Strengths and benefits
    - Major challenges and weaknesses
* Conclusions

References