Video Object Segmentation Based on Pixel-level Annotated Dataset

EECS6893 Final Project Proposal

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Introduction

Video Object Segmentation

Goal: extracting foreground objects from video clips.

Application:

- video summarization/editing
- object tracking
- video action detection[3][4]
- autonomous driving
- etc…

Figure 1. separating foreground object(s) from the background region of a video[5]

Data

DAVIS 2016[2]

Densely **A**nnotated **VI**deo **S**egmentation

- 50 full HD video sequences
- pixel-accurate ground-truth data provided for every video frame
- Contain occlusions, fast-motion, non-linear deformation and motion-blur

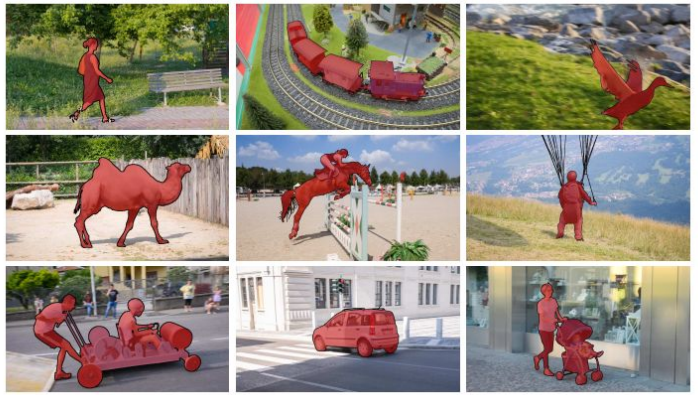


Figure 2. Sample images in DAVIS-2016 with annotation.[2]

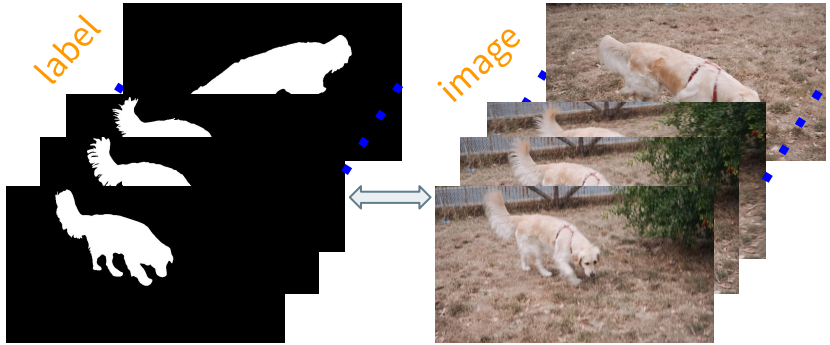


Figure 3. Image Sequence Data in DAVIS-2016.[2]

Methods

- Data argumentation:
  - Computational limit → resize image
  - Flip, Gaussian Noise, Brightness and Hue, etc.
- Model
  - Supervised vs. unsupervised → Spatiotemporal CNN[1]
- Evaluation: region similarity, contour accuracy and temporal instability (provided by dataset).

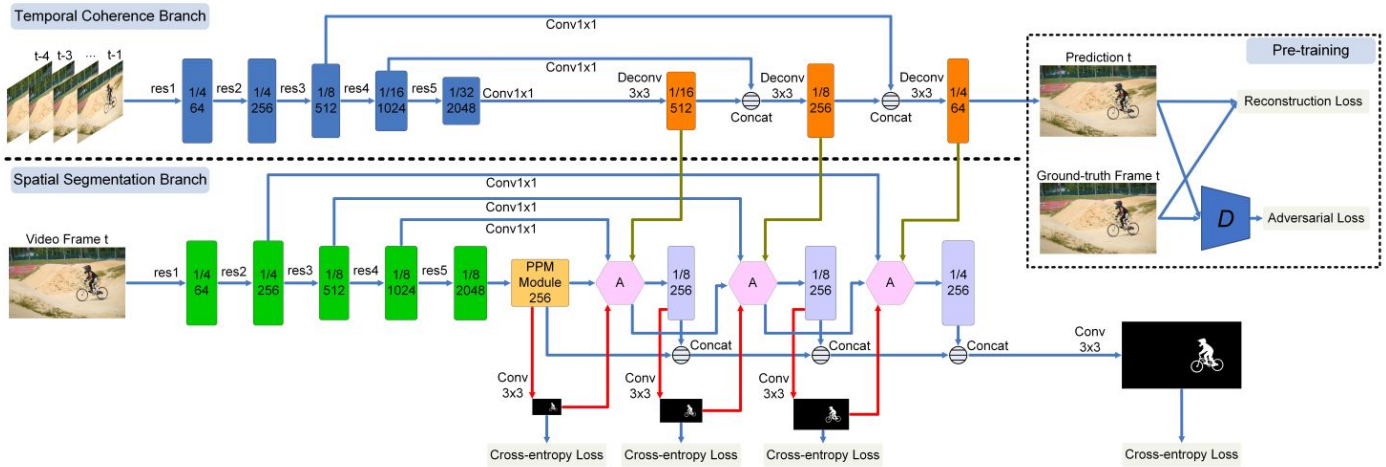


Figure 4. Network Structure Overview for STCNN.[1]

System

- Aims:
  - To support previewing uploaded video with segmented foreground object.
- Expected outcome:
  - Separate foreground objects with larger than 80% overlapping with ground-truth on average
  - Provide API for video website and simple web front-end for demo

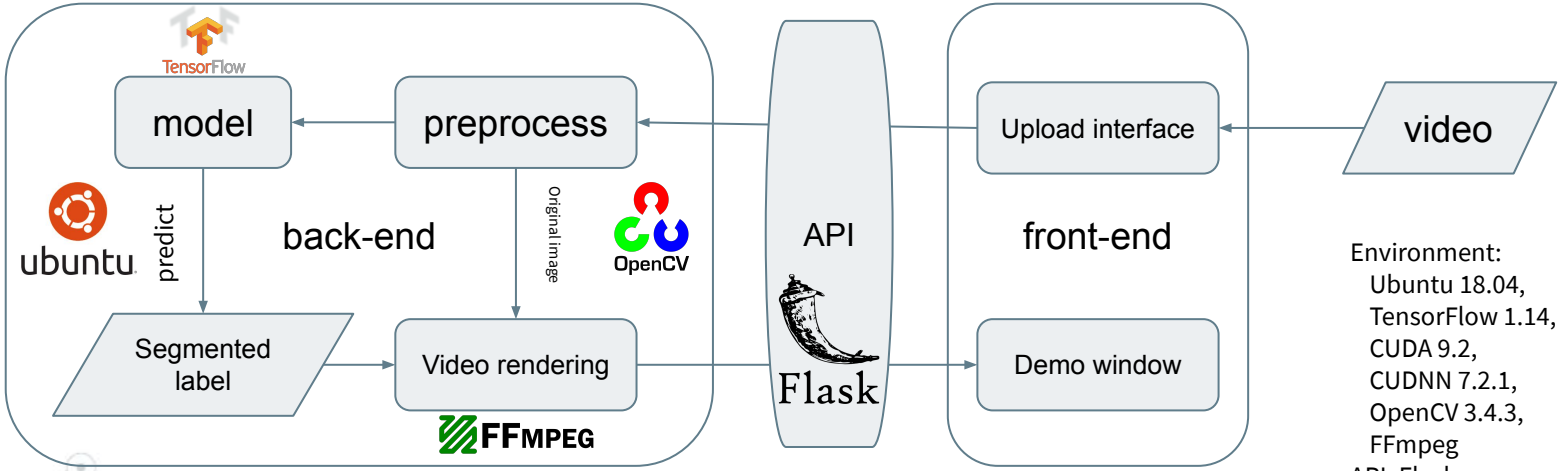
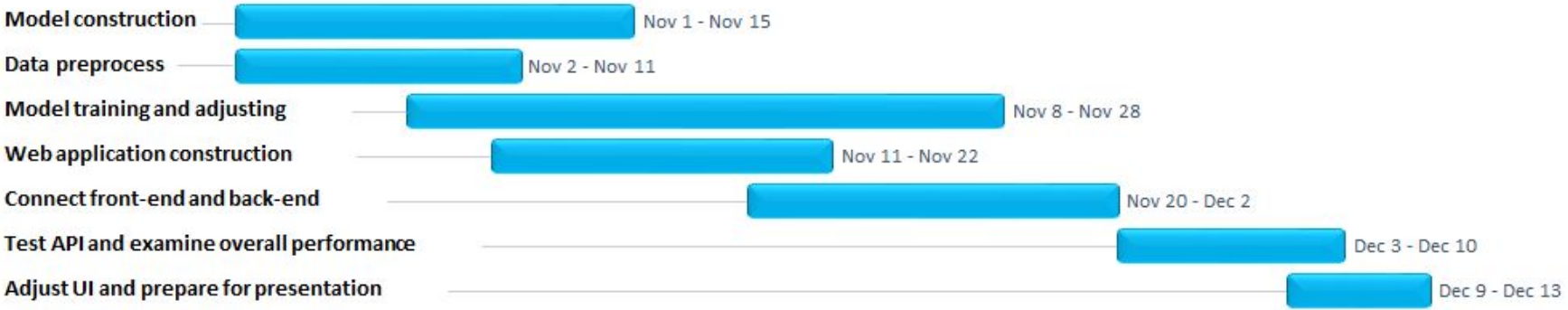


Figure 5. Simple overview diagram of system

Environment:
Ubuntu 18.04,
TensorFlow 1.14,
CUDA 9.2,
CUDNN 7.2.1,
OpenCV 3.4.3,
FFmpeg
API: Flask
Front-end: video js

Schedule


Proposal
Nov 1
Midpoint
Nov 22
Final presetation
Dec 13
2019
Nov
Dec
2019
Today


Model construction
Nov 1 - Nov 15
Data preprocess
Nov 2 - Nov 11
Model training and adjusting
Nov 8 - Nov 28
Web application construction
Nov 11 - Nov 22
Connect front-end and back-end
Nov 20 - Dec 2
Test API and examine overall performance
Dec 3 - Dec 10
Adjust UI and prepare for presentation
Dec 9 - Dec 13

Reference

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Thanks!