Automated Video Annotation for Traffic Incident Managers Software System
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Overview

We performed an exploratory study for automating annotation of behaviors in screen captured videos. We developed a model with a VGG16 core that classifies a frame of video as indicating 1 of 30 observed behaviors. Our dataset consists of frames extracted from annotated videos of Traffic Incident Manager (TIM) videos.

Problem Area

This project seeks to automatically identify what Traffic Incident Managers (TIMs) are doing with their computers based solely on video screen capture.
- TIMs detect, respond and clear traffic incidents
- We automated behavioral data collection
- Solutions needed to address their convoluted current system

Methods

- Created a python script to convert video data from [3] into PNG images using FFmpeg
- Sampled 30 frames around human annotation of behavior as positive instances
- Built model with a pretrained VGG16 base using our own classifier
- Trained on our frames of data using Categorical Entropy loss and RMSProp optimization

Results

- Top-1 Accuracy: 8.7%
- Random Guessing: 3.4%
- Single frame benchmark: 38.1% [1]
- State of the Art: 71.8% [2]
- Better models might yield better results
- Reason to doubt the usefulness of our dataset

Future Work

- More models:
  - Two-Stream networks
  - High-Res - Low-Res network
  - Shallow models
- Model TIM workflow
- Predict TIM errors
- Longitudinal behavior studies
- Model transferability tests
- Detect Mouse Cursor