

Scene Separation & Data Selection: Temporal Segmentation Algorithm for Real-time Video Stream Analysis

Yuelin Xin¹² Zihan Zhou¹ Yuxuan Xia¹

¹SWJTU-Leeds Joint School, CS
Southwest Jiaotong University

²School of Computing
University of Leeds

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Introduction

- ▶ The problem (Background & What we want to achieve)
- ▶ Our motivation (Why not neural networks?)

Remark

Scene separation is a problem in which we want to separate a video stream into different scenes. **A scene** is defined as a group of similar-looking frames that are temporally adjacent to each other.

The problem

- ▶ **Background:** real-time video stream interpretation, including video semantics / video accessibility / surveillance footage auto-interpretation, etc.
- ▶ **What's missing:** algorithms do not see video as a continuous stream of images, but as discrete frames.



Figure 1: Video semantics.

Readable Mathematics

Let X_1, X_2, \dots, X_n be a sequence of independent and identically distributed random variables with $E[X_i] = \mu$ and $\text{Var}[X_i] = \sigma^2 < \infty$, and let

$$S_n = \frac{X_1 + X_2 + \dots + X_n}{n} = \frac{1}{n} \sum_i^n X_i$$

denote their mean. Then as n approaches infinity, the random variables $\sqrt{n}(S_n - \mu)$ converge in distribution to a normal $\mathcal{N}(0, \sigma^2)$.