VIDEO CONTENT SEARCH ENGINE

FREEZE

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Summary

Freeze is a video content search engine designed to simplify the process of locating specific scenes or objects in videos. By integrating scene detection with object recognition, it provides an efficient and user-friendly solution for content creators, editors, and analysts.

Challenges in Video Analysis

Current video analysis tools are inefficient, often lacking integration between scene detection and object recognition. This results in time-consuming workflows for content creators, archivists, and analysts managing large video libraries.

Freeze: A Better Solution

Freeze combines advanced **scene detection** (PySceneDetect) with **object recognition** (YOLOv8) in one platform. Users can search videos for scenes with specific objects, set confidence thresholds, and download results—all via an intuitive interface.

Core Capabilities

- **Scene Detection**: **PySceneDetect** automatically identifies scene transitions for efficient navigation.
- **Object Detection**: **YOLOv8x** detects objects with confidence scores and bounding boxes.
- **Metadata** Storage: Stores scene and object data in **PostgreSQL** for easy retrieval.
- **Search** Functionality: Allows searches based on objects, confidence levels, and spatial positions.
- Quick **Extraction of Relevant Clips**
- **User-Friendly** Interface: Accessible via a clean **Streamlit** frontend.

Process Overview

1. Upload Video
2. Specify Search Criteria
3. Process Video and Perform Search
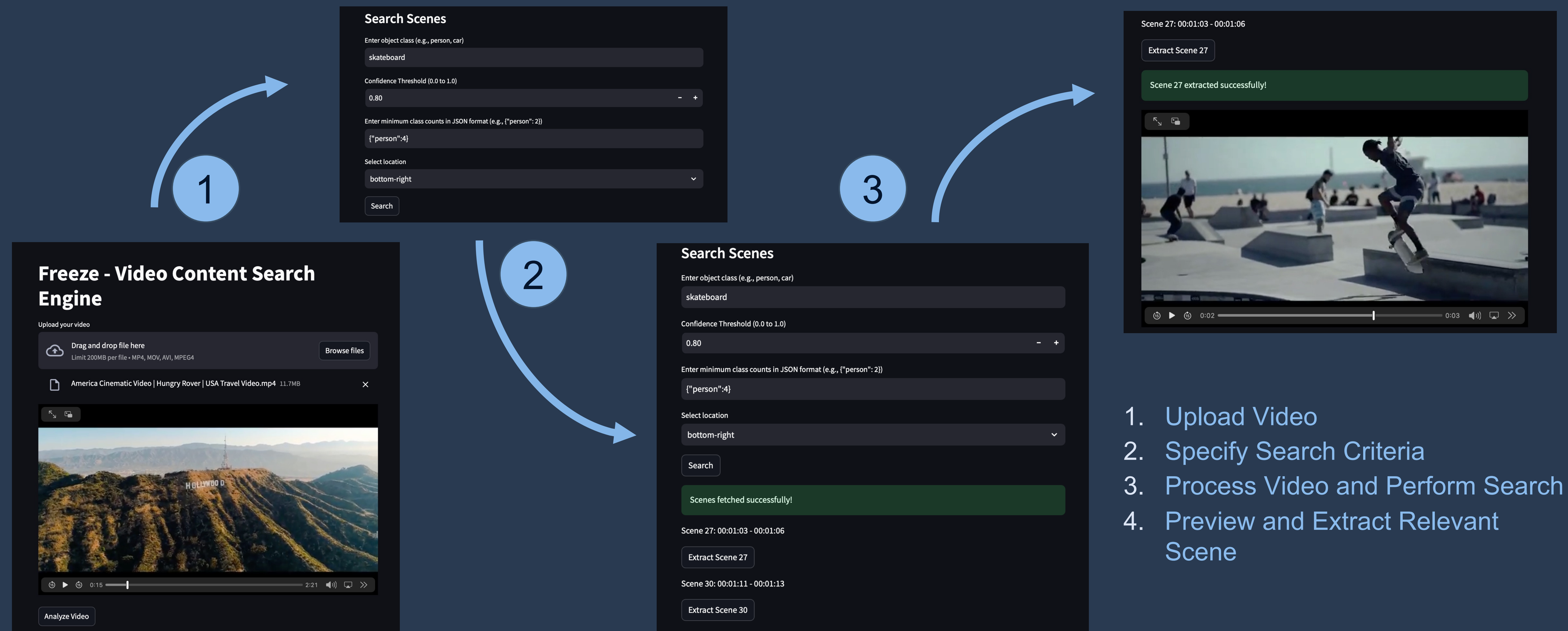4. Preview and Extract Relevant Scene

Key Differentiators

- Combines scene detection and object recognition in **one platform**.
- **Optimized** with **Metal Performance Shaders** for faster YOLOv8 inference.
- User-friendly interface makes it **accessible** to non-technical users.
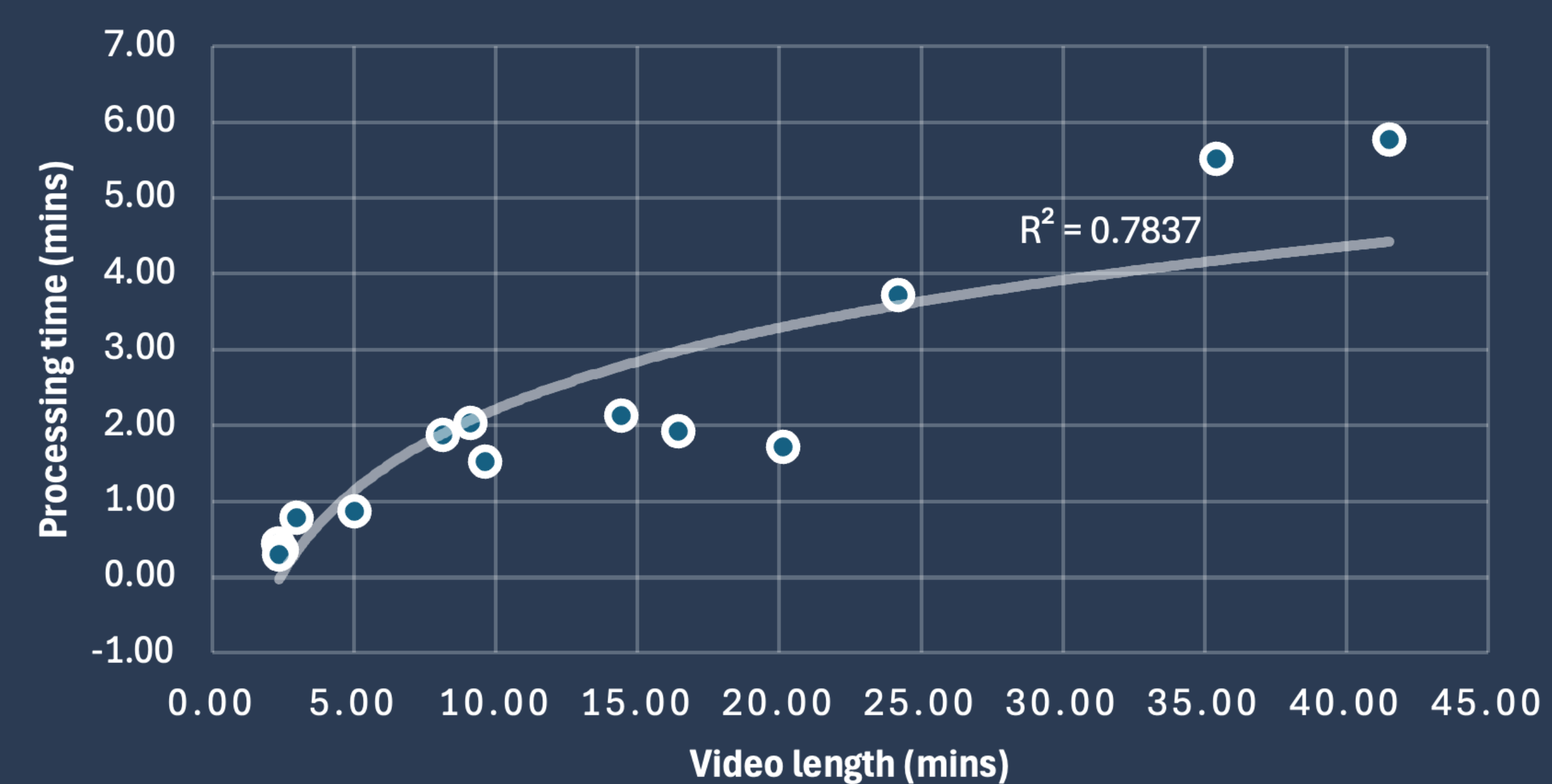
Empowering Video Professionals

Freeze supports a wide range of professionals by streamlining video analysis workflows:

- **Content Creators** and **Editors**: Locate specific scenes quickly for seamless editing.
- **Filmmakers**: Pinpoint key moments to refine storytelling.
- **Archivists** and **Media Analysts**: Organize large video libraries effortlessly.
- **Security Teams**: Detect suspicious events in surveillance footage efficiently.
- **Researchers**: Analyze video patterns and objects for insights across domains.

Use Case Example:
A content creator uploads a video, searches for scenes with "cars" at 80% confidence, and extracts relevant clips within minutes—saving hours of manual work.

Performance Highlights

- Processed a 20-minute full HD video in less than 3 minutes.
- Detected objects with high accuracy while skipping redundant frames for efficiency.
- Enabled precise scene extraction based on user-defined criteria

Freeze demonstrates consistent performance improvements with increasing video length showcasing real-world applicability

PROCESSING TIME BY VIDEO LENGTH

$R^2 = 0.7837$

X-axis: Video length (mins)
Y-axis: Processing time (mins)

Freeze Source Code and Setup Guide

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