



AI-POWERED ASPECT RATIO OPTIMIZATION WITH

Smart Video Cropping

Introduction

In the dynamic world of digital media, adapting video content to various aspect ratios is essential. Smart Video Cropping with AI offers a seamless solution by transforming video inputs into perfectly framed outputs. It detects video shot changes and dynamically calculates the optimal cropping box, ensuring that crucial elements remain in focus. This advancement in automated video refinement is ideal for creating content suited to any aspect ratio, whether for mobile screens, social media platforms, or widescreen cinematic displays, guaranteeing your content always looks its best.

The Challenge

One of the primary challenges lies in achieving accurate shot detection. This required comprehensive video analysis to identify scene changes and determine the key frame within these scenes, which will subsequently be utilized to identify the optimal cropping region. Calculating the optimal cropping box is indeed the principal challenge in this solution, which has been addressed by using a specialized Image Analysis model part of the Azure AI Vision offering.

The Solution: Smart Video Cropping with AI

To address these challenges, we employed various Microsoft AI resources:

Azure AI Content Understanding:

This technology analyzes video content to detect scene transitions and prioritize key video frames.

Azure AI Vision:

Used the Image Analysis Smart Cropping feature to dynamically adjust the cropping box, ensuring that crucial parts of the video are highlighted across various aspect ratios, making it adaptable for different platforms.

Shot Replacement using GenAI Video Generation (coming soon):

This upcoming feature will use Generative AI to replace or enhance specific video shots, creating more dynamic and visually appealing content optimized for the desired aspect ratio.

AI-powered Pipeline



The diagram illustrates a video processing application architecture on Azure. It is contained within a 'Resource group' and an 'Azure Region'.

- Frontend:** Consists of 'Static Website in Azure Storage' and a 'Video Player'.
- Backend API:** Consists of an 'Azure Container Apps API'.
- Data and Storage:**
 - 'Blob Storage' feeds into 'Frames'.
 - 'Frames' feed into 'CosmosDB VCMs Store'.
 - 'CosmosDB VCMs Store' feeds into 'Service Bus'.
 - 'Service Bus' feeds into 'Azure Container Apps Background jobs'.
- AI Processing:**
 - 'Azure Container Apps Background jobs' feed into a 'Video AI Pipeline'.
 - The 'Video AI Pipeline' outputs to 'AI Vision' and 'Azure AI Content Understanding'.
- Delivery and Monitoring:**
 - 'Static Website in Azure Storage' feeds into 'CDN'.
 - 'CDN' feeds into 'Playback Devices'.
 - 'Application Insights' and 'KeyVault' are shown as monitoring and security components.



AI Smart Cropping conversion from 16:9 to 9:16



Content Analysis: Identify Optimal Cropping Region

The process begins with **Video Analysis**, where **Azure AI Content Understanding** is employed to detect distinct shots within the video. Detailed descriptions of each shot are generated, capturing key elements and activities. Additionally, audio transcription complements the visual data, providing a comprehensive understanding of the content, which sets the foundation for intelligent cropping and enhancement.

Moving into **Smart Cropping**, individual frames are extracted for processing. **AI Vision Image Analysis** is then used to apply intelligent cropping, ensuring the focus remains on important elements within each frame. This dynamic adjustment highlights the most crucial parts of the video frames, making the content adaptable for various aspect ratios and platforms.

Content Creation: Smart Video Cropping Process

The forthcoming Video Generation feature involves reviewing each shot for potential enhancements. Generative AI technologies like **Runway** and **OpenAI Sora** are leveraged to replace or enhance specific shots, improving visual appeal and adding a layer of creativity to the video editing process.

In the final **clipping & stitching** stage, customized cropping filters are created for each shot based on prior analysis, ensuring key elements are consistently highlighted. The final video is rendered using **FFmpeg**, seamlessly combining all processed shots into a cohesive and visually appealing output. This comprehensive workflow ensures that video content is dynamically and intelligently adapted to various aspect ratios while maintaining visual integrity and focus on key elements.

Conclusion

Smart Video Cropping with AI dynamically adapts content to various aspect ratios while maintaining focus on key elements, ensuring high visual integrity.

Enhance Viewer Engagement with Smart Video Cropping and Azure AI

Intelligent Video Cropping with AI ensures that users receive visually compelling content tailored to various platforms, enhancing viewer engagement and delivering a seamless, professional-quality viewing experience. By dynamically adapting video content to different aspect ratios while maintaining focus on key elements, this advanced workflow saves time and effort in the editing process, allowing creators to produce high-quality videos with greater efficiency. Users benefit from consistently well-framed, aesthetically pleasing videos that are optimized for any device or platform, ultimately improving the overall impact and reach of their content.

Ready to see how Smart Video Cropping with AI can elevate your content workflow?

Whether you're working with large-scale media libraries or producing content for multiple platforms, our team is here to show you how this solution can be tailored to your exact needs.

Book a personalized session with a **SOUTHWORKS** expert and discover how we can help you save time, boost content quality, and get more from your video assets.

Let's talk about your specific use case—and how to make it smarter.

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