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Microsoft AI Partner of the Year 2023 ★ GLOBAL ★

CT – Vision

Leveraging Advanced Language and Vision Models to Solve Complex Business Challenges

Table of Contents

CT Vision Introduction

The **CT Vision** is a cutting-edge video analytics platform developed by Celebal. It is designed to provide comprehensive solutions for video understanding, scene retrieval, and analysis. CT Vision is a versatile solution that spans various industries, enabling efficient management of large volumes of video data. It adheres to strict data security and governance measures, ensuring reliability, accuracy, and protection of information. Additionally, CT Vision enhances user experience with an improved interface and facilitates seamless integration with existing systems, making it highly user-friendly and adaptable to diverse operational needs.

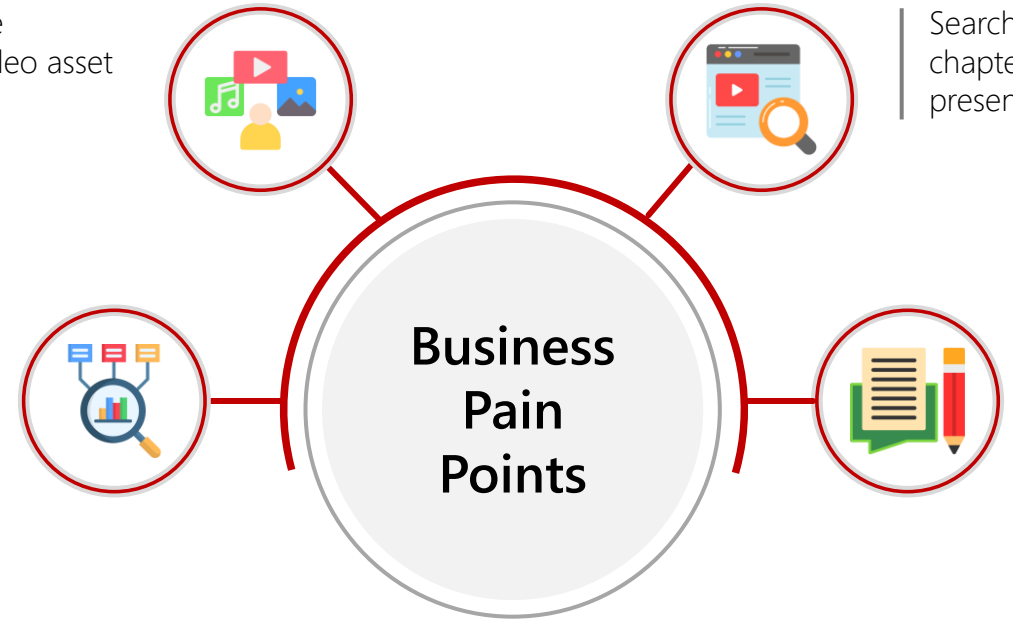
Business Requirement

Video Asset Searching

Video asset searching based on the contents of the video over large video asset library.

In video searching

Search for specific scenes, frames and chapters in the videos based on the content present in the video.



Real time video analysis

Analyze video content in near real time to provide video insights and description.

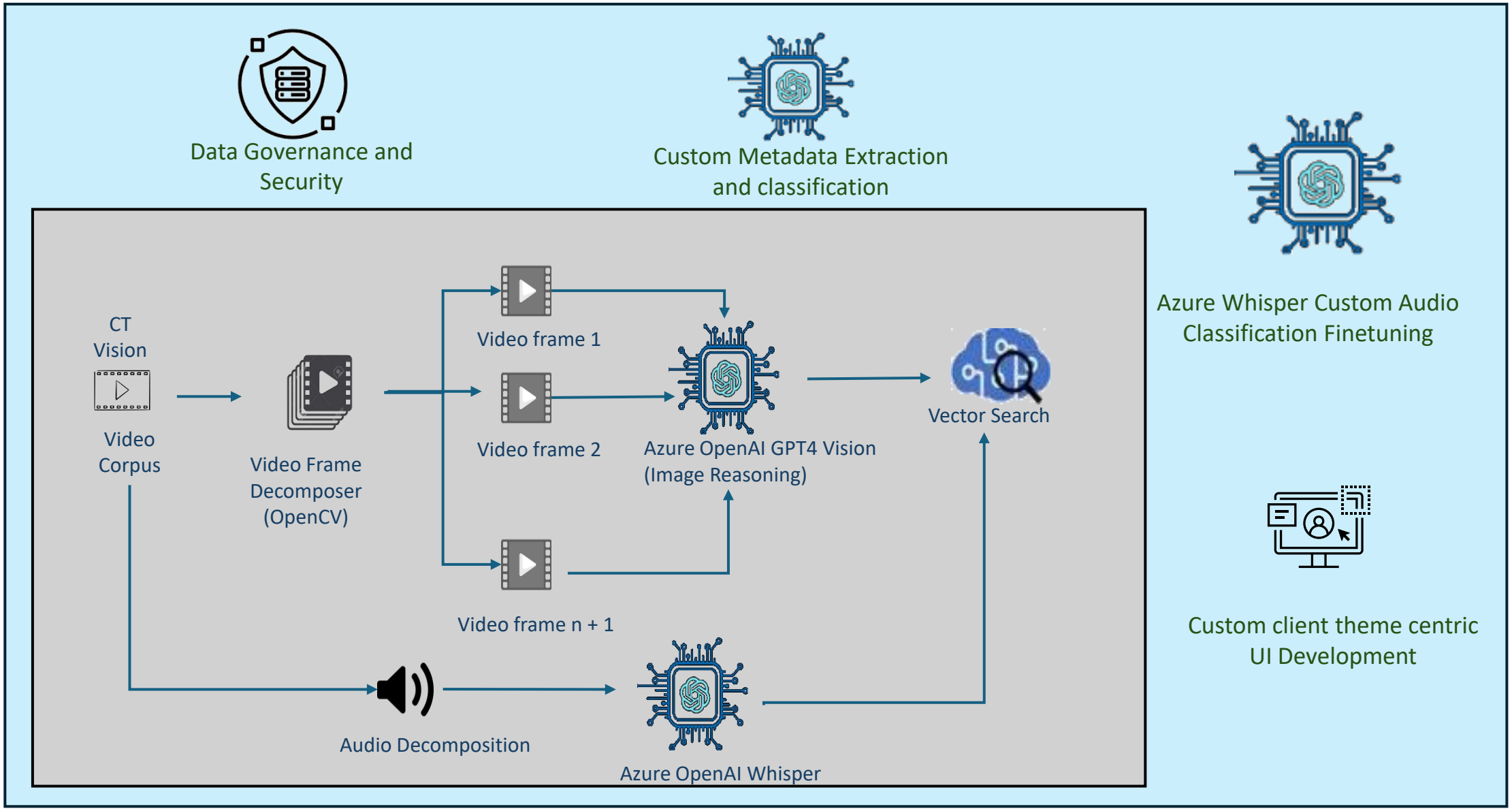
Content Modification

Allow video content modification such as language translation, create voice over dubbing based on the content of the video.

Industry Vertical

Custom Applications (legacy or new	BFSI	Energy	Manufacturing	Retail & CPG	Media & Entertainment
Solution	Car Damage Claim Automation	Asset Defect Detection	Gauge Monitoring	Inventory Management	Movie Trailer Generation
	Video KYC	Vegetation Management	Product Quality Inspection	Self Checkout Kiosk	Video Asset Searching
	Insurance Underwriting	EHS			Sports Match Highlights Generation
Industry Independent Use case	Video Resume Parser				
	Automatic Video To Manual Document Generation				
	Meeting Summarizer				
Tech Stack	Azure Open AI GPT 4 Vision + Whisper	Azure Cognitive Search	Azure Container Registry	Azure Kubernetes Service	Azure Cosmos DB	Azure Storage Account	App Service	Azure Data Factory
Frame work	Content – based image Retrieval Analysis Framework PTU enabled solution (recommended)				

High Level Architecture



CT Vision - Key Features

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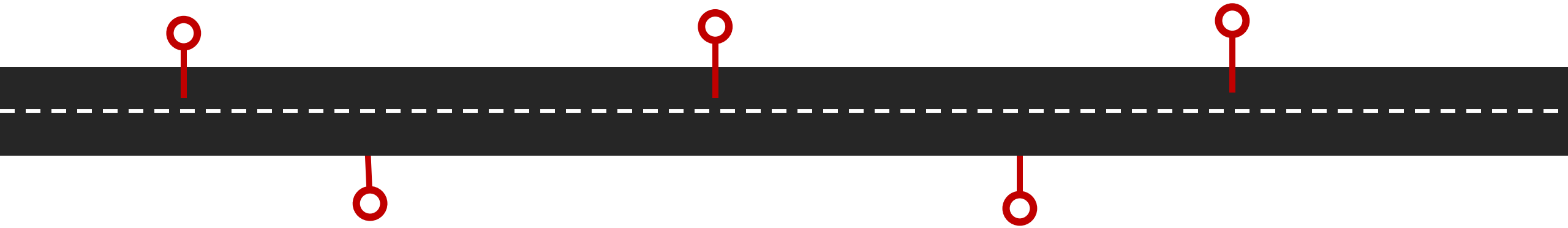
- Voice Over Dubbing
- Chapter Analysis
- Text-Based Video Scene Retrieval
- Action Summary Generation
- In Video Brand Identification
- Person Identification
- Keyword-Based Video/Scene Filtering
- Content-Based Similar Video Search
- Custom Text/ Metadata Classification
- Custom Object Localization
- Object Tracking
- Custom Audio Classification with Whisper Finetuning
- Foundational Model Assisted Object Localization
- Object Counting

Project Implementation

- Requirement Gathering and Sign-Off
- Infra setup on Client environment
- CT Vision Solution Setup
- Frame Processing Pipeline

- Audio based metadata enrichment (If required)
- Vision based metadata enrichment (If required)
- Custom KPI development (If required)

- API development and Cosmos DB Integration
- UI Development and integration
- PowerBI dashboard (if required)



- Video Repository Creation
- AKS Deployment
- CI/CD Pipeline
- Internal testing

- UAT
- Hyper Care

Tentative timelines for MVP : 4 – 6 Weeks

Tentative timelines for Production : 8 – 12 Weeks

CT Vision vs Classical Vision Approaches

CT Vision

- **Semantic Understanding and Contextual Awareness:** Excels at understanding and generating semantic meaning from visual scenes using textual representations and can interpret and respond based on broader contextual information beyond visual elements alone.
- **Adaptability:** Adapts to new tasks with minimal task-specific training due to extensive pre-training on vast data and hence has continuous performance improvement over time.
- **Advanced Pattern Recognition:** Recognizes complex patterns and anomalies that traditional methods might miss and adapts recognition patterns based on situational changes.

Classical Computer Vision

- **Feature Extraction and Pattern Recognition:** Relies on feature extraction and classification techniques for semantic inference. Efficient in recognizing straightforward visual patterns but struggles with abstract nuances.
- **Task-Specific Models**: Requires significant re-training or fine-tuning for new tasks or domains. Learning is generally static, needing explicit re-training to improve.
- **Efficiency**: Processes and recognizes well-defined patterns efficiently in consistent environments. Less adaptable to dynamic or complex patterns and contexts.

Car Insurance Claim Automation

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Problem Statement

The current manual process of assessing car insurance claims is time-consuming, prone to human error, and often inconsistent. This leads to delays in claim processing, dissatisfied customers, and increased operational costs. Automating the analysis of car damage from user-submitted videos can streamline the process, improve accuracy, and enhance customer satisfaction.

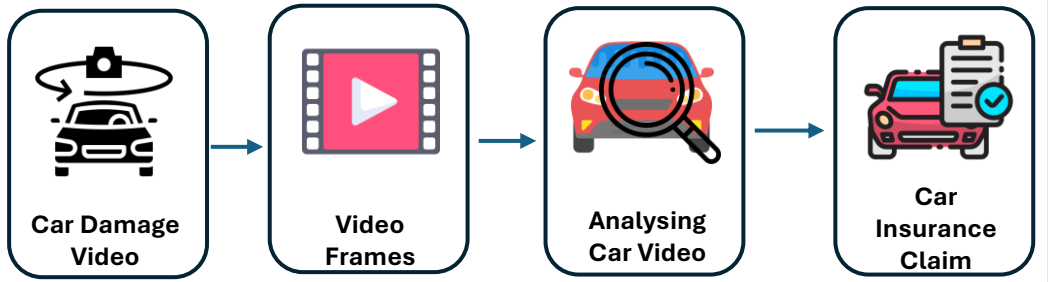
Business Scenario

A car insurance company wants to implement a solution that automates the initial assessment of car damage from user-submitted videos. When a policyholder submits a video of their damaged car, the system will automatically process the video, analyze the damage, and generate a detailed report. This automated approach aims to reduce claim processing time, increase accuracy in damage assessment, and provide a more efficient service to policyholders.

Objectives:

1. **Efficient Retrieval:** Use GPT-4, Azure Computer Vision, and CT Vision to analyze video frames for detailed damage assessment.
2. **User-Friendly Interface:** Provide an intuitive and easy-to-use interface for users to upload videos of their damaged cars.
3. **Time Savings:** Significantly reduce the time needed to process and analyze car damage claims by automating the video analysis and report generation process.

Process Flow



Automated Asset Analysis

Problem Statement

Manual inspection of critical infrastructure assets like poles, switchyards, and transformers is labor-intensive, prone to oversight, and can delay the identification of defects and vegetation-related risks. Automating the analysis of video footage of these assets can enhance the accuracy and efficiency of inspections, ensuring timely maintenance and risk mitigation.

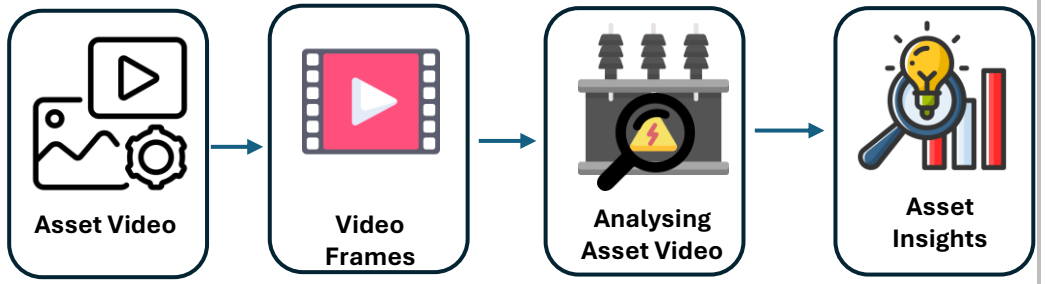
Business Scenario

A utility company aims to implement an automated system for inspecting infrastructure assets through user-submitted videos. The system will analyze the videos to identify defects in assets and assess the surrounding vegetation.

Objectives:

1. **Automated Asset Defect Analysis:** Implement a system using GPT-4, Azure Computer Vision, and CT Vision to analyze video footage of assets, identifying defects and providing detailed insights.
2. **Maintenance Recommendations:** Provide basic and advanced fixes for identified defects and vegetation issues to facilitate timely maintenance and risk mitigation.
3. **Vegetation Assessment:** Evaluate the proximity and condition of vegetation near the assets and determine potential risks.

Process Flow



Video Highlight Extraction

Problem Statement

Sports video analysis, especially for football, involves sifting through lengthy footage to find and highlight key moments, which is time-consuming and requires manual effort. Automating the extraction of key frames and creating concise highlight videos can significantly improve efficiency and provide a better viewing experience.

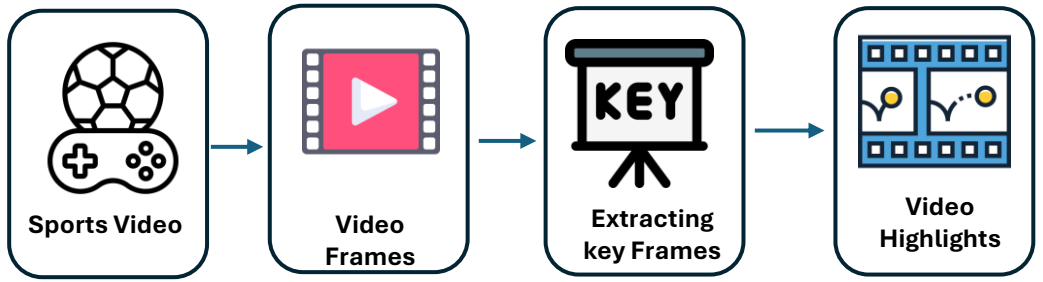
Business Scenario

A sports media company wants to automate the process of creating highlight reels from football matches. By extracting key frames and highlighting important parts of the video, the system will produce concise highlight videos that capture all significant moments, enhancing the viewing experience for fans and reducing manual editing time.

Objectives:

1. **Key Frame Extraction:**Compile the highlighted frames into a shortened video that showcases the essential moments of the match efficiently.
2. **Highlighting Important Moments:** Analyze the key frames to highlight significant events, such as goals, key plays, and critical moments in the game.
3. **Automatic Summary Generation :** Create concise summaries of football matches by combining key frames and highlighted moments.

Process Flow



Insurance Underwriting

Problem Statement

The current manual process of evaluating product insurance applications is labor-intensive, error-prone, and lacks standardization. This leads to slow processing times, potential inaccuracies in coverage assessment, and frustrated customers. By automating the review of product details and risk factors through a streamlined digital system, the process can be expedited, accuracy can be improved, and customer satisfaction can be significantly enhanced.

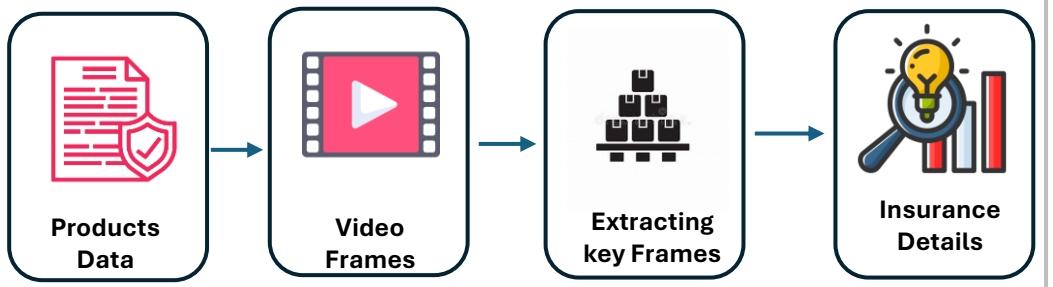
Business Scenario

An insurance company wants to implement an automated underwriting system. This system would integrate with a digital application portal where applicants can upload product information videos, and other relevant documents. The automated system would analyze this data to assess risk factors, determine coverage requirements, and provide recommendations.

Objectives:

1. **Efficient Retrieval:** Use GPT-4, Azure Computer Vision, and CT Vision to analyze video frames for detailed product assessment.
2. **User-Friendly Interface:** Provide an intuitive and easy-to-use interface for users to upload videos of their products.
3. **Time Savings:** Significantly reduce the time needed to process and analyze products data by automating the video analysis and report generation process.

Process Flow



Inventory Management

Problem Statement

Retail inventory management involves continuous monitoring and updating of stock levels across multiple products, which is often time-consuming and requires significant manual effort. Automating the tracking and updating of inventory levels to ensure accurate stock availability, reduce manual effort, and improve overall efficiency.

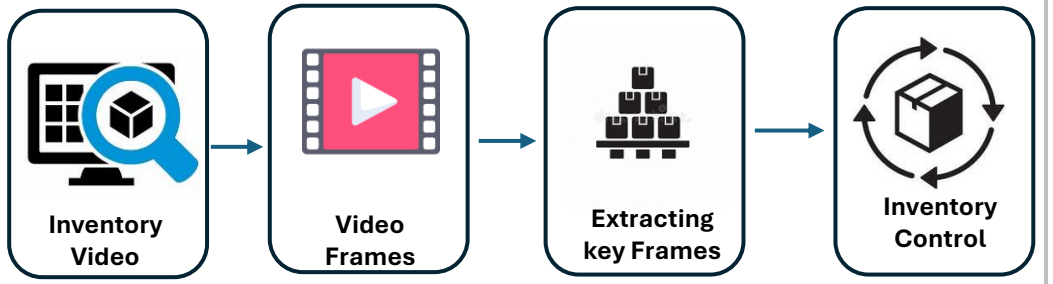
Business Scenario

A retail supply chain company wants to automate the process of inventory management by analyzing CCTV footage of inventories. By extracting key frames and processing important parts of the video, the system will produce valuable insights on effective stock management, enhancing data driven purchasing and replenishment decisions.

Objectives:

1. **Automated Data Extraction:** Implement systems to automatically capture and update inventory data from sales transactions and stock records.
2. **Real Time Monitoring:** Develop real time tracking mechanisms to provide up to date inventory levels and predict restocking needs.
3. **Enhanced Decision-Making:** Provide accurate inventory insights to inform purchasing decisions, reduce overstock and stockouts, and optimize stock levels.

Process Flow



Product Quality Inspection

Problem Statement

The current manual process of inspecting product quality is labor-intensive, prone to human error, and often inconsistent. This leads to delays in detecting defects, increased operational costs, and customer dissatisfaction. Automating the quality inspection process using advanced imaging technology can ensure consistent quality control, reduce manual effort, and enhance overall efficiency.

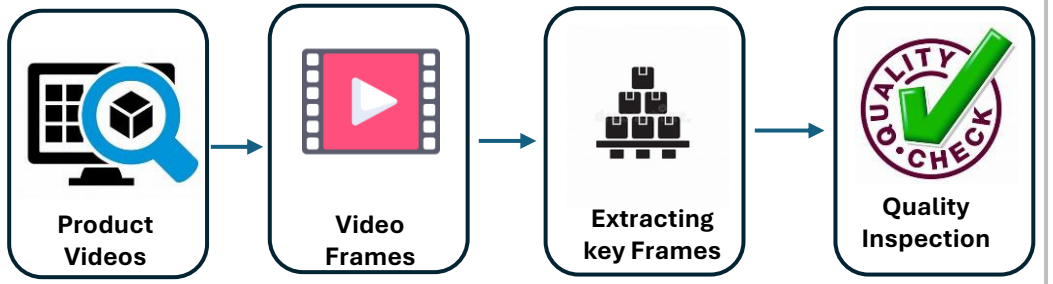
Business Scenario

A product supplier company wants to implement an automated quality inspection system. This system will leverage CCTV footage from the production line, extracting key frames and analyzing them using advanced imaging technology and machine learning algorithms. The automated system will detect defects in real-time, providing immediate feedback to the production team.

Objectives:

1. **Consistency and Accuracy:** Automated inspection ensures uniform quality checks, reducing variability and human error in detecting defects.
2. **Efficiency and Cost Reduction:** Streamlines the inspection process, significantly reducing the time required to identify and address quality issues and minimizing the need for manual labor and reducing waste from defective products.
3. **Scalability:** Supports increased production volumes without compromising on quality, enabling the company to scale efficiently..

Process Flow



Key Frame Extraction And Summarisation

Problem Statement

Video analysis involves sifting through lengthy footage to find and highlight key moments, which is time-consuming and requires manual effort. Automating the extraction of key frames and creating concise summaries of videos can significantly improve efficiency and provide a better viewing experience.

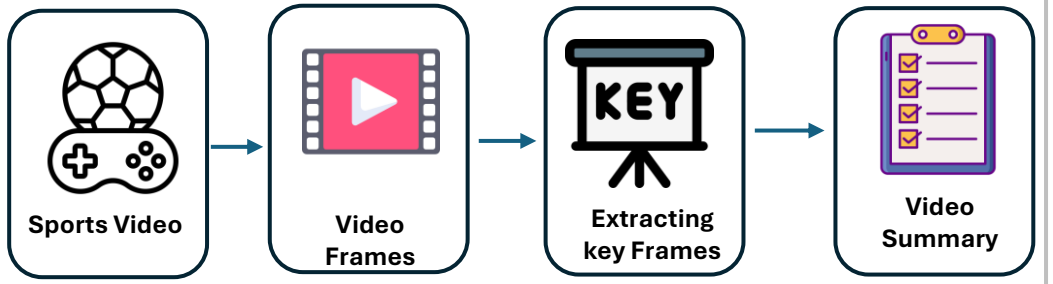
Business Scenario

A company aims to automate the process of summarizing videos and identifying key frames. By extracting key frames and highlighting important parts of the video, the system will generate a concise summary along with key frames that capture all significant moments. This will enhance the viewing experience by providing an efficient way to understand the main content and important details of the video.

Objectives:

1. **Key Frame Extraction:** Develop a system to automatically extract key frames from lengthy footage to capture all significant moments.
2. **Highlight Important Moments:** Automatically identify and highlight critical parts of the video, ensuring important events are easily noticeable.
3. **Concise Summary Generation:** Create brief and comprehensive video summaries combining key frames and highlighted moments to enhance viewing efficiency and experience.

Process Flow



Environment, Health and Safety

Problem Statement

Environment, Health, and Safety (EHS) management often involves monitoring extensive surveillance footage to detect and address hazardous situations. This process is labor-intensive, requiring manual review to identify potential risks, unsafe practices, or compliance violations. Automating the identification of hazardous scenarios and generating concise summaries can greatly enhance efficiency, reduce response times, and ensure a safer workplace environment.

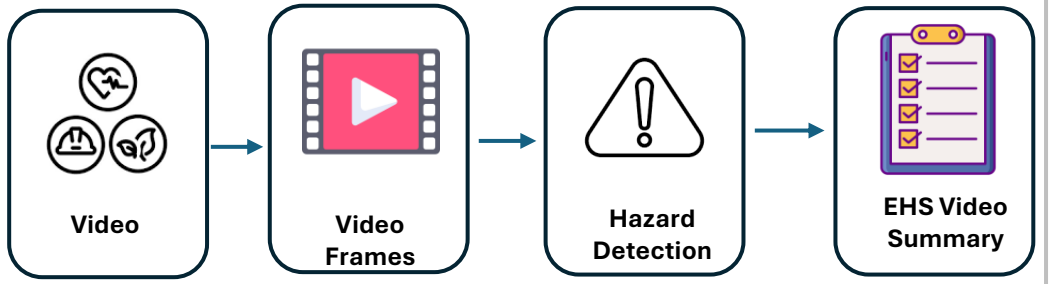
Business Scenario

A company aims to automate the process of monitoring and analyzing surveillance footage for Environment, Health, and Safety (EHS) purposes. By identifying key frames and hazardous scenarios in real-time, the system will generate concise summaries and flag critical moments that indicate potential risks or unsafe conditions. This will enhance workplace safety by providing an efficient way to quickly assess and address hazards, ensuring compliance and reducing the likelihood of incidents.

Objectives:

1	**Protective Gear and People Detection**	Develop a system to automatically detect the presence of people and their use of protective gear in surveillance footage to ensure compliance with safety protocols.
2	**Hazard Detection**	Automatically identify and highlight hazardous situations, unsafe practices, or conditions in real-time, ensuring critical risks are easily noticeable and actionable.
3	**Safety Gear Identification**	Create an automated mechanism to identify specific types of safety gear and evaluate their proper usage, generating concise summaries of non-compliance or unsafe behavior to enhance workplace safety and monitoring efficiency.
4	**Concise Summary Generation**	Create brief and comprehensive summaries of surveillance footage by combining key moments of protective gear detection, hazard identification, and safety gear analysis, enabling quick and efficient review of critical safety events.

Process Flow



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Thank You

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