METHOD AND APPARATUS FOR TRACKING OF OBJECT IN SET OF VIDEO FRAMES

IITM Technology Available for Licensing

Problem Statement

- Existing object tracking techniques, particularly **corner point tracking, struggle with accuracy at object boundaries and depth discontinuities in video frames.**
- There is a **demand for a more robust and efficient object tracking method** that can accurately track objects across frames, especially at boundaries, in **computer vision and video surveillance applications**.

Technology Category/ Market

Category – Computer Vision, Object Tracking
Applications - Video Surveillance, Visual Odometry, Optical Flow, Stereo Vision, Structure from Motion (SfM), Simultaneous Localization and Mapping (SLAM)
Industry - Security and Surveillance, Autonomous Vehicles, Robotics, Augmented Reality, Virtual Reality, Healthcare Imaging
Market -The Global Video Surveillance Systems Market size is estimated at USD 81.68 billion in 2024, and is expected to reach USD 145.38 billion by 2029, growing at a **CAGR of 12.22%** during the forecast period (2024-2029).

FIG. 3A

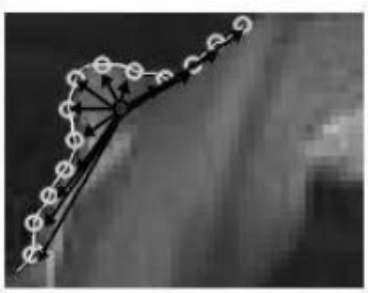

FIG. 3B

FIGS. 3A-3B show detecting stable level line segments in video frames.

Technology

Maximally Stable Level Line Segments (MSLLS):
Key technology for robustly identifying stable features in video frames, enhancing object tracking accuracy.

Shape-Based Matching:
Technique to compare shapes of object features across frames, aiding in reliable object identification and tracking.

Texture-Based Matching:
Method to analyze and compare texture patterns of object regions, improving matching accuracy in varying conditions.

Part SSD Matching:
Substantial Sum-of-Squared-Differences matching technique for comparing texture patches, enhancing object tracking performance in complex scenes.

Corner Point Detection:
Algorithms for identifying distinctive corner points in images, facilitating precise object localization and tracking.

Intellectual Property

- **IITM IDF Ref. 1508**
- **IN 394760 (Patent Granted)**

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Key Features / Value Proposition

User Perspective:

- Enhanced object tracking for security.
- Improved navigation for robotics.
- Seamless virtual element integration in AR.

Technical Perspective:

- Novel maximally stable level line segment method.
- Flexible integration into computer vision systems.
- Advanced shape and texture-based matching.

Industry Perspective:

- Enhanced security surveillance.
- Improved autonomous vehicle navigation.
- Immersive AR and gaming experiences.

Image

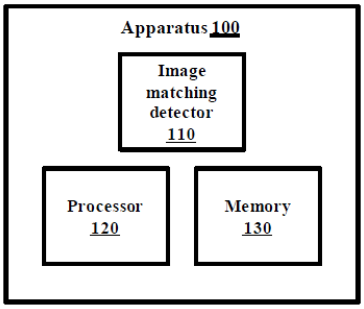
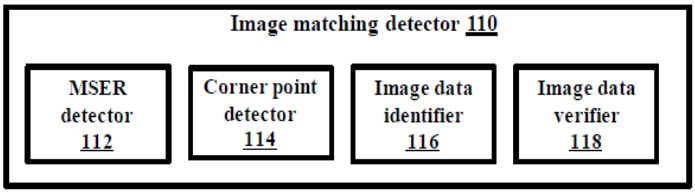


FIG. 1A depicts hardware components of an object tracking apparatus in video frames. FIG. 1B illustrates hardware components of an image-matching



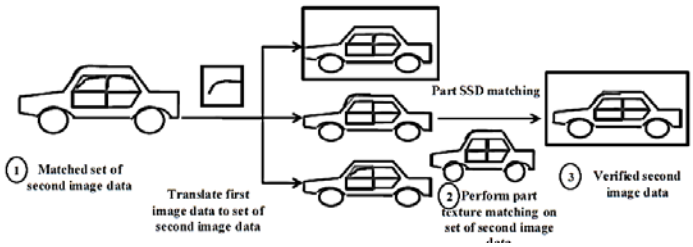


FIG. 6 demonstrates tracking at least one second corner point in the second image data through texture matching.

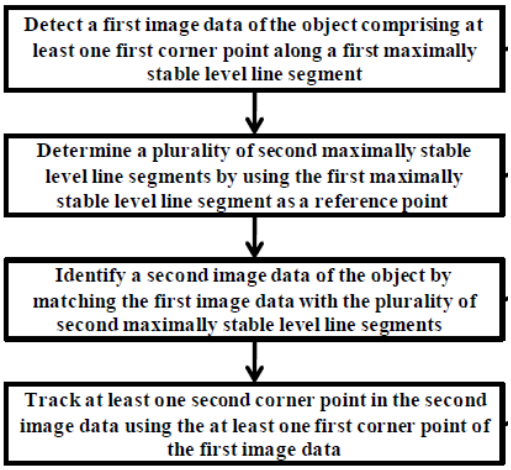


FIG. 2 shows a method for tracking objects in video frames.

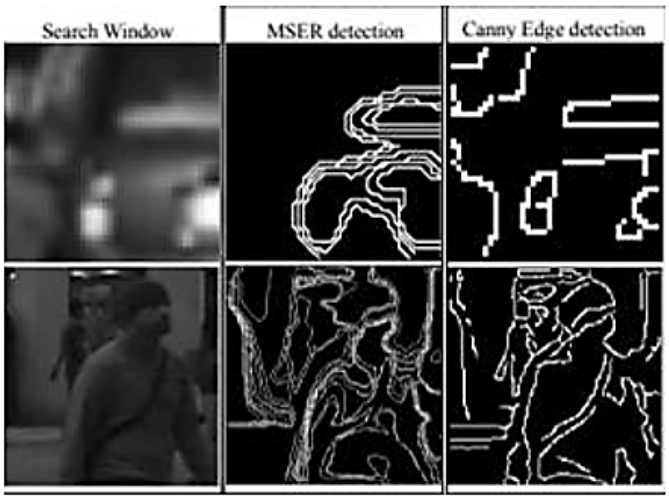


FIG. 7 shows object boundaries obtained using MSER and edge detection techniques, enhancing the existing mechanism.

TRL (Technology Readiness Level)

TRL- 4, Technology validated in lab scale.

Research Lab

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