技术开启新"视"界
Technology Bring New Vision

基于FFmpeg的运动视频分析

李忠　　Intel - 开源技术中心
张华　　Intel - Data Center Group

LiveVideoStack 音视频技术社区

CSDN

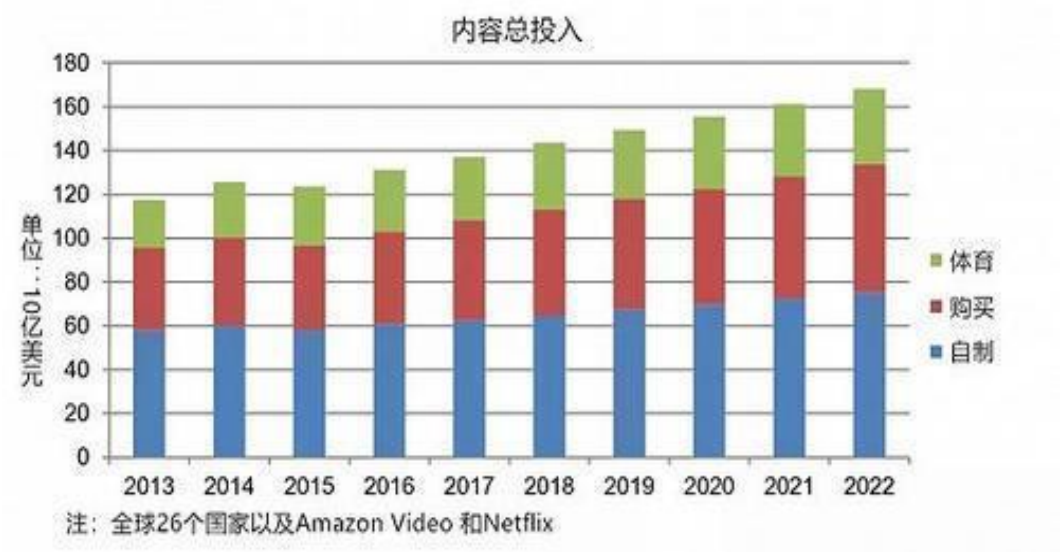
1 视频分析的市场前景

2 基于FFmpeg的运动视频分析

3 Intel运动视频分析案例解析

4 Q&A

视频分析的市场前景



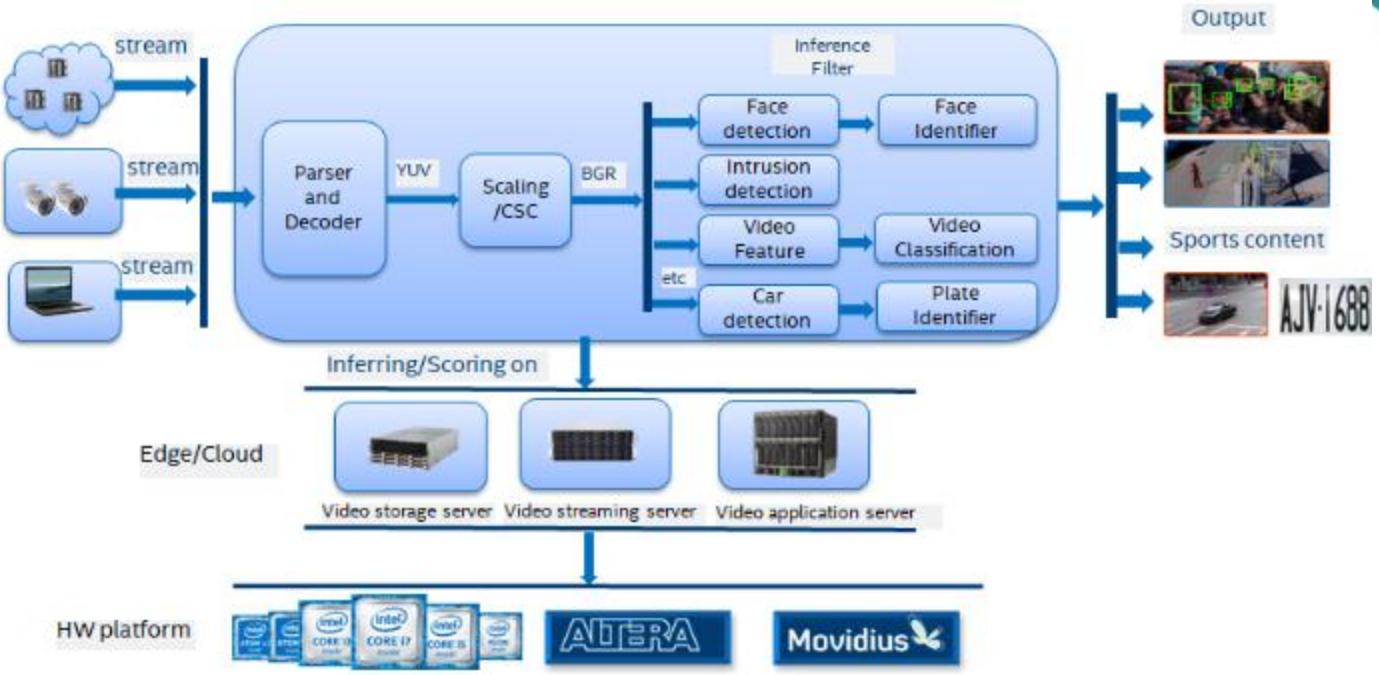
来源https://baijiahao.baidu.com/s?id=1610094146145423069&wfr=spider&for=pc

视频行业的技术趋势

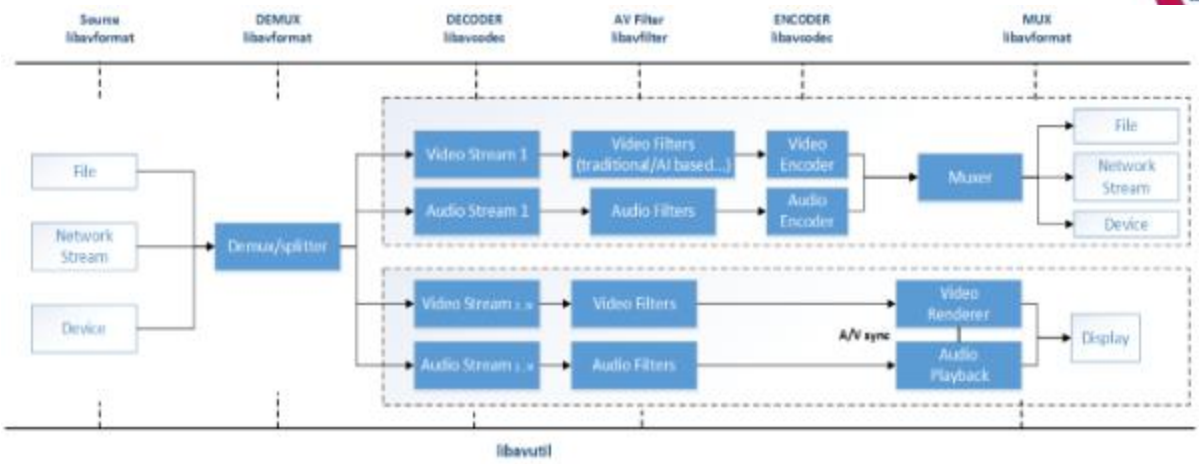
Gartner Identifies the Top 10 Strategic Technology Trends for 2018

- 1. AI Foundation
- 2. Intelligent Apps and Analytics
  ...
- 7. Immersive Experience
  ...

Video Analytic Pipeline



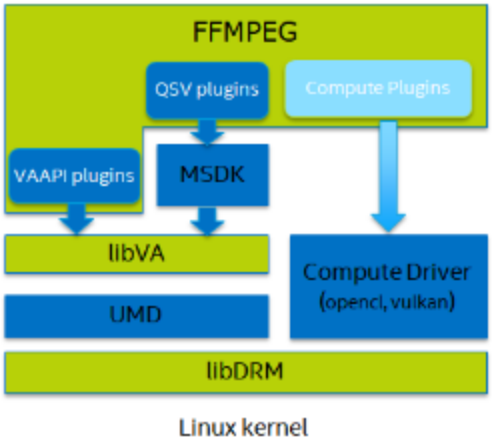
FFmpeg Framework



- Advantages:
  - Support streaming/decoding/encoding/mux/demux quite well
  - Support many video filters, such as scaling/CSC/denoise/tone-mapping. And hwupload/download filters for CPU/GPU memory data exchange.
  - Intel HW acceration transcoding supported: dxva/vaapi/qsv/opencl.
- Limitation: not good at video analysis. Need to co-work with other CV libaries.

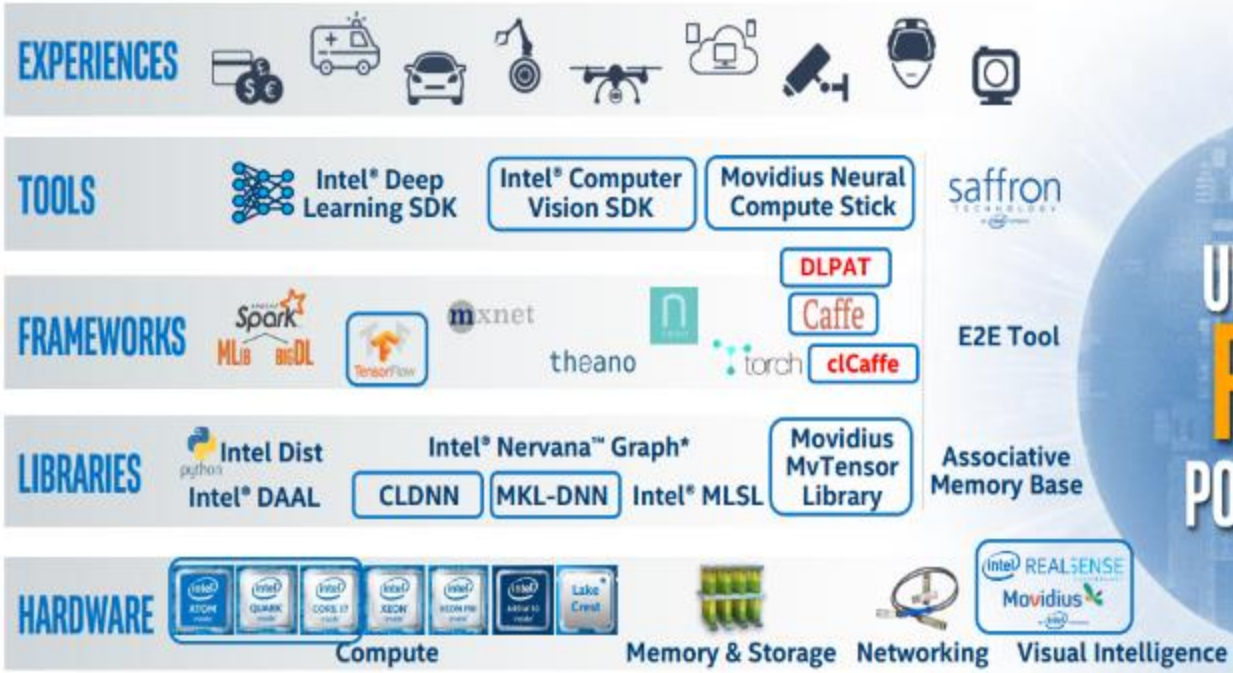
FFmpeg Intel HW ACCEL soultion

- Functions:
  - vaapi codecs + vaapi filters
  - qsv codecs + qsv filters
  - Compute (opencl) filters: such as overlay/tonemapping. provide flexiable filters without dependency on video-driver and MSDK.
- Encoding quality improvement with look_ahead
- Performance tuning
  - qsv decoding/encoding: 1:1 transcoding with asynchronous
  - qsv encoding: 1:N trancoding with MFE
- Flexibale pipelines:
  - pure vaapi trancoding
  - pure qsv qsv trancoding
  - mixed pipeline such as: vaapi decoding + vaapi filters + qsv encoding.
  - vaapi/qsv codecs + ocpencl filters.

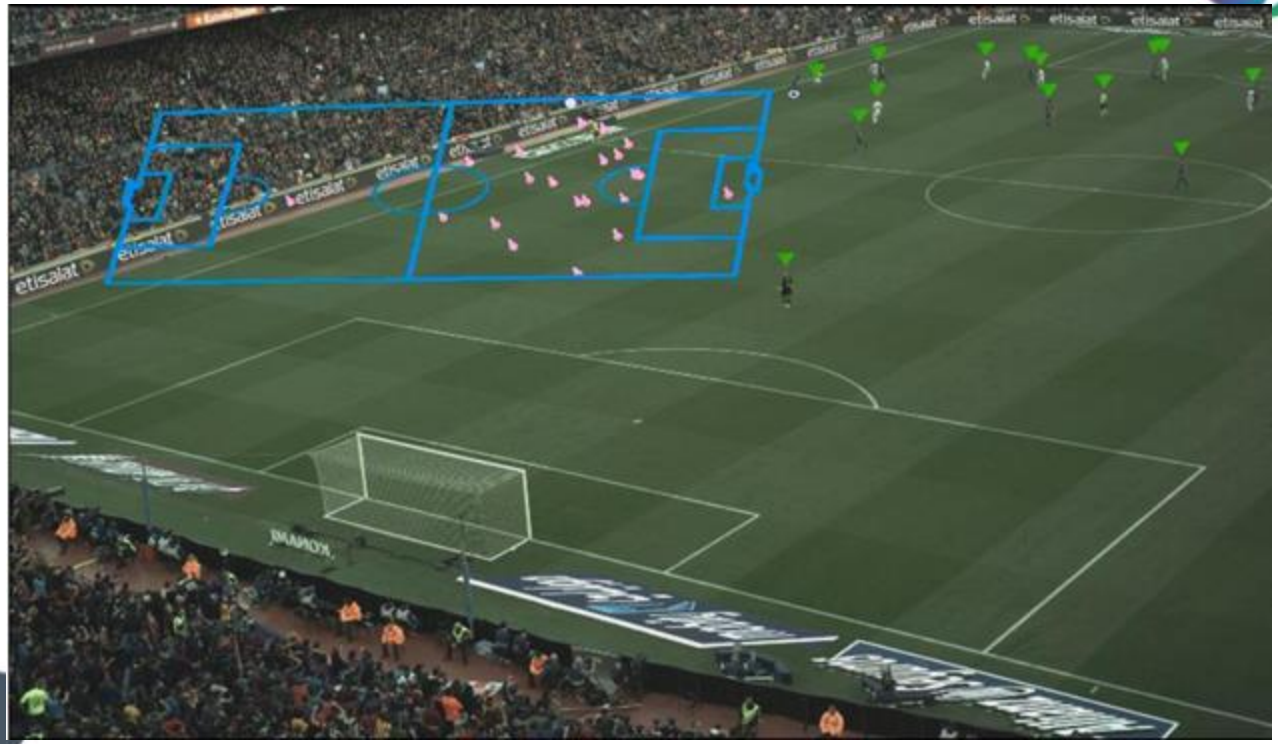


Intel HW ACCEL soultion on Linux

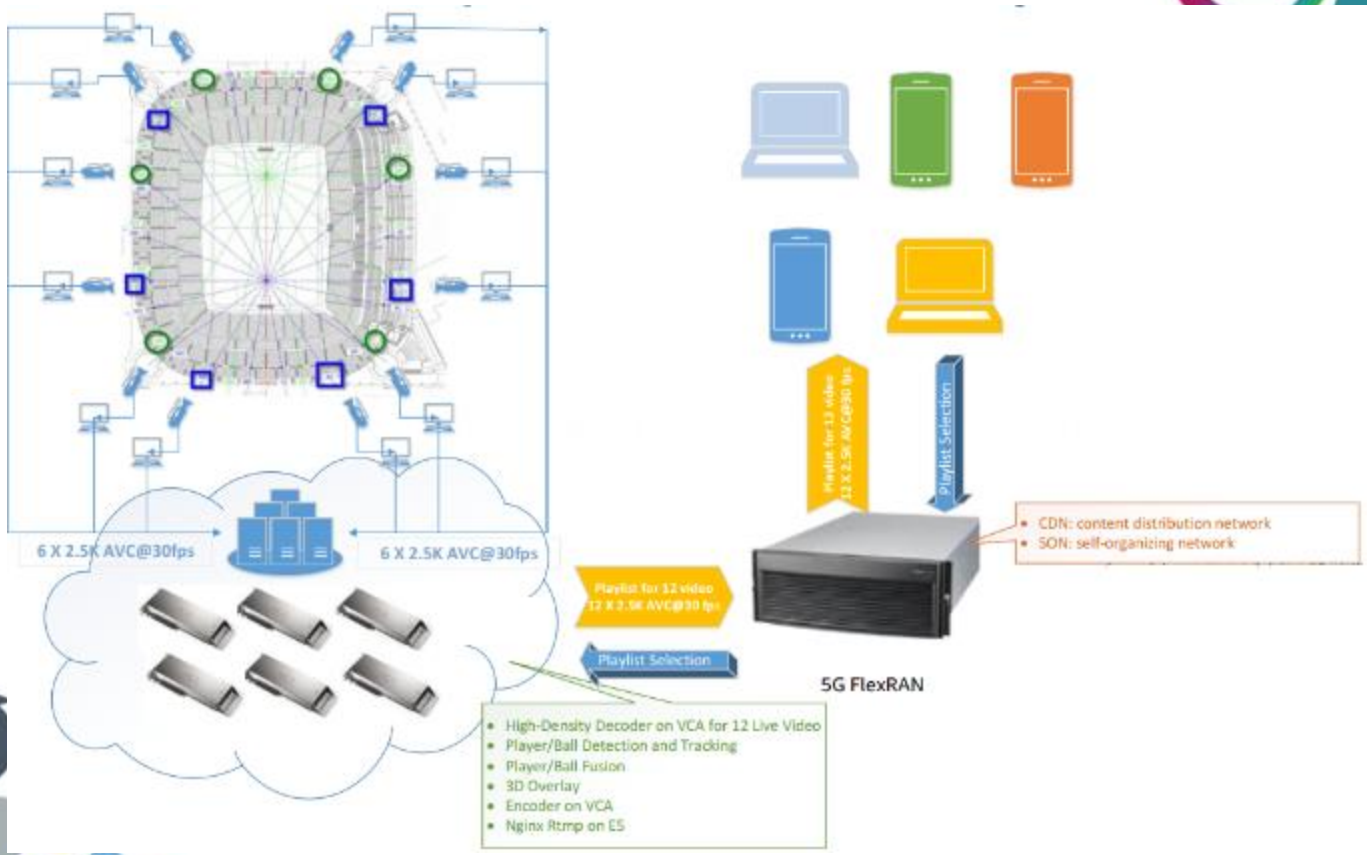
Intel AI Portfolio



Intel运动视频分析案例解析



2.5K Live Sports Visual Analytic over 5G FlexRAN



Solution Description

- Description :
  - Collect 12 camera video to do media transcoding, media analytics and 3D graphics rendering on Edge
  - Switch video streams over 5G FlexRAN per the interaction between clients and edge

- Functions
  - 12x AVC 2.5K@30fps Live Sports video over 5G FlexRAN
  - Media Analytics on Edge
  - Media Codec on Edge
  - 3D Gfx Rendering on Edge

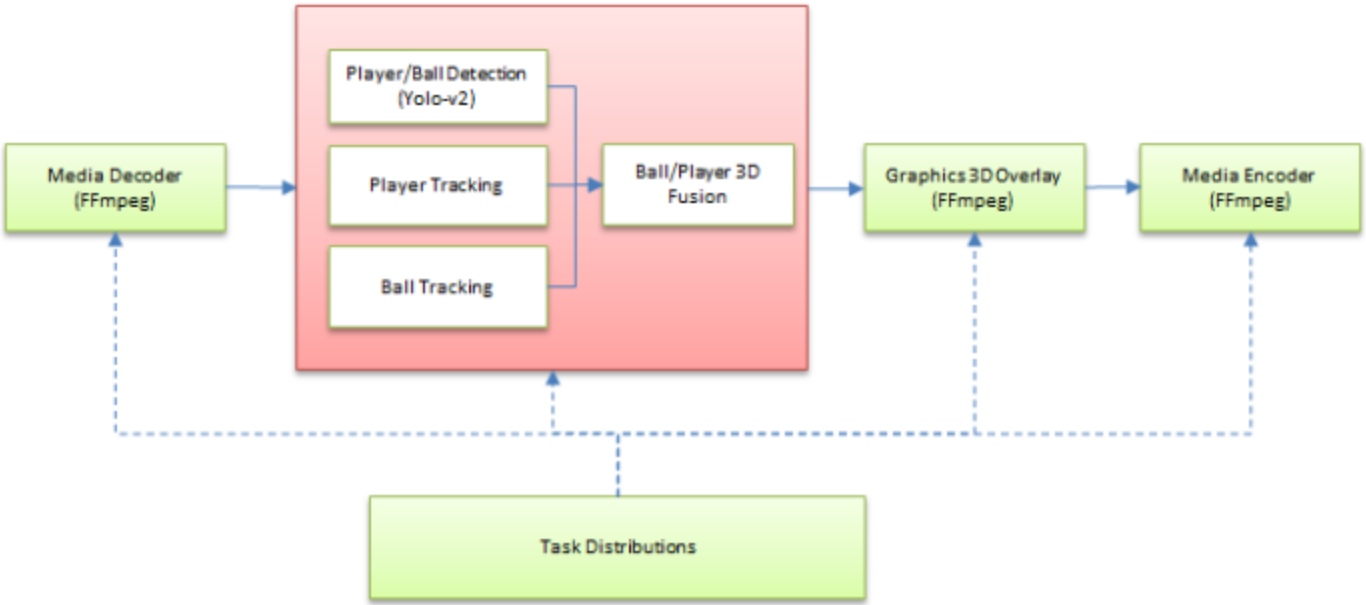
- Requirement
  - VCA x 24 for the edge computing fo Ball/Player detection/tracking/fusion and media codec (totally 12 video streams)
  - E5 x2 for 4K transcoding (4K30 AVC to 4kp30 HEVC and 2x 480p30 HEVC) and decode (4kp30 decode and display)
  - Separate Display (notebook/tablet) for 2x 1080p30
  - 4K Display
  - Gigbit Switch

- Min Requirement
  - VCA x2, E5 x1 for 1 video streams

Key features

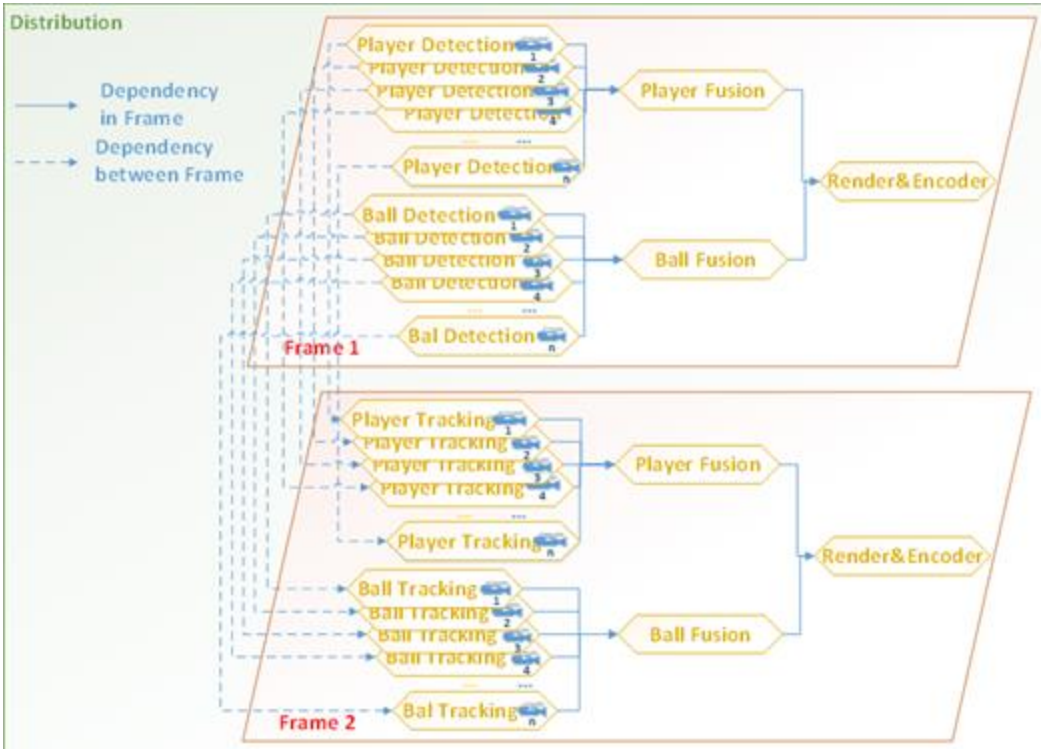
- Ball detection and tracking in each camera view
- Multi-view ball location by multi-cam input for better accuracy and robustness
- Detection for the players in each camera view
- Multi-view player location by multi-cam input for better accuracy and robustness
- Freeze moment to identify the shoot and stop/block moments as highlight candidate
- Event recognition for the shot-on-goal event

Processing pipeline



- FFmpeg Decoder plugin: fully utilize Intel GPU capability to support input stream decoding without EU usage.
- FFmpeg Video Processing Plugins: HW-accelerated processing fo the conversion between YUV and ARGB (for media analytic)
- FFMpeg + OpenGL 3D Overlay: composite the decoded video with the output of media analytic;
- FFmpeg Encoder plugin: utilize Intel Intel GPU capability to encode the frames composed with media analytic output and rendered by 3D graphics.

Parallel Processing



Thank you

LiveVideoStack 音视频技术社区

CSDN