Large-scale Video Surveillance Solution

Video Analysis for Intelligent Transportation

2016/2/16

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Background

- Global video surveillance industry
  - Video surveillance equipment market: $15.0 billion (2014), $23.6 billion (2018); Grow more than 10% in 2015 *
  - Video surveillance market in China: 171 billion RMB (2015), 19% increased**

- Problems
  - High human cost: watched by eyes
  - Low efficiency: searched after events
  - Low automation: reported by people

* From www.ihs.com
** From http://www.hcr.com.cn/
Video analysis solution for transportation

Overview

- Efficiency and automation need to be improved for transportation to reduce human effort
- Video analysis technologies
  - Traffic flow (vehicle counting, traffic jam)
  - Occupation (abandoned object, illegal parking, etc.)
  - Traffic accident (collision)
  - Traffic violation (rule-breaking, intrusion, etc.)
  - Parking lot management
- A low cost and efficient solution attached to the video surveillance system in transportation
- Can be used for transportation data notification or active traffic management

Technology features

- Average precision >90% for all weathers and 24 hours
- Real time on surveillance image & video
Algorithm framework

Defog

Night view enhancement

surveillance video input

Image sharpening
Motion det. & tracking
Feature extraction

Object property, position, direction, speed, etc.

Feature pattern
Rule data
Unified evaluation

• Object recognition
  • Traffic accident
  • Incident, etc.

Analysis output
Ways of analysis products

Video surveillance network for transportation

② Front analysis device
Now: embedded SW

① Back end server
Now: server SW

③ Front end camera
Future: chip function

Surveillance center
Storage center

Our technologies try to solve follow challenges, as a solution

Outdoor surveillance challenges:
- Complex scenes
- Variable lightings
- Variable weathers

Fiber
Network device

Fujitsu Confidential
Video analysis solution trial case in China

**Video surveillance system**

- Analog camera
- IP camera
- PTZ camera
- Encoder
- Management server
- Storage
- Client

**Video analysis service**

- FUJITSU CELSIUS W530
- Analysis SW
- For each work station
  - SW: integrate 7 algorithm cores
  - HW: 1 server runs with 4 cameras as input

**Platform service**

- GPS data
- SPATIOWL
- Data distribution

**Customer**

1. Video stream
2. Analysis result
3. Customer
4. Platform service
5. GPS data
Example of traffic accident detection solution

Traffic prediction and control

Traffic Anomaly Detection
Techs:
- Anomaly detection
- Accident Detection
- Violation Detection
- …

Real-time navigation, Road snapshot access

Traffic Optimization, Traffic Management, Data Retrieve

To personal user

To authority

Traffic Monitoring Platform

Store/Analyze/Inquiry

Jam

Busy

Normal

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Example of parking lot management solution

Already deployed surveillance cameras in parking sites

BEFORE enhancement: Algorithm doesn’t work.

AFTER enhancement: Precision>90%

Analysis Server (support multi-channels)

LAN/Wi-Fi

Mobile Access

Publish Server

Occupied: XX
Unoccupied: XX

Status

Web Browser/Admin SW.

Parking Slot Info.

12/53
5/33
7/15

Average technology precision >98%; Trial places: outdoor parking place at some airport in China