

Traffic Analysis System

Progress Report: 21/05/2021





System Configuration

1. Thingsboard Relationship and Attributes

server1

Asset details

?

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Details

Attributes

Latest telemetry

Alarms

Events

Outbound relations

Direction

From

+

↺

🔍

Type ↑	To entity type	To entity name
<input type="checkbox"/> Contains	Device	cctv_101
<input type="checkbox"/> Contains	Device	cctv_102

cctv_101

Device details

?

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Details

Attributes

Latest telemetry

Alarms

Events

Relations

Audit Logs

Shared attributes

Entity attributes scope

Shared attributes

+

↺

🔍

	Key ↑	Value
<input type="checkbox"/>	Last update time	[[{"x": 0.0025, "y": -0.88}, {"x": 0.0025, "y": -0.6}, {"x": 0.0, "y": 1}], [{"x": 0.99298422, "y": 0.02977351, "z": 0.11443723}, {"x": 0.08427805, "y": 0.50064045, "z": 0.86154301}], [{"x": -0.08294306, "y": 0.86514316, "z": 0.49461881}], [{"x": -2.8933979, "y": -3.82637147, "z": -10.28728748}], [{"x": 0.0, "y": 0.0, "z": 0}]]
<input type="checkbox"/>	2021-05-14 13:45:38	cam_param
<input type="checkbox"/>	2021-05-17 11:21:53	conflict_point
<input type="checkbox"/>	2021-05-14 13:47:04	lane_info



System Configuration

2. Local configuration (config.ini)

```
config.ini X
opt > igi > bin > config.ini
1  [sys]
2  python = /root/miniconda3/bin/python
3  # number of gpu
4  num_gpu = 2
5  # number of division per gpu
6  div_gpu = 2
7
8  [thingsboard]
9  asset = server1
10 url = http://iot.sappasing.com
11 username = tenant@thingsboard.org
12 password = tenant
13 config_update = 5
14 mqtt_host = 172.23.0.87
15 mqtt_port = 1883
```



System Configuration

3. Database: CCTV Table

Column	Description
id	ID of CCTV (Integer)
device_id	Thingsboard: Device ID
name	Thingsboard: Name of CCTV
access_token	Thingsboard: Access Token
attributes	Thingsboard: CCTV shared attributes
last_update	Attributes last updated
active	Ready for processing (with valid attributes) Requirement: 'cam_param', 'lane_info', 'speed_marker', 'rtsp_src'



Components

1) Config Updater (config_update.py)

Periodically update CCTV config from Thingsboard to DB

2) CCTV Processor (cctv_processor.py)

Continuously process CCTV data

3) Path Monitor (monitor.py)

Watch and process files in the path

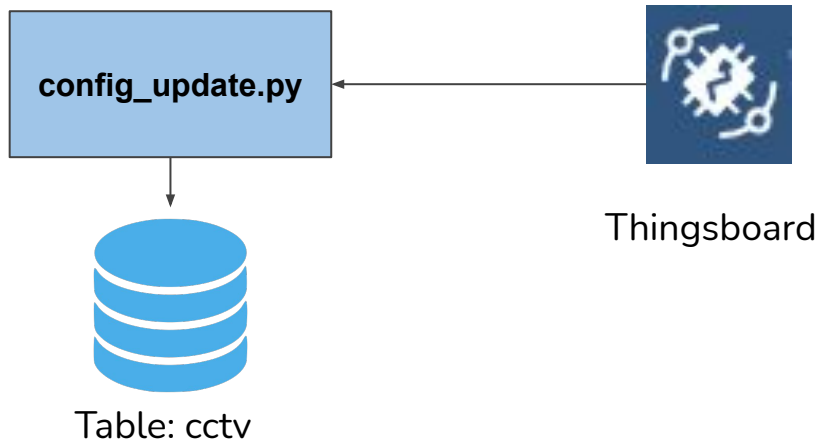


Type of Processing

System processing	Per CCTV processing	Concurrent processing
Config Updater	<p>CCTV Processor</p> <ul style="list-style-type: none">• rtsp_download• rtsp_process• track• mod_send_lanespeed• mod_serve_lanespeed	Path Monitor



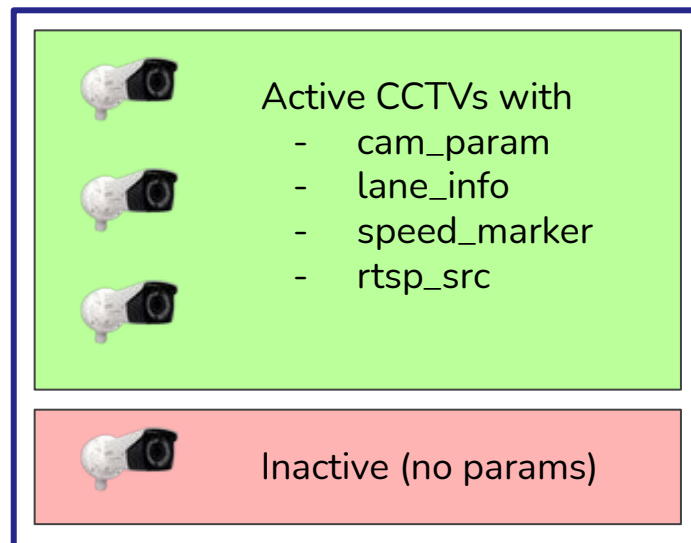
Config Updater



config_update.py

Update CCTVs config from Thingsboard

Devices of ASSET: server_name





CCTV Processor



Table: cctv

cctv_processor.py

cctv_processor.py

Control processes for each CCTV



Active: cctv_id

rtsp_download.py

rtsp_process.py

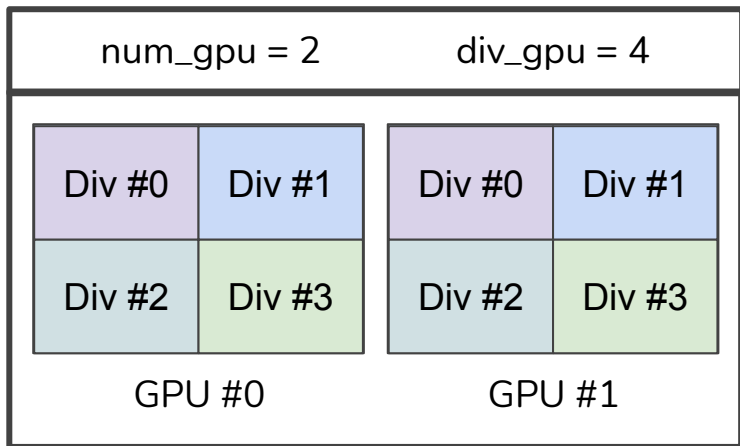
track.py

mod_send_lanespeed.py

mod_serve_lanespeed.py



Path Monitor



monitor.py

Watch and process files in path

```
monitor.py <path>  
├─ monitor.py <path> <gpu#> <div#>  
├─ monitor.py <path> <gpu#> <div#>  
├─ ...  
└─ monitor.py <path> <gpu#> <div#>
```

Input Path	Operation	Output Path
incoming	detect.py	queue
queue	upload.py	done
done	archive.py	archive



CCTV Processing Status

Process	Key
RTSP Download / Process	rtsp_ts
Detect / Upload	detect_ts
Track	track_ts
Send Statistic	send_ts
Serve Visualization	serve_ts

cctv_101

Device details

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Details

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Relations

>

Client attributes

Entity attributes scope

Client attributes

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Last update time ↓

Key

Value

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2021-05-21 15:05:51

send_ts

1621585123582

☐

2021-05-21 15:05:50

track_ts

1621585064076

☐

2021-05-21 15:05:43

detect_ts

1621585064160

☐

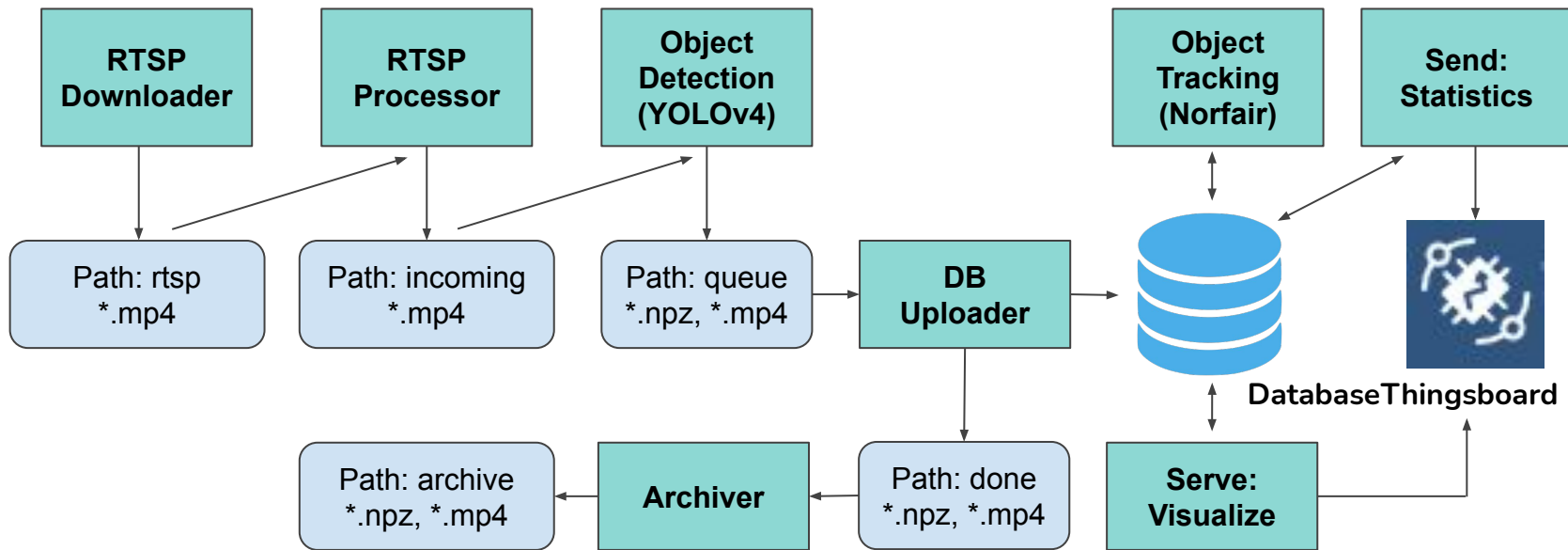
2021-05-21 15:05:05

serve_ts

1621584823582



Processing Workflow





TODOs

- PyTorch NMS across the classes (detect.py)
- Workflow: LOS Analysis, Reports
- Archiver (archive.py): path [done ➡ archive]
- Frame to TS Visualization (Numpy npz: frame no ➡ ts | get_sources)

frame	timestamp
#	#####
#	#####

- Fix milliseconds mismatch in FFmpeg segment (detect.py / upload.py)