

DEMO

# CONTRIBUTIONS TO THE RE-IDENTIFICATION OF OBJECTS

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# CONTENTS

- INTRODUCTION
- INTERSHIP
- DEMO



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Escuela Politécnica Superior



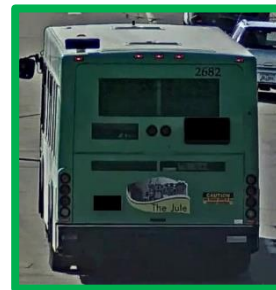
Video Processing  
and Understanding  
Lab

- What is vehicle re-identification?
  - Identify a particular vehicle (query) recorded by a camera among a set of test images (gallery) that have been recorded by different cameras.
- Popularity
  - Smart Cities
  - ITS (Intelligence Transport System)
- AI City 2021 Challenge

Query



Gallery: Top100 list



...

- CHALLENGES

- High intra-class variability
- High inter-class similarity
- Bias (Orientation, Background, Type, Color)
- Limited databases



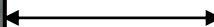
Different  
ID



Same ID



Different  
ID



Same orientation and  
color but different ID....

- DATABASES

CityFlowV2-ReID



VehicleX



# INDICE DE CONTENIDOS

- INTRODUCCIÓN



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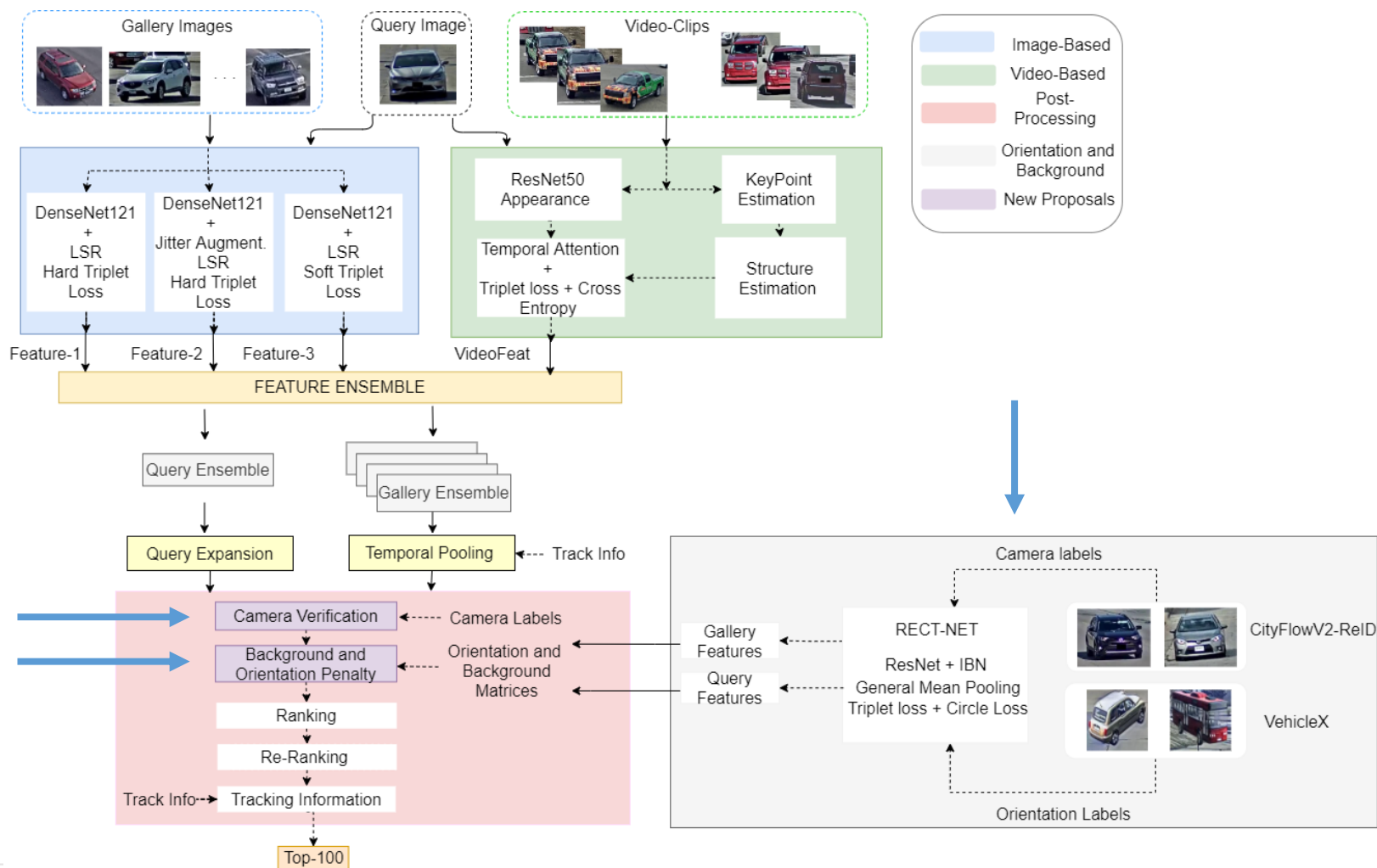


## PROCESS:

- **Challenge:** Familiarization with the 5th edition of AI City Challenge
- **Datasets:** Download and study the conditions of the databases.
- **Baseline:** Understanding the method proposed last year.
  - Download and reproduce previous results
- **State of the art:** Read and understand the methods proposed last year.
- **Research:** Evaluate and experiment with new improvements
- **Experimentation:** Integrate new ideas and obtain results.
- **Final method:** Create the final model based on results.
- **Paper:** Write the paper proposed for the workshop. Published in IEEE/CVF Conference on Computer Vision and Pattern Recognition 2021 (CVPR 2021).



## • COMPLET SYSTEM



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- Format of the results given by the system:
  - Track2.txt: top100 images for each query (Evaluation)

```

2  374 541 1062 1074 1332 1633 2026 2462 3326 3472 4423 4833 5245 5817 6003 6465 6655 7589 8182 8950 9099 9256 9283 10638 10835 10973 11067 12051 12470 12760
13596 13778 14370 14435 14637 14944 15103 16126 16246 16439 16508 16519 223 538 968 1431 1443 1860 2323 2485 2584 3821 4401 4874 5522 7621 8210 8458 8729 8942
9843 9969 10789 11007 11170 11777 11931 12380 12576 13171 13312 14231 14360 14364 14463 14743 14894 16097 16180 16336 102 706 1090 1303 1383 1413 2011 2317
2490 3146 3498 3731 3817 4525 5155 5931 5936 6023 7017 7593
3  244 258 2172 2325 3285 4546 4665 4666 4835 5079 5186 5318 6485 6698 8005 8075 8332 8423 8908 9911 10367 10398 10547 10758 10849 10863 11234 11455 11653 11941
12204 13936 15012 15607 15682 16297 16546 16639 564 1295 2734 7673 7722 7971 9084 9387 9580 11358 12500 12569 12652 14507 14878 532 924 1048 1659 1989 2407
2537 2636 2728 2993 3345 3420 3803 3809 5470 5806 6092 6385 6442 6535 6948 6958 7691 9373 11057 11064 11879 11963 12016 12887 13742 14475 14931 15299 15349
15576 16140 572 1054 1068 1568 3109 3377 3450 3492 3622 5554
4  146 576 635 2592 2785 2930 5295 5461 5509 6267 7106 8818 10221 11617 11685 11713 13374 13629 13729 14114 14166 14499 14557 14928 14974 15929 16193 729 2010
3292 3313 3431 3881 4626 4893 5321 5413 5689 6293 6743 6918 7607 7705 8114 9805 10068 13165 13363 13497 13773 13975 15463 15785 16194 560 1751 1985 2750 4058
4723 4909 5397 5713 6343 7352 7665 8655 10027 10361 10488 10502 11690 12427 12931 13091 13258 14831 15403 16367 315 335 351 954 3014 3189 4902 7770 7924 8137
8342 8519 9815 10487 12748 12898 13473 13694 14288 14553 16181
5  208 395 1247 2200 3762 4045 4371 4792 5126 5279 6340 8103 8624 8843 9598 9713 9765 10626 11497 11766 14179 15088 15261 15310 15613 16291 16471 689 1031 1467
1539 4153 6482 7952 10087 11166 12543 13588 13733 16423 656 1837 6571 7619 7756 8625 9222 10875 12142 12872 13308 15124 15560 2142 2997 3439 4003 4131 4295
5350 5526 10292 11789 12369 13066 13900 14657 15032 16052 93 2487 3353 4415 5636 6786 6883 7873 8215 8969 9000 9641 9664 9783 10264 10619 10698 11152 12809
12943 13749 13762 14110 14876 15870 15903 16640 813 1219 1436 1596

```

- A different txt file for each query that contains the corresponding top100 (Demo)

- Matlab: Numeric Evaluation
- Necessary step to use the user interface

```

Evaluation_CityFlow2021Subset.m  x +
1 - close all;
2 - clear all;
3 - clc;
4
5 - load('query_annotation2021Rename.mat','query_new');
6 - load('gallery_annotation2021Rename.mat','gallery_new');
7
8 - names_query='Track2.txt';
9
10 - fid=fopen(names_query);
11 - track2=[];
12

```

← File that we want to evaluate

```

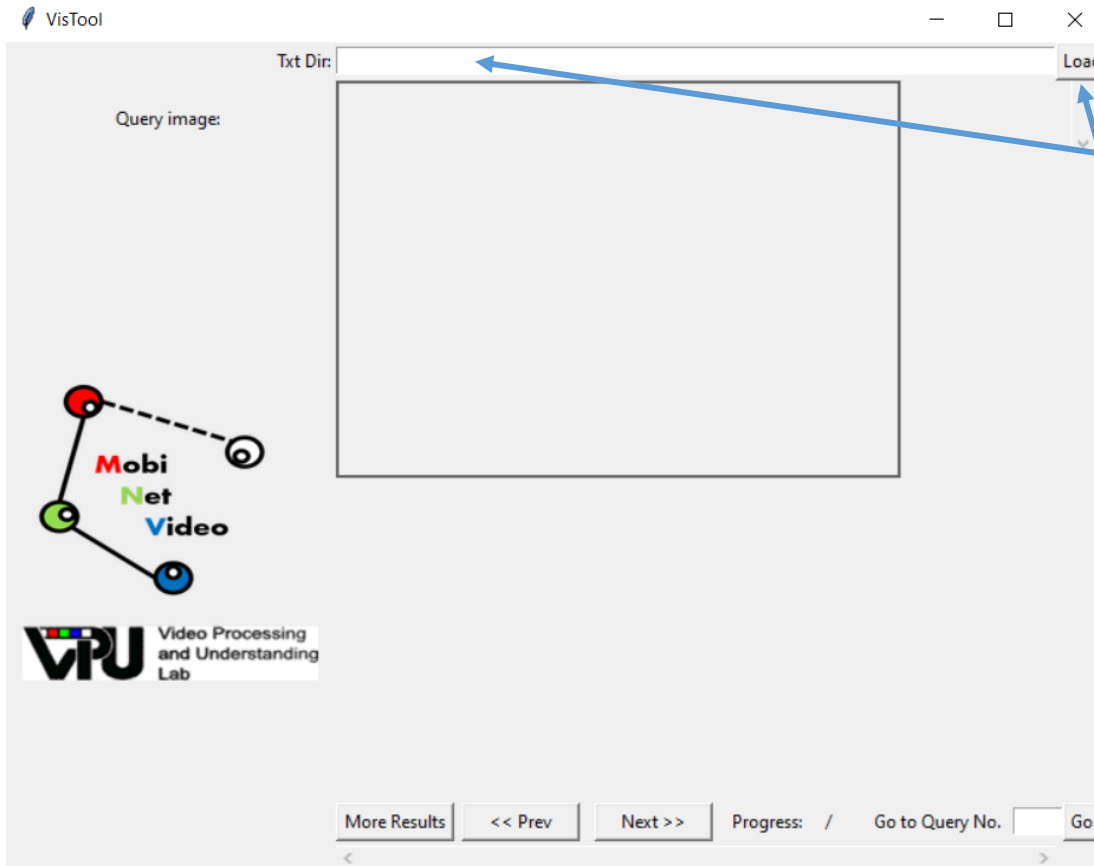
Command Window
mAP= 0.51088321337704
CMC-1 =0.69271758436945
CMC-5 =0.69626998223801
CMC-10 =0.69804618117229
CMC-15 =0.70692717584369
CMC-20 =0.70870337477798
CMC-30 =0.74955595026643
CMC-45 =0.81349911190053
CMC-100 =0.86500888099467

```

← General Results

- Provides:
  - txt file with the AP result for each query and general results
  - txt file for each query with the correct indexes

- Python: Visual evaluation
  - Command: Python visualize.py



1º: Introduce the directory of the txt files containing the top100 of the queries.

2º: Press "Load"

- Python: Visual evaluation

Query

Numeric results

Top100

Control Panel

The screenshot displays the VisTool interface. On the left, a 'Query' image of a green bus is shown. Below it is the 'Control Panel' with navigation buttons: 'More Results', '<< Prev', 'Next >>', '0001/0563', 'Go to Query No.', and 'Go'. The main area shows 'Numeric results' and 'Top100' search results, which are a grid of 100 images of the same green bus from various angles and positions. The interface also displays performance metrics: 'Query = 1', 'AP = 0.524590', and 'mAP = 0.510883'. The VPU logo and 'Video Processing and Understanding Lab' text are visible at the bottom left of the interface.

- Python: Visual evaluation

- TOP100 :

- Green box: Positive
    - Red box: Negative

Ranking Position



## • Python: Visual evaluation

### – Numeric results

Query = 1  
AP = 0.524590  
mAP = 0.510883

Query = 2  
AP = 0.027416  
mAP = 0.510883

→ Particular for each query

→ Mean result

### – Control Panel

More Results << Prev Next >> 0001/0563 Go to Query No.  Go

- More results: Window with additional results
- << Prev: Previous query
- >> Next: Next query
- Go to Query No. : Go to a specific query

Results

mAP = 0.510883
CMC-1 = 0.692718
CMC-5 = 0.696270
CMC-10 = 0.698046
CMC-15 = 0.706927
CMC-20 = 0.708703
CMC-30 = 0.749556
CMC-45 = 0.813499
CMC-100 = 0.865009





The image shows the MATLAB R2019a - academic use interface. The main window is the Editor, displaying a script named 'Evaluation\_CityFlow2021Subset.m'. The script contains the following MATLAB code:

```
1 - close all;  
2 - clear all;  
3 - clc;  
4  
5 - load('query_annotation2021Rename.mat','query_new');  
6 - load('gallery_annotation2021Rename.mat','gallery_new');  
7  
8 - names_query='Track2.txt';  
9  
10 - fid=fopen(names_query);  
11 - track2=[];  
12
```

The Command Window shows the prompt `>>`. The Workspace window is empty. The File Explorer shows the current folder structure, including subfolders like 'Definitive results', 'pruebas', and 'query\_results', and files like 'Evaluation\_CityFlow2021Subset.m', 'gallery\_annotation2021Rename.mat', 'h.xls', 'Mat\_anotacionGallery.mat', 'Mat\_anotacionQuery.mat', 'OneDrive\_1\_25-3-2021.zip', 'query\_annotation2021Rename.mat', 'Results.txt', 'Track2.txt', and 'Untitled.m'.

DEMO

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