Study on Improving Semi-Automated Active Learning Through ORB Feature Extraction Method

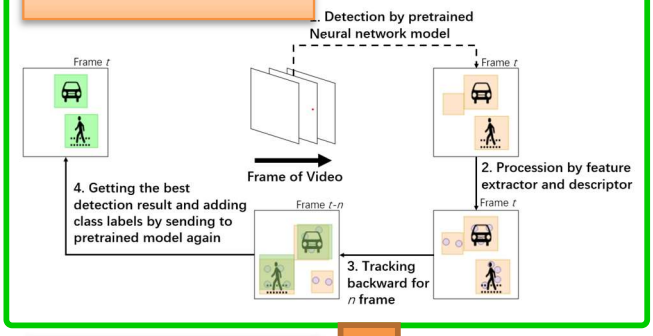
Abstract

Artificial intelligence techniques are widely used in automated driving, but data preparation and model training is necessary to ensure the desired performance. Active learning has vastly reduced the cost of AI technology deployment, but there is still potential for further improvement. Our study aimed to reduce the rest model training cost.

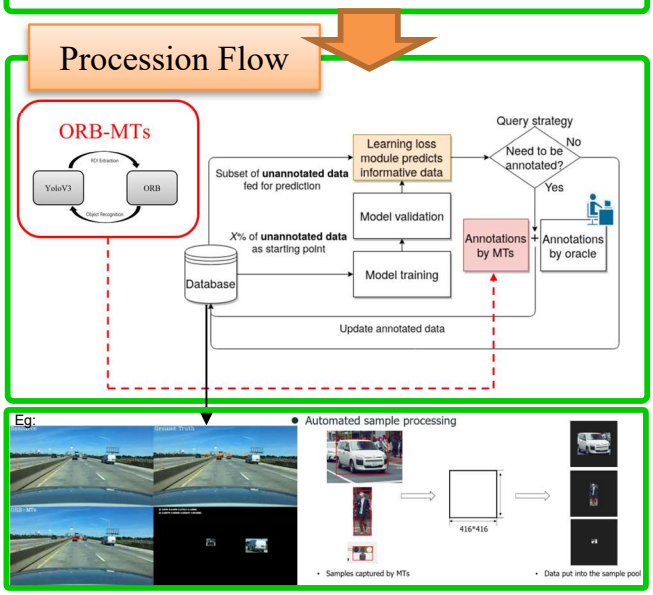
Introduction

- Replacing the LK-optical flow into ORB keypoints detector.
- Modification of the input of loss prediction module to enhance the performance of active learning.
- Comparing the two versions of SAAL to verify the improvements.

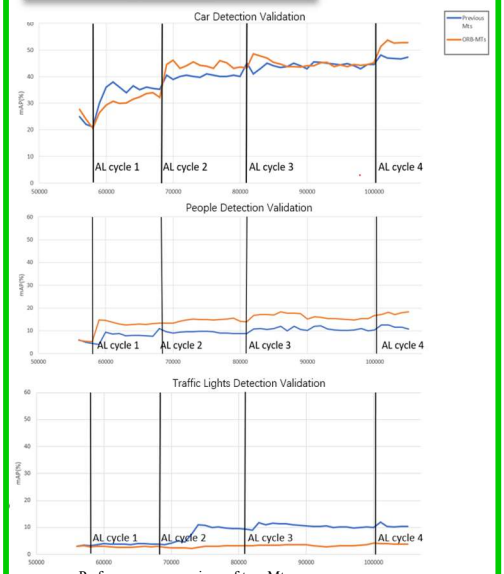
ORB-MTs



Procession Flow



Comparison in Object Detection



Performance comparison of two Mts

	MTs-Optical Flow	MTs-ORB	
Avg. IoU	0.16	0.49	+0.33↑
Valid sample percentage	17%	19%	+2%↑
Recall Rate	17.6%	33.1%	+15.5%↑

Object Tracking Performance Comparison

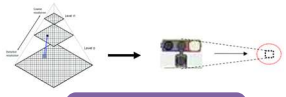
	MOTA	MOTP	Frag
LK-Optical Flow	-3.126	0.407	79
ORB	0.029	0.277	12

Current Problems

(1) Feature point loss

- A large number of targets become invalid samples

(2) Tracking objects are lost during image down sampling



- Object lost

Further Study

(1). Further reduction of manual labor by using other more advanced feature detectors, like AKAZE and Ets.
(2). Applying MTs to other computer vision areas like semantic segmentation, or other AI application scenario in automated driving areas.
(3). Try training other models via SAAL to improve the effectiveness of our MTs.

Effectiveness and Advantages of the Research

Efficiency of query sample processing and the performance of automatic training data generation has been improved.

Collaboration research content with practical utilization scenarios

Wish to work with companies that are developing and researching camera-based automated driving technology.

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