

LiteReconfig: An efficient and adaptive video object detection framework for mobile GPUs

Track Code: 2022-CHAT-69774

Categories:

- Computer Technology

Keywords:

- Autonomous vehicles
- Computer Technology
- Decision Making
- mobile computing
- object detection
- Self-Driving Cars
- Software

Researchers at Purdue University have developed an adaptive video object detection system (LiteReconfig) intended for systems where there are limited computing resources and low latency requirements. These challenges are particularly relevant on devices using mobile hardware to analyze video streams. LiteReconfig uses a cost-benefit analyzer to schedule switching to new image features as video conditions change, allowing for a more optimal balance of accuracy and computation time. This is done in a content-aware manner, resulting in selections that are tailored to the specific content of the video stream. This system is intended to run on mobile devices and has shown significantly better performance when compared to existing adaptive object detection systems, while running on an NVIDIA AGX Xavier at speeds of up to 50 fps. This technology has applications in the autonomous driving, machine vision, and facial recognition sectors as it allows for improved object detection while minimizing the computational requirements and latency.

Advantages:

- Low latency capability (50 fps)
- Mobile GPU compatible

Applications:

- Mobile computing
- Autonomous vehicles
- Real time object/facial detection

Technology Validation:

This technology has been validated using the ImageNet VID 2015 benchmark. The model

achieved 1.8% to 3.5% greater object detection accuracy and 20.3X to 74.9X lower latency when compared to existing state of the art systems.

Related Publications:

Ran Xu, Jayoung Lee, Pengcheng Wang, Saurabh Bagchi, Yin Li, and Somali Chaterji. 2022. LiteReconfig: cost and content aware reconfiguration of video object detection systems for mobile GPUs. In Proceedings of the Seventeenth European Conference on Computer Systems (EuroSys '22). Association for Computing Machinery, New York, NY, USA, 334–351. <https://doi.org/10.1145/3492321.3519577>

People:

- Chaterji, Somali (Project leader)
- Bagchi, Saurabh
- Xu, Ran

Intellectual Property:

Application Date: March 10, 2022

Type: Copyright

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Application Date: March 10, 2022

Type: Provisional-Patent

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Contact OTC:

Purdue Office of Technology Commercialization
The Convergence Center
101 Foundry Drive, Suite 2500
West Lafayette, IN 47906

Phone: (765) 588-3475

Fax: (765) 463-3486

Email: otcip@prf.org