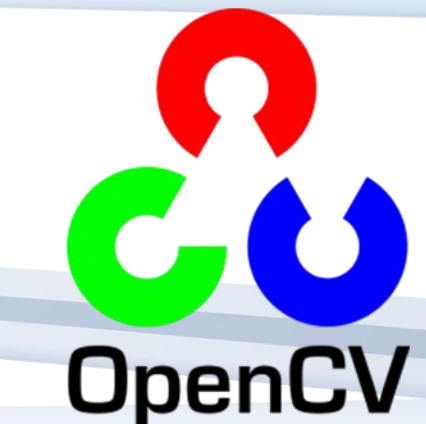


# OPENCV ON GPU



## COMPUTER VISION & GPU

- Apps: robotics, autonomous vehicles, video surveillance...
- Real-time image processing is an ideal task for a GPU
- Massive parallel calculations are common for CV algorithms

## OpenCV GPU MODULE

- An infrastructure for CV developers, ready to use (opencv/gpu)!
- GPU memory control, stereo vision, mean shift, remap (done)
- NPP integration, support for key OpenCV algorithms (in progress)

## GPU STEREO VISION

### BLOCK MATCHING

- Real-time FullHD stereo vision
- GPU gives up to **10x** speedup!
- Multi GPU + CPU capability
- Texture-based filtering
- Speckle filtering (CPU)

### BELIEF PROPAGATION

- High-quality stereo correspondence
- GPU gives up to **20x** speedup!
- Hierarchical dense stereo algorithm [1]
- High memory requirements, can run not more than 1280x768 on Tesla 3GB

### CONSTANT SPACE BELIEF PROPAGATION

- GPU gives **50-100x** speedup compared with CPU implementation!
- More than 20 times faster than BP GPU
- Hierarchical dense stereo based on BP [2]
- Memory requirements are 500Mb for FullHD, Max Disparity = 256

[1] Pedro F. Felzenszwalb, Daniel P. Huttenlocher "Efficient Belief Propagation for Early Vision", IJCV, Vol. 70, No. 1, October 2006

[2] Qingxiong Yang, Liang Wang, Narendra Ahuja "A Constant-Space Belief Propagation Algorithm for Stereo Matching, Realtime stereo vision", CVPR 2010

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