What you will learn in the practical course

- Introduction to parallel computing on GPUs
- Introduction to NVIDIA CUDA Framework
- How to parallelize basic computer vision algorithms in CUDA/C++
- Practical project experience
- Team work & presentation skills
Important Dates

- Preliminary Meeting: 7. February 2018 (today)
- Registration in the matching system from 9th to 14th of February 2018
  - List your preferred practical courses
  - Send an email to cuda-ss18@vision.in.tum.de with your (tabular) CV which shows that you meet the prerequisites. Deadline 13. February 2018
- Matching Results: 21. February 2018
- Only assigned students are allowed to attend !!!
- See docmatching.in.tum.de/index.php/schedule
Course Organization

- 4–5 weeks block course in the semester break (beginning of September - mid of October)
- 1 week lecture and exercise session
- 3–4 weeks project phase
- Our computer lab will be open for students
- Computers are equipped with proper GPUs (GTX 750), one for each student.
- Students will work in groups: 24 students; 8 groups, each has 3 students.
- Every group will be assigned to one advisor.
Course Structure

- Prerequisites:
  - Good Knowledge in C/C++
  - Knowledge in Basic Mathematics (Calculus/Analysis and Linear Algebra)

- First week
  - Lecture (CUDA + Math) in the morning
  - Hands-on programming exercises in the afternoon

- Following 3-4 weeks
  - Project phase, one project per group
    - Your own ideas
    - Project Proposals, any related topic to Computer Vision, Image Processing, Machine Learning, etc.

- Demo Day
  - Final presentation of the projects
Evaluation Criteria

- Successful completion of the exercises (0.3 bonus)
- Gained expertise in CUDA/parallel programming
- Quality of your final project
  - Successful completion of the project
  - Projects will be evaluated by the project advisors
- Your talk
Regular Attendance is Required

- Attendance at classes/exercises is mandatory
- In case of absence: Medical attest
- The practical course is intended as a 4-5 week full-time project
Motivation on GPU programming

4-32 cores

3072 cores
CPU vs GPU

Theoretical Peak GB/s

- GeForce GPU
- Tesla GPU
- Intel CPU

2003 2005 2007 2009 2011 2013 2015
Student projects from the previous years
Image Stitching of Aerial Images
Depth-Adaptive Superpixels
Kinect Fusion
Dense Visual Odometry