

Module MA-INF 4308	Lab Vision Systems				
Workload 270 h	Credit points 9 CP	Duration 1 semester	Frequency every semester		
Module coordinator	Prof. Dr. Sven Behnke				
Lecturer(s)	Dr. Nils Goerke				
Classification	Programme M. Sc. Computer Science		Mode Optional	Semester 3.	
Technical skills	Students will acquire knowledge of the design and implementation of parallel algorithms on GPUs. They will apply these techniques to accelerate standard machine learning algorithms for data-intensive computer vision tasks.				
Soft skills	Self-competences (time management, goal-oriented work, ability to analyze problems and to find practical solutions), communication skills (Work together in small teams, oral and written presentation of solutions, critical examination of implementations)				
Contents	Basic matrix and vector computations with GPUs (CUDA). Classification algorithms, such as multi-layer perceptrons, support-vector machines, k-nearest neighbors, linear-discriminant analysis. Image preprocessing and data handling. Quantitative performance evaluation of learning algorithms for segmentation and categorization.				
Prerequisites	<b>Recommended:</b> At least 1 of the following: MA-INF 4111 – Intelligent Learning and Analysis Systems: Machine Learning MA-INF 4204 – Technical Neural Nets				
Format	Teaching format	Group size	h/week	Workload[h]	CP
	Lab	8	4	60 T / 210 S	9
	T = face-to-face teaching; S = independent study				
Exam achievements	Oral presentation, written report (graded)				
Study achievements	none (not graded)				
Forms of media					
Literature	<ul style="list-style-type: none"><li>• R. Szeliski: Computer Vision: Algorithms and Applications, Springer 2010.</li><li>• C. M. Bishop: Pattern Recognition and Machine Learning, Springer 2006.</li><li>• NVidia CUDA Programming Guide, Version 4.0, 2011.</li></ul>				