Which content is relevant for examination

1. relevant/non-relevant slides
2. relevant algorithms
3. relevant formulas
4. relevant terms
5. relevant data formats
6. relevant procedures/errors

Exam

Relevant Content

▶ slide contents are relevant to the exam

▶ contents of the exercises are relevant to the exam

▶ Blackboard notes are relevant to the exam

▶ type of examination: written

▶ Date of examination: Tuesday 07/18/2023, 11:00 am, Campus 1, Room 5.2.04

▶ Exam Duration: 90 minutes

▶ Aids: 2 DIN A4 pages handwritten on both sides

Exam

Content that is relevant for the exam

1. Introduction: S.12-S.16
2. 3D Cameras: S.2-S.25, S.29-S.30
3. 3D Data Representation: S.2-S.23
4. 3D Data Processing: S.2-S.5, S.9-S.31, S.33-42
5. Correspondence Search: S.2-S.31, S.35-S.83
6. Epipolar Geometry: S.2-S.43

Exam

Content that is not relevant for the exam

1. Introduction: S.17-S.41
2. 3D Cameras: S.26-S.28, S.31-S.36
3. 3D Data Representation: S.24
4. 3D Datenverarbeitung: S.6-S.8, S.32, S.43-S.59
5. Correspondence Search: S.32-S.34
6. Epipolar Geometry: none!

Exam - Algorithms,

... that you should be able to explain

1. Quadtree-Decomposition
2. Kd.tree-Decomposition (2D)
3. Sequence of nearest neighbor search in Kd-tree
4. Regression with singular value decomposition
5. RANSAC algorithm
6. Construction of the Gaussian and Laplace Pyramid
7. Eight-point algorithm
8. Rectification

Exam - Formulas,

... that you should be able to read

1. mean, variance, covariance matrix, correlation coefficient
2. 1D Gaussian distribution, Multivariate Gaussian distribution
3. All different auto/cross correlation functions
4. Local Template Matching Measures (SSD, SAD)

1. PLY-Data Format

Exam - Terms,

... that you should be able to explain

1. depth value, depth range, depth resolution, dynamic range, distance, disparity
2. topology, triangular fan, voxel, RGB-D image, octree
3. data matrix, data covariance matrix, Mahalanobis distance, precision matrix
4. regression, vertical error/offset, orthogonal error/offset, pseudoinverse
5. eigenvalues/vectors, singular values/vectors, singular value decomposition, principal component analysis
6. Hessian normal form, structure tensor, null space
7. invariance, discriminativity, scale space, descriptor
8. optical flow, correspondence problem, aperture problem
9. baseline, epipole, epipolar line, epipolar plane, essential matrix
10. epipolar constraint, geometric error, reprojection error

Exam - Procedures/Errors,

... that you should be able to explain

1. Systematic and Random Errors in Depth Measurement
2. Different time-of-flight measurement techniques (pulsed & modulated light)
3. Passive/Active Stereoscopic Vision
4. Design of a HoG descriptor
5. Coarse-to-fine strategy (multiscale approach)
6. Different triangulation methods