

Dipartimento di DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE
Academic year 2014/2015

3D VISION SYSTEMS [A000300]

Nessun partizionamento

Study course ELECTRONICS ENGINEERING
Regulation ELECTRONICS ENGINEERING
Curriculum comune

Lecturers: GIOVANNA SANSONI

Hours amount: 60

Period: Secondo Semestre

Credits: 6

Fields: ING-INF/07

Formative aims

The aim of the course is to give students the basic elements to understand the most important aspects, applications and problems of 3D vision systems. The approach is based on a 'learn by doing' method.

The students will develop the system set-up and the measurement procedures of the two following 3D optical heads:

- a 3D laser slit system;
- a 3D fringe projection based system.

The mentioned technology covers the 80% of the measuring 3D devices currently market available for 3D measurements, reverse engineering and rapid prototyping applications.

The optical instrumentation is available at the Laboratory of Optoelectronics of the department.

The students will use the LabView platform for developing the measurement procedures.

At the end of the course students are expected to acquire a wide knowledge of the 3D technology based on triangulation.

Prerequisites

Algebra and geometry, Mathematical Analysis, knowledge of the LabView platform.

Course programme

Optical heads based on triangulation;

Optical heads using a single camera and a laser stripe;

Optical heads based on a single camera and a fringe projector;

Camera and projector calibration techniques;

Development and metrological characterization of two 3D range systems: a laser slit system and a Gray-code fringe projection based system.

Point cloud creation;

Development of a reverse engineering and prototyping process using a market available fringe projector system.

Reference books

Couse Material: tutorial and presentations downloadable from the e-learning site.

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