

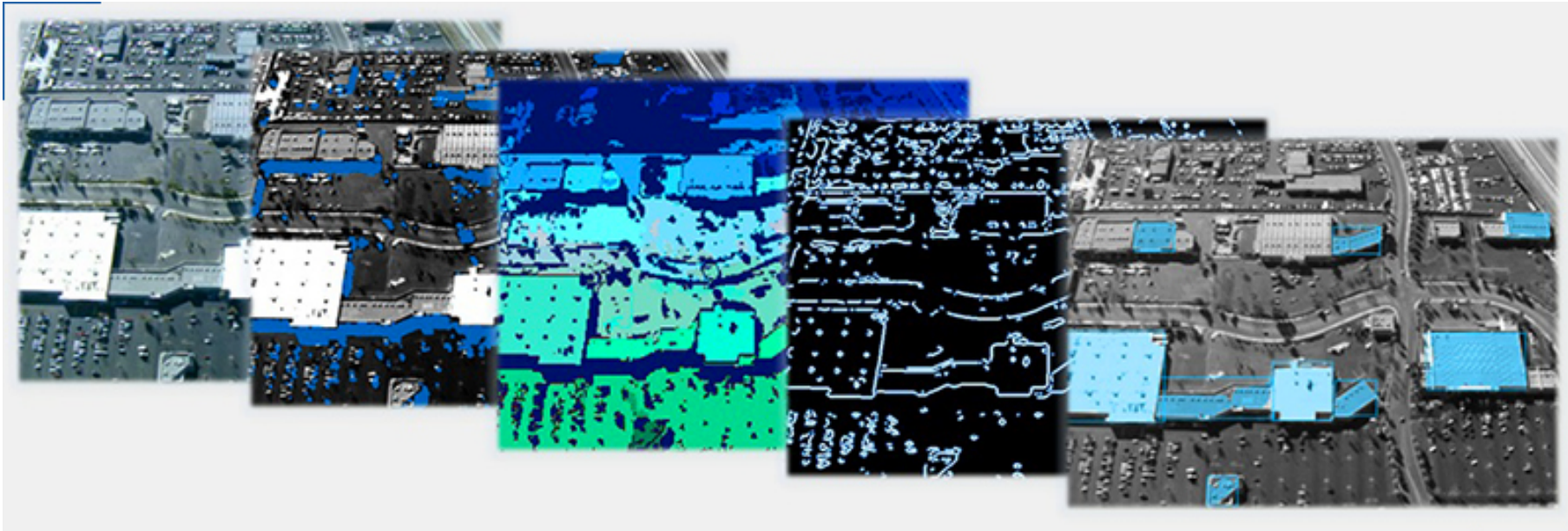
Master in de Ingenieurswetenschappen:
Computerwetenschappen Profiel Multimedia
Master in Applied Sciences and Engineering:
Computer Science Profile Multimedia



Examples of Courses

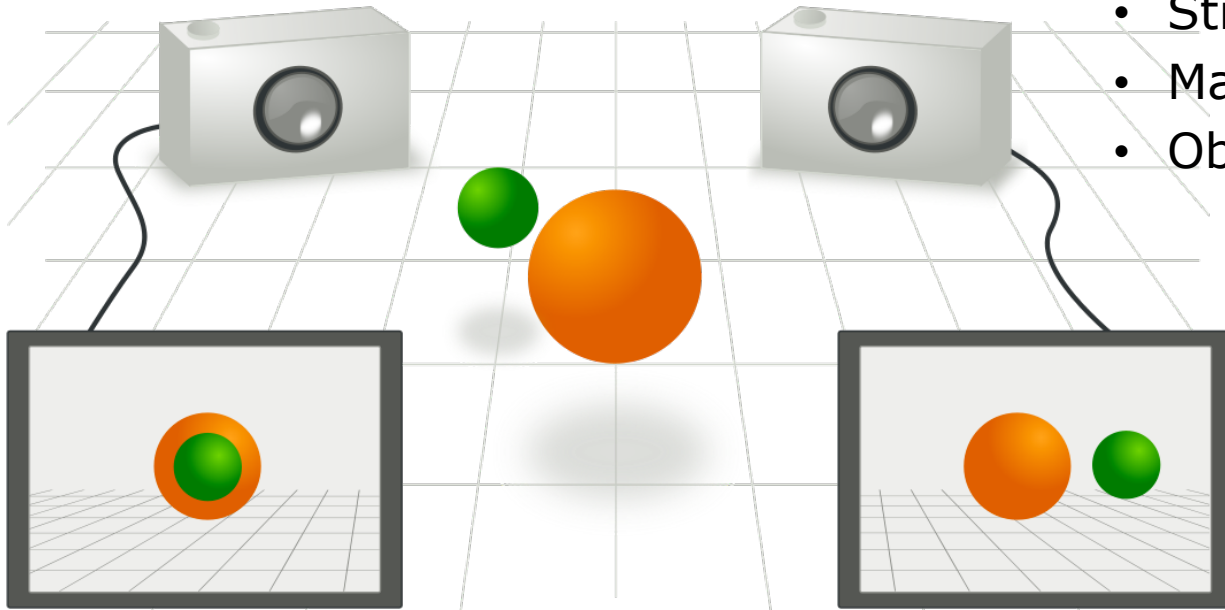
Image Processing (5 ECTS) - Prof. Adrian Munteanu

- Global Image Transforms
- Wavelet Transform
- Image enhancement and image restoration
- Image segmentation
- Mathematical Morphology



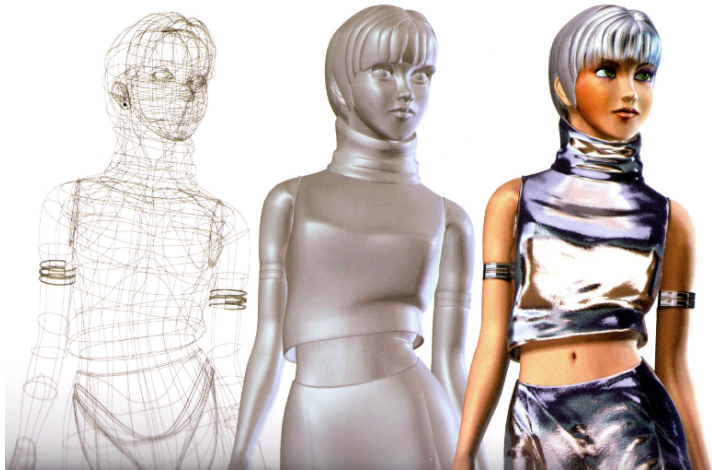
Computer Vision (4 ECTS) - Prof. Hichem Sahli

- Introduction & Review of Linear Algebra, Geometric
- Camera model - Image Formation
- Camera model - image geometry
- Camera model - image radiometry
- Epipolar Geometry & Stereo Reconstruction
- Structure from Motion & Optical Flow
- Structured light & Time of Flight
- Machine learning for Recognition & Classification
- Object detection/classification & tracking



Virtual Reality (5 ECTS) – Prof. Gauthier Lafruit

3D Graphics OpenGL pipeline & Shaders programming



- 3D content formats
- OpenGL rendering pipeline with some maths (projection, quaternions, etc)
- How do VR glasses work?
- Depth sensing
- Photogrammetry
- Raytracing & Radiosity

Virtual Reality Project

Roller coaster

INFO-H-502



ECOLE
POLYTECHNIQUE
DE BRUXELLES



Programmed with OpenGL & shaders (practical sessions), not with Unity or Unreal (we teach the core of any 3D, not specific software packages).

Virtual Reality (5 ECTS)

Depth Image-Based Rendering (MPEG-I)

Give the illusion of a 3D animation without the need of explicit 3D modeling of all objects

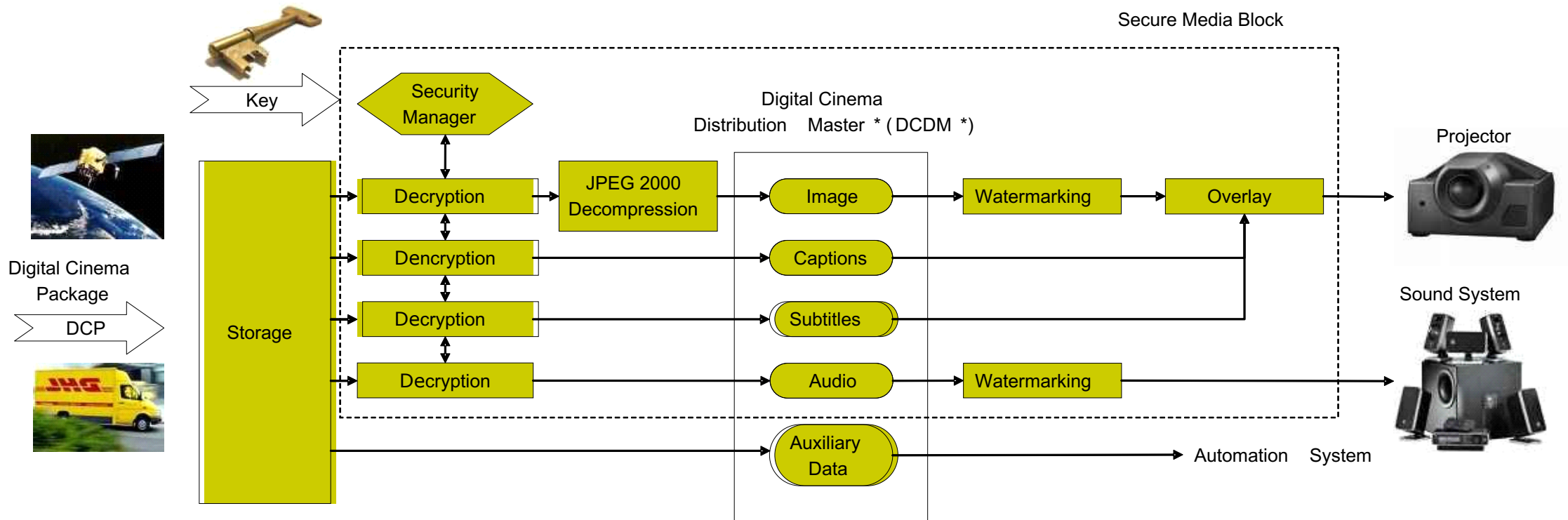


Wrong!

Right, i.e. the way we teach it (but not part of the project)

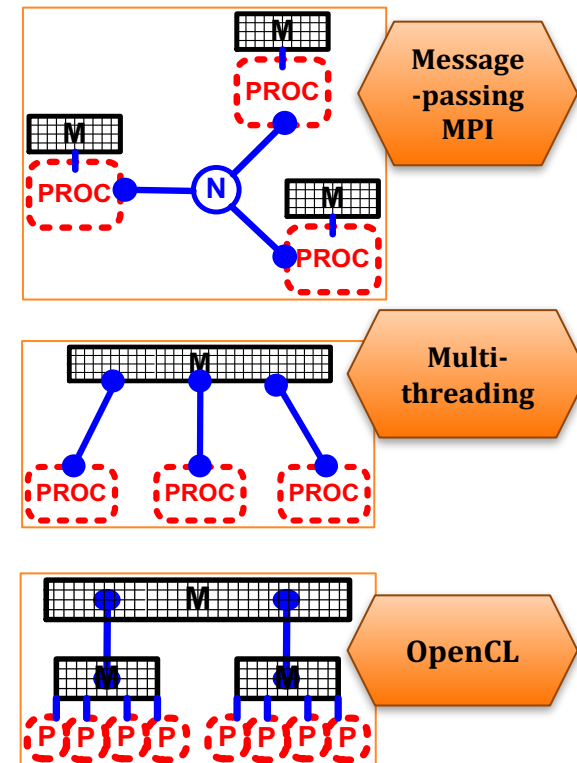
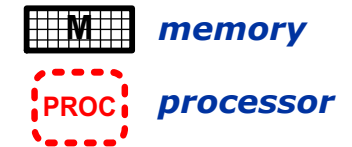
Final score of the course = $\frac{2}{3} \times \max(\text{theory}, \text{project}) + \frac{1}{3} \times \min(\text{theory}, \text{project})$

Image and Video Technology (3 ECTS) – Prof. Peter Schelkens



Parallel Systems (6 ECTS) – Prof. Jan Lemeire

- **Context:** software acceleration by parallelization of algorithms.
- **Main goal:** learn to design efficient parallel solutions on modern parallel systems.
 - Master low-level (hardware and system) and high-level IT skills (software engineering)
- **Three main programming paradigms**
 - Message-passing (MPI) for distributed-memory parallel architectures (clusters).
 - Multi-threading for shared-memory architectures (multicores).
 - OpenCL for GPUs.
- **Prerequisites:** good programming skills, basic knowledge of computer systems
- **More information:** <http://parallel.vub.ac.be> -> teaching



Cryptography (3 ECTS) – Prof. Ann Dooms

- Building blocks of secret communication within historical/societal context:
 - Symmetric cryptosystems
 - Public-key cryptosystems
- Recapitulation of the underlying mathematical concepts from number theory (Euclidean and modular division, finite fields, ...)
- Applications
 - Hash functions, digital signatures and blockchain
 - Homomorphic encryption for privacy preservation
 - Watermarking for multimedia content
 - ...

