Visual Computing and Communication

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Why Visual Computing and Communication?

- The human being is ocular-centric

- Visual data on the Internet (Cisco)
  - In 2021, it will take an individual more than 5 million years to watch the amount of video that will cross global IP networks each month.
  - By 2022, global IP video traffic will be 82% of all consumer Internet traffic.
- Strong research area worldwide

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Developed Skills

1. Understand the potential of visual data

   - Lean how visual data is processed

   - Lean how to make decisions based on visual data

2. Design and build systems for visual computing

   - Streaming systems for immersive data

   - Decision systems for autonomous systems

3. Operate in a multicultural environment

   - Human communication beyond technology

4. Learn from successful businesses and develop own ideas

   - Innovation and entrepreneurship for visual technology

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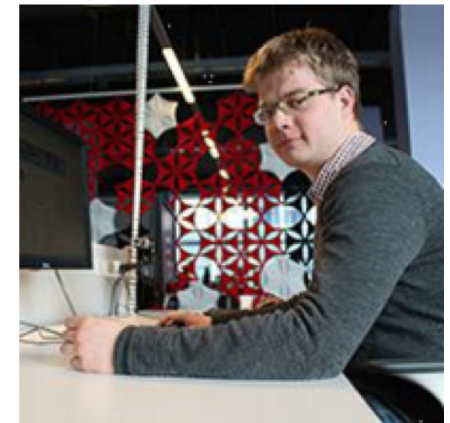
Job Opportunities

PHILIPS

ERICSSON

Unified Streaming Platform

skype™

Meltwater

Telia

SCANIA

Klarna
Klarna Checkout
Payments solved

Courses: 1st Year

- Obligatory Technical Courses
  - DH2320 Introduction to Visualization and Computer Graphics

- Additional Obligatory Course (7.5 ECTS)
  - II2202 Research Methodology and Scientific Writing

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Courses: 1st Year

- Obligatory I&E Courses (19 ECTS)

  - ME2072 Entrepreneurship for Engineers

  - ME2073 Business Development Lab for Entrepreneurship

- Choose One Additional Obligatory I&E Course (7.5 ECTS)

  - ME2062 Technology-based Entrepreneurship

  - ME2094 Internet Marketing

  - ME2095 e-Business Strategies

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Courses: 1ˢᵗ Year

- Elective Courses
  - DD2257 Visualization
  - DD2477 Search Engines and Information Retrieval Systems
  - EQ1220 Signal Theory (Recommended for Image Processing)
  - EQ2845 Information Theory and Source Coding
  - DD2423 Image Analysis and Computer Vision
  - EQ2461 Seminars in Information and Network Engineering
  - DH2323 Computer Graphics and Interaction
  - DD2421 Machine Learning
  - EQ2341 Pattern Recognition and Machine Learning
  - DH2642 Interaction Programming and the Dynamic Web
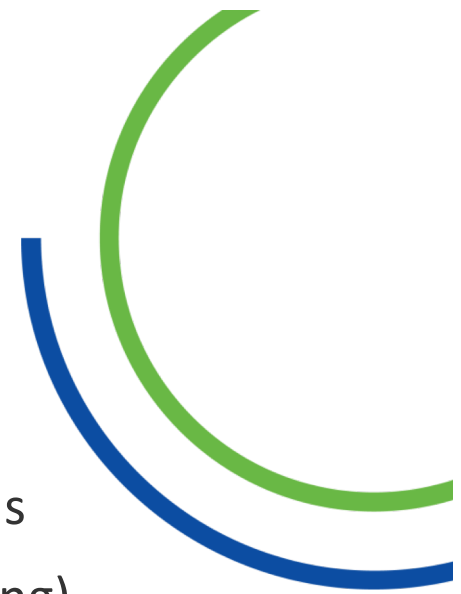
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2nd Year Focus

Mobile Visual Computing

- Where visual computing meets telecommunication
- Communication-constrained visual data processing
- High societal impact
- Many business opportunities:
  - Media analysis
  - Mobile visual media
  - Mobile autonomous systems
  - . . .

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Free-Viewpoint Experience

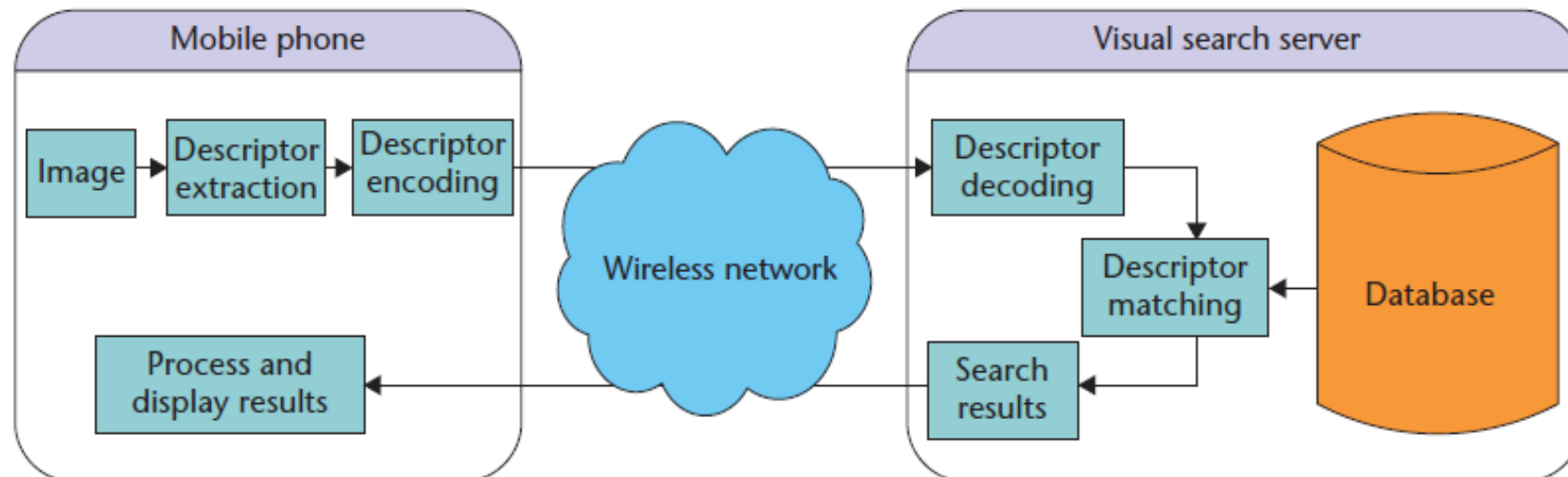- Free-viewpoint experience of sport events

- Augmented reality
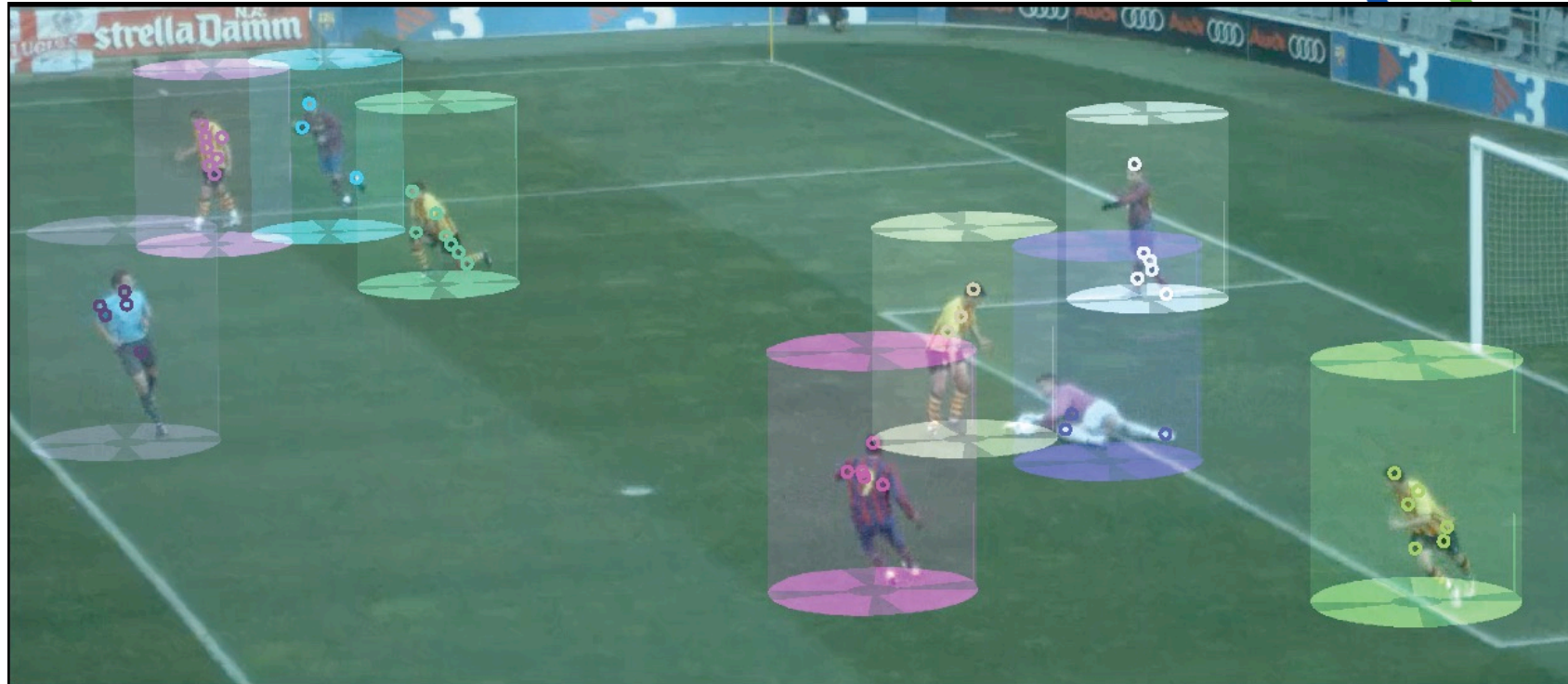
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Mobile Visual Search

- Mobile augmented reality

- Advanced mobile services

- Beyond image-based search

- Learned image descriptors

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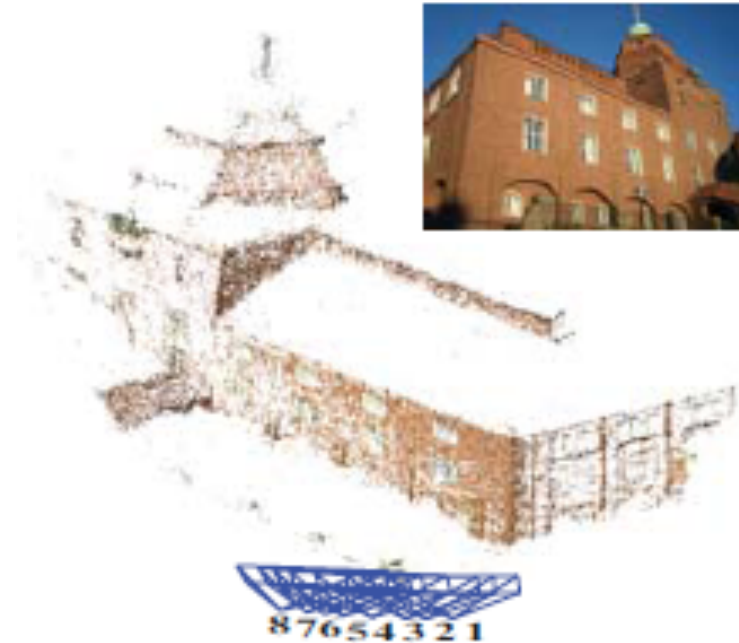ICT Innovation

Mobile 3D Visual Search

- Search aided by 3d geometry

[Stockholm Buildings Database]

http://people.kth.se/~haopeng/M3DVS/index.html

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Courses: 2nd Year

- **Obligatory Master Thesis (30 ECTS)**
  - ✓EA256X Degree Project

- **Obligatory I&E Course (6 ECTS)**
  - ✓ME2096 ICT Innovation Study Project

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Courses: 2nd Year

- Obligatory Technical Course (7.5 ECTS), choose one of
  - ✓ EQ2330 Image and Video Processing, or
  - ✓ EQ2425 Analysis and Search of Visual Data

- Elective Courses
  - ✓ EQ2330 or EQ2425, if not chosen as obligatory course
  - ✓ EL2805 Reinforcement Learning
  - ✓ EQ2300 Digital Signal Processing
  - ✓ EQ2310 Digital Communications
  - ✓ EQ2415 Machine Learning and Data Science
  - ✓ ID2223 Scalable Machine Learning and Deep Learning
  - ✓ EQ2461 Seminars in Information and Network Engineering

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Some Internship Opportunities

ERICSSON

tobii

SONY

MANOMOTION

SCANIA

Some Master Thesis Projects

- Efficient features for movie recommendation systems (VionLabs)

- A document recommender based on word embedding (Meltwater)

- Machine learning for text-independent speaker verification (Ericsson)

- Integral video coding (Ericsson)

- Implementation and evaluation of an augmented reality teleoperation system (Ericsson)

- Playful advertising: In-game advertising for virtual reality games (Goo Technologies)

- Hand segmentation from RGB images in uncontrolled indoor scenarios using randomized decision forests (ManoMotion)

- Efficient selection of training data for an image classification task (Scania)

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Opportunities for Exchange

- Sorbonne University, Paris, France

  (Advanced Image Understanding)

- University of Trento, Trento, Italy

  (Computer Vision and Multimedia Analysis)

- Aalto University, Helsinki, Finland

  (Web-based Applications)

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