Master topics
Digital Signal Processing and Image analysis Group
Supervisors

- Fritz Albregtsen (DSB) fritz@ifi.uio.no  Sverre Holm (DSB) sverre@ifi.uio.no
- Anne Solberg (DSB) anne@ifi.uio.no  Andreas Austeng (DSB) andrea@ifi.uio.no
- Asbjørn Berge (SINTEF/DSB)  Roy Hansen (FFI/DSB) rhn@ifi.uio.no
  - asbjorn.berge@sintef.no
- Håvard Danielsen (Radiumhospitalet/DSB)  Martin Reimers (BM) martinre@ifi.uio.no
- Eigil Samset (GE/BM/DSB) eigisa@ifi.uio.no
Detection of faults in seismic images

- Goal: identify positions where there are faults in the seismic data.
- Done in cooperation with Schlumberger

1. Literature study on seismic imaging
2. Literature study on previous approaches to fault detection
3. Implementation and study of features that detects discontinuity in the seismic image.
4. Implementation of one method to link pixel-wise discontinuities to form continuous fault lines.
Example of seismic data with faults
Integration of AIS information in automatic oil spill detection

1. Literature study on oil spill imaging

2. Implementation of a reader for AIS ship traffic information

3. 

4. Studying how this information can be used in automatic oil spill detection.
AIS ship traffic information

Position information from ships
Automatic oil spill detection

- areal = 270
  - bredde = 30
  - konturregularitet = 0.765432
  - langstrekthet = 0.789653
  - antall flekker i nærhet = 6
  - avstand til skip = 46.68
  - gradient = 0.458965
  - kontrast = 213.9875
  - homogenitet i omgivelsen

- Sannsynlighet for oljesøl
  - Oljesøl

- Sannsynlighet for lookalike
  - Lookalikes

- Olje
  - P1>P2?
  - Lookalike
Detection of avalanches using remote sensing

- Main goal: study how well avalanches can be detected using optical satellite data.

1. Literature study on remote sensing sensors
2. Literature study on avalanche mapping
3. Segmentation of avalanche candidate regions based on texture
4. Feature extraction from the regions
5. Region classification
6. Evaluation of the detection accuracy
Water Simulation on GPUs

• A mix of mathematics and informatics
• The use of Graphics Processing Units for simulation

• Example Projects:
  1. Develop a pollution transport shallow water simulator (CUDA, mathematics)
  2. Develop a sedimentation and erosion shallow water simulator (CUDA, mathematics)
  3. Develop a Multi-GPU and auto-tuning shallow water simulator (CUDA, MPI)
  4. Develop new visualization techniques for simulation results (OpenGL, CUDA)

• For more information:
  André R. Brodtkorb, Andre.Brodtkorb@sintef.no
  Webpage: http://babrodk.at.ifi.uio.no/
  Youtube videos: http://youtube.com/babrodk/
Adapting geometry to WebGL-clients

- Thin clients (tablets, cell-phones, ultrabooks) can not process large models
  - Remedy: High quality rendering on servers + lightweight geometry on client

- Tasks:
  - Coarsening of large geometry models
  - Bandwidth adaption
  - Advanced WebGL-rendering
  - Port desktop game to web?
  - OpenGL to SVG?

- Key Technologies
  - Tinia Open Source Framework
    - www.tinia.org
  - C++/JavaScript/OpenGL Shaders

- Location: SINTEF in Forskningsparken, Oslo
- Contact: kjetil.olsen.lye@sintef.no (41 56 76 50)
Simulation of Flow in Subsurface Porous Media

- Applications include petroleum production and CO2 deposition
- Open source code
  - Matlab: www.sintef.no/mrst
  - C++ : www.opm-project.org/

**Project Examples** in Matlab using automatic differentiation framework:
- Develop simple *compositional* simulator
- Develop an *adaptive implicit (AIM)* solver (hybrid between explicit and implicit)
- Develop and include support for advanced wells

- Contact:
  Knut-Andreas.Lie@sintef.no
  Stein.Krogstad@sintef.no