ETIN80 — Algorithms in Signal Processors

Introduction

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Course Information

Contact information.

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Course Information

This course is a project course.

- Development on an actual hardware platform.
- Research and develop your own project.
- Project may be adapted to your field of interest.
- Work in groups of 2–3 students.
- Mandatory weekly group meetings.
- Written report, presentation and demonstration.

Course Information

Project time frame.

week 1	Decide a project, research and find references.
week 1–3	Make a reference implementation in Matlab.
week 4–7	Make a realtime implementation on the DSP.
week 8	Presentations and demonstrations.

Course Information

Report format.

Describe your project, research, solution and problems.

- Six to eight pages.
- Latex using the standard `article` format is preferred.
- Submit your report in PDF format.
- Reports will be published on the course web page.

Presentation procedure.

A brief overview of your project, solution and results.

- Ten to fifteen minutes.
- Demonstrations will be *after* all presentations.

What is a Signal Processor

Programmable domain-specific computational unit.

- Real-time requirements.
- Steam processing.
- High I/O demands.
- Data driven applications.
- Wide range of power and computational capabilities.

What is a Signal Processor

Typical features.

- Architecture:
  - Multiple memory banks and busses.
  - Separate program and data memory.
  - Separate data and address computation.
  - Word-oriented processing.
- Computation:
  - Multiply-accumulate units.
  - Extended-precision multiplier.
  - Saturation instead of overflow.
- Instructions:
  - Single-cycle instructions.
  - Zero-overhead loops.
  - Parallel store-compute-load instructions.
  - Circular and bit-reversed addressing.

What a Signal Processor is *not*

Not a general-purpose processor or microcontroller.

Lower cost and more power efficient than general processors.

- Low memory.
- No virtual memory.
- Limited operating system.
- Limited threading.
- Limited run-time library.