

OpenShoe

A research tool made in India



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Internal seminar at Signal Processing

John-Olof Nilsson

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My goal

- Present the "product"
- Give a flavor of what's required to carry out a project like this.
 - Building hardware
 - Embedded implementation
 - Automatic code generation
 - Open source infrastructure
- Lower the barrier for someone else to make a similar type of work/implementation.



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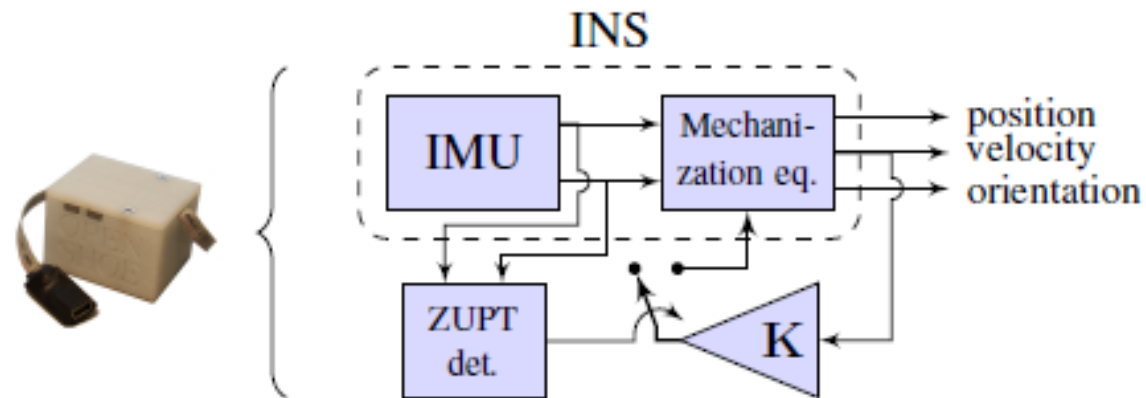
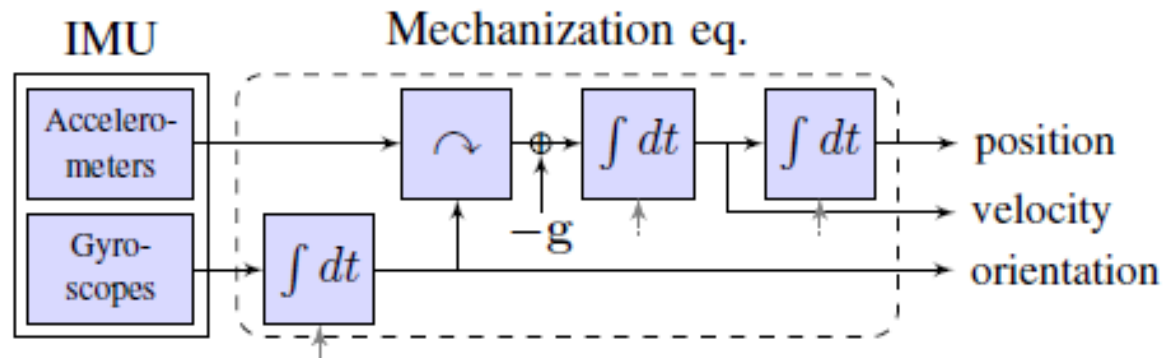
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Foot-mounted INS



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Main results of the project

With roughly 1000 man-hours (7 man-month) we have:

- Off-line Matlab algorithm implementation => realtime microcontroller implementation
- Integrated sensors and processing platform in Shoe
- Made a module which can be used as a component in a larger pedestrian navigation system
- Published everything open source



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Short-comings of previous systems

- Not realtime (Matlab)
- Uncomfortable measurement equipment
- One-size-fits-all
- Non-modular
- Require external processing unit
- Costly



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Which sums up in:

- Not possible to build further on it (to a realtime pedestrian navigation system)
- Not possible to equip a larger number of users

"Loose" specs of embedded implementation

- Realtime
- Including processing platform
- Integrated into normal shoes
- Open source



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Which sums up in:

- Possible to build further on it (to a realtime pedestrian navigation system)
- Possible to equip a larger number of users

Required project componets

- Hardware (IMU, processing platform, casing, cabling etc.)
- Software (Algorithm implementations, runtime env. etc.)
- Footware
- Code/design distribution infrastructure



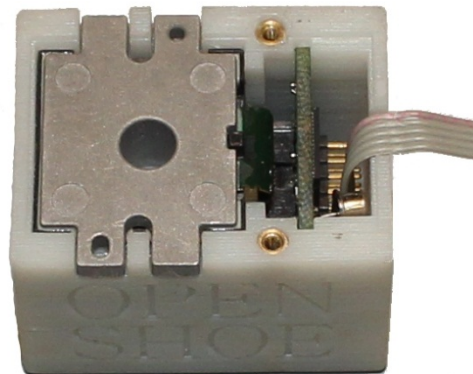
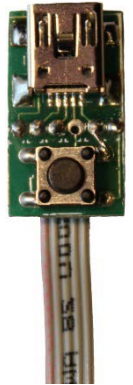
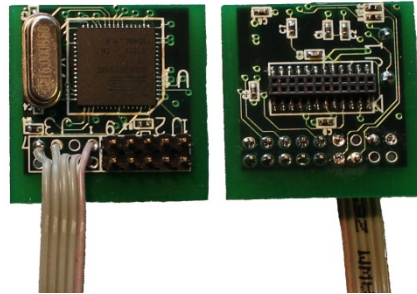
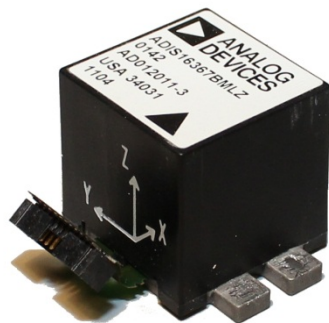
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Hardware



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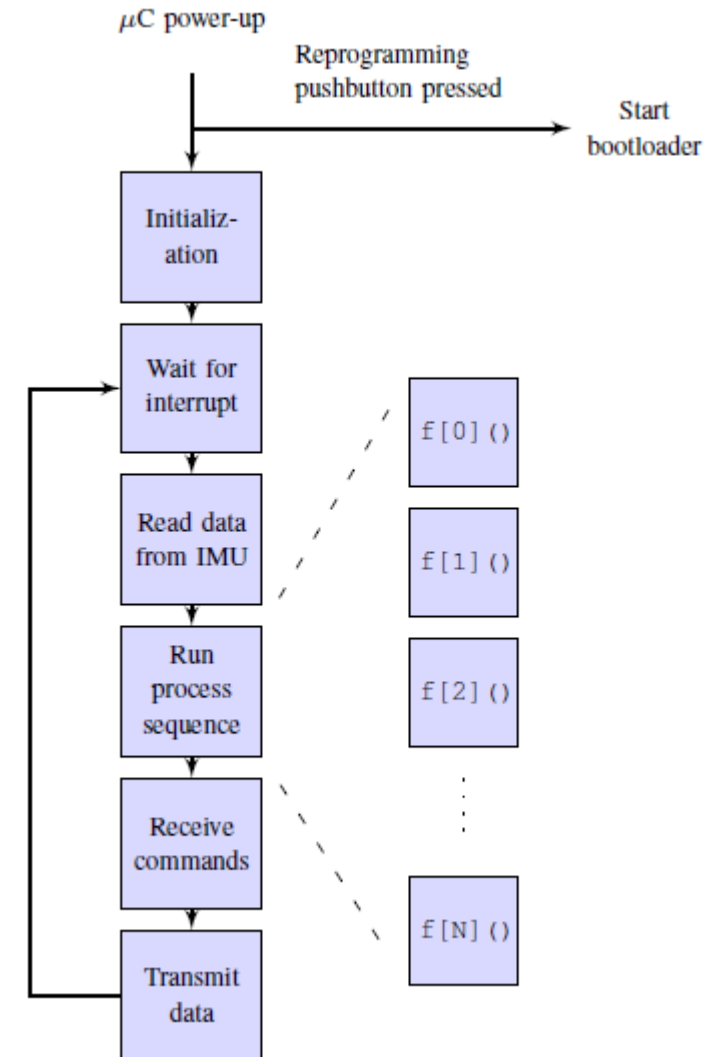


Software

- ~1500 lines of C
 - Algorithm implementation
 - Communication routines
 - Runtime framework
- Matlab interface/control scripts
- C++ interface to realtime processing framework
- Automatic documentation generation



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Footware



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Code/design distribution infrastructure

- Web hotell www.binero.se/
- Homepage www.openshoe.org
- Repository <http://sourceforge.net/p/openshoe/home/Home/>



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Publishing open source



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- A way of forcing yourself to make a good implementation.
- Your coding effort can be used by others
- Open access repository
 - Repository needed anyway if more than 1 developer
 - Many free hosts available (e.g. SourceForge)
 - Has been very convenient when students have wanted code
- Code documentation
 - Open source require good documentation
 - Automatic documentation generation is simple and looks good (e.g. Doxygen)
- Homepage advantageous
 - Simple to setup nowadays (~hours). Content take time to make.
 - Easy to refer people to.
 - Another channel to make your work known.

The end



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