

# AMIDST

## Analysis of Masslve Data Streams

### Requirement Engineering for a Small Project with Pre-Specified Scope

Thomas D. Nielsen<sup>1</sup>, Sigve Hovda<sup>2</sup>, Antonio Fernández<sup>3</sup>,  
Helge Langseth<sup>2</sup>, Anders L. Madsen<sup>4</sup>,  
Andrés Masegosa<sup>2</sup> and Antonio Salmerón<sup>3</sup>

<sup>1</sup>Univeristy of Aalborg, <sup>2</sup>Norwegian University of Science and Technology,

<sup>3</sup>Universidad de Almeria, <sup>4</sup>Hugin Expert

- 1 Introduction of the AMIDST Project
- 2 Introduction to Requirement Engineering RE
- 3 Challenges with RE in the AMIDST project
- 4 The AMIDST RE process
- 5 Realization of the AMIDST RE process
- 6 Conclusion

- 1 Introduction of the AMIDST Project
- 2 Introduction to Requirement Engineering RE
- 3 Challenges with RE in the AMIDST project
- 4 The AMIDST RE process
- 5 Realization of the AMIDST RE process
- 6 Conclusion



- ▶ Research project:
  - ▶ Funded by the EU seventh programme





- ▶ Research project:
  - ▶ Funded by the EU seventh programme
- ▶ Objective:
  - ▶ Toolbox that facilitates efficient prediction and data analysis in streaming data

- ▶ Research project:
  - ▶ Funded by the EU seventh programme
- ▶ Objective:
  - ▶ Toolbox that facilitates efficient prediction and data analysis in streaming data
- ▶ Consortium:
  - ▶ Three academic partners
    - ▶ University of Aalborg
    - ▶ Norwegian University of Science and Technology
    - ▶ Universidad de Almeria

- ▶ Research project:
  - ▶ Funded by the EU seventh programme
- ▶ Objective:
  - ▶ Toolbox that facilitates efficient prediction and data analysis in streaming data
- ▶ Consortium:
  - ▶ Three academic partners
    - ▶ University of Aalborg
    - ▶ Norwegian University of Science and Technology
    - ▶ Universidad de Almeria
  - ▶ Four industrial partners
    - ▶ Verdande Technology
    - ▶ Daimler AG
    - ▶ Cajamar Cajas Rurales Unidas
    - ▶ Hugin Expert

- 1 Introduction of the AMIDST Project
- 2 Introduction to Requirement Engineering RE**
- 3 Challenges with RE in the AMIDST project
- 4 The AMIDST RE process
- 5 Realization of the AMIDST RE process
- 6 Conclusion



- ▶ Traditional RE
  - ▶ Elicitation
  - ▶ Priorization
  - ▶ Validation
  - ▶ Evaluation

- ▶ Traditional RE
  - ▶ Elicitation
  - ▶ Priorization
  - ▶ Validation
  - ▶ Evaluation
- ▶ Agile RE
  - ▶ Product owner that continuously negotiates
  - ▶ Scrum teams that are self organized
  - ▶ Work is organized in sprints

- ▶ Traditional RE
  - ▶ Elicitation
  - ▶ Priorization
  - ▶ Validation
  - ▶ Evaluation
- ▶ Agile RE
  - ▶ Product owner that continuously negotiates
  - ▶ Scrum teams that are self organized
  - ▶ Work is organized in sprints
- ▶ Use case driven RE
  - ▶ Focus on functional requirements

- 1 Introduction of the AMIDST Project
- 2 Introduction to Requirement Engineering RE
- 3 Challenges with RE in the AMIDST project**
- 4 The AMIDST RE process
- 5 Realization of the AMIDST RE process
- 6 Conclusion



- ▶ Pre-specified scope of the project
  - ▶ Agreed on in document of work



- ▶ Pre-specified scope of the project
  - ▶ Agreed on in document of work
- ▶ Different geographical locations
  - ▶ Four countries



- ▶ Pre-specified scope of the project
  - ▶ Agreed on in document of work
- ▶ Different geographical locations
  - ▶ Four countries
- ▶ Transfer of domain knowledge
  - ▶ Domain knowledge from use case providers
  - ▶ Transfer of academic knowledge



- ▶ Pre-specified scope of the project
  - ▶ Agreed on in document of work
- ▶ Different geographical locations
  - ▶ Four countries
- ▶ Transfer of domain knowledge
  - ▶ Domain knowledge from use case providers
  - ▶ Transfer of academic knowledge
- ▶ One framework for three different domains
  - ▶ Flexible enough for "all" requirements
  - ▶ Focused enough to keep the structure



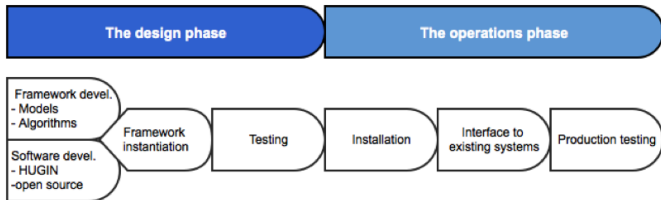
- ▶ Pre-specified scope of the project
  - ▶ Agreed on in document of work
- ▶ Different geographical locations
  - ▶ Four countries
- ▶ Transfer of domain knowledge
  - ▶ Domain knowledge from use case providers
  - ▶ Transfer of academic knowledge
- ▶ One framework for three different domains
  - ▶ Flexible enough for "all" requirements
  - ▶ Focused enough to keep the structure
- ▶ Potential refinement of project focus
  - ▶ Need to be transparent

- 1 Introduction of the AMIDST Project
- 2 Introduction to Requirement Engineering RE
- 3 Challenges with RE in the AMIDST project
- 4 The AMIDST RE process**
- 5 Realization of the AMIDST RE process
- 6 Conclusion

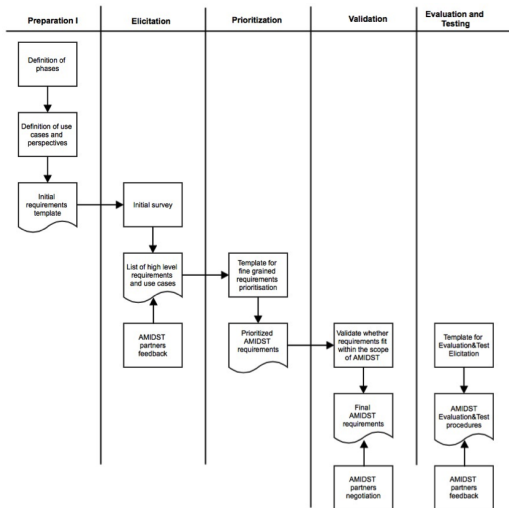
- ▶ Waterfall method
  - ▶ All specifications are listed upfront

- ▶ Waterfall method
  - ▶ All specifications are listed upfront
- ▶ Use case driven approach
  - ▶ Use case: Interactions between user and systems
  - ▶ Identified set of user groups
  - ▶ Focus on functional requirements

- ▶ Waterfall method
  - ▶ All specifications are listed upfront
- ▶ Use case driven approach
  - ▶ Use case: Interactions between user and systems
  - ▶ Identified set of user groups
  - ▶ Focus on functional requirements
- ▶ Project phases



# The AMIDST RE process



- 1 Introduction of the AMIDST Project
- 2 Introduction to Requirement Engineering RE
- 3 Challenges with RE in the AMIDST project
- 4 The AMIDST RE process
- 5 Realization of the AMIDST RE process**
- 6 Conclusion



- ▶ Coupling between academic and industry partners



- ▶ Coupling between academic and industry partners
- ▶ Formal template
  - ▶ Simple description of RE
  - ▶ System description
  - ▶ Definition of user groups
  - ▶ Use cases
  - ▶ Requirements related to each use case

- ▶ Coupling between academic and industry partners
- ▶ Formal template
  - ▶ Simple description of RE
  - ▶ System description
  - ▶ Definition of user groups
  - ▶ Use cases
  - ▶ Requirements related to each use case
- ▶ Requirements
  - ▶ Linked to project phases
  - ▶ Linked to work packages
  - ▶ Prioritized in terms of must/should/could
  - ▶ Ranked in terms of importance

Req. ID.	Relevant subphase	Must/should/could	Points	Task
DAI.U5.D1	Framework devel. & instan.	Should	30	2.2
DAI.U5.D2	Framework devel. & instan.	Should	20	2.2
DAI.U5.D3	Framework devel.	Should	15	2.2
DAI.U5.D4	Framework devel.	Should	15	2.2
DAI.U5.D5	Framework instant.	Should	20	2.2
DAI.U7.D1	Framework devel.	Must	35	2.1
⋮	⋮	⋮	⋮	⋮

Table : Example of work package requirements table

- 1 Introduction of the AMIDST Project
- 2 Introduction to Requirement Engineering RE
- 3 Challenges with RE in the AMIDST project
- 4 The AMIDST RE process
- 5 Realization of the AMIDST RE process
- 6 Conclusion

- ▶ RE process tailored to needs in AMiDST
  - ▶ Pre-specified scope of the project
  - ▶ Very different stakeholders
  - ▶ Software need to be general enough for different industries

- ▶ RE process tailored to needs in AMiDST
  - ▶ Pre-specified scope of the project
  - ▶ Very different stakeholders
  - ▶ Software need to be general enough for different industries
- ▶ Realization of RE
  - ▶ Use case driven approach
  - ▶ Formal template across domains
  - ▶ Pairing of academic and industrial partners

- ▶ RE process tailored to needs in AMiDST
  - ▶ Pre-specified scope of the project
  - ▶ Very different stakeholders
  - ▶ Software need to be general enough for different industries
- ▶ Realization of RE
  - ▶ Use case driven approach
  - ▶ Formal template across domains
  - ▶ Pairing of academic and industrial partners
- ▶ Transfer to other projects

- ▶ RE process tailored to needs in AMiDST
  - ▶ Pre-specified scope of the project
  - ▶ Very different stakeholders
  - ▶ Software need to be general enough for different industries
- ▶ Realization of RE
  - ▶ Use case driven approach
  - ▶ Formal template across domains
  - ▶ Pairing of academic and industrial partners
- ▶ Transfer to other projects
  1. Share the same characteristics



- ▶ RE process tailored to needs in AMIDST
  - ▶ Pre-specified scope of the project
  - ▶ Very different stakeholders
  - ▶ Software need to be general enough for different industries
- ▶ Realization of RE
  - ▶ Use case driven approach
  - ▶ Formal template across domains
  - ▶ Pairing of academic and industrial partners
- ▶ Transfer to other projects
  1. Share the same characteristics
  2. Reuse the very idea of identifying challenges to steer the RE process

*This project has received funding from the European Union's Seventh Framework Program for research, technological development and demonstration under grant agreement no 619209*