Combining Model Driven Development and Agile Software Development

A Review Study

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- Himesha Wijekoon is a lecturer in information technology at the Department of Industrial Management in University of Kelaniya, Sri Lanka.
- He holds a M.Sc. in Systems Engineering and Informatics from Czech University of Life Sciences Prague, Czech Republic.
- At present, he is a Ph.D. candidate at the Department of Information Engineering in the Czech University of Life Sciences Prague, Czech Republic.
- He also has more than 10 years of experience as a software engineer in multiple companies.
- His main research interests include *crowdsourcing, software engineering, software modelling and model driven engineering*.

Associate Professor Vojtěch Merunka, M.Sc., Ph.D.

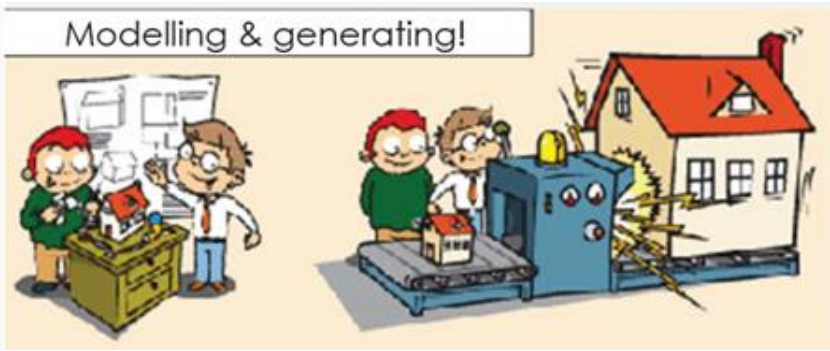
- Vojtěch Merunka (Vojta) is an Associate Professor in Information Management since 2005 at the Czech University of Life Sciences in Prague and the Czech University of Technology in Prague. He teaches software engineering and information management.
- He holds a Master's in Computer and Software Engineering and has obtained his PhD in Data Processing and Mathematical Modelling in 1998.
- He also has 15 years of experience in the international management and consulting company Deloitte.
- He is a founding member of the MOBA (Modelling of Business Agility) workshop and the SIGMAS (Special Interest Group on Modelling and Simulation) at the AIS.
- Vojta is professionally interested in object-based programming languages and object-oriented methods and tools for modelling and simulation.
- Among other activities, Vojta is concerned in inter-slavism and conlanging.

Introduction

- Agile Software Development (ASD)
  - Major software engineering methodology now
  - Treats customer in the centre of development process
- Model Driven Development (MDD)
  - A software development methodology
  - Not as popular as ASD due to its complexity, time consumption and the requirement for extensive tools
  - Focuses to ensure traceability and completeness between the different levels of software design
- Combining these 2 will bring benefits while reducing shortcomings.
- Objective of this study
  - To review the work related to combine MDD and ASD to identify potential future research

Model Driven Development (MDD)

- MDD is a Software development methodology which uses models to drive the development.
- Subsection of Model Driven Engineering (MDE)
- Models are created before code and uses automation for model transformation and code generation.
- Do not allow sufficient client involvement.
- Not agile as they highly focus on modelling activities



Agile Software Development (ASD)

- The “Agile Manifesto” which was published in 2001 aims to provide best practices for software development.
- Agile manifesto values
  - individuals and interactions over processes and tools
  - working software over comprehensive documents
  - customer collaboration over contract negotiation
  - responding to change over following plans
- Advocates the incremental development of software based on continuous interaction with the client (e.g. prototypes)
- Iteration based development
- Puts less emphasis on analysis and design
- Issues with large-scale projects

Combining MDD and ASD

- Motivation is to overcome the shortcomings of each approach and to create a superior methodology.
- 3 ways to combine;
  - MDD-based: introducing Agile method to an MDD process,
  - Agile-based: applying MDD process to an agile method and
  - Assembly-based: integrating some fragments from Agile and others from MDD to develop the process.
- Conclusions made in the previous surveys:
  - Agile MDD is still in its early stages
  - Most of the attempts of combining MDD and ASD have not clearly mentioned the comprehensive details about the integration

Combining MDD and ASD cont…

- Pros:
  - Improvement in productivity and quality
  - Faster development rate
  - Better customer satisfaction
- Cons:
  - Lack of model management
  - Lack of verification
  - Steep learning curve
  - Start-up overheads

Combining MDD and ASD – Major Previous Research

- Alfraihi & Lano have proposed a general and **comprehensive process for integrating ASD and MDD.**
- Romano and da Cunha have developed the **Agile and Collaborative Model Driven Development (AC-MDD)**.
- **eXtreme Modeling** is a model-based development analogue of eXtreme Programming.
- **Essebaa and Chantit** have combined MDA and Scrum agile methodology to improve sprints of scrum and benefit from MDA principles.
- **Agile Concern-Driven Development (Agile CDD)** is a software development process that uses concerns as its primary artifact and applies agile practices.
- **ScrumDDM** is a hybrid metaprocess which integrates MDD practices into the SCRUM method used in ASD.

Discussion

- Most of the Agile MDD work are towards specifying a new software development process or methodology.
- Most of the proposed methodologies/processes break original intentions of Agile Manifesto.
- Proposed processes are complex and difficult to follow.
- Very few research have been conducted to empower agile development with the MDD components preserving the simplicity of ASD.

Research Opportunity

- **To Empower agile development with the MDD components preserving the simplicity of ASD.**
- Agile requirements engineering is a good place to involve the MDD practices as modelling seems to be lacking in ASD.
- There are few research attempting to help ASD with automatic generation of models from user stories.
- All these approaches use Natural Language Processing techniques to some extent to process the textual user stories.
- As this is a quite new research area there is a need for proposing more useful techniques to generate or assist generating models in agile requirements engineering.
- **The MDD practices such as automatic model generation and model transformations can be utilized in this regard.**

Conclusion

- Most of the related work so far focus on creating a new software development methodology combining ASD and MDD.
- These approaches seem to be complex and break the simplicity of ASD.
- Therefore, we believe it could be very useful to the industry if we bring good practices from MDD into ASD to improve it without making the process too complex.
- Hence agile requirements engineering is identified as a problematic area in ASD which can be improved using modelling support from MDD components and tools.

Thank You!

QUESTIONS?