Automated Requirements Engineering Framework for Agile Development

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Short resume

- **Muhammad Aminu Umar** is a PhD candidate at Department of Informatics, King's College London. He obtained his Bachelor and master's degrees in Computer Science from Ahmadu Bello University, Zaria, Nigeria and Universiti Teknologi Malaysia respectively. His main research interests are requirements engineering, and model driven engineering. His current research work includes processing of natural language text to extract artefacts useful for requirements analysis and validation.

Current research work

- As a PhD candidate, we are currently working automated requirements engineering which is part of our agile MDE team.
- Our Agile MDE team consists of academics, RA and PhD students.
- We also collaborate with MDE teams at other universities.

Agenda

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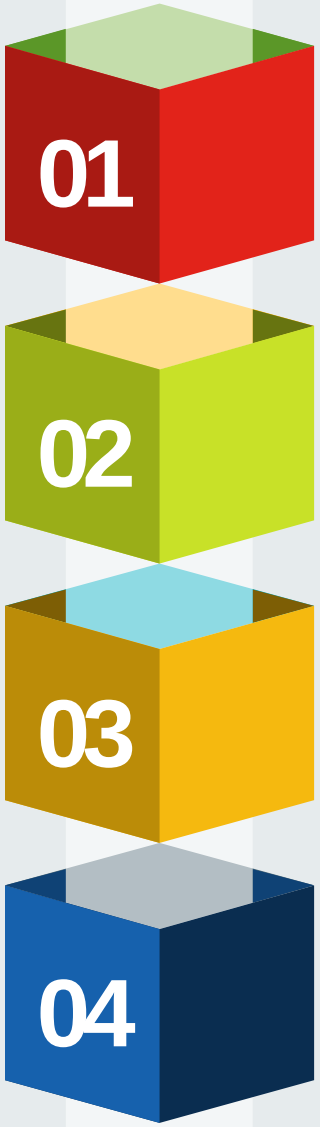

Introduction/Motivation

Automated RE

Application of NLP in RE activities

Proposed approach

Problem/ Motivation

- Increase in software complexity and size
- Changes in business process
- Unstructured Natural Language requirements is very common
- Interpretation and understanding of NL text can be influenced by geographical, psychological and sociological factors
- Need for alternative development paradigm
- In agile development, rapid change and flexibility are very important

Automated RE

- RE is the lifecycle stage with the highest influence on the quality of a final product
- Automated requirements elicitation provides computer-supported elicitation of requirements from NL
- NLP and IR have been employed to implement automated requirements elicitation
- In recent times, text mining have been employed

Application of NLP in RE activities

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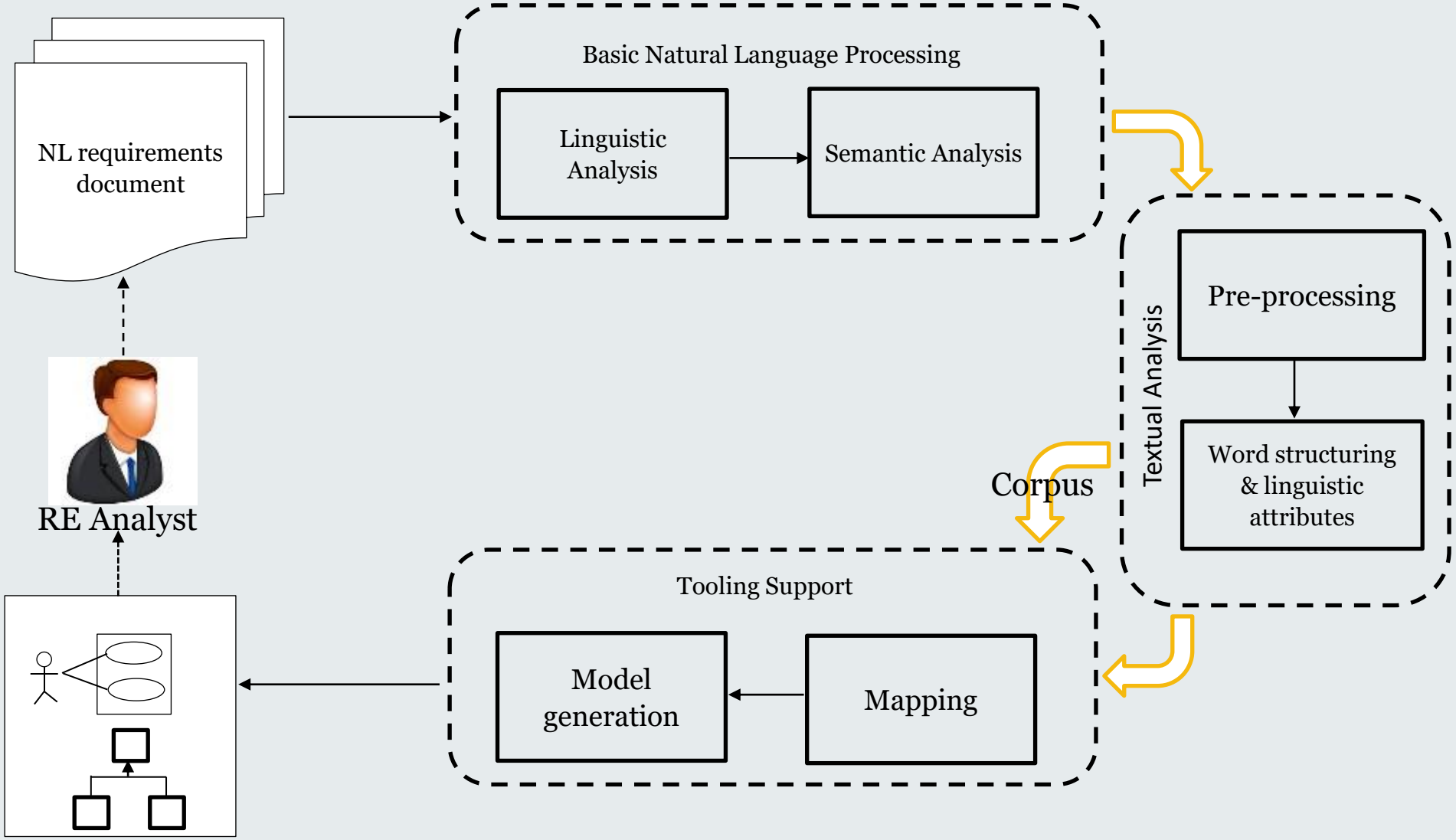
Ref	Elicitation	Analysis	Validation	Management
Ko et al, 2019 [12]			*	
Aysolmaz et al, 2018 [17]		*		
Moketar et al, 2016 [19]			*	
Deeptimahanti & Babar, 2009 [4]		*		
Li et al, 2015 [20]	*			
Elallaoui et al, 2018 [21]		*		
Vidya Sagar and Abirami, 2014 [22]		*		
Li et al, 2019 [11]				*
Rago et al, 2016 [10]				*
Antinyan and Staron, 2017 [23]				*
Ambriola and Gervasi, 2006 [24]		*		
Gacitua et al, 2011 [25]	*			
Alkhader et al, 2006 [26]		*		
Cybulski and K. Reed, 1998 [27]	*			
[28]				*
Do et al, 2019 [29]	*			
Lucassen et al, 2017 [30]		*		
Reinhartz-Berger and Kemelman, 2020 [31]				*
Al-Hroob et al, 2018 [32]		*		

Categories of NLP RE Tools

- Finding defects and deviations in natural language (NL) requirements document.
- Generating models from NL requirements descriptions.
- Inferring trace links between NL requirements descriptions.
- Identifying the key abstractions from NL documents.
- Therefore, the second category item is the goal this work seeks to achieve

Proposed framework



Work plan

- **Conceptualization** – this involves designing of the proposed framework and testing of the existing algorithms.
- **Tool development** – implementation of the tool support base on the proposed framework. Highlight of the development techniques languages.
- **Applications** – this has to do with evaluation and case studies to establish the applicability of the developed tool and generate useful feedbacks.

Conclusion

- This paper proposed a framework for automated RE using NLP and other AI techniques.
- The framework will be implemented and evaluated using at least two industrial case studies.
- This is to establish the applicability of the framework, which will also serve as a source of useful feedbacks.

Thank you.