

ASME 2019 IDETC/CIE

International Design Engineering Technical Conferences & Computers and Information in Engineering Conference

CONFERENCE August 18–21, 2019

Hilton Anaheim, Anaheim, CA



Realization of Inter-Model Connections Between Requirements to Computer Aided Design CIE 2020 Graduate Research Poster

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Background

Motivation

***** Reduce misinterpretations and miscommunication of requirements

Conclusion

- This study will introduce an AI user interface, which can identify and trace • engineering changes for performing up- and downstream analysis between requirements and CAD models.
- By grouping requirements as topics and CAD components into subassemblies, the user interface would realize and identify product components with related requirements and CAD parts. • The results will validate with existing requirement management tools for various industrial datasets and be interpreted by domain experts to ensure consistency with design intent across domains.
- ***** Bridge a research gap between requirements and computer-aided **Design analysis**

Research Questions

Can topic models convert requirement documents to a set of topics?

Can clustering algorithms group CAD models as a number of subassemblies?

How many system requirements for CAD model relationship can be realized through generated topics and subassemblies?

Requirements

<u>Hypothesis (1)</u>: Different topic models can be explored to generate a number of necessary topics.

Timeline

Task	Description	Time (month)	Sp19 (2)	Fa19 (3)	Sp20 (4)	Fa20 (4)	Sp21 (4)
1	Develop requirement & CAD datasets and identify heuristic methods.	9.0					
2	Cluster requirements into topics	9.0					
3	Cluster CAD models into subassemblies	11.0					
4	Develop AI computer-human interface	8.0					

<u>Hypothesis (3)</u>: By using various products (datasets), the topic & subassembly relationship can be verified or realized based on their functionalities.

Geometric Models

<u>Hypothesis (2)</u>: Certain merging criteria can determine the optimal number of subassemblies.

AI Computer-human Interface (Chatbot)

Clustered Requirements

Latent Topics

CAD Models as Graphs





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