

Formal Specifications to Natural Language Requirements

ABSTRACT

Ambiguity is often observed in technical specifications because they are written in a natural language (e.g., English). This project aims to develop an automated approach to formulate formal specifications from natural language requirements, such as regulation and policy documentation.

GOALS

- Develop an automated approach to formulate formal specifications from natural language requirements (e.g., regulations, policies).
- Gain a better understanding of Natural Language Processing (NLP) and how it works to eliminate ambiguity in technical documentation.

TECHNOLOGIES



Python



Stanford Typed
Dependency Parser

FINDINGS

As a group, we manually classified several sentences as temporal or non-temporal. We then utilized four classification techniques in our machine learning algorithm to determine accuracy. These techniques are as follows: (1) Random Forest, (2) Naive Bayes, (3) Decision Tree, and (4) Linear Regression.

Algorithm not complete...histogram with results of classification techniques will be included here for final poster

IMPACT

- Contribution of knowledge will serve to advance the field of NLP.
- Automating the classification of requirements will reduce ambiguity in engineering projects.
- Bridging the gap between natural language and formal specification will increase productivity in today's Agile approach to software development.
- Proving ties between temporal phrases and requirements will aid Project Managers and Developers to more accurately estimate their time.

CHALLENGES

- Each group member is relatively new to the field of NLP. Limited knowledge caused time constraints during early stages.
- Comprehension of highly technical papers and knowing what information to extract.
- Deciding on Python libraries for our machine learning algorithm.

ACHIEVEMENTS

- Learned how to use variety of NLP tools.
- Implemented a protocol to determine temporal phrases in requirement documentation.
- Confirmed correlation between our findings and those presented by researchers at the Jet Propulsion Laboratory.



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