Object Oriented Analysis using Natural Language Processing concepts: A Review

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The Software Development Life Cycle (SDLC) starts with eliciting requirements of the customers in the form of Software Requirement Specification (SRS). SRS document needed for software development is mostly written in Natural Language (NL) convenient for the client. From the SRS document only, the class name, its attributes and the functions incorporated in the body of the class are traced based on pre-knowledge of analyst. The paper intends to present a review on Object Oriented (OO) analysis using Natural Language Processing (NLP) techniques. This analysis can be manual where domain expert helps to generate the required diagram or automated system, where the system generates the required diagram, from the input in the form of SRS.

Keywords: Natural Language, Natural Language Processing, Object Oriented, Parts Of Speech, Software Development Life Cycle, Software Requirement Specification.

1. INTRODUCTION

Software Requirement Specification (SRS) document forms the basis of problem analysis between client and developer. SRS needs to be very specific, while serving as a basis, to proceed towards implementation of desired software. It is very often observed that SRS is expressed in any natural language as comprehensible by the client. But it may be ambiguous, possibly inconsistent, and probably unmanageably large from the software analyst’s point of view.

Identifying major functionalities from the OO analysis point of view plays an important role in project success. The use of formal languages like Unified Modeling Language (UML) have been applied to avoid the inherent problems of natural language such as incompleteness and ambiguity [1]. Earlier analysis was used to help for an explanatory model called as build and fix programming style. But this style was observed to be very informal and there are no set of rules as to which one is superior. Every programmer formulates his own software development technique solely guided by his expertise and in his own language and style [2].

In recent years, the object-oriented software development style is a preferred style over conventional style by developers as the present day software development languages are object oriented in nature. Hence, OO analysis of software helps to find out the candidate for class, function, and the attributes associated with those classes.

Natural Language Processing (NLP) combines the effect of computer science and linguistics branch which are concerned with the interaction between the computer and human languages [3]. Natural Language generation systems mostly extracts right information from statements which are in human readable form. The aim of the work is to present a review on existing literature of application of NLP in Object Oriented Analysis (OOA) based on literature available such as: Abbott [5], Saekai and Enamoto [6], Nanduri and Rugaber [7], Juristo and Moreno [8], Popescu et al., [9], Ibrahim and Ahmed [10], Harmain and Gaizauskas [11], Overmyer and Rambow [12], Mich [13]. Among these literatures few authors suggested auto-
classes, the relation between the subject and object of a sentence is found out.

- For other rules like multiplicity determines are used that specify the relationship like one-one, one-many, many-one, many-many.

4. CONCLUSIONS AND FUTURE SCOPE

There are different tools that have been developed to analyze the text; but as there is no exhaustive dictionary which helps to provide POS for each words. Although few tools generate the class diagram but different authors suggest that a manual intervention is needed to improve the final result. Until and unless there is specific rules for writing the SRS document, the ambiguities continue to be present in it and that cause issue in compiling the SRS. Though many approaches have been proposed and also are used to obtain the elements of OO analysis still there is scope for research in this area. To automated understanding the SRS written in informal NL is also an issue in research.

REFERENCES

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