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QUESTION ANSWERING SYSTEM USING ARTIFICIAL INTELLIGENCE

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ABSTRACT

The objective of this paper is to describe a question answering system using artificial intelligence techniques. The input to the system is a text file and the system uses the extracted knowledge from the text file to answer the questions posed by the user to it. This system is used to provide answers to open domain questions in the documents. This system can be implemented to assess online FAQs and also in interactive online lecturers.

KEYWORDS: *Artificial Intelligence, Parts of Speech, java*

I. INTRODUCTION

The main aim of this question answering system is to provide answers to specific questions in restricted domain. It allows the user to pose questions in natural language and obtain relevant answers or assistance they require in order to solve certain tasks. Natural Language Question Answering is recognized as a capability with great potential. This system is different from search engines in two ways: first, Instead of a string of keyword search terms, the query is a question in natural language, thus necessitating question processing and second, instead of a list of documents or URL"s, answers at sentence level are expected to be returned in response to the query and thus a need for text processing supported by Natural Language Processing (NLP) and Information Extraction (IE). Considering an example of challenges to find correct answer, It is not difficult to match the question „Who killed Abraham Lincoln?“ with the text „John Wilkes Booth killed Abraham Lincoln.“ But it is more challenging to find the answer to the question in the text „John Wilkes Booth is perhaps America"s most infamous assassin. He is best known for having fired a bullet that ended Abraham Lincoln"s life. "

II. DESCRIPTION

Question answering system is a type of information retrieval and Natural Language Processing (NLP) which answers questions posed by

humans in natural language. The systems constructs answers by querying a structured database called as information or knowledge base. Previously in 1964, a similar system was developed which is known as ELIZA which was used to interact with people through a text chat interface which responds to the users dialog in a natural way of interaction between a client and their therapist. Additional systems were also built such as BASEBALL and LUNAR. The BASEBALL system was used to answer questions related to US football league and LUNAR system was related to geological analysis of rocks. Both were very successful in their respective domains.

III. IMPLEMENTATION

The question answering system presented in this paper consists of three modules implanted in its architecture. They are:

- Processing module regarding questions
- Processing module regarding document
- Answer extraction and formulation module

The questions that the system receives can be categorized into following types:

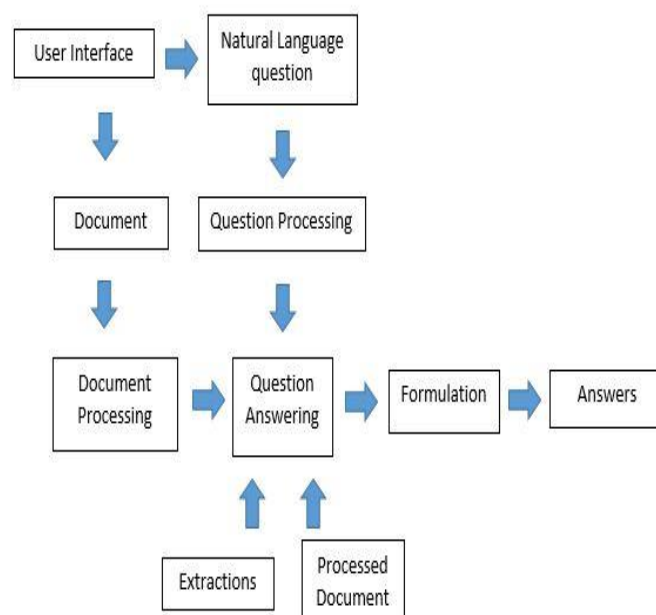
- Factual: Questions which contain words such as *what, where, when* and *who*.
- Expert: Questions which contain words such as *how* and *why*.

As of now, only level of intelligence of system is limited to factual questions as the intelligence required to solve expert requires more sophisticated and complex algorithms to be implemented. The user is first asked to select the passage of his choice and then the type of question. The Question processing module will process the question and pass it to the Question Answering module which will make use of the various extractions received from the Document Processing phase, along with the Processed Documents containing the tagged format of the original input document. The tags can be generated using a POS tagger. By applying required algorithms this module will pass it to the Formulation module for getting the desired answer. The 3 modules have been implemented in java using 3 different algorithms which are described below.

Algorithm used in processing module regarding questions is as discussed below.

- ◆ Question from the user.
- ◆ StringTokenizer tokenizes it and stores in an array.
- ◆ Return the stored array for further use.

IV. BLOCK DIAGRAM



V. APPLICATIONS & SCOPE

In this paper, a system is implemented which can handle questions in natural language and provide answers in a single statement.

The system can further be improved and the present system can be used for the following applications:

- ✧ Situation where quick review of entire text takes time.
- ✧ Adding speech recognition abilities to the current system will enable people with reading disabilities to take advantage of this system.

Algorithm used in processing module regarding document is as discussed below.

- Takes in the choice of the user for a particular passage from the displayed list and using file reader reads it and using StringTokenizer tokenizes it.
- POS tagger tags the tokens.
- Find verbs in the passage using tags.
- An array of verbs along with their tenses and ing form is created using the list of irregular verbs and the logic for regular verbs.
- Algorithm used in processing module regarding document is as discussed below.

Algorithm used in answer and formulation module regarding document is as discussed below.

- Finds the verb in the question.
- Match the verb found using the tokens.
- According to the selected case for type of factual question (*what*, *when*, etc) it further tries to extract and formulate the answer

- ✧ This system can be used to make online lectures more old-school type by allowing lectures to proceed only when questions related to the previous lecture are answered correctly.
- ✧ The QA paradigm extends beyond AI systems to query processing in database systems and many analytical tasks that involve gathering, correlating and analysing information; can naturally be formulated as QA problems.

The existing system can be integrated with a search engine to enhance the performance.

VI. CONCLUSION

A system is described that tries to process a question asked in natural language related to a particular passage and answers it in a more human-like manner as possible using Artificial Intelligence rather than the traditional NLP. Overall success is limited, because firstly, answering is restricted to a precise domain and secondly, user has to follow a particular format while entering a passage and asking related questions.

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