



# Question Answering using NLP

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## Introduction

This research project is based on Question Answering using the Natural Language Tool Kit try to find out the precise answers to Natural Language Questions. Most of the research which is related to this area can return possible whole sentence for a particular question, but they do not deliver the precise answers to the user. For this project I have experimented with the kindergarten stories, and find answer to questions made based on those stories. Kindergarten stories are chosen because the sentences are simple, but they contain all sorts of possible structural formation.

## Motivation

**“Aim of this research project is to find out the short answers for questions on the given passage or story, and analyze how the natural language tool kit helps to find the precise answers to questions”.**

## Methodology

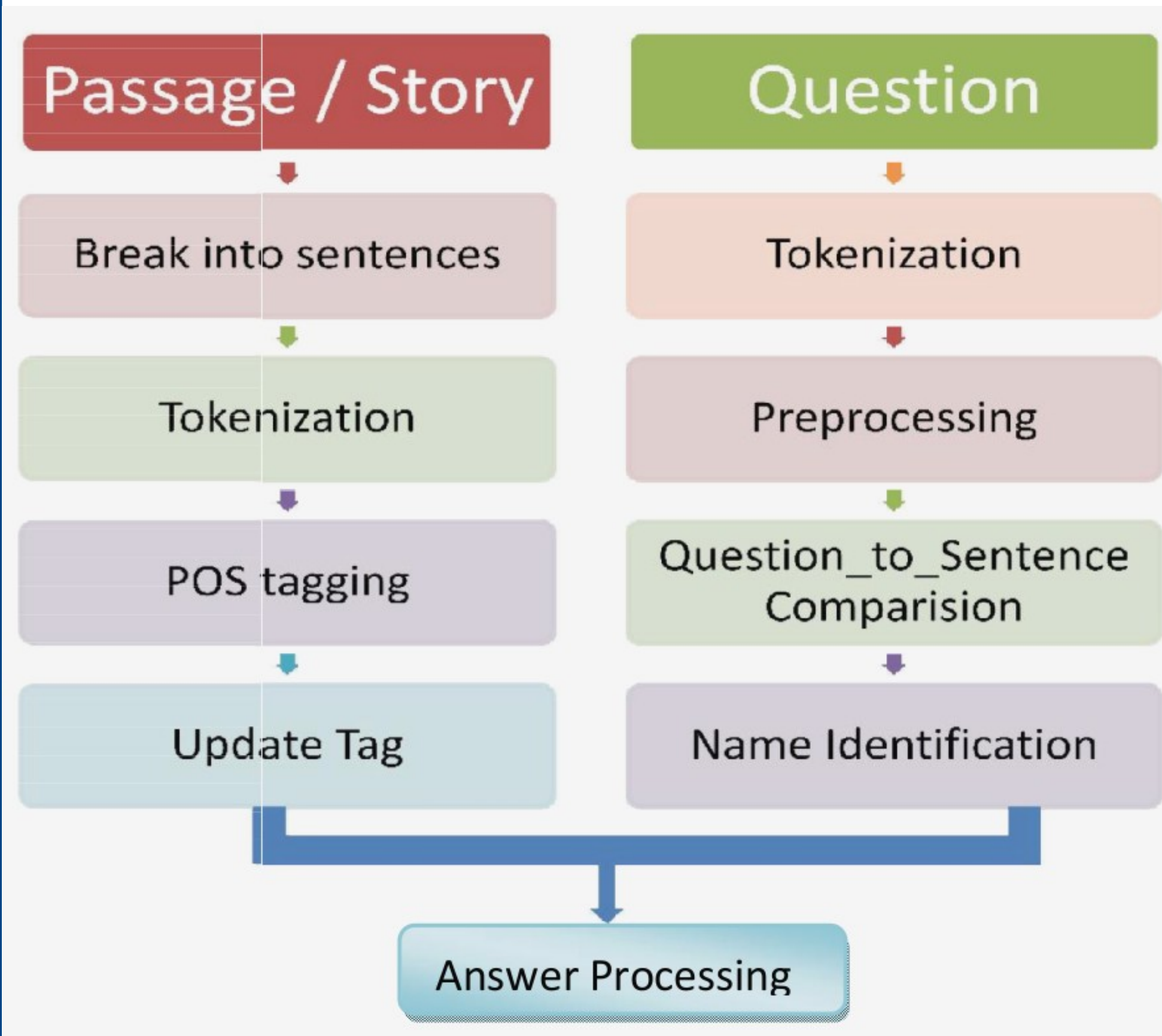


Figure 1: Methodology of Question and Answering.

- In Tokenization, the input sequence or sentences converted into words/tokens.
- The tokens are given as input for further processing such as parsing or POS tagging.
- To perform the POS tagging there is a predefined set of POS tags within NLTK and a model which is used to determine the tags for each token such as whether the particular token is noun, verb or adjective and etc.
- Next step is need to analysis the type of question. Natural Language questions are classified into different categories, but for my research purpose I focus on “Wh” questions such as when (seeks a date or time), who (seeks a person), where (a location) and What (Definition question types). Once the type of entity being sought has been identified, the remaining task of question analysis is to identify additional constraints that entities matching the type description must also meet.

## Results

### The Story is:

A crow flew all over the fields looking for water. For a long time, he could not find any. Suddenly, he saw a water jug below the tree. He could see some water inside the jug! The crow tried to push his head into the jug but, he could not put his head because the neck of the jug was too narrow. The crow thought hard for a while. Then looking around it, he saw some pebbles. He started picking up the pebbles one by one, dropping each into the jug. Then the water level kept rising. Soon it was high enough for the crow to drink. His plan had worked. Moral of the story "Think and work hard you may find solution to any problem".

### Using the POS\_tagging with Tokenization:

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[('A', 'DT'), ('crow', 'NN'), ('flew', 'NN'), ('all', 'DT'), ('over', 'IN'), ('the', 'DT'), ('fields', 'NNS'), ('looking', 'VBG'), ('for', 'IN'), ('water', 'NN'), (',', '.')]
[('For', 'IN'), ('a', 'DT'), ('long', 'JJ'), ('time', 'NN')]
[('he', 'PRP'), ('could', 'MD'), ('not', 'RB'), ('find', 'VB'), ('any', 'DT'), (',', '.')]
[('Suddenly', 'NN')]
[('he', 'PRP'), ('saw', 'VBD'), ('a', 'DT'), ('water', 'NN'), ('jug', 'NN'), ('below', 'IN'), ('the', 'DT'), ('tree', 'NNP'), ('could', 'MD'), ('see', 'VB'), ('some', 'DT'), ('water', 'NN'), ('inside', 'NN'), ('the', 'DT'), ('jug', 'NN'), ('!', '.')]
[('The', 'DT'), ('crow', 'NN'), ('tried', 'VBD'), ('to', 'TO'), ('push', 'VB'), ('his', 'PRP$'), ('head', 'NN'), ('into', 'IN'), ('the', 'DT'), ('jug', 'NN'), ('but', 'NN')]
[('he', 'PRP'), ('could', 'MD'), ('not', 'RB'), ('put', 'VB'), ('his', 'PRP$'), ('head', 'NN'), ('because', 'IN'), ('the', 'DT'), ('neck', 'NN'), ('of', 'IN'), ('the', 'DT'), ('jug', 'NN'), ('was', 'VBD'), ('too', 'RB'), ('narrow', 'JJ'), (',', '.')]
[('The', 'DT'), ('crow', 'NN'), ('thought', 'VBD'), ('hard', 'JJ'), ('for', 'IN'), ('a', 'DT'), ('while', 'NN'), (',', '.')]
[('Then', 'RB'), ('looking', 'VBG'), ('around', 'IN'), ('it', 'JJ')]
[('he', 'PRP'), ('saw', 'VBD'), ('some', 'DT'), ('pebbles', 'NNS'), (',', '.')]
[('He', 'PRP'), ('started', 'VBD'), ('picking', 'VBG'), ('up', 'RP'), ('the', 'DT'), ('pebbles', 'NNS'), ('one', 'CD'), ('by', 'IN'), ('one', 'NNP')]
[('dropping', 'VBG'), ('each', 'DT'), ('into', 'IN'), ('the', 'DT'), ('jug', 'NN'), (',', '.')]
[('Then', 'RB'), ('the', 'DT'), ('water', 'NN'), ('level', 'NN'), ('kept', 'VBD'), ('rising', 'VBG'), (',', '.')]
[('Soon', 'RB'), ('it', 'PRP'), ('was', 'VBD'), ('high', 'JJ'), ('enough', 'RB'), ('for', 'IN'), ('the', 'DT'), ('crow', 'NN'), ('to', 'TO'), ('drink', 'VB'), (',', '.')]
[('His', 'PRP$'), ('plan', 'NN'), ('had', 'VBD'), ('worked', 'VBN'), (',', '.')]
[('Moral', 'NNP'), ('of', 'IN'), ('the', 'DT'), ('story', 'NN'), (',', '.'), ('Think', 'NNP'), ('and', 'CC'), ('work', 'VB'), ('hard', 'NNP'), ('you', 'PRP'), ('may', 'MD'), ('find', 'VB'), ('solution', 'NN'), ('to', 'TO'), ('any', 'DT'), ('problem', 'NN'), ('"', '"'), (',', '.')]
[('problem', 'NN'), ('"', '"'), (',', '.')]
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### Enter Your Question: 1

Who tried to push his head into the jug?

**Crow**

### Enter Your Question: 2

Why he could not put his head?

**he could not put his head because the neck of the jug was too narrow**

### Enter Your Question: 3

Where he saw a water jug?

**below the tree**

### Enter Your Question: 4

Why Crow flew all over the fields?

**Crow flew all over the fields looking for water.**

### Enter Your Question: 5

Who started picking up the pebbles one by one?

**Crow**

### Enter Your Question: 6

What is Moral of the story?

**"Think and work hard you may find solution to anyproblem"**

## Conclusion

- I focused on closed-domain question answering about reading comprehension by using NLTK which is something new to this related research area.
- At the present I just completed the back end using Python. Testing results also got from Python Interpreter. In future I have a plan to develop (interface) for question answering.

## Reference

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