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Abstractive Text Summarizer Using Attention Machanism

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***Abstract*— Abstractive text summarization is the task of generating a headline or a short summary consisting of a few sentences that captures the salient ideas of an article or a passage. We use the adjective 'abstractive' to denote a summary that is not a mere selection of a few existing passages or sentences extracted from the source.**

In this work, we will create the model of abstractive text summarization using Attentional Encoder Decoder Recurrent Neural Networks. Neural sequence-to-sequence models have provided a viable innovative approach for abstractive text summarization (meaning they are not restricted to simply selecting and rearranging passages from the original text). However, these models have two shortcomings: they are liable to reproduce factual details inaccurately, and they tend to repeat themselves. In this work we will used standard Long Short-Term Memory (LSTM) sequence-to-sequence attentional model. This method utilizes a local attention model for generating each word of the summary conditioned on the input sentence. While the model is structurally simple, it can easily be trained end-to-end and scales to a large amount of training data. We will apply our model to the Amazon-fine-food-review dataset. We will evaluate the reconstructed paragraph using standard metrics like ROUGE, showing that neural models can encode texts in a way that preserve syntactic, semantic, and discourse coherence.

We propose several features that address problems which are coming in existing system in summarization that data visualization , Audio input, etc. and emitting words that are rare or unseen at training time.

Keywords—component, formatting, style, styling, insert

I. INTRODUCTION

Abstractive text summarization is the task of generating a headline or a short summary consisting of a few sentences that captures the salient ideas of an article or a passage. We use the adjective 'abstractive' to denote a summary that is not a mere selection of a few existing passages or sentences extracted from the source.

Compressed paraphrasing of the main contents of the document, potentially using vocabulary unseen in the source document. This task can also be naturally cast as mapping an input sequence of words in a source document to a target sequence of words called summary.

II. BACKGROUND

After the success of deep leaning approaches in a variety of fields such as computer vision or speech recognition, the new architectures started spreading to other areas like machine translation and natural language processing. More than that, recent success with neural machine translation inspired new approaches for the task of automatic text summarization. This led to the development of different methods to extract information from the input, which is one of the main components of an extractive summarizer

A. Motivation

Text summarization systems are the best candidates to serve this need. However, in contrast to other successful transduction tasks like machine translation where commercial solution are widely adopted since many years, automatic text summarization systems are still a bit far from producing business-reliable outputs. Seeing the success of deep learning approaches in the task of neural machine translation, motivated a new wave of research works related to text summarization hoping to reproduce a similar progress in this field.

Existing neural abstractive summarization methods are limited to taking the first sentence on an article as input and output a generated headline of the article. By ignoring all the details in an article except the first sentence, it leaves a lot of valuable information behind that may lead to a more informative headline.

B. Problem Definition

This world filled with immense amount of data and that is increasing every day. Go through the all data is very time-

Consuming Process. There is a great need to reduce much of this text data to shorter, focused summaries that capture the salient details, so we can navigate it more effectively as well as check whether the larger documents contain the information that we are looking for.

To solve this problem many text summarization tools is available in market but some of features yet to be introduce in them. We are effective, easier and more time saving for user.

Proposed system is much more helpful to easily understand large text by summary. The input data is processed using NLP and processed data input is converted into vector using word embedding. Word embedding means a set of feature learning and language modeling techniques in NLP where phrases or words from the vocabulary are mapped to vectors. Sentence ranking is used to extract higher ranked sentence from sentences and forms the extractive summary of the news text.

The user will be able to upload the Content in Text, Document and Audio format for Summarization. The user will be able to save the summarize file. The user will be able to visualize given Data.

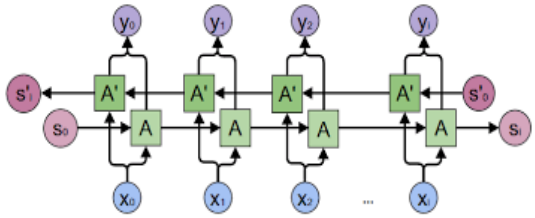
III. OBJECTIVES

Objectives of the project are:

- To provide the text Summarization with text input.
- To provide the text Summarization with Document input.
- To provide the text Summarization with Audio into text input.
- To provide the Data Visualization of given Content.

IV. ENCODERS AND DECODERS

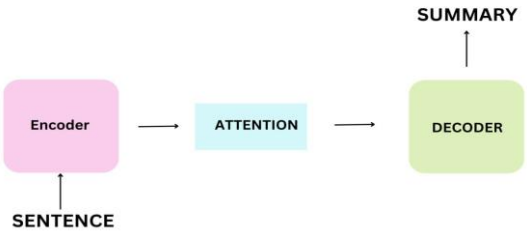
One approach to seq2seq prediction problems that has proven very effective is called the Encoder-Decoder LSTM. This architecture is comprised of two models: one for reading the input sequence and encoding it into a fixed-length vector, and a second for decoding the fixed-length vector and outputting the predicted sequence. The use of the models in concert gives the architecture its name of Encoder-Decoder LSTM designed specifically for seq2seq problems.



V. ATTENTION MECHANISM

For encoder-decoder neural networks, the use of attention allows for the creation of a context vector at each time step, given the decoder's current hidden state and a subset of the encoder's hidden states. For global attention, the context vector is conditioned on all of the encoder's hidden states, whereas local attention uses a strict subset of the encoder's hidden states.

This attention mechanism can be applied only once in the model, it is the piece that connects the encoder with the decoder and allows to compare the input and the output sentence as in the previous image. It receives the matrix of hidden states from the encoder and calculates thanks to the alignment score where to pay attention to, a simplified representation looks like this:



VI. FUNCTIONAL REQUIREMENTS

Functional requirements are the functions which are expected from the software or platform. Functional requirements along with requirement analysis help identify missing requirements. They help clearly define the expected system service and behavior. Functional requirements are as follows:

- To be able to upload the Document through the web interface
- To be able to upload the Audio through the web interface.
- To be able to view visualize Data

VII. NON-FUNCTIONAL REQUIREMENTS

Non-functional Requirement is mostly quality requirement. That stipulates how well the portal does, what it has to do. Other than functional requirements in practice, this would entail detail analysis of issues such as availability, security, usability and maintainability. Non-functional requirements are as follows:

- The processing system is fast enough to reduce the existing delays
- The interface should be simple and minimal
- The results should be comprehensive and detailed

VIII. DESIGN

System design provides the understanding and procedural details necessary for implementing the system.

A. *System Architecture:*

A System Architecture is the conceptual model that defines the structure, behavior, and more views of a system and architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures.

Assistant architecture can comprise system components, the extremely visible properties of those components, the relationship i.e., the behavior between them. It can provide a plat- form in which system can be procured, and systems developed, that will work together to implement the overall system.

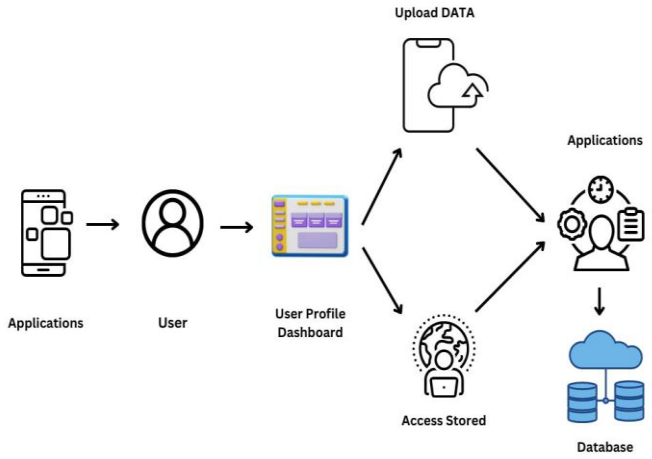


Fig. System Architecture

B. *DFD Level 1:*

A level 1 DFD notates each of the main sub-processes that together form the complete system. We can think of a level 1 DFD as an" exploded view" of the context diagram. Figure 4.3 shows Level 1 DFD of project. In 1-level DFD, the context diagram is decomposed into multiple bubbles/processes. The Level 0 DFD is broken down into more specific, Level 1 DFD. Level 1 DFD depicts basic modules in the system and flow of data among various modules. Level 1 DFD also mentions basic processes and sources of information. It provides a more detailed view of the Context Level Diagram. Here, the main functions carried out by the system are highlighted as we break into its sub-processes.

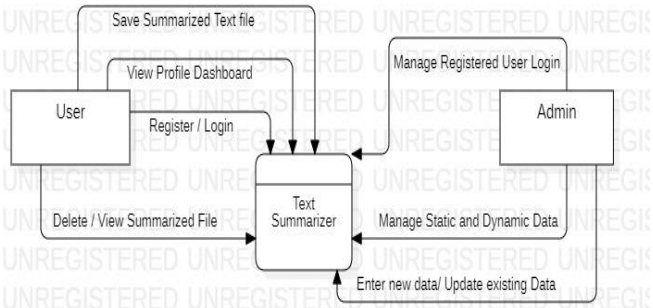


Fig. DFD Level 1

C. *Use Case :*

A Use Case diagram shows the interaction between the system and entities external to the system. These entities are called actors which have specific role in the system. The figure shows the use case diagram for proposed system. Purpose of Use Case Diagram is to know or show functionality of the system.

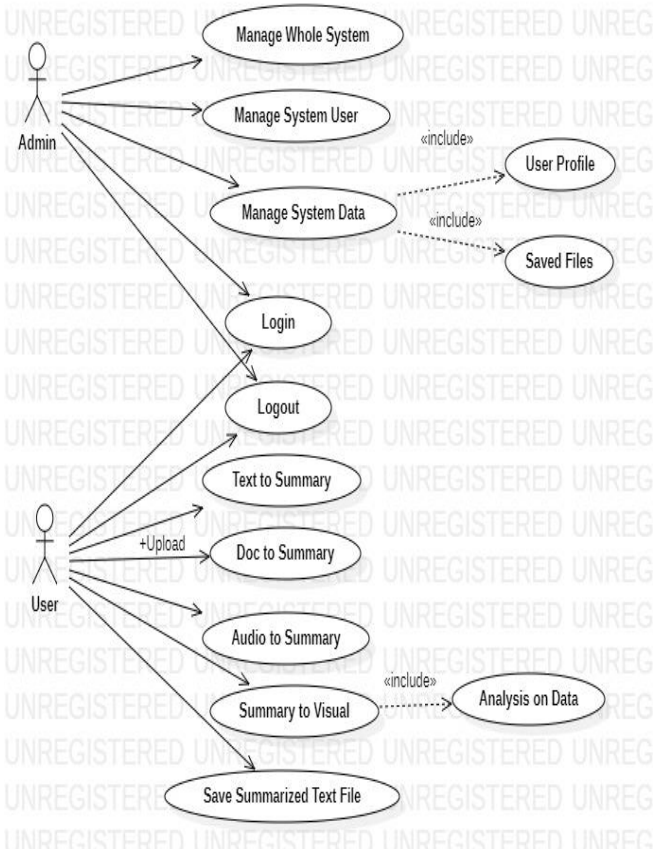


Fig2. Use Case Diagram

IX. CONCLUSION AND FUTURE SCOPE

Currently there is no such model available in market which summarized Content with the input of audio, scanning technology and visualize the content. We are aiming to build such model which is able to implement all these functionalities.

One of the future plans is to apply the content-focused summarization framework to news articles or blogs and to extend the work in the machine leaning approaches. Content-focused summaries of news articles would be lot more accurate and valuable to users. It would be more interesting to work on topic modeling and summarization in the domain of social media in future.

Research in summarization continues to enhance the diversity and information richness, and strive to produce coherent and focused answers to users' information need.

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