Digital Image Processing a Formal Grammar Approach

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ABSTRACT

In this research paper, authors proposed an approach in which the size reduction and speed enhancement of file or document takes place and to achieve this process, methods of grey scale in Digital Image Processing, which refers to processing of digital images by means of a digital computer; Chomsky Normal Form (CNF) process for merging in one of the three forms namely, two non-terminal symbol, one terminal symbol or null; and process splitting through context free grammar (CFG), is used. In initial procedure for a file, we have to allocate two places for a file. The first one is non- converted (original file) and the other one is converted (greyscale file), which has reduced the size of a file. Thereafter, further splitting of the file is processed by context free grammar. By this approach, split portions allocate an address, which are displayed on the calling of the required part.

Keywords-- Grey Scale, Automata, Context Free Grammar, Generalization, Specialization, Chomsky Normal Form.

I. INTRODUCTION

Digital image processing deals handling of digital images from beginning to end in a digital computer. DIP focuses on raising a computer system that is able to perform dispensation on a figure. An image may be distinct as a 2D function, which directs that $F(x,y)$, where x and y are plane of coordinates, is a function at any set of coordinates (x,y) called as the strength or gray level of figure at that point[4]. Grey scale is the converging of RGB image in two colour image that is black and white. The image in grey scale can be represented in the range of 0 to 1 where 0 represent as black and 1 represent as white. The colour of image pixel lies between 0 and 1 [4].

Grey Scale PDF	Original PDF
Abstract— A Context free grammar is a formal grammar which is represented as a combination of four tuples (V,T,P,S), where 'V' denote the set of Non-Terminals, 'T' denote a set of terminals , P' denote a set of Production Rule and 'S' denote a Starting Symbol. A Context Free Grammar can be constructed with the help of these symbols, which would be helpful to generate context free language for the given grammar. Context free grammar is the most commonly used kind of grammar in computer science. The various area of context free grammar includes natural language processing, Programming languages syntax defining and processing of	*Abstract— A Context free grammar is a formal gramm which is represented as a combination of four tupl (V,T,P,S), where 'V' denote the set of Non-Terminals, ' denote a set of terminals , P' denote a set of Production R: and 'S' denote a Starting Symbol. A Context Free Gramm can be constructed with the help of these symbols, whi would be helpful to generate context free language for t given grammar. Context free grammar is the most commor used kind of grammar in computer science. The various ar of context free grammar includes natural language processir Programming languages syntax defining and processing*

Fig 1.1: compression between grey scale and   original file

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Context free grammar is the most commonly used kind of grammar in computer science. The various areas of context free grammar includes natural language processing, programming languages syntax defining and processing of digital images. This paper presented a concept of digital image processing with the help of context free grammar.

Authors have proposed a transformation approach of an image to its equivalent digital format through CFG. The process first break an image in two parts which would be stored in digital form.
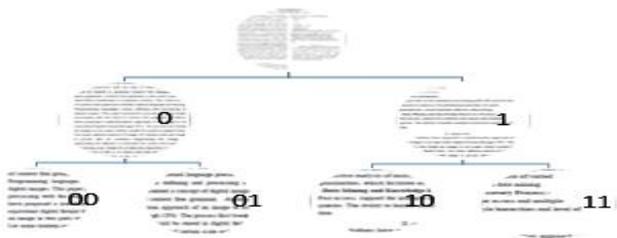

Fig 1.2: Address allocation of pdf

The pdf is splits in to left sub tree and right sub tree. The left sub tree parent node is assign as 0 and right sub tree parent node is assign as 1. Then the splitting further goes on and the assignment of value to the next node is the address accordingly along with address of parent node [2].

Let some random portion of image (of certain scale and range is given) and we continue fragmenting the image by generating the address or terminals for context free grammar and storing every single bit of data into repository or database. The purpose of this is to depict and kept the fragmented or maximum viewed data at the top of the address or queue which can be further retrieve through data mining techniques. This approach would be further useful for formalization of digital images.

II.   PROBLEM STATEMENT

At present the problems which effecting most today's generation is closely related to size and speed. So, to resolve these issues, authors had proposed an approach which is helpful in resolving the issues related to size and speed. In this approach methodology of grey scale and a part of Automata, which is presented at second layer of its classification called Context Free Grammar, is used.
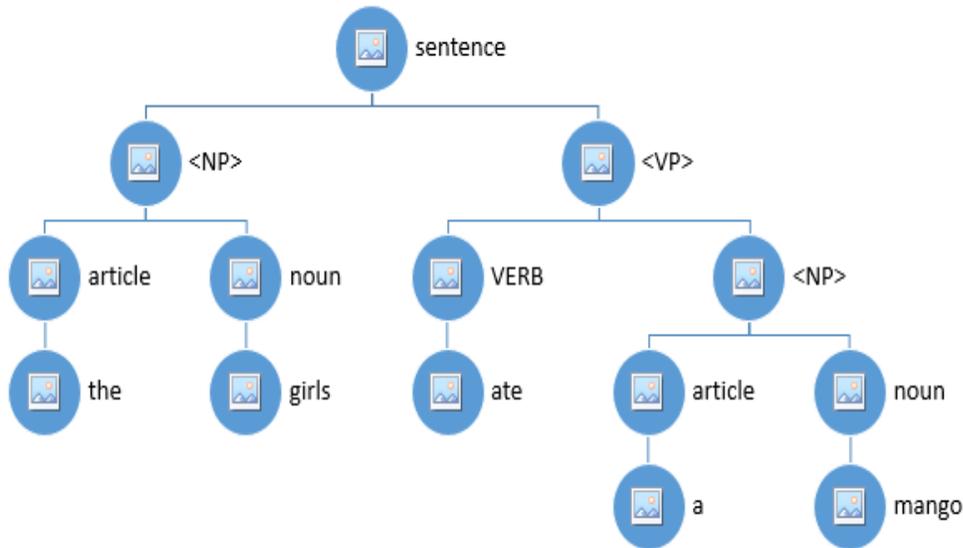
Related Work

Fig 3.1: Context free grammer

The sentence breaks into two forms with the use of CFG process, namely NP and VP. Further the splitting takes place in the NP and VP as, article and noun; and Verb and NP, respectively. Image processing is a form of signal processing. One of the distinctive operations on image processing is image segmentation [1]. Segmentation refers to the method of subdividing a digital figure into various segments (sets of pixels also identified as super pixels). The ambition of segmentation is to make simpler or modify the representation of an figure into rather i.e. more meaningful

and easier to scrutinize [2].Image action is the process of coating images (two or more) of the same scene in use at changed times, from dissimilar viewpoints, and by altered sensors. The registration geometrically arranges in a line two images (the reference and sensed images) [1].

III.   METHODOLOGY

The application of the grey scale software to be made more common in the cyber world in organize to shrink the size of the file and increase the speed of the Loading file on the web.
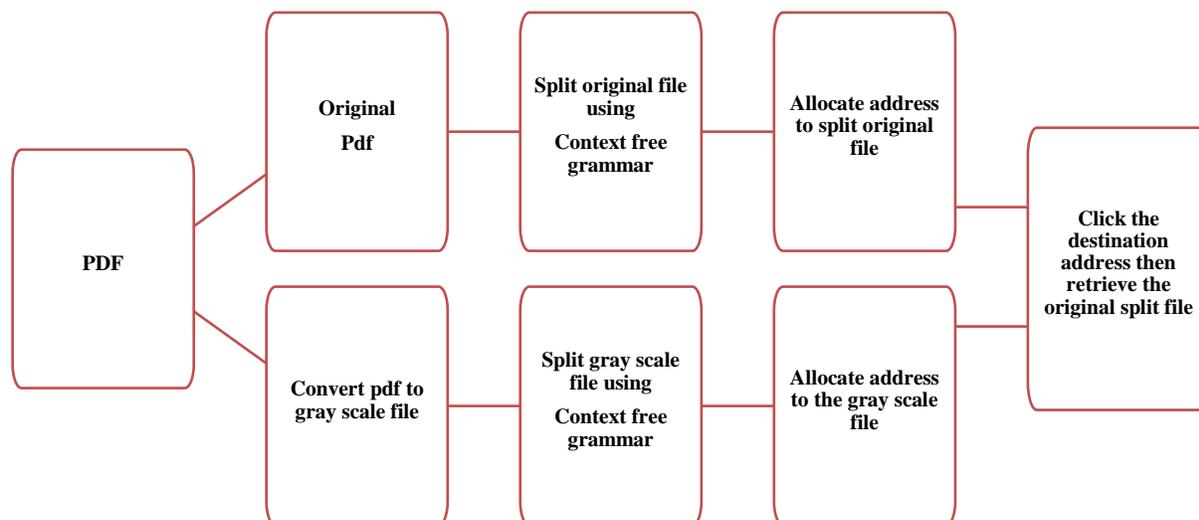
Fig4.1: Digital image processing approach

The Pdf file on the web splits [2] into two forms of the format namely, original and grey scale [1]. Further the original file as well as the grey scale file gets split by using Context Free Grammar (CFG). After the splitting of the original file and the grey scale file, the allocation of the address of the file takes place and then then by clicking on the destination address we retrieve the original file.

IV.   CONCLUSION & FUTURE SCOPE

From the above research, I have concluded that the size of the original file in PDF format reduced, and the size of the Grey scale file acquired short memory. Also, I came to a result that due to large size of the original file, the file opened with a low speed as compared to the grey scale file. During the implementation of the grey scale software and context free grammar (CFG), the specialization and generalization of the file takes place.

The allocation of size to segmented regions could be further reduced and the processing speed could be enhanced.

REFERENCES

[1] http://greyscalepdf.com/

[2] http://rubypdf.appspot.com/pagedivide.html

[3] K.L.P. Mishra & N. Chandrasekaran. (2009). *Theory of computer science automata, languages and computation*. (3rd ed.). INDIA: Prentice, Hall of India Private Limited.

[4] Rafel C. Gonzalez & Rechard E.Woods. (2008). *Digital image processing*. (3rd ed.). New York: Prentice-Hall, Inc.

[5] Ku.Vasundhara & H. Lokhande. (2014). Study of region base segmentation method. *International Journal of Advanced Research in Computer Science and Software Engineering, 4*(1), 197-200.

[6] S. Dhanalakshmi & Dr. T. Ravichandran. (2012). A new method for image segmentation. *International Journal of Advanced Research in Computer Science and Software Engineering, 2*(9) 293-299

[7] Alan Conrad Bovik. (2009). The essential guide to image processing. *IEEE Transactions on Image Processing 16*, 385-419.

[8] B. Kulis, P. Jain & K. Grauman. (2009). Fast similarity search for learned metrics. *IEEE Transactions on Pattern Analysis and Machine Intelligence, 31*(12), 2143–2157.