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ADAPTIVE SCANNING FOR THE COMPRESSION OF REMOTE SENSING IMAGE

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Abstract: ***Remote sensing image compression technologies have been extensively studied in the past a few decades, and various algorithms have been developed accordingly. In this paper, we provide an overview of practically deployed remote sensing image compression using Binary Tree Coding. In the remote sensing applications compression method is most significant, using mean square error. In the vision based application, the PSNR is higher which shows the good visual quality. In existing compression methods it consider the human visual system for designing natural images, which does not consider the unique feature of remote sensing images. Based on this problem we consider human vision based adaptive scanning scheme for the application of remote sensing image compression.***

Keywords: Remote Sensing Image, Matlab R2015b, Image Processing, Adaptive Scanning, Binary Tree Coding.

I. INTRODUCTION

Sensor technology is mainly used for the remote sensing data in the case of remote sensing application to improve the spatial and spectral resolution. Remote sensing images contain more information and cost is increased in present scenario, we are using space borne sensors, which generates the large number of remote sensing images at a rate of several terabytes per day. So data transmission and storage is difficult, hence we have to compress the image using compression technique. The image compression is to reduce the size of an image without degrading the visual quality of an image. The image compression method is used for reducing the image redundancy and store or transmits the data in a significant way.

II. PROBLEM DEFINITION

In existing compression methods it consider the human visual system for designing natural images, which does not consider the unique feature of remote sensing images. Sometimes we have storage problems because of large size of image so it can be removed by using compression technique. Data transmission is also difficult. The image compression is to reduce the size of an image without degrading the visual quality of an image. The image compression method is used for reducing the image redundancy and store or transmits the data in a significant way..

III. SYSTEM ARCHITECTURE AND DESIGN

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

Processing

Figure-1: System Processing

In above system architecture, we give an input image which we want to compress. User browses the image & select input image. Then processing is done on selected input image. After processing it will give compressed image & other details of image.

IV. METHODOLOGY FOR PROPOSED SYSTEM

In the remote sensing applications compression method is most significant, using Binary Tree Coding. In the vision based application, the PSNR is higher which shows the good visual quality. In this proposed application we used following techniques :

A. BTCA (BINARY TREE CODING)

The remote sensing image data is so vast that it requires compression by low-complexity algorithm on space-borne equipment. Binary tree coding with adaptive scanning order (BTCA) is an effective algorithm for the mission. However, for large-scale remote sensing images, BTCA requires a lot of memory, and does not provide random access property. In this paper, we propose a new coding method based on BTCA and optimize truncation. The wavelet image is first divided into several blocks which are encoded individually by BTCA. According the property of BTCA, we select the valid truncation points for each block carefully to optimize the ratio of rate-distortion, so that a higher compression ratio, lower memory requirement and random access property are attained. Without any entropy coding, the proposed method is simple and fast, which is very suitable for space-borne equipment. Experiments are conducted on three remote sensing image sets, and the results show that it can significantly improve PSNR, SSIM and VIF, as well as subjective visual experience.

B. DETAILED LIFE CYCLE OF PROJECT

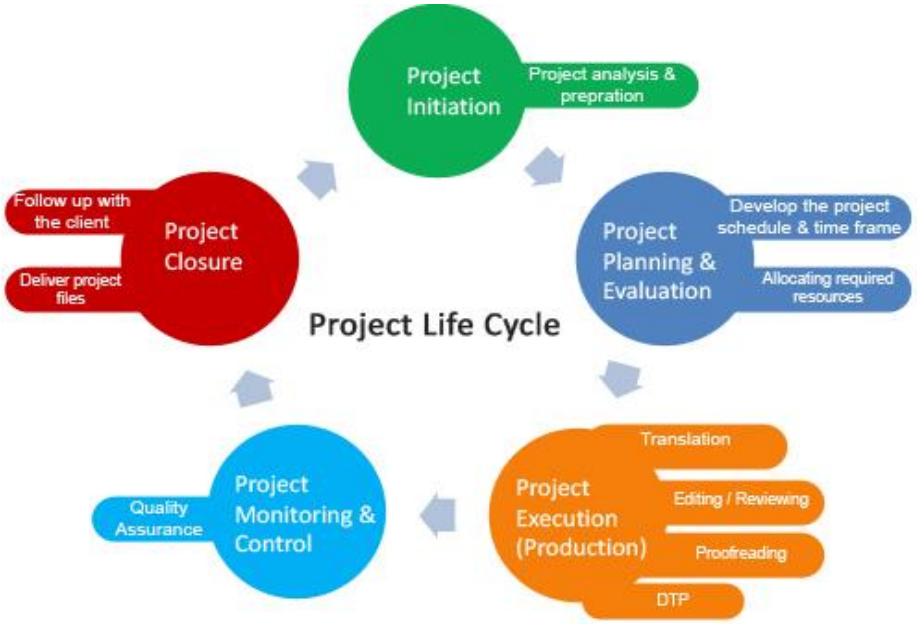

Figure-2: Lifecycle of Project

- **Introduction**
  System design is the process of defining the architecture, modules, interfaces, and data for a system to satisfy specified requirements. Systems design could be seen as the application of systems theory to product development. There is some overlap with the disciplines of systems analysis, systems architecture and systems engineering.

- **UML Diagrams**
  It is a general-purpose, developmental, modeling language in the field of software engineering that is intended to provide a standard way to visualize the design of a system.

- **Use case diagram**

A use case diagram is a graphic depiction of the interactions among the elements of a system. A use case is a methodology used in system analysis to identify, clarify, and organize system requirements. The purpose of use case diagram is to capture the dynamic aspect of a system. However, this definition is too generic to describe the purpose, as other four diagrams (activity, sequence, collaboration, and State chart) also have the same purpose. We will look into some specific purpose, which will distinguish it from other four diagrams. Use case diagrams are used to gather the requirements of a system including internal and external influences. These requirements are mostly design requirements. Hence, when a system is analyzed to gather its functionalities, use cases are prepared and actors are identified. Actors can be a human user, some internal applications, or may be some external applications. When we are planning to draw a use case diagram, we should have the following items identified.

- Functionalities to be represented as use case
- Actors
- Relationships among the use cases and actors.

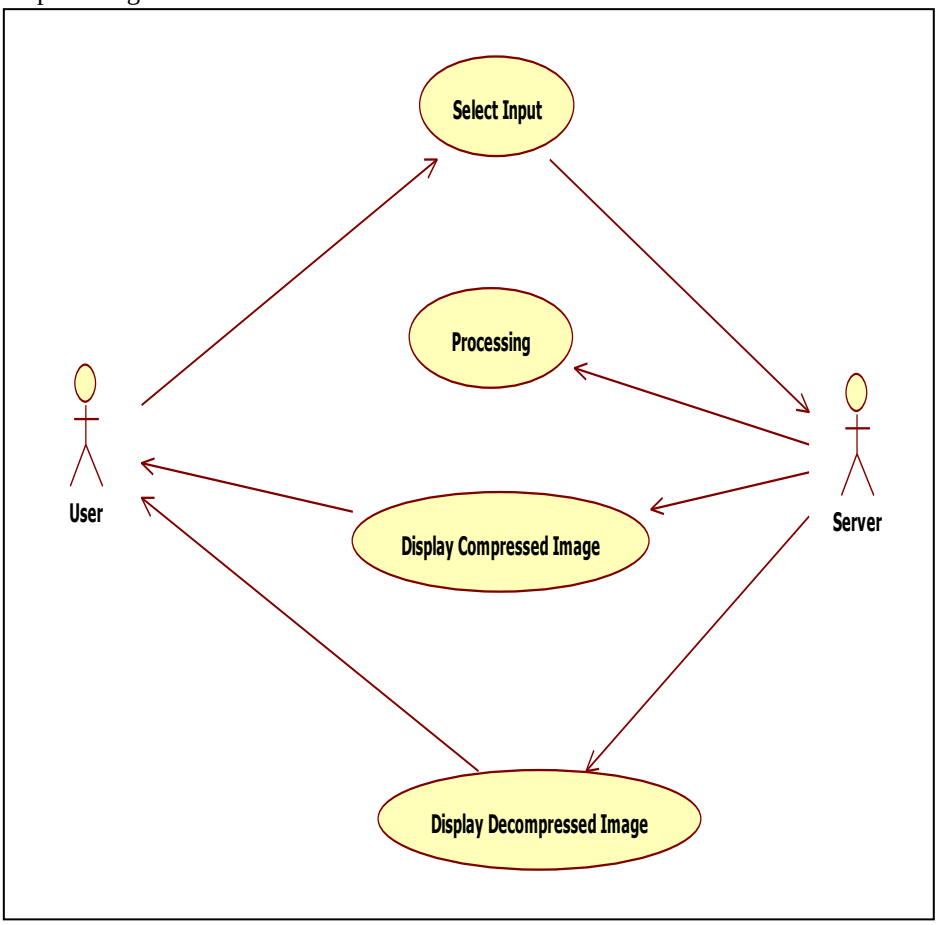

Figure-3: Use-Case Diagram

C. WORK TASK 1: ANALYSIS PHASE

Work Task	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12
1.1												
1.2												
1.3.1												

1.3.2					■							
1.3.3						■						
1.4							■	■				
1.5									■			

D. WORK TASK 2: DESIGN PHASE

Work Task	Wk 13	Wk 14	Wk 15	Wk 16	Wk 17	Wk 18	Wk 19	Wk 20	Wk 21	Wk 22	Wk 23	Wk 24
2.1	■	■	■									
2.2				■	■	■						
2.3							■	■	■	■	■	■

E. WORK TASK 3: CODING, DEPLOYMENT AND DOCUMENTATION PHASE

Work Task	Wk 25	Wk 26	Wk 27	Wk 28	Wk 29	Wk 30	Wk 31	Wk 32	Wk 33	Wk 34	Wk 35	Wk 36
3.1	■	■										
3.2			■	■	■							
4.1						■						
4.2							■					
4.3								■	■			
5										■		
6											■	■

V. ADVANTAGE

- Save memory of image to store into systems
- Easy to use
- The scanning method improves the coding performance.
- As compared other scan based method, the proposed compression method provide a good VSNR
- It has a low complexity.
- It is very suitable for the vision related applications.

VI. CONCLUSION

In this proposed application, we have processed an image for the compression of remote sensing images. Here we use binary tree coding for encoding the image this will help to a progressive image transmission. The proposed compression method provides a good VSNR. It is a low complexity.

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