

Empirical Evaluation of Coding and Inter Pixel Redundancy in still Image Compression

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Abstract

The main aim of this research work is to compress grayscale images efficiently using prediction and intensity-based image compression algorithms. Image compression is useful for removing the duplication in an image to store and transmit the data in an efficient form. This research work analyzes four new schemes for gray scale lossy image compression. Among the four schemes considered, two compressive approaches are designed for Prediction Based Image Compression (PBIC) level implementation. Third approach is designed for Intensity Based Image Compression (IBIC). Finally, the previously designed PBIC and IBIC schemes lead to an Integrated Encoder. All the considered method performances are analyzed using the performance metrics. These results are compared with JPEG 2000 which is a extensively used benchmark compression encoder. The outcome of all the proposed methods is also compared with modern encoders.

Keywords: Prediction based Image Compression, Intensity based Image compression, Intra Prediction, Modulus Transformation, Integrated Encoder, octagon based intra prediction, neighboring block, JPEG 2000

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1. Introduction

Visual information is of vital importance for mankind to perceive and understand the surrounding world. The saying "A picture is worth a thousand words" rightly expresses the amount of information contained in a single image. As the transmission and storage of every single bit in an image incurs a cost, the necessity of cost-effective image compression technique plays an important role. There are various compression methodologies that are designed in the last several decades. It starts with grayscale image, followed by color image and the research has its path in video compression (both grayscale and color). Predictive coding can be made superiorly with the help of the compression ratio. Some researchers describe prediction-based lossless compression [1-5]. The research work that was proposed

previously for grayscale image compression is analyzed in this paper.

The following research works are considered in this paper:

- An Octagon Based Intra Prediction (OBIP) scheme in PBIC method.
- N-Modulus Transformation (NMT) in PBIC method.
- IBIC – The impact of pixel values over compression is studied by dividing the image into high and low intensity values. Various existing compression methods are analyzed in this method.
- The Integrated Encoder.

The results of the above four methods are analyzed and compared with JPEG 2000 and recent encoders.

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Proceedings of the Third Forum on Research and Technology Advances in Digital Libraries--ADL '96 ,1996

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considers image processing more precisely algorithms of image compression and denoising This research is motivated in particular by the new standard for compression of still images known as JPEG 2000 The second chapter has new results on the Navier Stokes and other nonlinear evolution equations Frequency modulated signals and their use in the detection of gravitational waves are covered in the final chapter In the book the author describes both what the oscillating patterns are and the mathematics necessary for their analysis It turns out that this mathematics involves new properties of various Besov type function spaces and leads to many deep results including new generalizations of famous Gagliardo Nirenberg and Poincare inequalities This book is based on the Dean Jacqueline B Lewis Memorial Lectures given by the author at Rutgers University It can be used either as a textbook in studying applications of wavelets to image processing or as a supplementary resource for studying nonlinear evolution equations or frequency modulated signals Most of the material in the book did not appear previously in monograph literature

Proceedings of International Conference on Recent Advancement on Computer and Communication Basant Tiwari, Vivek Tiwari, Kinkar Chandra Das, Durgesh Kumar Mishra, Jagdish C. Bansal, 2018-04-18 The book is a compilation of best papers presented at International Conference on Recent Advancement in Computer and Communication ICRAC 2017 organized by IMPLab Research and Innovation Foundation Bhopal India The book covers all aspects of computers and communication techniques including pervasive computing distributed computing cloud computing sensor and ad hoc network image text and speech processing pattern recognition and pattern analysis digital signal processing digital electronics telecommunication technologies robotics VLSI technologies embedded system satellite communication digital signal processing and digital communication The papers included are original research works of experts from industry government centers and academic institutions experienced in engineering design and research

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Integrated Computer Technologies in Mechanical Engineering

Mykola Nechyporuk, Vladimir Pavlikov, Dmitriy Kritskiy, 2020-01-03 This book presents the proceedings of the 2019 International Scientific and Technical Conference Integrated Computer Technologies in Mechanical Engineering Synergetic Engineering ICTM 2019 The ICTM was established by the National Aerospace University Kharkiv Aviation Institute to bring together outstanding researchers and practitioners in the fields of information technology in the design and manufacture of engines creation of rocket space systems and aerospace engineering from around the globe all to share their knowledge and expertise The ICTM 2019 conference was held in Kharkiv Ukraine on November 28-30 2019 During the event technical exchanges between the research communities took place in the form of keynote speeches panel discussions and special sessions In addition participants had the opportunity to forge new collaborations with their fellow researchers ICTM 2019 received 172 submissions from various countries This book features selected papers offering insights into the following topics Information technology in the design and manufacture of engines Information technology in the creation of rocket space systems Aerospace engineering Transport systems and logistics Big data and data science Nano modeling Artificial intelligence and smart systems Networks and communication Cyber physical system and IoE Software Engineering and IT infrastructure The organizers of ICTM 2019 made great efforts to ensure the success of this conference The authors would like to thank all the members of the ICTM 2019 Advisory Committee for their guidance and advice the members of Program Committee and Organizing Committee the referees for their time and effort in reviewing and soliciting the papers and the authors for their contributions to the formation of a common intellectual environment for solving relevant scientific problems Also the authors are grateful to Springer especially Janusz Kacprzyk and Thomas Ditzinger as the editors responsible for the series Advances in Intelligent System and Computing for their valuable support in publishing these selected papers

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