

RAVI UYYALA

PERSONAL INFORMATION

email uyyala.ravi@gmail.com
Name [Ravi Uyyala](#)
Father's name [Roshaiyah Uyyala](#)
phone (M) +91 9618511774

To be associated with progressive organization that provides scope to update skills.

EDUCATION

Aug 4, 2014- **IDRBT and University of Hyderabad, India**
Mar 4, 2020

*Doctor of
Philosophy
(Ph.D)*

Specialization : *Computer Science (CS)*
Thesis: *Reversible data hiding using Prediction error expansion based techniques*
Description: Inevitably, Data hiding is used to communicate the secret information through the digital medium. The existing methods in the literature along with Data hiding are not capable of restoring the original medium along with the secret data. The Reversible Data Hiding (RDH) is the only way of extracting the original medium along with secret data. The Prediction Error Expansion (PEE) is used to obtain the better visual quality of the medium than the other existing methods. Thus, PEE based RDH is only the ultimate solution for the applications where original medium along with secret data is required exactly.
Advisors: Prof. Rajarshi Pal

2007-2009 **National Institute of Technology Karnataka,
Surathkal (NITK, Surathkal)**

*Master of
Technology
(M.Tech)*

Specialization : **Computer Science and Engineering (CSE)**
Thesis: Aspect Oriented Program design in Distributed Application
Advisors: Prof. Annappa

2003-2007 **University College of Engineering, Osmania
University, (O. U Campus), Hyderabad**

*Bachelor of
Engineering (B.E)*

Specialization : **Computer Science and Engineering (CSE)**
Project: Ware House Management System
Advisors: Prof. Venkat Das

WORK EXPERIENCE

Feb 2011-June **BM College of Technology, Indore, India**
2014

*Associate
Professor*

Offered courses on Basic computer Engineering, Distributed systems, Computer Networks, Operating systems, Discrete structures

May2010- **Vignan Institute of Science And
Jan2011
Technology(VITS), Hyderabad, India**

*Assistant
Professor*

Offered courses on Socket Programming, Design and Analysis of Algorithms

Aug2009- **Nalla Narasimha Reddy Group of
Aprill2010
institutes,Hyderabad,India**

Lecturer

Offered courses on C And Data Structures

PUBLICATIONS

Feb-2016 **Gradient dependent reversible watermarking with low embedding impact**

(3rd International
Conference on
Signal Processing
and Integrated
Networks
(SPIN-2016, New
Delhi))

This paper presents a novel prediction error estimation (PEE) based reversible watermarking scheme. A good predictor is key to the performance of this kind of watermarking scheme. A novel gradient based predictor estimates the pixel value based on a 5×5 neighborhood of the pixel. Moreover, the prediction error expansion (PEE) is divided between the current pixel and its top-diagonal neighbor such that distortion remains minimum. Experimental results establish that the proposed predictor with optimal embedding outperforms several existing methods.

Authors: RAVI UYYALA, RAJARSHI PAL and MUNAGA VNK PRASAD

Jan-2017 **Selected Context Dependent Prediction for Reversible Watermarking with Optimal Embedding**

International
Conference on
Computer Vision
and Image
Processing
(CVIP-2017, IIT
Roorkee)

This paper presents a novel prediction error expansion (PEE) based reversible watermarking using 3×3 neighborhood of a pixel. Use of a good predictor is important in this kind of watermarking scheme. In the proposed predictor, the original pixel value is predicted based on a selected set, out of the eight neighborhood of a pixel. Moreover, the value of prediction error expansion (PEE) is optimally divided between current pixel and top-diagonal neighbor such that distortion remains minimum. Experimental results show that the proposed predictor with optimal embedding outperforms several other existing methods.

Authors: RAVI UYYALA, MUNAGA VNK PRASAD and RAJARSHI PAL

July-2018 **Reversible Data Hiding Based on the Random Distribution of Reference Pixels**

(IEEE Technical
Symposium on
Internet of Things)
(IEEE-TenSymp-
2018, Sydney,
Australia)

A novel Prediction Error Expansion (PEE) based reversible data hiding scheme has been proposed in this paper. A set of reference pixels are randomly distributed throughout the image. Number of these reference pixels in a portion in the image is loosely proportional to the roughness of the portion. The prediction of a non-reference pixel is carried out as the weighted median of the reference pixel values within a local neighborhood of the non-reference pixel. The data is embedded in a non-reference pixel using an adaptive embedding strategy based on an estimate of the local complexity and the estimated prediction error. The experimental results show that the proposed method outperforms some of the existing methods in the literature.

Authors: RAVI UYYALA and RAJARSHI PAL

Feb-2020 **Reversible Data Hiding Using Improved Gradient Based Prediction and Adaptive Histogram Bin Shifting**

(7th International
Conference on
Signal Processing
and Integrated
Networks
(SPIN-2020, New
Delhi))

In this paper, a novel reversible data hiding method is proposed using an improved gradient based prediction. The gradients are computed across horizontal, vertical, diagonal and anti-diagonal directions using 5×5 neighborhood. The final predicted value is obtained as a weighted average of two linearly predicted values in the directions of the smallest two gradients. An adaptive prediction error histogram bin shifting method is also proposed to insert either 1 bit or 2 bits in the prediction error of a pixel. It is experimentally observed that the proposed reversible data hiding technique using an improved gradient based prediction and adaptive prediction error histogram bin shifting outperforms several other existing techniques.

Authors: RAVI UYYALA and RAJARSHI PAL

May-2020 **Reversible Data Hiding Using Multi-Layer Perceptron Based Pixel Prediction**

(11th International Conference on Advances in Information Technology (IAIT 2020), Bangkok, Thailand))

Reversible data hiding is a branch of data hiding in which cover image can additionally be restored along with the extraction of hidden data. In prediction error expansion based reversible data hiding techniques, pixel values are predicted using the neighborhood pixels. Data bits are hidden in the expanded prediction error. Prediction error expansion based techniques have become popular due to their superior performances over other categories of techniques. In this paper, a novel reversible data hiding technique is proposed based on a multi-layer perceptron based pixel prediction. The multi-layer perceptron is trained to predict a pixel value based on its eight neighbors. Experiments have been conducted by varying the number of hidden layers and the number of neurons in each hidden layer in the multi-layer perceptron. The best architecture for the multi-layer perceptron is chosen for the proposed reversible data hiding technique. Finally, an adaptive embedding strategy is used to insert either one bit or two bits of data in the expanded prediction error of the pixel based on the standard deviation of the pixel values in the local neighborhood.

Authors: ABHISHEK BHANDARI , SHIVRAJ SHARMA, RAVI UYYALA , RAJARSHI PAL and MRIDULA VERMA

July-2020 **Reversible Data Hiding with Selected Directional Context Based Prediction Using 8-Neighborhood**

(IEEE CONECCT 2020, Bangalore, India)

In this paper, a novel reversible data hiding technique using a selected directional context based prediction has been suggested. In the proposed prediction strategy, the predicted values are obtained across vertical, horizontal, diagonal and antidiagonal directions using pixel values in 8-neighborhood of a pixel. The final predicted value is obtained as the average of predicted values for a set of selected directional contexts. These directions are selected using the diversities in the neighborhood pixel values in the respective directions. Finally, the prediction error in an image pixel is used to insert the secret data in the pixel using a prediction error histogram bin shifting method. An adaptive histogram bin shifting method is introduced in this paper to adaptively embed one or two bits of data in a pixel. The proposed selected directional context based prediction with adaptive histogram bin shifting has outperformed several state-of-the-art reversible data hiding techniques.

Authors: RAVI UYYALA and RAJARSHI PAL

Oct-2019 **Reversible data hiding using B-tree triangular decomposition based prediction**

(IET Image Processing , Volume 13, issue 11, 1986-1997, October 2019)

A novel reversible data hiding (RDH) technique has been proposed in this study using a B-tree triangular decomposition-based prediction of image pixels. The superiority of a prediction error expansion-based RDH scheme depends on a good prediction strategy for image pixels. In the proposed scheme, the B-tree triangular decomposition is used to recursively decompose the image into a set of right-angled triangles. The vertices of such triangles serve as the reference pixels to predict (interpolate) the intensity values of other non-reference pixels within the triangle. Data bits are reversibly embedded into these non-reference pixels by expanding the prediction error. Moreover, according to the proposed scheme, the number of bits being embedded in these pixels is varied (either one or two bits) based on an estimated local complexity of the triangle. The local complexity of a triangle is computed from the intensity of vertices of the triangle. The superior performance of the proposed method is verified through extensive experiments.

Authors: RAVI UYYALA, RAJARSHI PAL and MUNAGA VNK PRASAD

Dec-2019 **Reversible Data Hiding Using Reference Pixel Based Prediction**

IDRBT Doctoral Colloquium

Performance of a Prediction Error Expansion (PEE) based reversible data hiding scheme depends on a pixel prediction strategy. A novel reversible data hiding technique has been proposed based on the reference pixels of the image. Reference pixels are used for predicting the non-reference pixels. Data bits are reversibly embedded into these non-reference pixels by expanding the prediction error. Moreover, according to the proposed work, either one bit or two bits are embedded in these pixels based on a local complexity estimation of the pixel. Experimental results establish the superiority of the proposed scheme in comparison to several state-of-the-art methods.
 Authors: RAVI UYYALA

Aug-2013 **Compositional Constructs for UML State Chart Diagrams**

*ICACM-2013,
Hyd*

This paper proposes a revised semantic interpretation of UML Statechart Diagrams which ensures, under the specified design rules, that Statecharts be constructed to have true compositional properties. In particular, hierarchical state machines may be properly encapsulated to allow independent verification and compositional testing, something which is not possible under the current UML semantics.

Authors: RAVI UYYALA, SATISH PRASAD, and VELPULA PRASAD

TECHNICAL SKILLS

<i>Concepts</i>	REVERSIBLE DATA HIDING, DIGITAL IMAGE PROCESSING, MACHINE LEARNING, PATTERN RECOGNITION, ALGORITHMS, OPERATING SYSTEMS, SOFTWARE ENGINEERING, DATABASES, DISCRETE STRUCTURES
<i>Languages</i>	C, C++, CODING IN MATLAB, PYTHON
<i>Platforms</i>	WINDOWS/LINUX
<i>Databases</i>	MYSQL
<i>Tools or Methodologies</i>	CLOUDSIM, AOP, ASPECTJ, MATLAB, TEXTSTUDIO
<i>Web Technologies</i>	HTML AND XML
<i>Advanced Technologies</i>	ASPECT ORIENTED PROGRAM, INTER PROCESS COMMUNICATION, SOCKET PROGRAMMING, HIGH PERFORMANCE COMPUTING, DATA HIDING, AND REVERSIBLE DATA HIDING
<i>Internet Tools</i>	MS OFFICE, AJAX, NETBEANS, ECLIPSE, WAMP SERVER, DIA TOOL, YED GRAPH EDITOR, MIKTEX, TEAMVIEWER, BURPSUITE

OTHER INFORMATION

<i>Academic Achievements/ Scholarships</i>	2014-2020 IDRBT Reseach Scholar Fellowship for pursuing Ph.D
	2007-2009 MHRD Scholarship for pursuing Master of Technology
	2003-2007 State govt scholarship for pursing Bachelor of Engineering
	2009-2010 98.41 Percentage Result in My subject Socket Programming at VIGNAN, Hyderabad

2012-2013 100 Percentage Result in My subject Distributed systems at BMCT, Indore

2013-2014 100 Percentage Result in My subject Operating systems at BMCT, Indore

Presentations on

Gradient dependent reversible watermarking with low embedding impact, SPIN-2016, New Delhi, 2016

Selected Context Dependent Prediction for Reversible Watermarking with Optimal Embedding, CVIP-2017, IIT Roorkee

Reversible Data Hiding Based on the Random Distribution of Reference Pixels, IEEE Ten Symp-2018, Sydney, Australia

Reversible Data Hiding, IDRBT, 2018

Academic Activities

Participated in two day workshop on MATLAB held in MANIT, Bhopal, 2013

Participated in National level workshop on Socket programming, held at GNITS, Hyderabad for one week

Participated as a Event organizer in infinity, a Technical Festival, 2007 held at Osmania University

Participated as a VOLUNTEER in software freedom day in 2004 held at Osmania University

Participated in Linux Glug Festival held in Osmania University, 2006

Member of Organizing Team for National conference held at BMCT, indore, 2013

Participated in International Conference held at IDRBT, Hyderabad

Participated as VOLUNTEER in ICDCN-2017, held at IDRBT, Hyderabad

Participated in IAPR, summer school on document analysis, held at Jaipur in 2017

Participated as a VOLUNTEER in International Conference on MIKE-2018, IDRBT, Hyderabad

Sports Activities

Member of the champion cup in cricket held at Osmania University, 2007

Member of the winners cricket team held at IDRBT-2018

Member of Organizing Team for conducting sports held at IDRBT-2018

Valley ball team member at Osmania University in 2006-2007

Leadership

Member of Infinity2k7 a technical festival conducted in 2007 at University College Of Engineering, Osmania University, Hyderabad, India

Post Graduates Coordinator at NITK, Surathkal for the year 2008-2009

Interests

Watching Sports, Movies and News

August 21, 2020