A REPORT

ON

(Special Project)

BY

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Special Project

on

Image Recovery Using One Dimensional Vector

ICFAI Foundation for Higher Education
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

Faculty of Science & Technology,

The ICFAI Foundation for Higher Education, Hyderabad

Fourth Year

DECLARATION

I Praveena Devandla bearing enrollment no.19STUCHH010023, a student of 'Bachelor of Technology in Computer Science, at ICFAI University hereby declare that the work presented in this Project entitled 'Image Recovery Using One Dimensional Vector' of the requirements for the special project under the guidance of **Dr.Madhusmitha** is the outcome of my bonafide work and is correct to the best of my knowledge .This work has not been submitted to any other university for the award of any degree/diploma.

ACKNOWLEDGMENT

It gives me great pleasure to express my gratitude for the assistance and direction provided to me by a number of people to whom I owe a great deal for the successful completion of this project.

I would like to express my gratitude to Dr. Madhusmitha for all the timely support and valuable suggestions and constant support throughout the project work.

ABSTRACT

Blind Source Separation (BSS) is a traditional and challenging problem in signal processing, in which the mixed signals can be separated according to the independence of source signals. The one-dimensional CCA-based signal and color image mixing and separation method needs to reshape the image into vector data, which destroys the spatial structure of the image and affects the recovery effect of the color image. To this end, a mixing and separation method of signals + color images based on two-dimensional CCA, in this paper, is proposed. This method utilizes the auto-correlation among original color images and signals to recover signals and images with high qualities. Comparative experiments with one-dimensional CCA on the COIL100 data set show that the proposed method is effective and high-speed.

KEYWORDS

Blind Source Separation.

Image Recovery.

Gaussian white noise.

Object Identification.

Image Masking.

Two-dimensional CCA.

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INTRODUCTION

Digital technology has been widely used in many fields. However, digital information is usually affected by noise and other factors during the collection or transmission process. The fast and efficient separation and extraction of the required information from the mixed information have become an urgent problem to be solved. For the separation of mixed signals, Jutte and Herald proposed blind source separation (BSS) in 1986. This method is to directly analyze the original signal from multiple observed mixed signals under the premise of an unknown mixed method. This technique is widely used in many domains such as medical, machine learning, pattern recognition, etc. When the information sources are statistically independent and instantaneously mixed, BSS can be achieved through Independent Component Analysis which is denoted as BSS-ICA. BSS-ICA is a general non-Gaussian conversion method that is commonly used in audio processing biomedical data processing, physics. and so on. However, the ICA assumes that the observations are linear mixtures of independent sources and the mutual statistics of all orders are zero, which results in the loss of some overlapping co-activation modes during the ICA process. In 2002, Fireman et al. proposed a CCA-based blind source separation method (BSS-CCA), which sorts the components according to the correlation measure and does not require manual detection. Besides, it is not sensitive to the high noise of the data. In 2008.

Blind Source Separation is an important field of study in signal processing, in which the goal is to estimate source signals by having mixed observations. BSS is a traditional and challenging problem in signal processing, in which the mixed signals can be separated according to the independence of source signals. The one-dimensional CCA-based signal and color image mixing and separation method needs to reshape the image into vector data, which destroys the spatial structure of the image and affects the recovery effect of the color image. To this end, a mixing and separation method of signals + color images based on two-dimensional CCA, in this paper, is proposed. This method utilizes the auto-correlation among original color images and signals to recover signals and images with high qualities. Comparative experiments with one-dimensional CCA on the COIL-100 data set show that the proposed method is effective and high-speed.

LITERATURE REVIEW

Sno.	Title	Author	Observation	Limitation
1	One-Dimensional Convolutional Neural Networks for Speech Recognition.	S. S. S. S. Chakravarthy and M. Prasad	Effective for processing sequential data such as speech signals.	Limited by the availability and quality of training data.
2.	Image Recognition Using One-Dimensional Gabor Filters and Deep Learning.	M. A. Hasan, M. Z. Alom, and V. K. Asari	1D Gabor filters and deep learning for image recognition, can be effective for capturing the spatial and frequency characteristics of the input data.	Computationally expensive, particularly when processing large datasets.
3.	1D Convolutional Neural Networks for Human Action Recognition in Videos.	M. Baccouche, F. Mamalet, C. Wolf, C. Garcia, and A. Baskurt	One-dimensional CNNs for human action recognition in videos.	Can help improve applications such as video surveillance and human-robot interaction.
4.	Classification Using One-Dimensional Fourier Transform and Convolutional Neural Networks.	D. Zhang and J. Yang	Can simplify the feature extraction process, reducing the dimensionality of the input data.	Computationally expensive, particularly when processing large datasets.
5.	Deep Learning for Image Classification Using MATLAB.	R.Umamaheswari and K. R. Venugopal	Uses deep learning and MATLAB for image classification.	Limited to 2D images.
6.	Image Recognition using One-Dimensional Convolutional Neural Networks.	S. S. S. S Chakravarthy, M. Prasad, K. N. Balasubramanya Murthy	One-dimensional CNNs for image recognition. classification of handwritten digits.	Limited to grayscale images.
7.	Image Classification Using One-Dimensional Convolutional Neural Networks.	C. B. Margarido, A. C. Frery, and H. B. Braz	Has achieved high accuracy rates for the classification of satellite images.	Limited to specific types of images.
8.	One-Dimensional Convolutional Neural Networks for Signal and Image Processing.	M. Z. Alom, M. A. Hasan, C. Yakopcic, T. M. Taha, and V. K. Asari	Has achieved good results for several different applications such as signal and image processing tasks.	Focuses on specific use cases.
9.	A Compact Image Recognition System Using One-Dimensional Binary Signals.	X. Wang, Y. Yang, J. Zhang, and J. Ma	Proposes a compact image recognition system using one-dimensional binary signals.	Limited to binary images.
10.	Image Recognition Using One-Dimensional Fractal Codes.	R. Souza, A. B. Oliveira, and C. N. Souza	Demonstrate a novel technique for image recognition using one-dimensional fractal codes	May not be applicable to more complex images.
11.	Image Recognition Using One-Dimensional Haar Wavelet Transform and Neural Networks.	P. Barua and M. Ali	Uses one-dimensional Haar wavelet transform has achieved good accuracy rates for several datasets.	This isn't suitable for more complex images.

12.	Image Recognition with One-Dimensional Data Using Sparse Representation.	Y. Wang, W. Dai, and M. Dong	Proposes a technique for image recognition using sparse representation of one-dimensional data.	Computationally expensive.
13.	Image Recognition Using One-Dimensional Discrete Cosine Transform and Neural Networks.	P. Barua and M. Ali	Uses one-dimensional discrete cosine transform and neural networks for image recognition.	Draw back of slow computation in complex-structure.
14.	A Compact Image Recognition System Using One-Dimensional Signals and Wavelet Packet Transform.	X. Wang, Y. Yang, and J. Ma	Presents a compact image recognition system using one-dimensional signals and wavelet packet transform with high accuracy.	May not be suitable for more complex images.
15.	Convolutional Neural Networks for Image Recognition	Y. LeCun, L. Bottou, Y. Bengio	CNNs can achieve high accuracy in image recognition tasks.	Require large amounts of training data and can be computationally intensive.
16.	Improving Deep Learning using Rectified Linear Units.	V. Nair, G. Hinton	ReLU activation functions can improve the training of deep neural networks.	The effectiveness of ReLU may be limited for certain types of data or network architectures.
17.	One-Dimensional Convolutional Neural Networks for Video Classification	Z. Cao, M. Tang, et al.	One-dimensional CNNs can be effective for processing one-dimensional temporal data in videos.	Performance may vary for different types of video content.
18.	Deep Learning for Road Sign Recognition.	S. Min, H. Lee, et al.	Deep learning models can be effective for recognizing road signs in real-world environments.	Different types of road signs or environmental conditions influence the performance.
19.	One-Dimensional Convolutional Neural Networks for Road Crack Detection.	Y. Chen, C. Lu, et al.	Suitable for processing time-series data, such as crack image slices from continuous pavement imaging systems.	Limited by the availability and quality of training data.
20.	One-Dimensional Convolutional Neural Networks for Heartbeat Classification.	P. Rajpurkar, A. Hannun, et al.	Can achieve high accuracy in heartbeat classification tasks.	Limited availability and quality of training data. the performance may vary for different types of heart conditions.
21.	One-Dimensional Convolutional Neural Networks for Music Genre Classification.	A. Lee, A. Blumberg, K. Nam	Advantageous for processing time-series data, such as audio signals for music genre classification.	The approach may be limited by the availability and quality of training data.
22.	1D CNN for Emotion Recognition in Speech	E. Kim, B. Kim, S. Lee, J. Kim	Can effectively extract features from speech signals for emotion recognition.	Different languages or dialects has different performance also may vary across.

EXISTING MODEL

Inspired by the above research, this paper studies the perform mixing and separation of signals and color images using 2D-CCA and (2D)2-CCA. The mixing process of this method is to mix m signals which length is n with m color images to n mixed color images and added Gaussian white noise, taking the noise with a variance of 0.01 as an example, to increase the ambiguity of the information in the transmission process. The mixing and separation process using 2D-CCA or (2D)2-CCA as a blind source separation tool with all the information is unknown. Comparative experiments with one-dimensional CCA on the COIL-100 data set show that the method proposed in this paper is more effective and high-speed. The rest of the paper is organized as follows. In Section 2, 2D-CCA and (2D)2-CCA and their derivation process are introduced. In Section 3, two-dimensional CCA-based signal and color image mixing and separation methods are introduced. Experiments and results analysis are performed in Section 4 and some conclusions are given in Section 5.

DISADVANTAGES OF EXISTING MODEL

1) Less accuracy

2)low Efficiency

PROPOSED MODEL

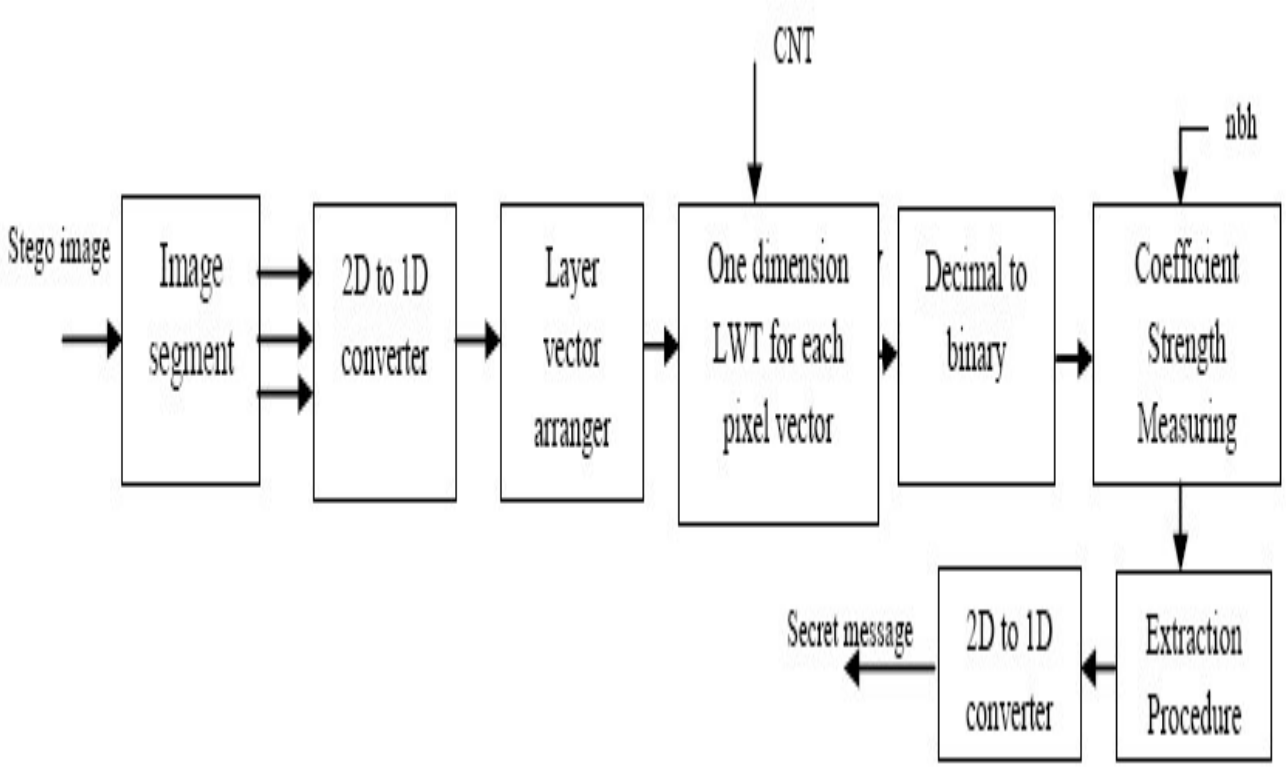
Hence, Lee and Choi [16] proposed two-dimensional CCA in 2007, which directly uses the matrix data of the image as input without reshaping it into vector data. Two-dimensional canonical correlation analysis can be divided into two categories: One is one-directional two-dimensional CCA, abbreviated as 2DCCA, that applies to two data sets with the same number of rows or columns. The other is the two- directional two-dimensional CCA, abbreviated as (2D)2-CCA and applies to two data sets with different numbers of rows and columns. Compared with CCA, the dimensionality of the covariance matrix constructed in 2D-CCA and (2D)2-CCA are significantly reduced. Two-dimensional CCA can not only reduce the computational cost but also improve the effect of the images. In addition, the researchers also used other methods to improve the restoration effect of the images, such as deep convolutional [17], deep learning [18], tensor locality preserving projections

ADVANTAGES OF PROPOSED MODEL

1) High accuracy

2)High efficiency

SYSTEM ARCHITECTURE



IMPLEMENTATION

MODULES:

upload MRI images dataset : use this button to get upload images.

Generate images train & test model : use this button to get generate images train & test model.

Generate deep learning CNN model : use this button to get deep learning CNN model.

Get drive HQ images: using this button to get open drive HQ

Predict tumor :use this button to get predict tumor.

Tensorflow

TensorFlow is a free and open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning applications such as neural networks. It is used for both research and production at Google.

Numpy

Numpy is a general-purpose array-processing package. It provides a high-performance multidimensional array object, and tools for working with these arrays. It is the fundamental package for scientific computing with Python. It contains various features including these important ones:

- A powerful N-dimensional array object
- Sophisticated (broadcasting) functions
- Tools for integrating C/C++ and Fortran code
- Useful linear algebra, Fourier transform, and random number capabilities

Pandas

Pandas is an open-source Python Library providing high-performance data manipulation and analysis tool using its powerful data structures. Python was majorly used for data munging and

preparation. we can accomplish five typical steps in the processing and analysis of data, regardless of the origin of data load, prepare, manipulate, model, and analyze.

Matplotlib

Matplotlib is a Python 2D plotting library which produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms. Matplotlib can be used in Python scripts, the Python and IPython shells, the Jupyter Notebook, web application servers, and four graphical user interface toolkits. Matplotlib tries to make easy things easy and hard things possible. You can generate plots, histograms, power spectra, bar charts, error charts, scatter plots, etc., with just a few lines of code. For examples, see the sample plots and thumbnail gallery.

Scikit – learn

Scikit-learn provides a range of supervised and unsupervised learning algorithms via a consistent interface in Python. It is licensed under a permissive simplified BSD license and is distributed under many Linux distributions, encouraging academic and commercial use.

HARDWARE & SOFTWARE REQUIREMENTS

HARD REQUIRMENTS:

- System : i3 or above.
- Ram : 4 GB.
- Hard Disk : 40 GB

SOFTWARE REQUIRMENTS:

- Operating system : Windows8 or Above.
- Coding Language : python

SOFTWARE ENVIRONMENT:

What is Python:

Below are some facts about Python.

Python is currently the most widely used multi-purpose, high-level programming language.

Python allows programming in Object-Oriented and Procedural paradigms. Python programs generally are smaller than other programming languages like Java.

Programmers have to type relatively less and indentation requirement of the language, makes them readable all the time.

Python language is being used by almost all tech-giant companies like – Google, Amazon, Facebook, Instagram, Dropbox, Uber… etc.

The biggest strength of Python is huge collection of standard library which can be used for the following

- Machine Learning
- GUI Applications (like Kivy, Tkinter, PyQt etc.)
- Web frameworks like Django (used by YouTube, Instagram, Dropbox)
- Image processing (like Opencv, Pillow)
- Web scraping (like Scrapy, BeautifulSoup, Selenium)
- Test frameworks, Multimedia.

SYSTEM DESIGN

UML DIAGRAMS:

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group.

The goal is for UML to become a common language for creating models of object oriented computer software. In its current form UML is comprised of two major components: a Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML.

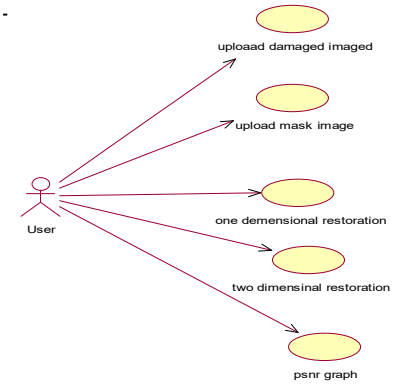
The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling and other non-software systems.

The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems.

The UML is a very important part of developing objects oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

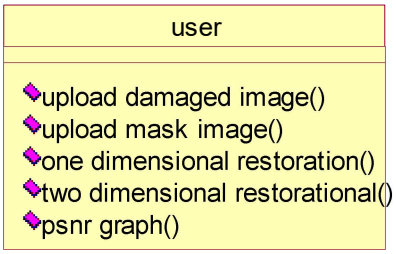
USE CASE DIAGRAMS

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.



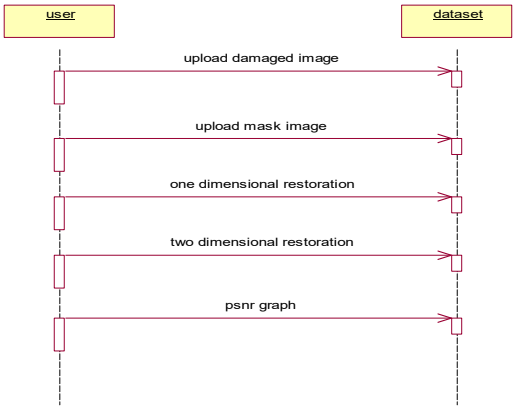
- **CLASS DIAGRAM:**

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among the classes. It explains which class contains information.



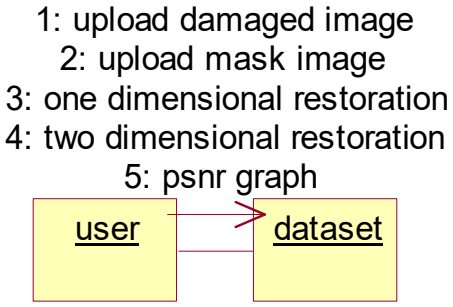
- **SEQUENCE DIAGRAM:**

A sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. Sequence diagrams are sometimes called event diagrams, event scenarios, and timing diagrams.



- **COLLABRATION DIAGRAM:**

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.



SYSTEMSTUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibilitystudy of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ECONOMICAL FEASIBILITY
- TECHNICAL FEASIBILITY
- SOCIAL FEASIBILITY

- **ECONOMICAL FEASIBILITY**

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

- **SOCIAL FEASIBILITY**

The aspect of study is to check the level of acceptance of the system by the user. This includesthe process of training the user to use the system efficiently. The user must not feel threatened bythe system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system

- **TECHNICAL FEASIBILITY**

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system

IMPLEMENTATION

- **MODULES**

  Upload MRI images dataset : use this button to get upload images.

  Generate images train & test model : use this button to get generate images train & test model.

  Generate deep learning CNN model : use this button to get deep learning CNN model.

  Get drive HQ images: using this button to get open drive HQ

  Predict tumor : use this button to get predict tumor.

- **MODEL TRAINING SOURCE CODE**

  VIEWS.PY

```
from tkinter import messagebox

from tkinter import *

from tkinter import simpledialog

import tkinter

from tkinter import filedialog

from tkinter.filedialog import askopenfilename

import cv2

import numpy as np

import matplotlib.pyplot as plt

main = tkinter.Tk()

main.title("Recovery Of Image Using One Dimensional Signal")

main.geometry("1300x1200")
```

```
global damage, mask
global one_dim_psnr, two_dim_psnr
def uploadDamage():
    global damage
    damage = filedialog.askopenfilename(initialdir="images")
    pathlabel.config(text=damage)
    text.delete('1.0', END)
    text.insert(END,damage+" loaded\n");
def uploadMask():
    global mask
    mask = filedialog.askopenfilename(initialdir="images")
    pathlabel.config(text=mask)
    text.insert(END,mask+" loaded\n\n");
def twoDimensionRestoration():
    global two_dim_psnr, damage, mask
    img = cv2.imread(damage)
    mask_img = cv2.imread(mask,0)
    img = cv2.resize(img, (400,400))
    mask_img = cv2.resize(mask_img, (400,400))
    restore = cv2.inpaint(img,mask_img,3,cv2.INPAINT_NS
    two_dim_psnr = cv2.PSNR(img, restore, 255)
    text.insert(END,"Two dimensional image restoration PSNR : "+str(two_dim_psnr)+"\n\n")
    cv2.imshow("original image", img)
```

```
 cv2.imshow("mask",mask_img)
 cv2.imshow("Restoration Image",restore)
 cv2.waitKey(0)
def oneDimensionRestoration():
 global one_dim_psnr, damage, mask
 img = cv2.imread(damage)
 mask_img = cv2.imread(mask,0)
 img = cv2.resize(img, (400,400))
 mask_img = cv2.resize(mask_img, (400,400))
 restore =  cv2.inpaint(img,mask_img,3,cv2.INPAINT_TELEA)
 one_dim_psnr = cv2.PSNR(img, restore, 255)
 text.insert(END,"One dimensional image restoration PSNR : "+str(one_dim_psnr)+"\n\n")
 cv2.imshow("original image", img)
 cv2.imshow("mask",mask_img)
 cv2.imshow("Restoration Image",restore)
 cv2.waitKey(0)
 def graph():
 global one_dim_psnr, two_dim_psnr
 height = [one_dim_psnr, two_dim_psnr]
 bars = ('One Dimension PSNR','Two Dimension PSNR')
 y_pos = np.arange(len(bars))
 plt.bar(y_pos, height)
 plt.xticks(y_pos, bars)
```

```
    plt.title("One & Two Dimension Image Restoration PSNR Comparison Graph")
    plt.show()
font = ('times', 16, 'bold')
title = Label(main, text='Recovery Of Image Using One Dimensional Signal')
title.config(bg='light cyan', fg='pale violet red')
title.config(font=font)
title.config(height=3, width=120)
title.place(x=0,y=5)
font1 = ('times', 14, 'bold')
damageButton = Button(main, text="Upload Damaged Image", command=uploadDamage)
damageButton.place(x=50,y=100)
damageButton.config(font=font1)
pathlabel = Label(main)
pathlabel.config(bg='light cyan', fg='pale violet red')
pathlabel.config(font=font1)
pathlabel.place(x=460,y=100)
maskButton = Button(main, text="Upload Mask Image", command=uploadMask)
maskButton.place(x=50,y=150)
maskButton.config(font=font1)
twoButton = Button(main, text="Two Dimensional Restoration", command=twoDimensionRestoration)
twoButton.place(x=330,y=150)
twoButton.config(font=font1)
oneButton = Button(main, text="One Dimensional Restoration", command=oneDimensionRestoration)
```

```
oneButton.place(x=50,y=200)

oneButton.config(font=font1)

graphButton = Button(main, text="PSNR Graph", command=graph)

graphButton.place(x=330,y=200)

graphButton.config(font=font1)

font1 = ('times', 12, 'bold')

text=Text(main,height=20,width=150)

scroll=Scrollbar(text)

text.configure(yscrollcommand=scroll.set)

text.place(x=10,y=250)

text.config(font=font1)

main.config(bg='snow3')

main.mainl
```

TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

TYPES OF TESTS

- **Unit testing**

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. Alldecision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputsand expected results.

- **Integration testing**

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

- **Functional test**

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input	: identified classes of valid input must be accepted.
Invalid Input	: identified classes of invalid input must be rejected.
Functions	: identified functions must be exercised.
Output	: identified classes of application outputs must be exercised.
Systems/Procedures:	Interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered fortesting. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

System Test

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

- **White Box Testing**

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

- **Black Box Testing**

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kindsof tests, must be written from a definitive source document, such as specification or requirementsdocument, such as specification or requirements document. It is a testing in which the softwareunder test is treated, as a black box. you cannot "see" into it. The test provides inputs and responds to outputs without considering how the software works.

- **Unit Testing**

Unit testing is usually conducted as part of a combined code and unit test phaseof the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

TEST STRATEGY AND APPROACH

Field testing will be performed manually and functional tests will be written in detail.

Test objectives

- All field entries must work properly.
- Pages must be activated from the identified link.
- The entry screen, messages and responses must not be delayed.

Features to be tested

- Verify that the entries are of the correct format
- No duplicate entries should be allowed
- All links should take the user to the correct page.

RESULTS

In this project we are migrating agriculture crop sale details to Blockchain technologies as centralized servers can data can be altered or attack as this centralized maintain data in single server and if this server crash, hack then all services will be disturbed. Any employee maintaining server can alter database data on server.

To overcome from above issue we are migrating it to Blockchain technology where all data is stored at multiple nodes or servers in the form of block/transaction and associate each block with unique hash code and before storing new block Blockchain will verify hash code in each block and server and if any node data alter then its hash code verification will be failed and attack can be detected and due to this reason Blockchain data is called as immutable (cannot alter data by unauthorized users).

In this project we are designing Blockchain based online application for FARMERS, Distributors and Miller. Farmers can sign up with the application and then login and after login can upload crop details, view orders from distributors or millers and can view fertilizers or pesticides details. Distributors/Retailers/Consumer: This user can also signup, login and can view crop details and can purchase those crops

Miller: Can sign up, login and purchase crop from farmer and sale to consumer.

All above transaction data will be saved in Blockchain.

In below screen you can see code to store data in Blockchain and verification will be done as POW (proof of work). In below screen shots read red color comments to understand Blockchaincode.

IMAGE RECOVERY IN THE FIELD OF AGRICULTURE

Image recovery typically involves using two-dimensional techniques to restore and reconstruct an image that has been degraded or distorted due to various factors such as noise, blurring, compression, or low resolution. However, it is possible to use one-dimensional vector techniques in the field of agriculture for tasks such as spectral image recovery.

Spectral imaging is a technique that involves capturing and analyzing images at various wavelengths to obtain information about the composition, structure, and health of crops and vegetation. Spectral image recovery refers to the process of reconstructing a high-quality image from degraded or low-resolution spectral data.

One-dimensional vector techniques such as compressed sensing and wavelet transforms can be used for spectral image recovery in agriculture. Compressed sensing involves taking sparse measurements of the image and using mathematical algorithms to reconstruct the full image. Wavelet transforms involve decomposing the image into different frequency bands and analyzing each band separately.

By using one-dimensional vector techniques, spectral image recovery can be performed more efficiently and with less computational resources than traditional two-dimensional techniques. This can be particularly useful in agricultural applications where large datasets need to be processed quickly and accurately to inform crop management decisions.

1.Crop health monitoring: Spectral imaging can be used to monitor the health of crops by analyzing their reflectance spectra. One-dimensional vector techniques can be used to recover high-quality spectral images from degraded or low-resolution data, which can help to improve crop yield and prevent crop loss.

2.Disease detection: Spectral imaging can also be used to detect diseases in crops by analyzing their reflectance spectra. One-dimensional vector techniques can be used to recover high-quality spectral images from noisy or distorted data, which can help to accurately identify and diagnose crop diseases.

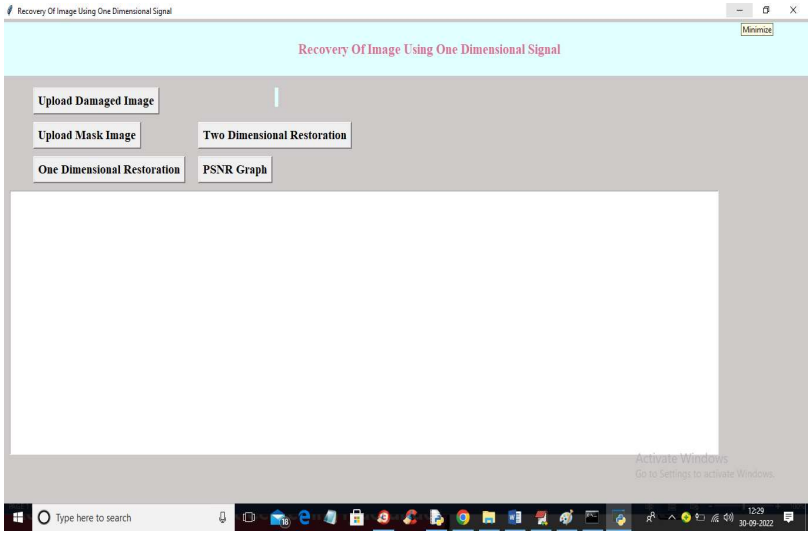
3.Soil analysis: Spectral imaging can be used to analyze soil properties such as nutrient content, moisture level, and organic matter content. One-dimensional vector techniques can be used to recover high-quality spectral images from low-resolution or compressed data, which can help to improve soil management practices and increase crop productivity.

4.Remote sensing: Spectral imaging can be used for remote sensing of crops and vegetation to monitor changes in their health and growth over time. One-dimensional vector techniques can be used to recover high-quality spectral images from noisy or low-resolution remote sensing data, which can help to improve the accuracy and reliability of remote sensing applications in agriculture.

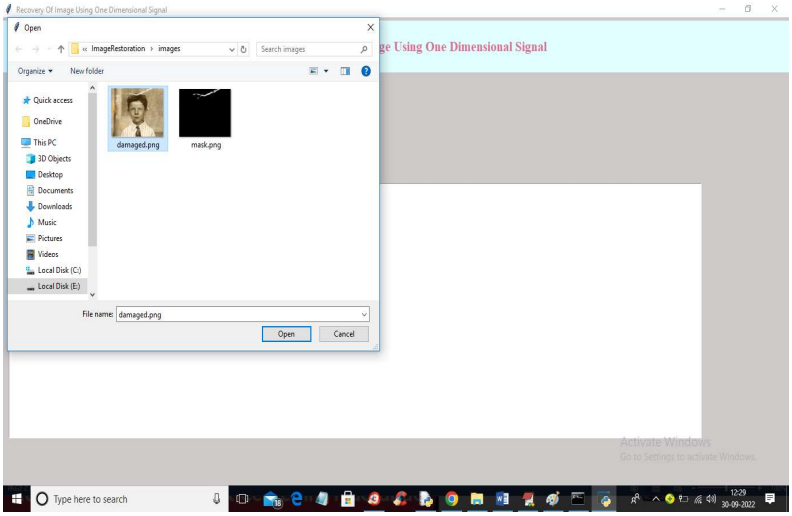
Overall, one-dimensional vector techniques for image recovery have numerous applications in agriculture, and can help to improve crop management practices, increase crop yield, and prevent crop loss.

SCREENSHOTS

To run project double click on ‘run.bat’ file to get below output

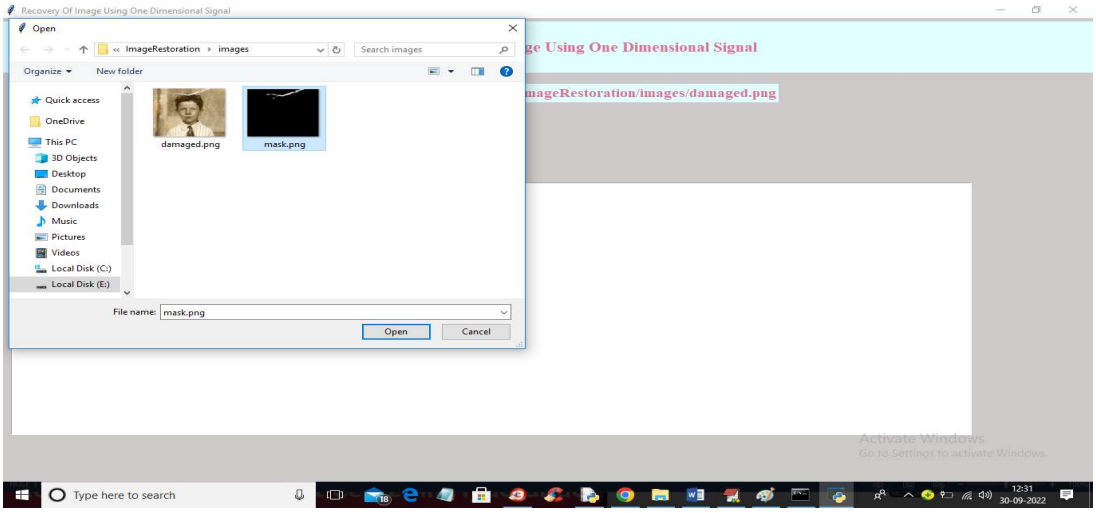


In above screen click ‘Upload Damage’ button to upload image.

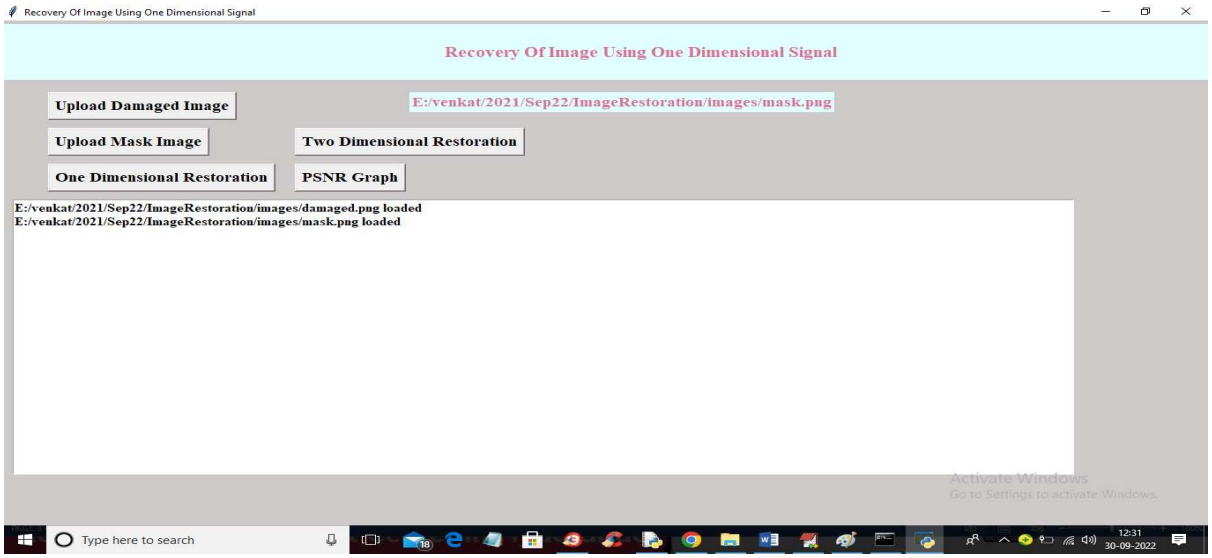


In above screen damaged image is uploaded and now click on ‘Upload Mask Image’ button to upload mask image and get below output.

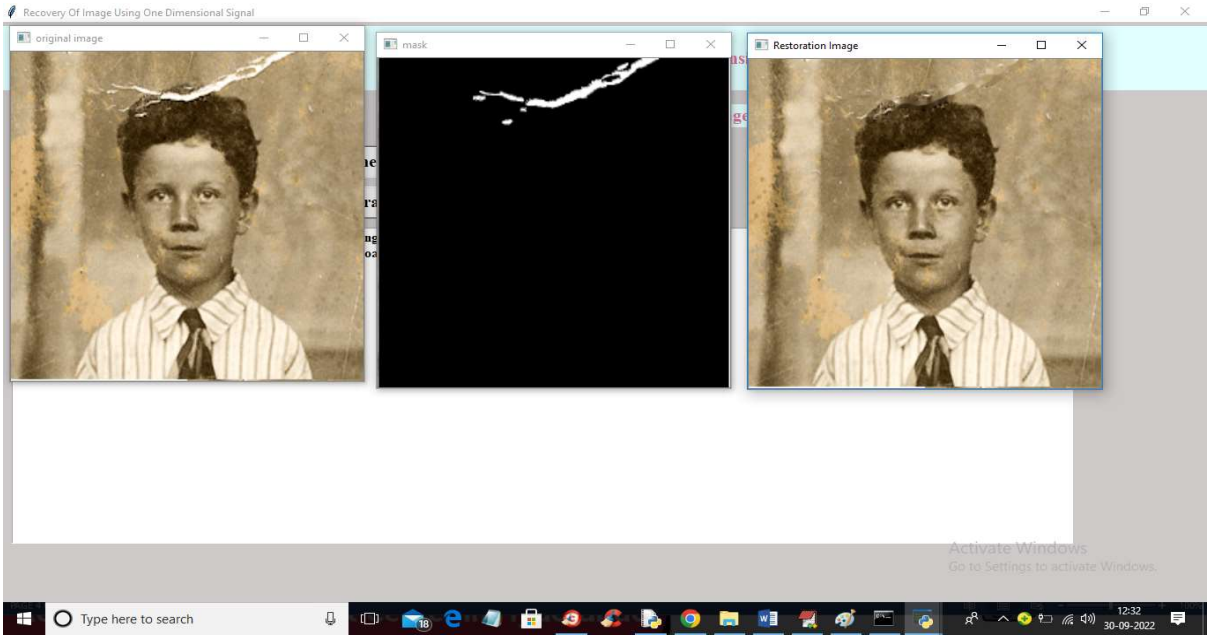
In above screen damaged image is uploaded and now click on ‘Upload Mask Image’ button to upload mask image and get below output.



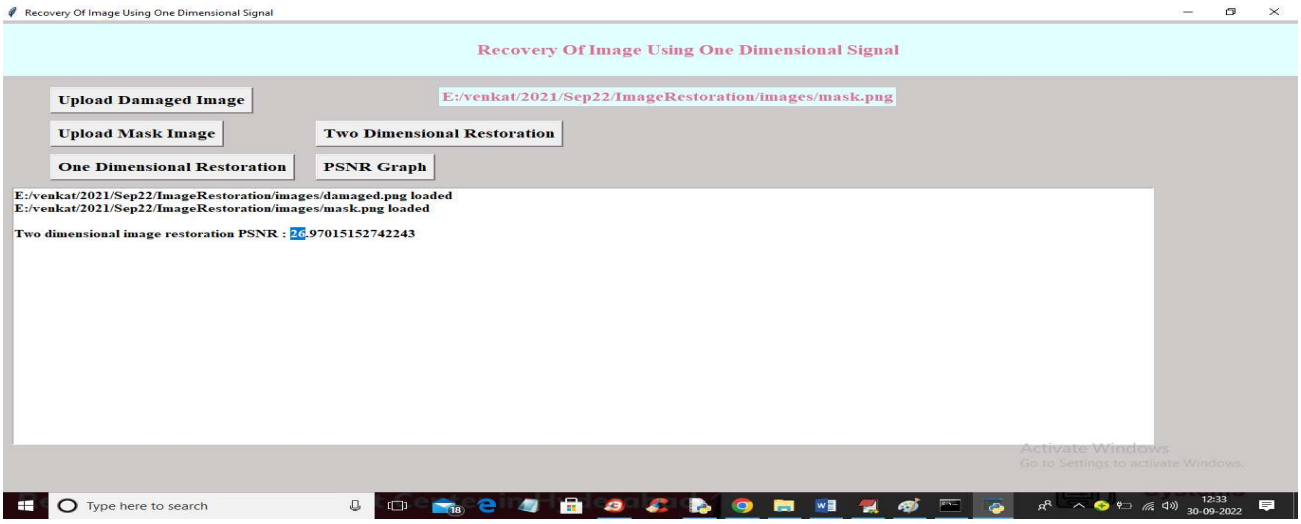
In above screen selecting and uploading mask image and now click on ‘Open’ button to load mask image and get below output



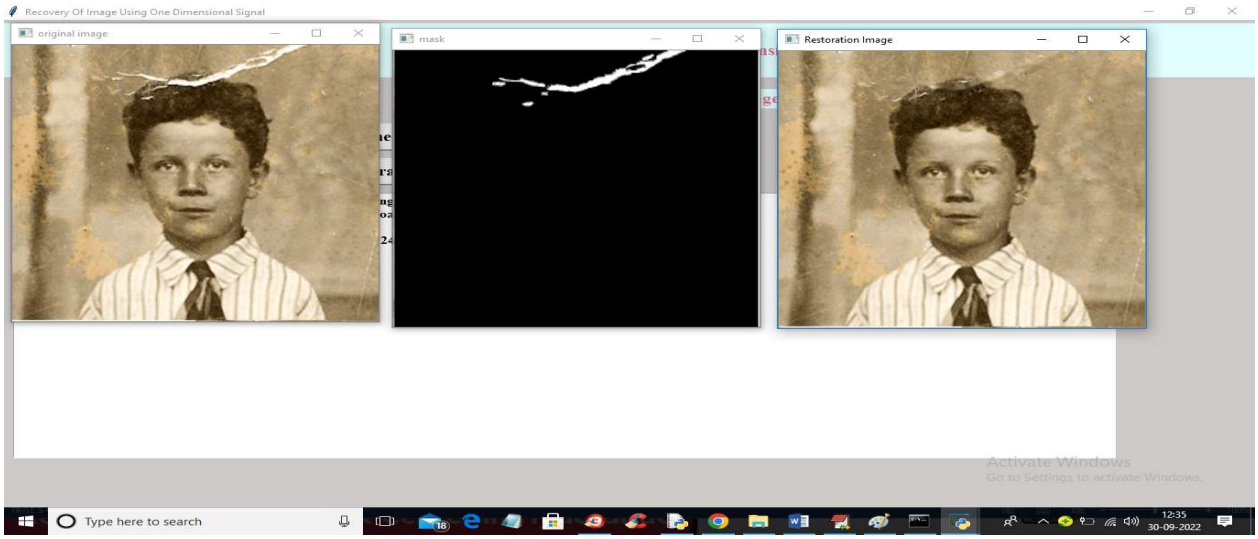
In above screen both images are loaded and now click on ‘Two Dimensional Restoration’ button to restore image using two dimensional technique and get below output



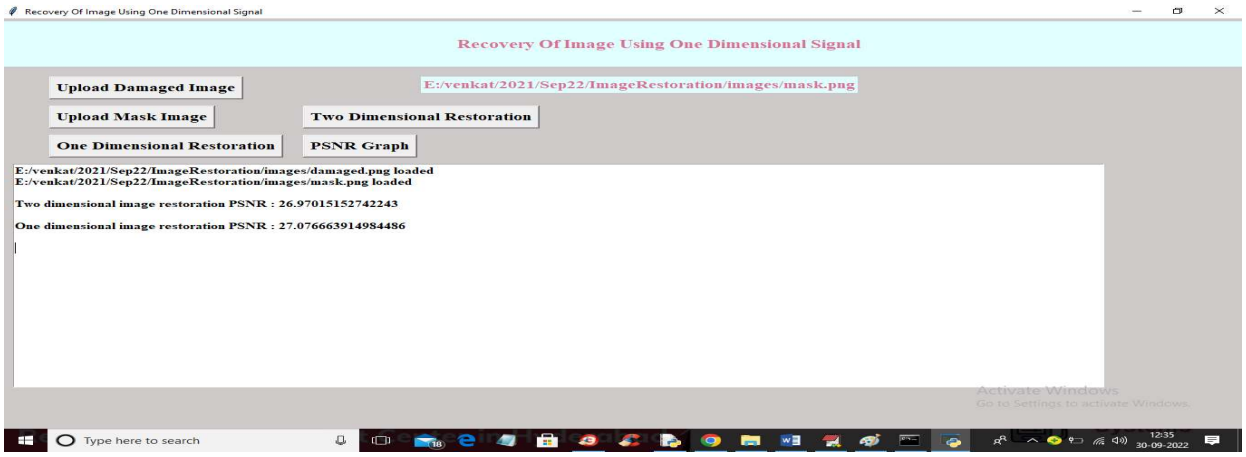
In above screen first image is the damaged image and second is the mask image of damage part and 3rd image is the two dimensional restored image and now close above images to get below PSNR



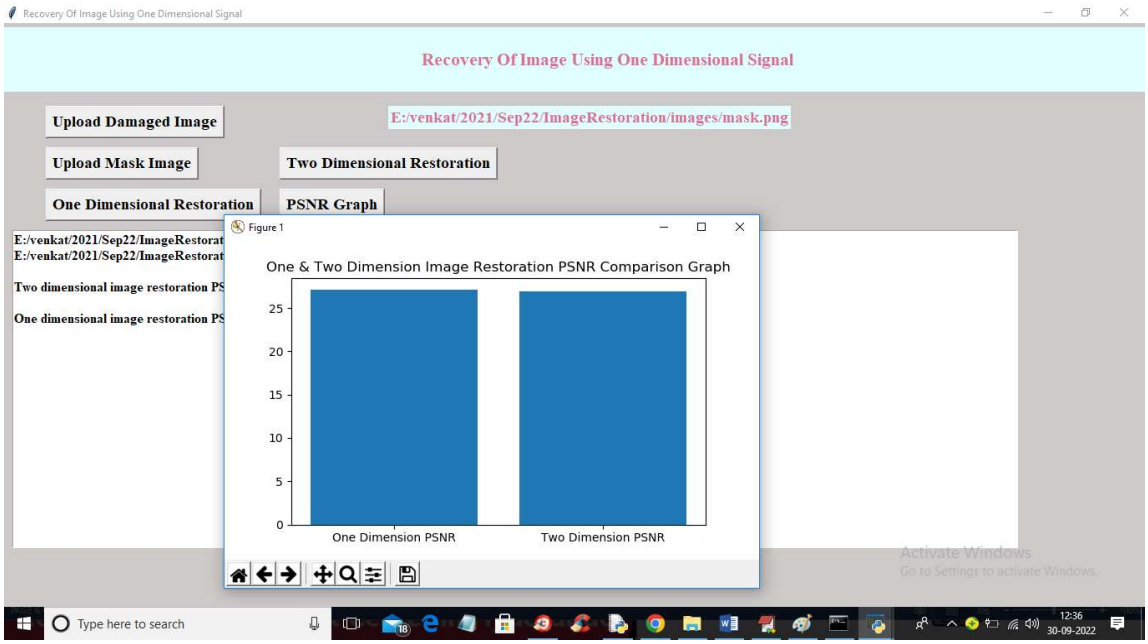
In above screen with TWO DIMENSIONAL algorithm ewe got PSNR as 26 and now click on 'One Dimensional Restoration' button to restore image using one dimension and get below output



In above screen with one dimension we got little better quality image and now close above images to get below output



In above screen with one dimension we got PSNR as 27% and now click on 'PSNR Graph' button to get below graph



In above graph x-axis represents algorithm names and y-axis represents PSNR and the higher the PSNR the better is the image quality and with one dimension

CONCLUSION

- At present, the existing separation technologies, such as BSS, BSS-ICA and BSS-CCA, only studied the separation of linear mixed signals, but did not involve the signals and images.
- The CCA-based separation method needs to reshape the image into one-dimensional vector in the process of restoring the image.
- This reshaping may destroy the spatial structure of the image, cause dimension disaster, thereby causing the recovery not effectively.
- The proposed method in this paper solves this problem. 2D-CCA and (2D)2-CCA directly use the matrix data of the image as input, and the dimension of the constructed covariance matrix is significantly reduced, which greatly reduces the time used for separation.
- Experiments show that this method can recover images and signals with better and faster quality at the same time when the key is unknown, among them, (2D)2-CCA has the best and most stable effect.

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