DIGITAL IMAGE PROCESSING AND ANALYSIS

IMAGE INTERPOLATION

Alessandro Zito
Auris Prääm
Joan Amorós Ramírez
Miguel Cid Espeso
Niladri Sarkar
Oleksii Chumakov

UNIVERSITY OF ZAGREB
Faculty of Electrical Engineering and Computing

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01 INTRODUCTION

Image interpolation is a basic technique in the field of image processing whose objective is to estimate the missing information in an image.

IMAGE INTERPOLATION

02 METHODS

NEURAL VS NON-NEURAL NETWORKS

NEURAL NETWORKS

NON-NEURAL NETWORKS

NON-NEURAL NETWORKS METHODS

NEAREAST NEIGHBOUR

Determines the pixel values of new pixels based on the values of the nearest neighboring pixels in the original image.

BILINEAR INTERPOLATION

Estimates new pixel values based on a weighted average of the surrounding pixels in the original image.

BICUBIC INTERPOLATION

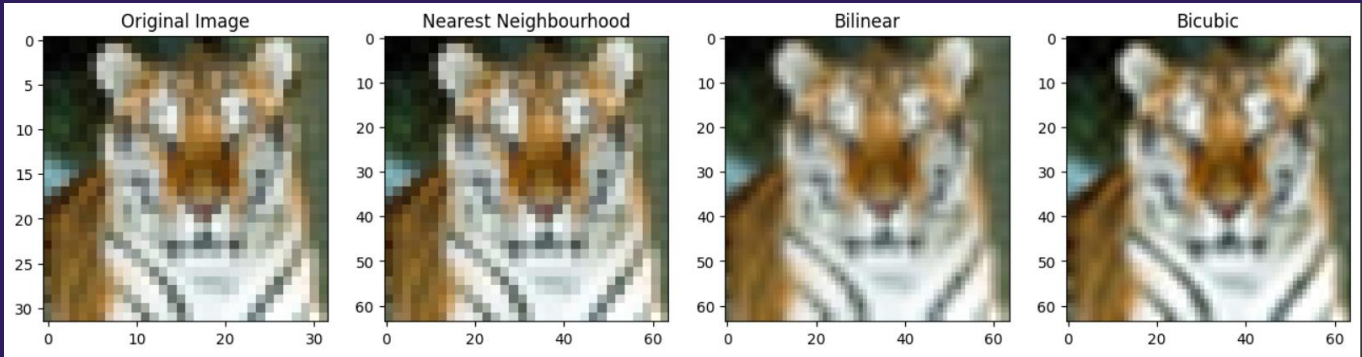
Estimates new pixel values by considering a weighted average of a larger set of neighboring pixel.

NEURAL NETWORKS

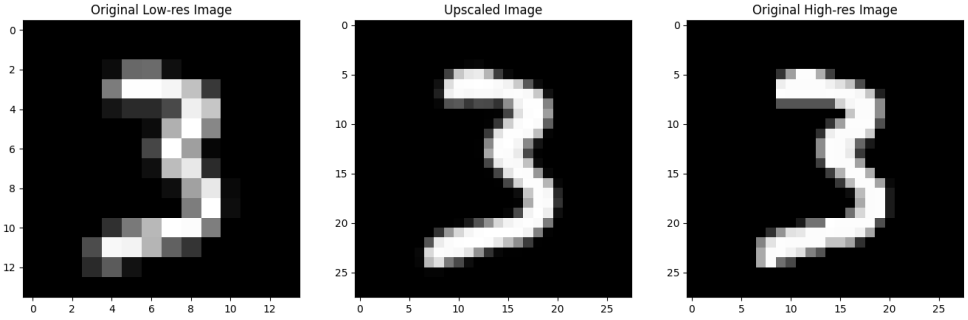
A neural network architecture is designed to learn the mapping between low-resolution inputs and high-resolution outputs.

03 RESULTS

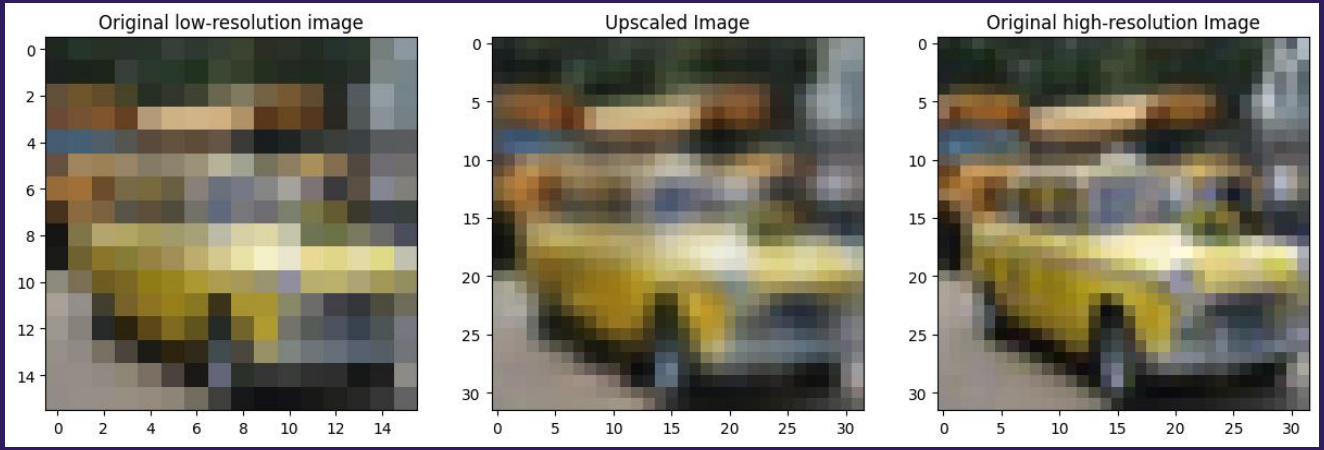
NON-NEURAL NETWORKS



NEURAL NETWORKS: 10 epochs



NEURAL NETWORKS: 100 epochs



04 COMPARISON OF RESULTS

ADVANTAGES & DISADVANTAGES

NON-NEURAL

- Easy interpretation
- Efficient
- Well performance with few data

- Limited flexibility
- Low adaptability
- Struggle to recognize and manage complex patterns

NEURAL

- Feature learning
- Flexibility
- Generalization
- Scalability

- Complexity
- Lack of interpretability
- Data requirements
- Computationally demanded

05 CONCLUSION

Image interpolation plays a crucial role in several applications such as image resizing, zooming, rotation, and restoration.

06 REFERENCES

[1] **numpy.org** (for numerical computations)
[2] **keras.io** (deep learning model)
[3] **matplotlib.org** (plotting)
[4] **opencv.org** (image processing)
[5] **pypi.org** (cv2 module)
[6] **scikit-image.org** (skimage.io module)

ANY QUESTIONS?

THANK YOU FOR YOUR ATTENTION