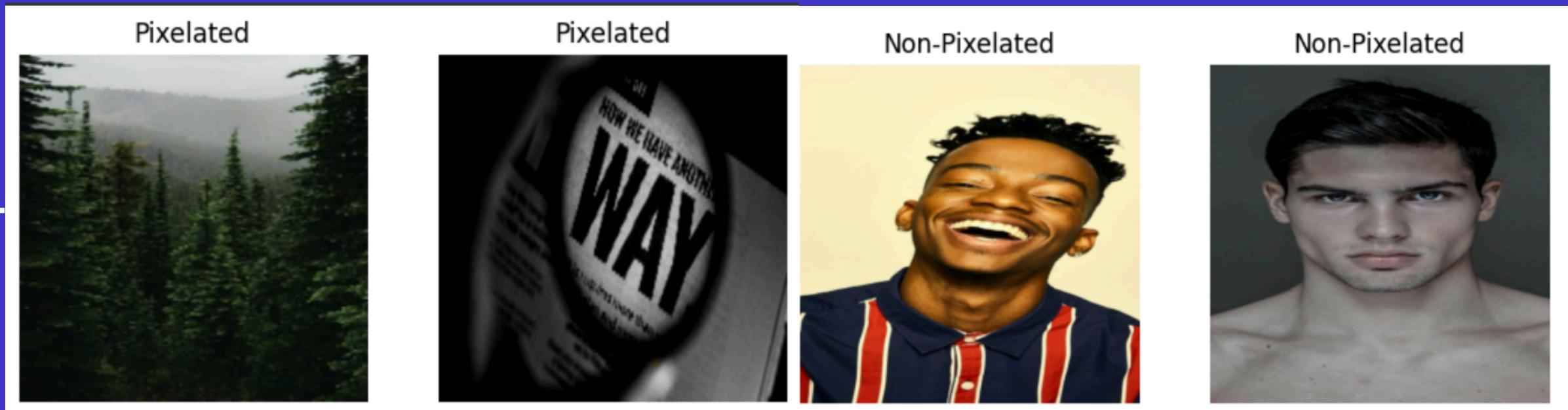


PROBLEM STATEMENT



DETECT PIXELED IMAGE & CORRECT IT

BY TEAM STELLR

Unique Idea Brief (Solution)

Tired of having your pictures degraded in quality and pixelated??

Now, you can make your pictures *pixel perfect* to make all those precious moments and frames truly memorable by **our two-stage solution** for pixelation detection and correction **using Keras and Enhanced Attention Mechanism (EAM)**.

- Firstly, the model identifies blockiness and texture anomalies through edge detection and statistical analysis to identify the pixelation present.
- Then, the RIDNet model, implemented in Keras and enhanced with EAM, targets pixelated areas to restore lost details and preserve edges.

This approach ensures efficient real-time processing, achieving significant **improvements in image quality** with precise detection and correction of pixelation with an **accuracy of 68% - 70%**.



Features Offered

1. EFFICIENT PIXELATION DETECTION:

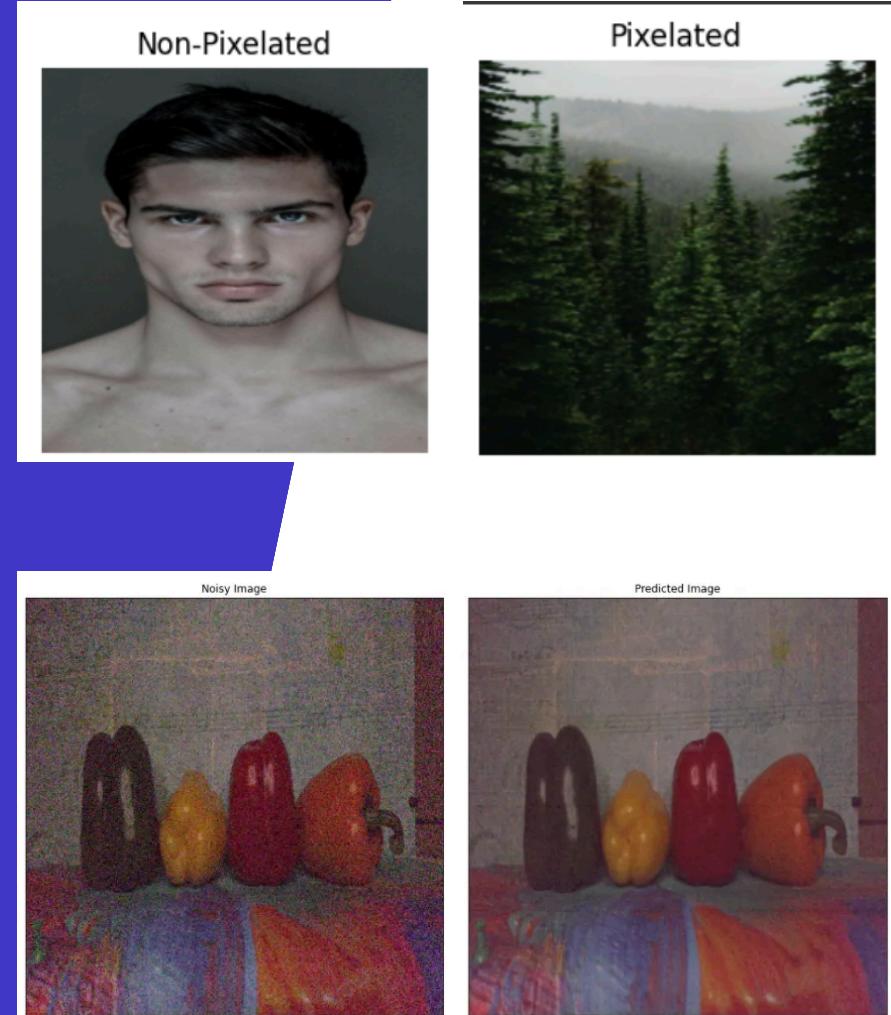
The model *employs edge detection and statistical analysis* to accurately identify pixelated images, *ensuring minimal false positives* even in rare class scenarios.

2. REAL-TIME PROCESSING:

Optimized for high-speed performance, the model processes images at a *minimum of 30 FPS, with a target of 60 FPS, suitable for 1080p resolution inputs* by leveraging downscaling techniques.

3. QUALITY RESTORATION OF PIXELATED IMAGES

Utilizing a pre-trained super-resolution model, the algorithm enhances the quality of pixelated images while *preserving the integrity* of non-pixelated images, ensuring *reliable restoration with high accuracy metrics like LPIPS and PSNR*.

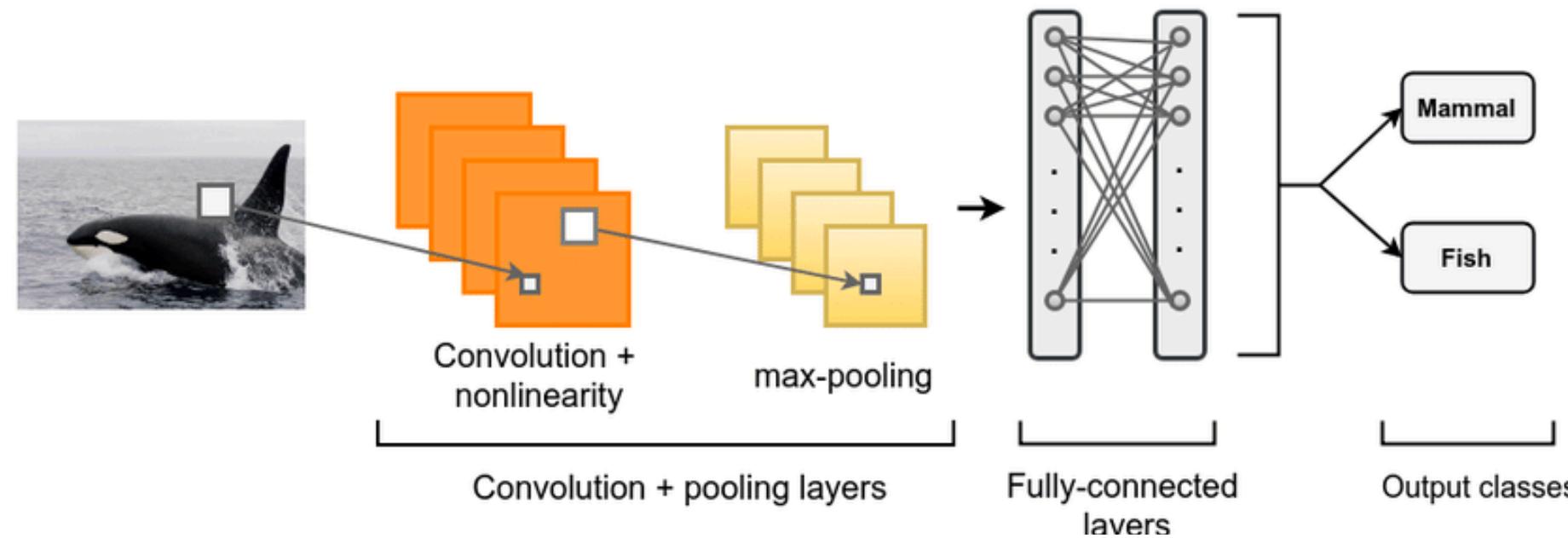


Process flow

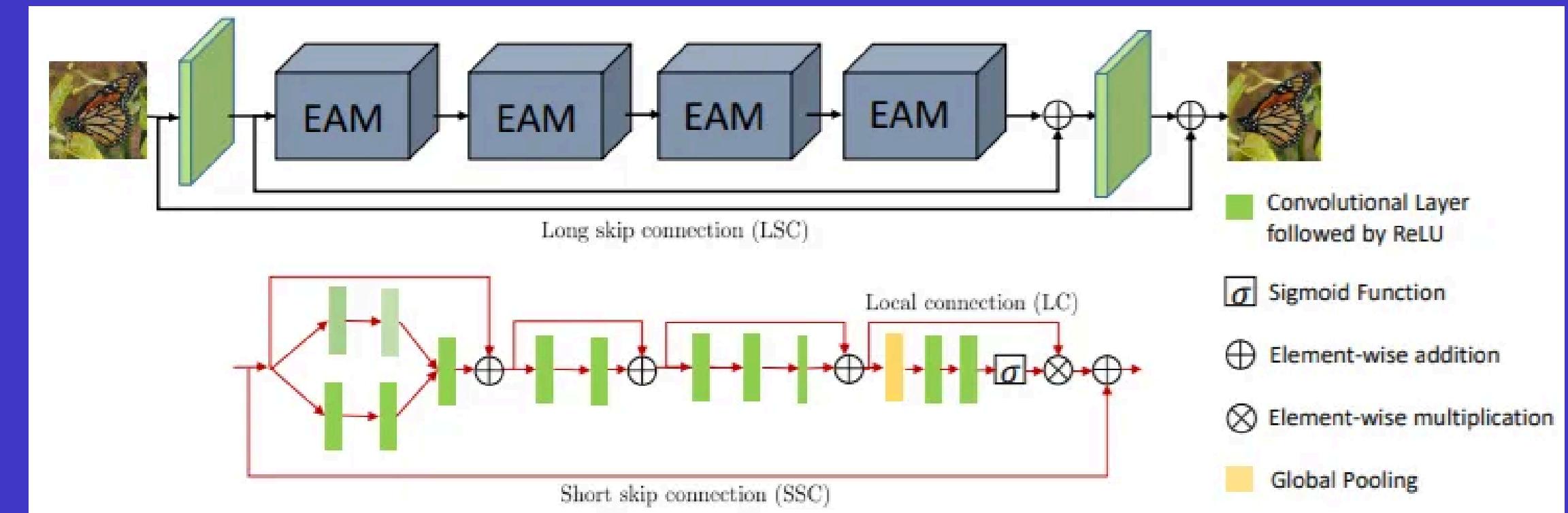
1. SETUP
2. DOWNLOAD AND EXPLORE THE DATASET
3. LOAD DATA USING A KERAS UTILITY
4. CREATE A DATASET
5. VISUALIZE THE DATA
6. CONFIGURE THE DATASET FOR PERFORMANCE
7. DATA AUGMENTATION
8. STANDARDIZE THE DATA
9. CREATE A MODEL
10. COMPILE A MODEL
11. MODEL SUMMARY
12. TRAIN THE MODEL
13. VISUALIZE TRAINING RESULTS

Architecture Diagram

CNN for Image Classification used for Pixelation Detection

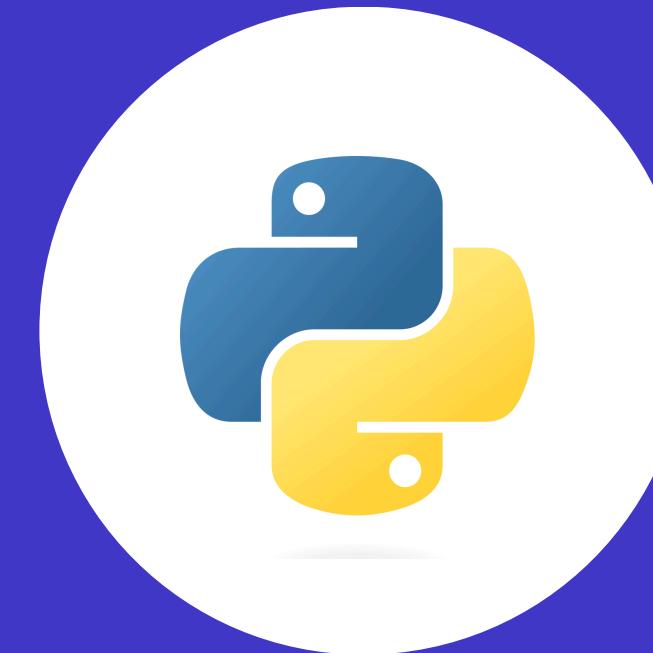


RIDNet- Residual Image Denoising Network used for removing Pixelation from Image



Technologies used

1. PYTHON
2. TENSORFLOW
3. SCIKIT-LEARN
4. OPENCV
5. MATPLOTLIB
6. FLASK



Team members and contribution:

Data set preparation: Ashish Pothal, Ananya Jyoti

Model Preparation: Anurag Prasoon, Vidisha Agrawal

Model Deployment: Shubham Prakash

Conclusion

The development of efficient algorithms for *pixelation detection and image denoising* marks significant progress in real-time image processing.

The pixelation detection model, utilizing edge detection and statistical analysis, reliably identifies pixelated images with minimal false positives.

The RIDNet-based denoising model effectively restores image quality, achieving 68%-70% accuracy by removing noise while preserving essential details.

Together, these models provide a comprehensive solution for handling pixelated and noisy images, ensuring high performance in practical applications..

With further refinement, they hold the potential for even greater accuracy and broader applicability in image enhancement and analysis.

