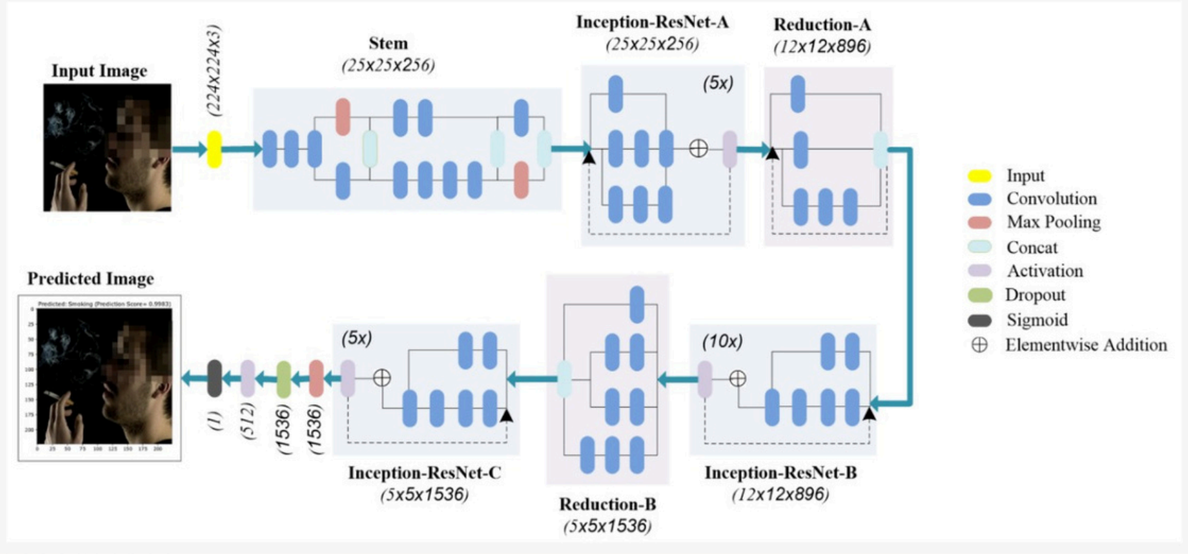
Seeing the Signs: AI Detection of Youth Smoking in Public Spaces

Inception ResNet V2

INTRODUCTION:

Inception-ResNet-V2 is a deep convolutional neural network architecture that combines the strengths of Inception modules with residual connections, originally proposed by Szegedy et al. in 2016. It is an improved version of the earlier Inception architectures (like Inception-V3 and Inception-V4) and integrates the residual learning approach from ResNet to enable faster convergence and more stable training in very deep networks.



WHY Inception-ResNet-V2:

✅ Combines Strengths of Inception + ResNet
→ Multi-scale feature extraction + fast, stable training.
✅ Deep Architecture
→ Learns complex facial patterns (wrinkles, discoloration, etc.).
✅ High Accuracy
→ Performs well on image classification tasks like face-based detection.
✅ Good for Transfer Learning
→ Pretrained on ImageNet, works well with small datasets.
✅ Multi-Scale Feature Extraction
→ Captures both fine details and large facial features.
✅ Proven in Research
→ Used in medical imaging, biometrics, behavior detection

WHY THIS RESEARCH PAPER?:

The paper by M. A. Khan, Beijing University of Posts and Telecommunications, Beijing , China, proposes a deep learning method to classify individuals as smokers or non-smokers using facial images. Using Inception-ResNet-V2 with transfer learning, the model captures smoking-related facial features like wrinkles and discoloration. Trained on a real-world dataset of 1,120 images, it achieved 96.87% accuracy,(epochs 50 times 0.001 learning rate) outperforming other CNNs. The study highlights the model's potential for health-related facial analysis and public health applications.

KEY TAKEAWAY:

✅ Relevant Topic – Focused on detecting smokers vs. non-smokers using facial images.

✅ Uses Inception-ResNet-V2 – Shows why it's effective for this task.

✅ Strong Accuracy – Achieved 96.87% accuracy, outperforming other models.

✅ Real-World Dataset – Includes diverse, natural images (indoor/outdoor, varied poses).

✅ Comparative Study – Compared with VGG19~92.24%, Xception~95.65% , InceptionV3~94.62%, NASNet~93.45%.

✅ Good Methodology – Used transfer learning, data augmentation, and proper evaluation metrics.

✅ Reproducible Approach – Clear explanation of architecture, training process, and hyperparameters.

THANK YOU