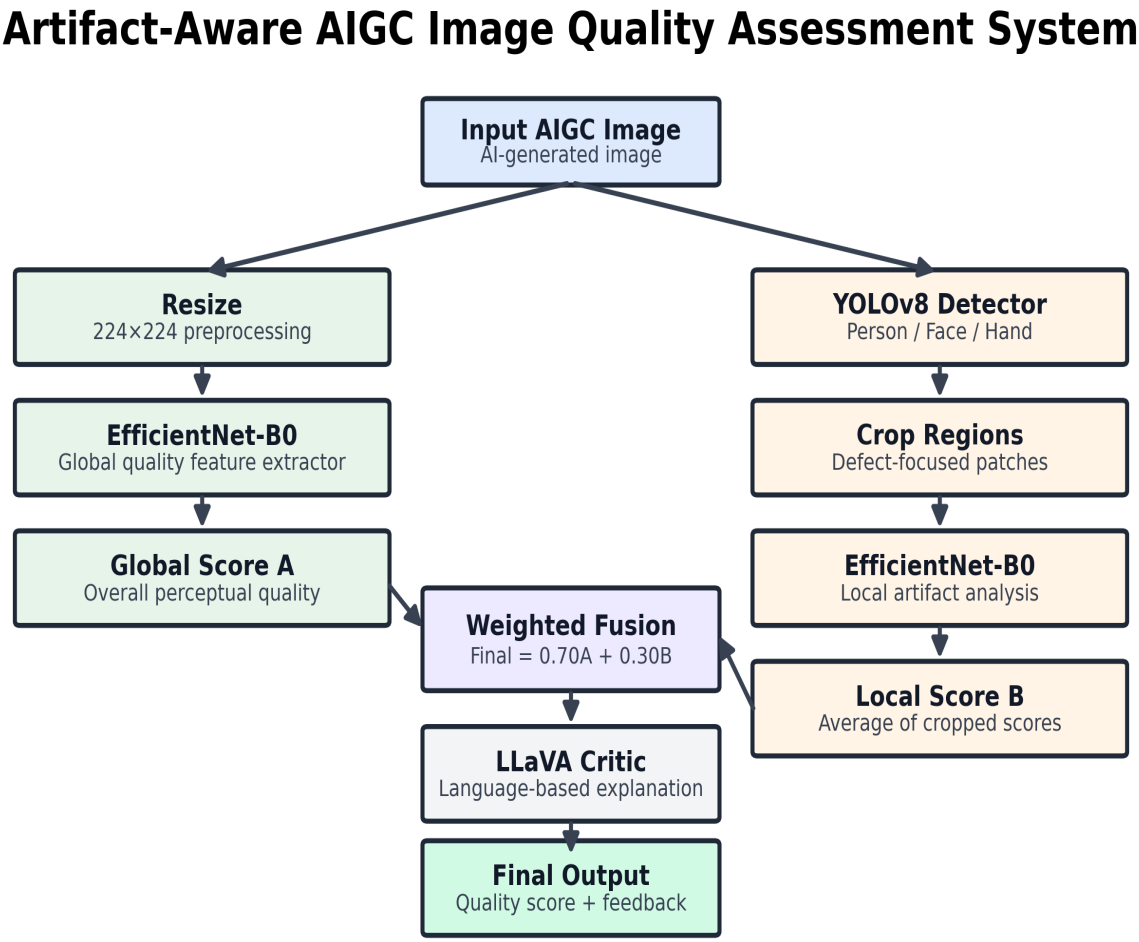
Artifact-Aware AIGC Image Quality Assessment – Detailed Architecture

System Block Diagram



Overview:
The proposed framework evaluates the perceptual quality of AI-generated images using a dual-path artifact-aware architecture. The global branch captures holistic image realism, while the local branch focuses on detecting fine-grained defects such as distorted hands and faces. The outputs from both branches are fused using a weighted strategy and further explained through a multimodal LLaVA critic, providing both quantitative and qualitative assessment.

Color Legend

Color Group	Meaning
Blue Block	Input image preprocessing

Green Blocks	Global quality assessment path
Orange Blocks	Local defect detection path
Purple Block	Score fusion module
Gray Block	Language-based critic (LLaVA)
Mint Block	Final output stage

Module-wise Description

Module	Description
Global Path (EfficientNet-B0)	Extracts holistic visual features and predicts overall perceptual quality score (A
Local Path (YOLOv8 + EfficientNet-B0)	Detects critical regions (hands/faces/persons), crops them, and evaluates loca
Weighted Fusion	Combines global and local scores using Final = 0.70A + 0.30B to balance rea
LLaVA Critic	Generates human-readable explanations highlighting anatomical or visual def
Final Output	Returns a numerical quality score along with descriptive textual feedback.

Evaluation Metrics:
The performance of the proposed IQA model is evaluated using standard correlation metrics such as Spearman Rank Correlation Coefficient (SRCC) and Pearson Linear Correlation Coefficient (PLCC). The objective is to achieve a correlation greater than 0.80 with human Mean Opinion Scores (MOS).