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# Image Quality Assessment Using Blind/Reference less Image Spatial Quality Evaluator

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**ABSTRACT:** Natural scene statistic-based distortion-generic blind/no-reference (NR) image quality assessment (IQA) model operates in the spatial domain. The new model, dubbed blind/referenceless image spatial quality evaluator (BRISQUE) does not compute distortion-specific features, such as ringing, blur, or blocking, but instead uses scene statistics of locally normalized luminance coefficients to quantify possible losses of "naturalness" in the image due to the presence of distortions, thereby leading to a holistic measure of quality. The underlying features used derive from the empirical distribution of locally normalized luminance and products of locally normalized luminance under a spatial natural scene statistic model. BRISQUE is statistically better than the full-reference peaksignal-to noise ratio and the structural similarity index, and is highly competitive with respect to all present-day distortion-generic NR IQA algorithms. BRISQUE has very low computational complexity, making it well suited for real time applications. BRISQUE features may be used for distortion-identification as well.

**KEYWORDS***:* BRISQUE, Reference less, Image quality assessment, Spatial domain.

## I.INTRODUCTION

Image quality can refer to the level of accuracy in which different imaging systems capture, process, store, compression, transmit and display the signals that form an image. Another definition refers to image quality as "the weighted combination of all of the visually significant attributes of an image". There are different methods to assess the quality of the image.Full reference methods try to assess the quality of a test image by comparing it with a reference image that is assumed to have perfect quality, e.g. the original of an image versus a JPEG-compressed version of the image.Reduced reference methods assess the quality of a test and reference image based on a comparison of features extracted from both images. No reference methods try to assess the quality of a test image without any reference to the original one. Here we use a no reference method which does not take any reference image and gives us the quality score mainly based on the natural scene statistics of the image such as checks the luminance factors like brightness, contrast, compare its pixels quality with that of neighboring pixels to give us the quality score.

## II.RELATED WORK

A no-reference objective image sharpness metric based on the notion of just noticeable blur.R.Ferzli and L. J. Karam, presents a perceptual-based no-reference objective image sharpness/blurriness metric by integrating the concept of just noticeable blur into a probability summation model. No-reference visually significant blocking artifact metric for natural scene images, proposed by S. Suthaharan. Quantifying visually annoying blocking artifacts is essential for image and video quality assessment. This paper presents a no-reference technique that uses the multi neural channels aspect of the human visual system (HVS) to quantify visual impairment by altering the outputs of these sensory channels independently using statistical "standard score" formula in the Fourier domain. Blind image quality assessment: A natural scene statistics approach in the DCT domain proposed by M. Saad, A. C. Bovik , and C. Charrier. The approach relies on a simple Bayesian inference model to predict image quality scores given certain extracted features.

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## III.PROPOSED SYSTEM

Blind/reference less image spatial quality evaluator (BRISQUE). BRISQUE is a model that only uses the image pixels to calculate features (other methods are based on image transformation to other spaces like wavelet or DCT). It is demonstrated to be highly efficient as it does not need any transformation to calculate its features. BRISQUE relies on spatial Natural Scene Statistics (NSS) model of locally normalized luminance coefficients in the spatial domain, as well as the model for pair-wise products of these coefficients.

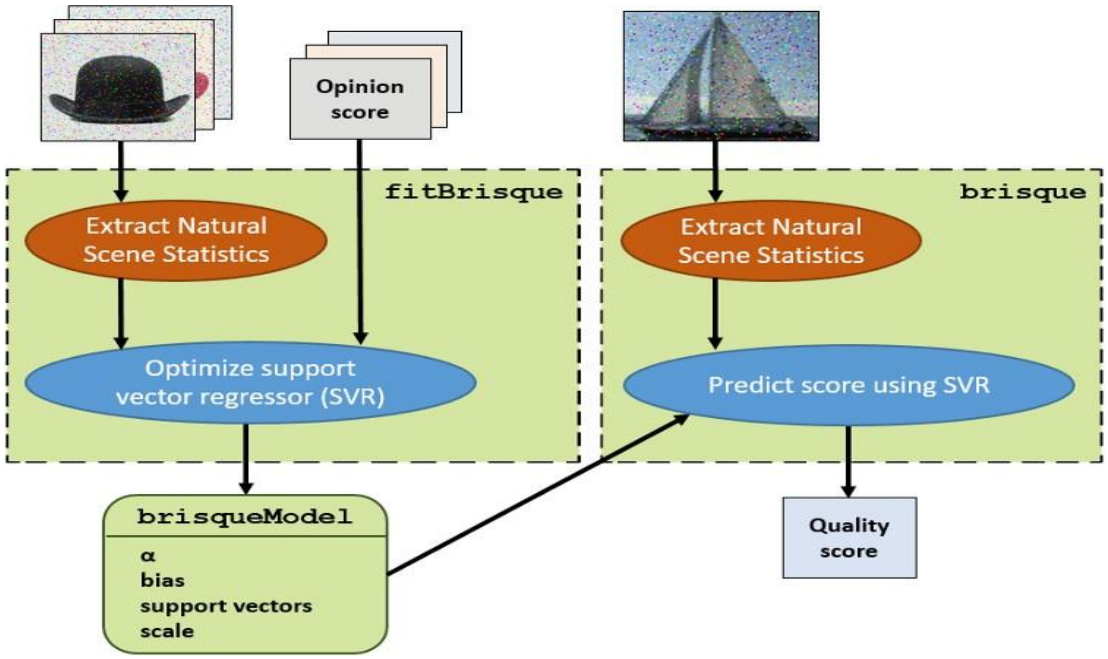


Fig.1: Architectural Design

### 4.1 Importing Libraries

*Tensor flow → 1.15.2*

Tensor Flow 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.

*Numpy → 1.18.2*

NumPy or Numerical Python is an open-source Python library that makes it easy to complex numerical operations. Working with machine learning and deep learning applications involve complex numerical operations with large datasets.

*Opencv-python → 4.2.0.**

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. The library has more than 2500 optimized algorithms. These algorithms can be used to detect and recognize faces, identify objects, classify human actions in videos, track camera movements, track moving objects.

*Matplotlib → 3.2.1*

Matplotlib is one of the most popular library in Python which is used in Machine Learning. It helps to understand the huge amount of data through different visualizations.

*Libsvm → 3.23.0*

LIBSVM implements the Sequential minimal optimization (SMO) algorithm for kernelized support vector machines (SVMs), supporting classification and regression.

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### 4.2 Workflow

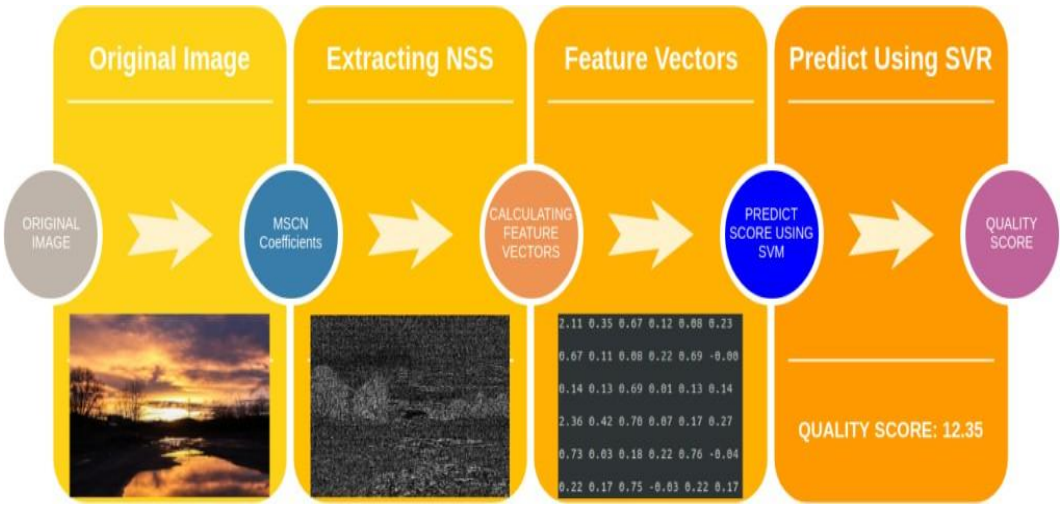


Fig.2 : Workflow

This Work flow diagram illustrates flow of different modules in Image Quality Assessment. In the proposed system the original image is uploaded here we had taken an image from Kodak dataset. Next we would extract Natural Scene Statistics (NSS) where Mean Subtracted Contrast Normalization (MSNC) coefficients would be calculated and then feature vectors are derived .This will be sent to the Support Regressor Vector model which will calculate the quality score of the image.

## IV.CONCLUSION

A Natural scene statistic based distortion generic blind/no-reference (NR) quality assessment algorithm– the Blind/Reference less Image Spatial Quality Evaluator (BRISQUE) – which operates in the spatial domain is proposed. No distortion specific features such as ringing, blur or blocking were modeled in the algorithm. The algorithm only quantifies the 'naturalness' (or lack thereof) in the image due to presence of distortions. The algorithm and the statistical features extracted, and demonstrated how each of these features correlate with human perception.
Undertook a thorough evaluation of the BRISQUE index in terms of correlation with human perception and demonstrated that BRISQUE is statistically better than FR PSNR and SSIM as well as highly competitive to all NR algorithms compared with. Demonstrated that BRISQUE performance is independent of database content and BRISQUE features may be used for distortion-identification as well.

## V.FUTURE ENHANCEMENTS

Further, BRISQUE is computationally efficient and that its efficiency is superior to other distortion-generic approaches to NR IQA, thus making BRISQUE an attractive option for practical applications like image denoising. This application can be used for augmenting non-blind image denoising algorithms using the BRISQUE features to produce blind image denoising algorithms.

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