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VISUAL ART IN USING THE STRUCTURAL SIMILARITY INDEX TO EVALUATE IMAGE QUALITY

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ABSTRACT

We show you a computer program that lets you do meta-cognitive practices that will help young children or students who are new to the visual arts improve their skills. This multimedia learning tool that you can interact with is built on imitating the features of a reference drawing on a standard picture. The color scheme of a known picture of a Fauve painting is applied to the input picture to create a picture that looks like the artist's style, which is bright colors. Filtering methods are used on the result to make it look like the artist's basic brushstrokes. The Structural Similarity Index Measure (SSIM) lets the user view and compare the original picture with the result in a fun way. In the past, objective ways to judge the quality of perceptual images tried to measure how noticeable mistakes (differences) were between a warped image and a reference image by using different known features of the human visual system. Based on the idea that people's visual sense is very good at getting structural information from a picture, we present an additional framework for judging quality that is based on how much structural information has been lost. As an example of this idea, we create a structure similarity index and show how useful it can be by using a number of natural cases and comparing it to both subjective scores and the most up-to-date objective methods.

Key words: ***The human visual system (HVS), judging the quality of an image, Information about structures, related structures, and how they are perceived (SSIM).***

I.INTRODUCTION

Education is a group practice that helps people learn a wide range of skills. The role of ICT has grown as the world quickly moves toward digital media and information. This will continue to grow in a society built on knowledge and technology. To keep up with the rising demand for college, Information and Communication Technology

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(ICT) should be looked into in the form of programs that use technology to improve them. The Indian government named the years 2010–2020 as the "Decade of Innovation" (National Innovation Council, 2011). The National Knowledge Commission (2009) put a lot of stress on how teachers and students can give and receive feedback and then connect with each other. This is especially important for new teaching methods that require teachers to keep coming up with new ways to teach. according toOne of the goals of the 8th Millennium Development Goal (United Nations, 2011) is to make the benefits of new technologies, especially information and communication technologies, available to everyone. This can be done by getting people from different fields to work together to provide education. The National Curriculum Framework from 2005 also talks about how important ICT is in education. UNESCO (2002) says that if teachers want to help students learn the skills they need, they should use cheap ICT tools and methods in the classroom.

Education in India

Education in India is provided by the public sector as well as the private sector. Education in India falls under the control of both the Union Government and the states. The Union or the State Government controls most universities in India.

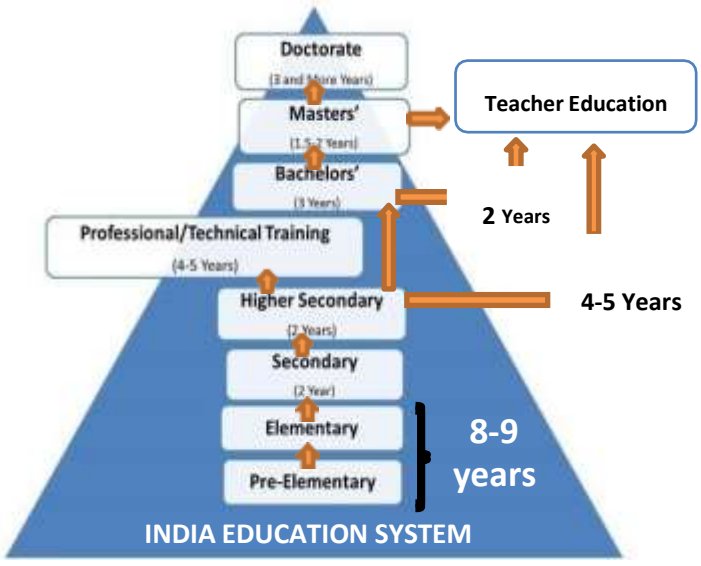

Fig 1.0 Indian Education System

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As shown in figure1.1, after grade 12 Examination, students may enroll in general degree programs such as bachelor's degree in Arts, Commerce or Science, or professional degree programs such as engineering, law or medicine etc. India's higher education system is the third largest in the world, after China and the United States. The main governing body in India at the tertiary level is the University Grants Commission, which enforces its standards, advises the government, and helps coordinate between center and state. Student can enroll in teacher education after high school for primary teacher training program and they can enroll after graduation for secondary teacher training program.

II. EXISTING WORK

Research has evidenced that multimedia package in subjects like science, mathematics, language learning was found to be effective. Results have revealed that utilization of multimedia in teaching learning enhances students‟ interest, achievement and motivation. Few studies have identified factors like belief, relatedness and personal values, motivational factors to be kept in mind while development and implementation of multimedia based teaching at pre-service level. Multimedia can be effectively used for enhancement of ICT skills among teachers. Research have also evidenced that it helps in developing different skills like problem solving skills, basic computer literacy and typing skills, comprehension, mental ability pertaining to motor skill etc.

MAJOR OBSERVATIONS

- ❖ Researcher came across studied related to different forms of media integration across primary to tertiary level.
- ❖ Most of studies carried out in India have similar kind of methodology, tools and data analysis techniques.

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Majority of researchers choose quasi experimental design-control and experimental group pre-test post-test design.

❖ Tools used by the researchers were achievement test, reaction scale, opinionative, etc. Most of researchers used t test, f test to analyze data in terms of achievement of students. Many researchers took gender as variance and used ANOVA, ANCOVA as data analysis technique. Researchers also used frequency, percentage, chi-square to analyses data obtained through opinionative, reaction scale. Different studies revealed that different media integrated teaching has positive influence on student's achievement and students found multimedia based teaching learning effective.

❖ As most of study revealed, there were significant difference in achievement of students in pre-test and post-test via using different media.

❖ Few studies adopted qualitative approach; many studies followed mixed method approach.

EXISTING OUTPUT

Fig 2.0 a) reference image b) target image c) blended sketch image

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III. PROPOSED WORK

Objective methods for assessing perceptual image quality traditionally attempted to quantify the visibility of errors (differences) between a distorted image and a reference image using a variety of known properties of the human visual system. Under the assumption that human visual perception is highly adapted for extracting structural information from a scene, we introduce an alternative complementary framework for quality assessment based on the degradation of structural information.

The SSIM index is calculated on various window of image. The measure between x and y of common size N*N is

$SSIM(x, y) = (2\mu_x\mu_y+c_1)(2\sigma_{xy}+c_2)$

$(\mu_x^2+\mu_y^2+c_1)(\sigma_x^2+\sigma_y^2+c_2)\mu_x$ - average of x

μ_y - average of yσ_x - variance of x

σ_y - variance of yσ_{xy} - covariance

Image Quality Assessment

When judging the quality of a picture, it is better to use the SSIM score regionally than worldwide. First, picture data traits don't stay the same in space very often. Second, picture errors may be different in different spaces, but this depends on the local image data. Third, a person can only see a small part of a picture clearly at a time when they are standing at a normal viewing distance. This is because of the hidden feature of the HVS. Lastly, localized quality measurement can give you an image quality map that changes over space. This gives you more information about how the image's quality is declining and may be useful in some situations.

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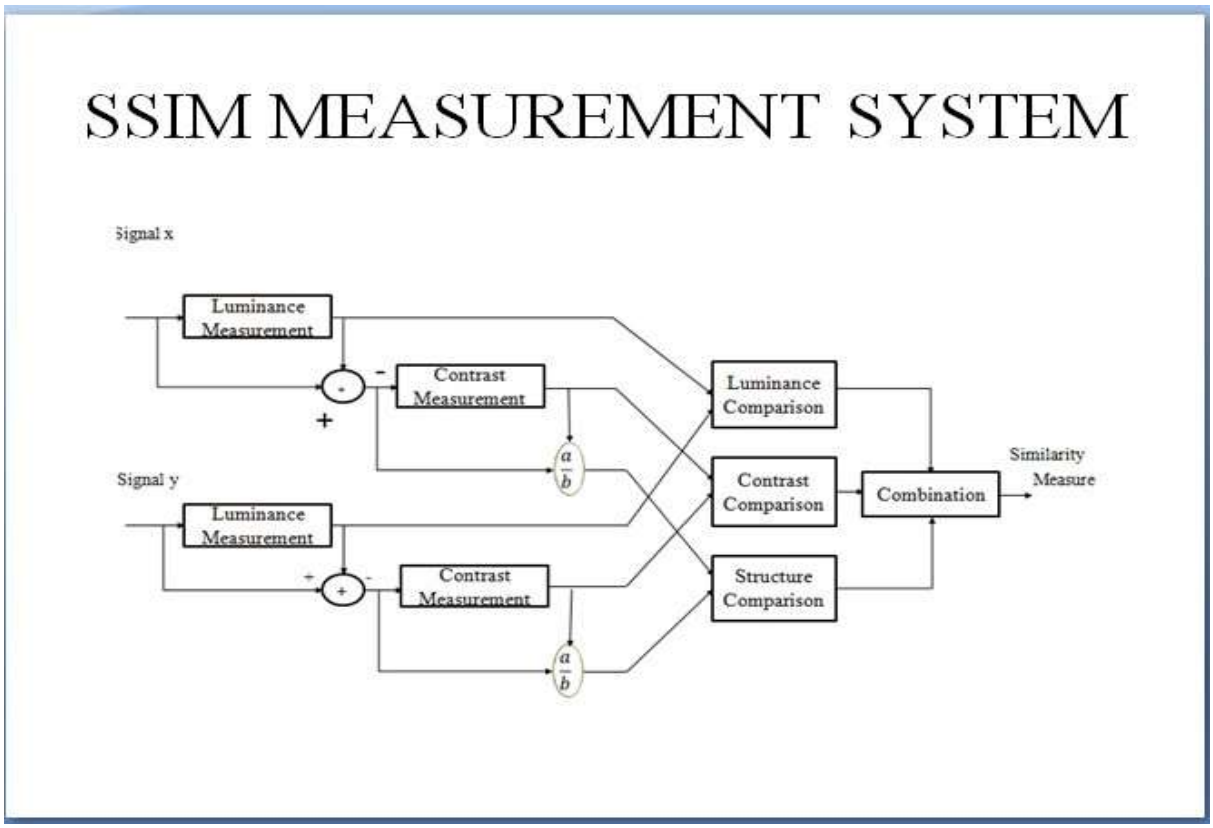

Fig.3. Diagram of the structural similarity (SSIM) measurement system.

PROPOSED WORK OUTPUT

Fig.4. Structural Similarity Calculation For Image Quality Assessment

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SIMULATION RESULT

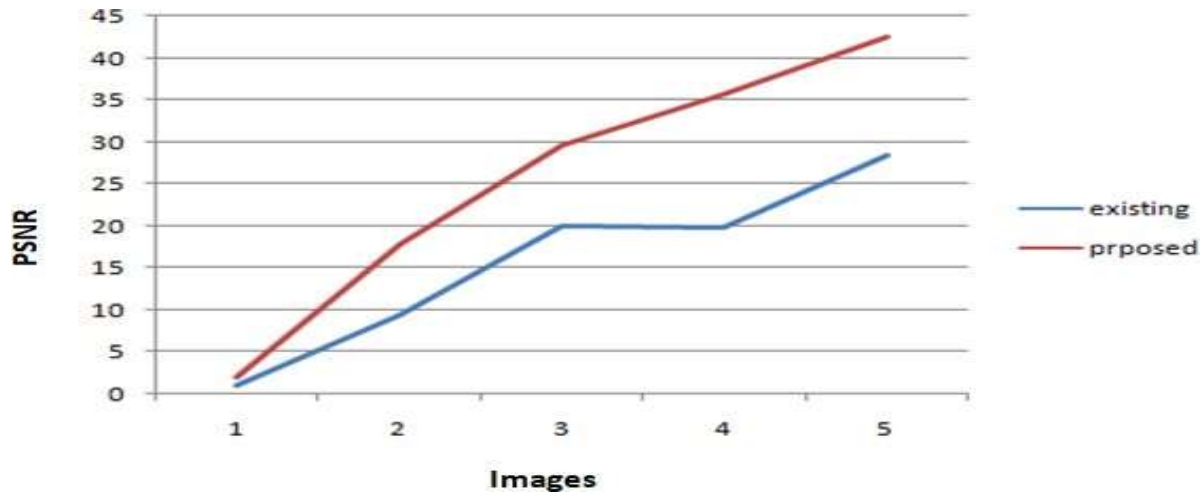

Fig.4. PSNR Calculation

IV. CONCLUSION AND FUTURE WORK

Digital images are subject to a wide variety of distortions during acquisition, processing, compression, storage, transmission and reproduction, any of which may result in a degradation of visual quality. For applications in which images are ultimately to be viewed by human beings, the only correct method of quantifying visual image quality is through subjective evaluation. In practice, however, subjective evaluation is usually too inconvenient, time-consuming and expensive. The goal of research in objective image quality assessment is to develop quantitative measures that can automatically predict image quality. An objective image quality metric can play a variety of roles in image processing applications. First, it can be used to dynamically monitor and adjust image quality.

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