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Creative AI

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Abstract: *This paper lays emphasis on two state of the art Artificial intelligence applications. 1) Image colorisation. In this application the user inputs a black and white image and this image is transformed into a colour image. 2) Neural Style Transfer. In this application a user needs to feed in two images. One will be the base image, and other will be the image whose style the user wants to copy on the base image. 3) Using Google's deep dream algorithm, the user can input an image and make a deep dream video of that image.*

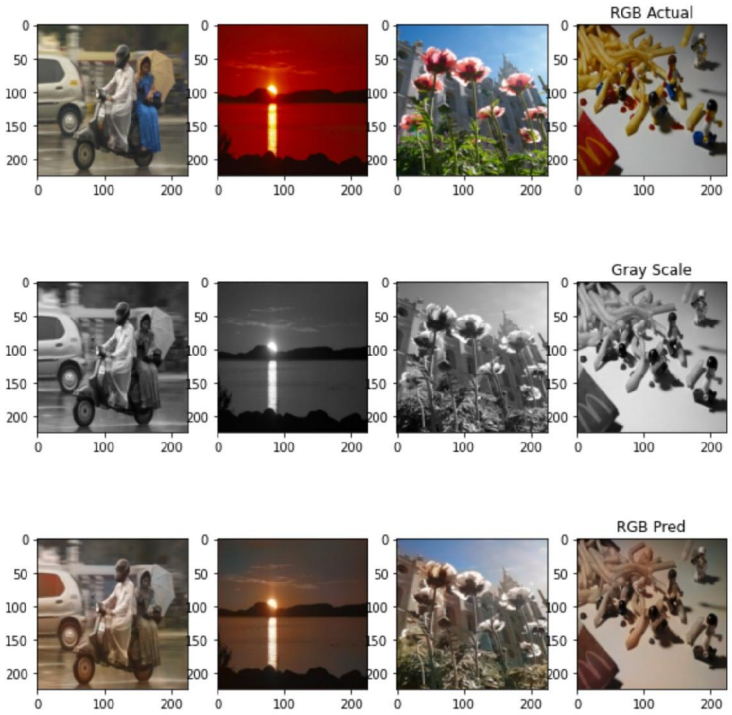
Keywords: CreativeAI, Image Colorisation, Neural Style Transfer, Deep Dream.

I. INTRODUCTION

Artificial Intelligence has revolutionised almost every facet of human life. AI refers to the ability of enabling machines/ computers to learn and act like the human brain. The field of AI is a massive possibility and has been explored in various fields namely, Healthcare, Finance, Agriculture, Business Analytics, etc. The one field that excites me the most is Creative AI. Creative AI is a new branch of Artificial intelligence in which AI can create paintings, write compelling stories and compose new music. In this project we have applied state of the art Artificial Intelligence techniques to two mobile applications:

1.1 Image Colorisation AI

In this application, the user inputs a gray scale or black and white image and the application returns a colour image.



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1.2 Neural Style Transfer

User needs to provide two images. One is called as the base image and the other is called as the style image. The application copies the style of the style image and combines it to the base image.

II. MOTIVATION

The motivation behind these state of the art machine learning algorithm is to explore the impact of Artificial Intelligence in the field of Creative AI. The proposed applications will help bring about a sentimental value to people. For example, our grandparents may have a lot of Black and White Images. We can easily pull up this application, take a photo of the black and white image and convert it into a coloured image within seconds. Also it will be used for photo manipulation of one image to different styles. Deep videos can help an individual in Deep meditation.

III. EXISTING SYSTEMS

Here's a list of all the repeated and most upvoted comments/ opinions received to the applications similar to us. They mainly suggest the following shortcomings of theses systems: Long processing time, Paid subscriptions, Privacy concerns, Disclosure of personal data with third party sources, Numerous advertisements, and inaccuracy in colorisation.

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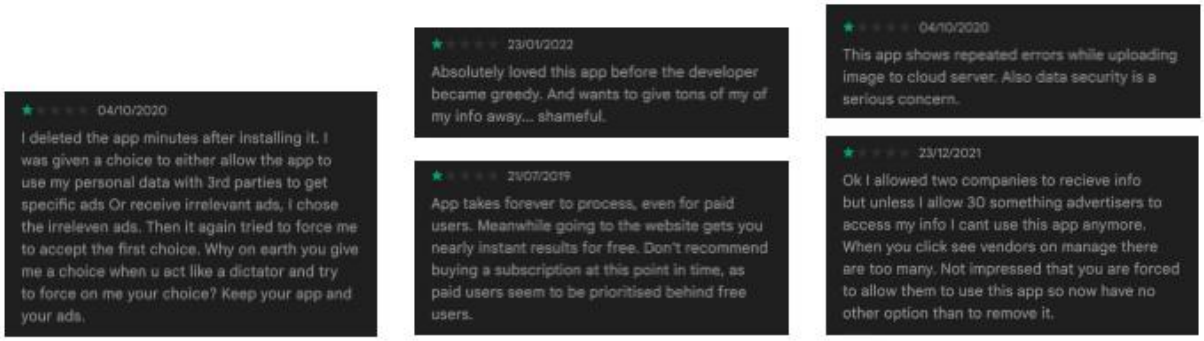
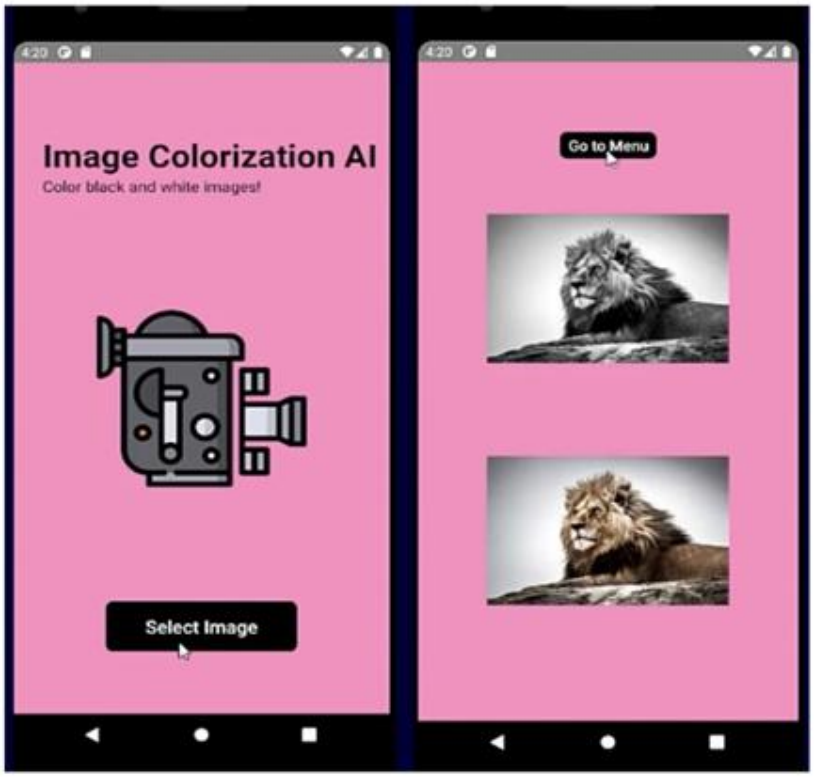


IV. Proposed System

4.1 Image Colorisation AI

Design



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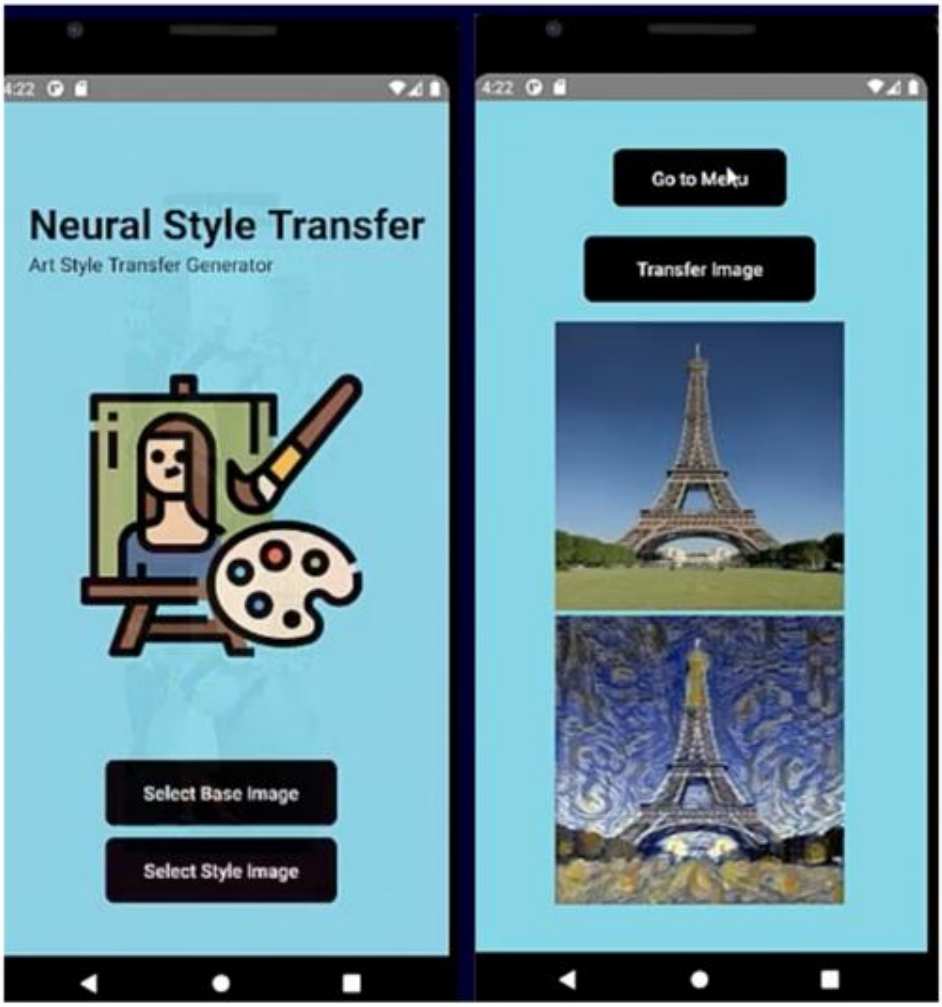
4.2 Neural Style Transfer

Design

The proposed system consists of two android applications which helps the user to colour a black and white image and also, change the style of a particular image with another one.



4.3 Accuracy

For any machine learning/ deep learning or artificial intelligence algorithm it is necessary that the model is efficiently trained with as much real world data as possible. The more the number of images or data in the training dataset the more increases its accuracy. This data needs to be clean, processed and relevant. By running and re running the model on the training data set and making validations via the testing dataset we have successfully built a model acquiring a 95% accuracy rate. Following is the tensor flow graph suggesting the same.

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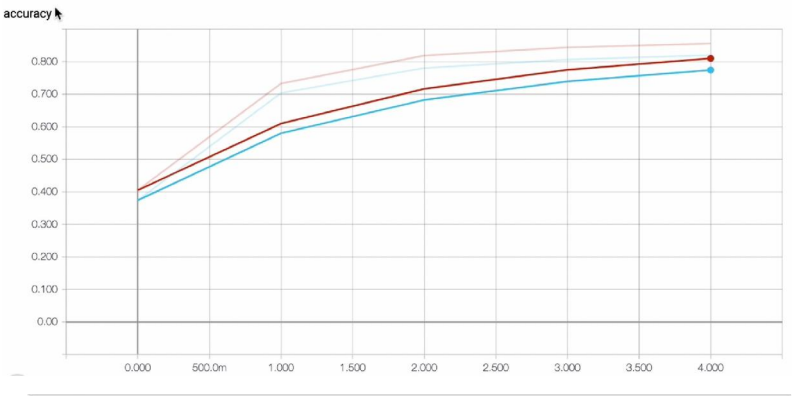
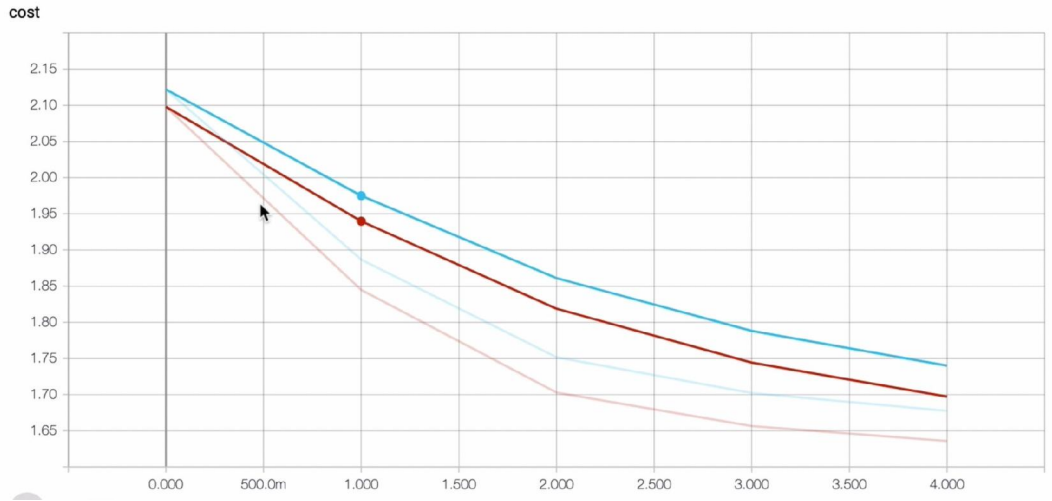



```
Epoch 0          | Training Accuracy = 0.7893333435058594
Epoch 1          | Training Accuracy = 0.8309999704360962
Epoch 2          | Training Accuracy = 0.8489999771118164
Epoch 3          | Training Accuracy = 0.8606666922569275
Epoch 4          | Training Accuracy = 0.8619999885559082
Epoch 5          | Training Accuracy = 0.8679999709129333
Epoch 6          | Training Accuracy = 0.8743333220481873
Epoch 7          | Training Accuracy = 0.9319999814033508
Epoch 8          | Training Accuracy = 0.9470000267028809
Epoch 9          | Training Accuracy = 0.9553333520889282
Done training!
```

4.4 Cost

The training dataset is divided into smaller chunks and fed to the model for making predictions. These chunks are known as batches, After every epoch the accuracy rate of these batches keeps on increasing gradually. More the no. of epochs the better the accuracy can be achieved.



Another very prominent factor that helps decide the efficiency of a model is the Cost. Cost should be minimum alongside the loss metrics should be declining or minimum.

4.5 Performance

We have already discussed the most important parameter that affect the efficiency of a model, namely, Accuracy and Cost. These are the factors that help play a determining role in performance of a model. The following graphs from tensor board indicate the performance, accuracy and cost metrics put together.

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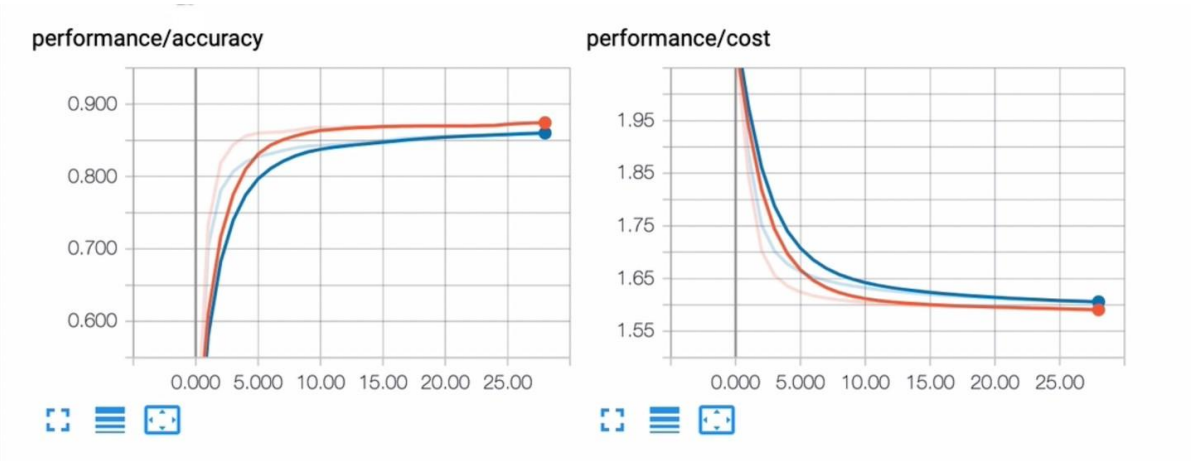

IV. Conclusion

With the help of machine learning, android development we have created two applications one of which takes the single black and white picture and colours it. Another one takes first image and takes another image to modify the first image to the style we want win second image.

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