One pager: Colourizing B&W Images

Speciation semester: ICT & Artificial Intelligence

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Project Idea:

The goal of this project is to convert black and white images into colored pictures. This AI could be used to add color to old pictures when at that time the option for color was not available in photography. If the project turns out the be efficient, it could even be used to color old films.

The possible drawback of choosing this kind of project is the long computing time while training. But this can be made shorter by using smaller image samples for training.

Data Sources:

Dataset 1:

The First dataset I am going to use is the “Coco Dataset”. it contains 5000 images, each image has different sized dimensions. The reason I selected this dataset is because of its picture variety . It not only focuses on people but also on other objects, this gives the training set more different scenarios to learn from.

Link: Coco Data set

Dataset 2:

The second Image dataset is the “FFHQ Faces”, which is from the website Kaggle. This dataset contains 70000 images with an resolution of 128px by 128px. The reason I selected this data set is that the first one contained too many scenery pictures, the dataset also contains a lot of ethnic variation.

Link: FFHQ Faces Data Set

Proposal:

In the Proposal document I will use the following chapters to answer the main project Questions:

- Domain Understanding

Where I talk about the project goal and Context understanding, this gives me a good base line of information to successfully start with the next phase.

- Impact assessment

I worked with the TICT tool to provide questions for the “Potential Impact Assessment”. These Questions give me a good starting point of knowing the societal impact of my technology.

- Modelling

Where I talk about the machine learning techniques, that I am going to use during this project.

- Dataset
In this chapter I describe the datasets I am going to use for the project. I will also add some speculation of possible problems I am going to face in providing phase.

- Evaluation and deployment
Here I explain the Evaluation and deployment part of the project.

- Conclusion
At the end I will write a conclusion, where I answer the main question of this Proposal document.

Preparation:
These are the datasets I am going to use and combine during this project. The amount of data and variation of these images are perfect for the current genuine challenge. But there are still some issues I need to address in the provisioning phase.

Problem 1: The current resolution of the images is not equal in both datasets, the “Coco Dataset“ has different sized dimensions, the “FFHQ Faces Data Set” has a size of 128px by 128px. This means that I have to scale these pictures to the same size of the input of the network.

Problem 2: The first data set has JPG pictures and the second dataset contains only PNG images. This means I have to create a function that converts the image into its corresponding RGB layers, this data will then be saved into a CSV format.

Problem 3: The images must be turned into black and white pictures to be used as a feature matrix. The original also needs to be separated into the separate 3 color layers (RED GREEN BLUE) in order to be used as the target vector.

Machine learning:
For this project, I am going to apply 2 machine learning techniques.

The first one is a **neural network that uses a feed-forward (DFF) technique**. The model of the network will consist of: input layer, hidden layers , and an output layer. Depending on the mean squire error(MSE) the best model will be used to produce the final colored output image.

The second AI is a **Support Vector Machine technique**. This will proof to be difficult, but there are already some examples on the internet that show that it is doable. Depending on the Accuracy the best model will be used to produce the final colored output image.

At the end of the Machine learning phase I will write a conclusion, were I talk about which AI preformed better!