Colorizing Grayscale Photographs with a Neural Network

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This work presents a deep learning based, fully automatic system for image colorization. A fully convolutional neural network was created, providing the ability to colorize images of any resolution and size. An architecture is proposed, where the network gets high-level position-specific image information from an external segmentation model called PSPNet. Furthermore, larger filters were added to the network to increase its field of view and therefore improve its ability to recognize global features of a given image. Skip connections were also used, reducing the possibility of diminishing returns on any deeper layers. The network was trained on 1.3 million images from the Imagenet dataset, combined with an additional two hundred thousand images of groups of people, which has shown to significantly improve the network's performance on historical photographs. Retraining PSPNet on grayscale images has also shown visible improvements to the network's colorization. Finally, the network was applied to 800 historical photographs and has shown the ability to produce plausible colorization.

Awards Won:

Innopolis University : Full tuition scholarships for the Bachelor program in Computer Science