

# PROJECT ABSTRACT

**TITLE:** Black and white image colorization

## **Abstract:**

Black and white image colorization has garnered significant attention in the field of computer vision due to its ability to restore historical photographs and enhance image aesthetics. This process involves adding plausible colors to grayscale images, which requires understanding the underlying content of the image. Traditionally, colorization was performed manually, but advancements in deep learning and computer vision, particularly with OpenCV and convolutional neural networks (CNNs), have automated this task.

This abstract explores an approach that leverages deep learning techniques and OpenCV for colorizing black and white images. Using a pre-trained CNN model, the system learns to predict color distributions for each pixel in the grayscale image. The CNN is trained on large datasets of colored images, allowing it to capture complex patterns and textures to accurately estimate colors. OpenCV is employed for image processing tasks such as resizing, normalization, and displaying the colorized output. The proposed method provides a visually appealing colorization with minimal user input, significantly reducing the effort and time required for manual image editing. Additionally, by employing deep learning, the system generalizes well across a variety of images, making it suitable for diverse applications such as image restoration, digital art, and media enhancement.

## **Keywords:**

openCV, Deep learning, CNN.

## **Objectives:**

- **Automate Image Colorization:** Develop a deep learning-based system using OpenCV to automatically colorize black and white images with minimal human intervention.

- **Leverage Deep Learning:** Utilize pre-trained convolutional neural networks (CNNs) to predict plausible colors for each pixel in grayscale images by learning from large datasets of color images.
- **Enhance Image Aesthetics:** Restore the natural appearance and vibrancy of historical and grayscale images by adding accurate and visually appealing colors.
- **Optimize Image Processing:** Implement image processing techniques such as resizing, normalization, and color mapping using OpenCV to facilitate effective image colorization.
- **Generalize across Diverse Image Types:** Ensure the model generalizes well across different categories of images (e.g., landscapes, portraits, objects) to broaden the applicability of the system.
- **Real-Time Performance:** Optimize the colorization process for real-time or near-real-time performance to enable efficient use in various applications, such as media enhancement and digital art.