

# Weekly Report 1

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## Week: 1 (Project initialization phase)

### Project Title: Super Resolution using Classical Interpolation Methods

#### □ Total work done

##### a. Understanding the Problem Description.

- The subject of the project that has been analyzed was called Super Resolution Problem: Extrapolate a smaller image into a larger one using classical interpolation methods and evaluate similarity.
- concluded that we have to use classic image processing methods only - not deep learning or machine learning.
- studied the three primary upscaling algorithms of picture interpolation: closestneighbor, bilinear, and bicubic.
- The known evaluation metrics to compare the quality of the SR and HR image are PSNR (Peak Signal-to-Noise Ratio) and SSIM (Structural Similarity Index Measure).

##### b. The Process of Workflow Planning.

- A timeline of 10 weeks was developed to offer systematic project instructions:
- The first step that one takes to super-resolution (SR) reconstruction is to collect the highresolution (HR) images and produce the identical images in low-resolution (LR) version.

- Interpolation Methods: To generate SR pictures, the traditional approaches such as nearest-neighbor, bilinear and bicubic interpolation are used.
- Performance Evaluation: We evaluate the quality of the image using PSNR(peak signal to noise ratio) and SSIM(structural similarity index measure)
- Visualization: Compare and explain results with the help of quantitative and visual analysis.

### **c. Plan for the Dataset**

- A special dataset was generated to meet the requirements of the project:
- High resolution Photos: In Hr as samples, some amazing 1024 x 1024 photos of things, structures and nature were utilized.
- Low-Resolution Generation: The HR pictures were resized to 256x256 using the INTERAREA interpolation of OpenCV, which generated equivalent LR pictures.

### **d. Initialization of coding part**

- The initial implementation step to prepare the dataset was done in Google Colab:
- Narrow down every High-Resolution (HR) image in the specified folder.
- They were automatically downsized to the correct Low-Resolution (LR) size.
- The generated LR dataset was stored and packed to be used further.
- LR-HR picture pairings were verified and displayed to ensure that the dataset was accurate.

### **e.Tasks to be undertaken in the next week.**

- The process of super-resolution of LR pictures by upscaling them with various interpolation techniques is the initial stage:
- The closest neighbor
- The bilinear
- Bicubic
- In order to make a visual comparison of LR and SR photos, display them.
- All the SR results are to be stored to evaluate them.
- To help in the quantitative assessment, it is time to start practicing PSNR and SSIM evaluation codes.