

# Comparison of Digital Image Filtering Techniques

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## Abstract

This project explores digital image filtering techniques by comparing the median and frequency filters. By testing the filters with images varying in object type (people, landscapes, or objects) and noise composition, the project determines the advantages and disadvantages of each in specific situations.

## Introduction and Background

Digital image processing such as filtering was first developed in the 1960's. As computers became cheaper and faster, real-time image processing became available and its applications boomed. Digital filtering attempts to clear out noise, or useless and distracting information, in pictures.

Examples of noise include missing pixels and wrong pixels. Noise is inevitable when converting analog information into a digital form. Such a conversion occurs inside a digital camera, when the camera takes the analog picture from the lens and stores it as a digital file.

## Larger Purpose

The field of image processing has wide and important uses. The results of this project will influence how images are processed and enhanced.

Applications stemming from the results of this project will be important to image and video enhancement applications because this research project provides insights on the best techniques in filtering and enhancing each kind of image.

## Procedures and Methods

This study will involve two filtering techniques: median filtering, and frequency filtering. First of all, algorithms will be developed for each of the two methods. A variety of images will be put through the two filtering techniques to determine which filtering techniques work best for which types of images. The variety of images used will include images of people, objects, and landscapes. The quality, or the amount of noise, of the images used will be another independent variable.

The quality of filtered images will be determined in a subjective manner through surveying a pool of people. The effects of human errors and subjectivity does not detract from this study because image filtering is done for subjective aesthetic qualities in the first place.

## Sample Effects



Before median filter



After median filter