**Image Processing Project**

**Pencil quality evaluation**

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Introduction

In a world increasingly reliant on digital technology, the humble pencil remains a steadfast tool for expression and creativity. Whether used for sketching, note-taking, or technical drawing, the quality of a pencil's tip significantly influences the user's experience.

This project explores the intersection of traditional writing instruments and modern image processing techniques. Its primary goal is to develop an image processing system capable of evaluating pencil tip quality through the analysis of pencil tip images. By extracting key parameters, such as tip sharpness and wear patterns, we aim to assess the overall condition of the pencil's tip.

Leveraging advancements in computer vision and image analysis, our approach offers a non-invasive and efficient method for assessing pencil tip quality using digital cameras or smartphone cameras. This technology has practical applications in quality control for manufacturers, aids educators in assessing pencil usability, and benefits artists and professionals in selecting the best writing or drawing instrument.

Throughout this project, we will delve into image processing intricacies, exploring various algorithms to quantify pencil tip quality accurately. We will also develop a user-friendly interface for capturing images and receiving real-time feedback on tip condition.

Our aim is to deliver a reliable system for evaluating pencil tip quality via image processing, bridging the gap between traditional writing instruments and modern technology, ultimately enhancing the writing and drawing experience.

Block diagram

**Picture of pencil**

Load classifier

**Predict**

**Load classifier and predict**

Turn to grey scale

correction

Erosion/dilation/closing

**Enhance picture.**

Find corners/edges of tip

Calculate angle of tip

Calculate area of tip

Calculate sum of corners of tip

**Extruct features from image**

Parameters:

In process of development I tried different approaches in order to extruct the most information saturated features, thatr can provide us with the decition making about the pencil condition.

Our goal is to get picture of pencil and by observing only the critical part of it - the tip , to determine pencils conditiom. In other words we want to know if the pencil is sharp or broken.