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CS469-1001 Spring 2024

Project Proposal

**The Pale Blue Dot: Our Home**

**Description of the Project**

Our project aims to explore and analyze the “Pale Blue Dot” image of Earth, captured by the Voyager 1 spacecraft in 1990. Through digital image processing techniques, we seek to create a method to display a series of photos beginning with a satellite image of Earth that will shrink until it is a single pixel within the famous ‘Pale Blue Dot’ photo.

**Problem Statement**

The “Pale Blue Dot” represents a perspective of Earth from a distance of over 6 billion kilometers. Extracting detailed information from this image along with shrinking a more modern image of Earth into a single pixel will present various digital imaging challenges.

**Current Solutions**

NASA has produced enhanced versions of the ‘Pale Blue Dot’ image to help better highlight the single light-blue pixel in the image. However, unless one is an astronomer, a fan of Carl Sagan, or is familiar with his famous ‘Pale Blue Dot’ speech, the impact the original image must have had on Dr. Sagan may be difficult to convey with this single image.

**Our Approach**

Applying multiple erosion algorithms onto the modern satellite image of earth will allow us to create the images needed to simulate zooming out to the distance where the ‘Pale Blue Dot’ photo was taken, along with transformations of the darkness to better simulate the ‘sunbeam’ seen in the image. This approach helps encapsulate just how empty, and in turn, how small we are with respect to the universe.

**DataSet**

The primary dataset for this project is the original “Pale Blue Dot” image captured by the Voyager 1 spacecraft. This image, though low in resolution, contains valuable information about Earth’s appearance from that distant vantage point. Additionally, a high-resolution satellite image of Earth and astronomical data will be used to estimate distance at each ‘frame’ generated by this project.

**Deliverables**

We plan on creating either a program or video file that will show the generated images as frames along with the approximate distance from Earth as the frames move farther away until we reach the ‘Pale Blue Dot’ image. We initially plan on programming in MatLab, however, may change to Python should the need arise.

**References**

* NASA. (n.d.). Voyager 1’s Pale Blue Dot. NASA.

<https://science.nasa.gov/resource/voyager-1s-pale-blue-dot/>

* NASA ‘On This Day in 2015: An EPIC New View of Earth’ taken by the DSCOVR satellite

<https://visibleearth.nasa.gov/images/151541/on-this-day-in-2015-an-epic-new-view-of-earth/151548l>