Visualization for Scientific Data(CS 6635/5635)

Project Design Report

1. Basic Information
Project Title: Tornado Visualization (Work in Progress)
Team Members: Matthew Streicher(u1379160), Kunal Manjare(u1419704)
Link to the repository: https://github.com/kunal911/CS-6635-5635-Final-Project

2. Overview
It is clear that Tornadoes have different strengths depending on wind speeds. However, the scale of damage that can occur between a 199 mph F4 and a 200 mph F5 may or may not be the difference between catastrophic damage. By exploring the flow and possibly volume rendering other variables such as pressure can give us a better understanding of what makes up a F0-F5 Tornado.

3. Importance of this project
- Geographic Distribution: Tornadoes can occur all over the world, but they are most common in the United States. Creating a visualization that shows the geographic distribution of tornadoes over time can help to illustrate how they vary in frequency and intensity across different regions.
- Climate change: There is some evidence that climate change may be affecting tornado frequency and intensity. A visualization that shows how tornadoes have changed over time in relation to changes in climate variables such as temperature, humidity, and wind patterns could be a valuable contribution to the climate change discussion.
- Understand impacts and damage a Tornado can cause depending on its strength and direction.

4. Project Objectives
The objective of this project is to combine our skills and knowledge at creating a visual representation of the flow of Tornadoes. We are attempting to do this by creating the workflow of how much impact a Tornado can have using Paraview, while following the design guidelines taught to us.

5. What would you like to learn by completing this project?

We would like to learn that using various different techniques if there are any differentiations in variables between F0-F5 tornadoes. Other than wind speed, is the pressure or velocity of different tornadoes also a contributing factor to their destruction.

6. Data

As of right now we have a basic data set that can display a simulated Tornado. Further exploration of open source data is in progress.

https://cgl.ethz.ch/research/visualization/data.php

7. If you are doing a programming project, list the hardware and software you will be using.

We are not doing a programming project, however, we anticipate using Paraview's Python scripting in order to automate repetitive tasks.

8. What is your project schedule? What have you done thus far and what will you have to do to complete this project? Be as specific as possible.

Date	Task	Is it Completed?
02/02/2023	Form Team	Yes
07/02/2023	Meet to discuss possible topics	Yes
15/02/2023	Submit Team Details	Yes
18/02/2023	Sessions to discuss Visualization Designs	Yes
23/02/2023	Selection of dataset	Yes
27/02/2023	Begin Project Proposal	Yes
01/03/2023	Submit Project Proposal	Yes
20/03/2023	Project Milestone	
19/04/2023	Final Submission	