The Challenger Accident
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Background

On January 28th, 1986, the space shuttle Challenger exploded approximately seventy seconds after lift-off, killing all seven astronauts on board. The accident was caused by the unusually cold temperatures at and around Cape Canaveral. The cold temperatures reduced the resiliency of the rubber O-ring seals that connect each section of the shuttle's solid rocket boosters. The loss of resiliency led to a gas leak at one of the O-ring joints and the eventual explosion.

How cold was it that day at Cape Canaveral?   In this practicum you will analyze temperature data for weather stations near the NASA facility. Write a modular python program that reads temperature and weather station data to determine the average reported temperature on that fateful day.

Instructions

The challenger_start.py file will get you started. The basic approach is:

1. Identify all weather stations within 100 km of Cape Canaveral (Note: not all the stations necessarily recorded a temperature on any given day, and some stations are missing GPS locations. All bad station (and temperature) data can be ignored.

2. Find the temperature for Jan 28th, 1986 for each station within 100 km.

3. Report the final average temperature as the average of these nearby stations. Was the temperature close to freezing? How might this have affected the Space Shuttle's O-Ring seals? The physicist Richard Feynman was on the commission that investigated the tragedy. He performed a simple experiment using a piece of the O-Ring material and a glass of ice water…. watch: https://www.youtube.com/watch?v=raMmRKGkGD4

4. Compute and plot the average temperature reported by nearby stations for every day in January 1986. What do you notice about January 28th? Had they pushed back the launch by a single day or two, would it have made a difference?

Submit

Code and visualizations.   Embed text output (final temperature estimate) in header.