Cherry Tree Narrative

N/A

2023-02-28

Climate change is upon us now and it is evident in everyday life. It is one of the hot topics in today's world wherever you look, and everyone has an opinion. Some are still in doubt that it exists, while others say that it is inevitable , and there also those that say humans are to blame. There are a ton of factors to look at when talking about climate change. One very helpful thing to consider when discussing climate is obviously the temperature, but another way to look more deeply into climate change would be the way that it is affecting other life sources, more specifically plants.

Cherry trees are a great indicator to use for climate change because of the beauty in their blooming. It is such a spectacle and there are festivals around the world to celebrate this occurrence of nature. It is a great way to bring together people around the world to better understand the world that we live in and how we are affecting it. Since they are so beautiful, it is easy to talk about and remember, and people have been documenting the bloom dates for locations across the world for hundreds of years, even thousands in some sites. So, there is plentiful data when speaking specifically about cherry trees, which is why they are very neat to study.

When tasked with this problem and after preparing from all the attached information and videos, I thought that the best prediction model when trying to predict future bloom dates would be using temperature. It is very evident that a very important factor in bloom dates for cherry trees is growing degree days. This would be the time in spring prior to bloom date which some biologists argue are some of the most precious days prior to a plant blooming. Another factor that also seemed to be important was chilling degree days, which would be days in the winter and depending on how cold they are, they could have an effect on the bloom date of the plant. So taking these two factors into account, I started building my model and working towards the best predictions possible from what I knew. Another fun thing about cherry trees is that when doing the predictions and looking at all of the previous data, they seem to alternate in how early or late they bloom and also seem to be random at some points in history. It was just interesting to note and also made the predictions more fun because there are so many different ways to go about doing the prediction for the bloom date.

When doing my model, I used the programming language R to do all my work. In R, there is a source of temperatures for the specific locations that we were looking at. For my model, I gathered all of the temperatures for the past 43 years and used those temperatures to predict the upcoming temperatures for the next 10 years. I gathered the temperatures by season and then took the averages of the minimum and maximum temperatures for those years. After doing that, I found the midpoint temperature for each season and year for each location. The only two seasons that I was concerned about for my model were winter and spring, so I took the average of those two seasons for each year and made this one of my main variables when building my model.

For my actual model, it was a linear regression model based on the previous locations' bloom dates and also the new temperature variable that I created. The regression model that I used showed promising results. There were no previous data points for the Vancouver location however, so for those predictions, I just took all of the previous bloom dates and ignored the location site. This way it would be an average over all three locations. When I was finally finished with building my model and had my predictions, the days for my bloom dates were a couple of days later than last year's recorded bloom date. This should not be of major

concern, since like I stated earlier the bloom dates do appear to alternate years when speaking in regards to how early or late they bloom.

In conclusion, when using growing degree and chilling degree day average temperatures along with previous bloom dates, my prediction model for the cherry blossom trees' bloom dates was later than the previous year for all locations. My prediction model does not specifically show that the bloom dates are shrinking, but this contest did make me think more about climate change and how we are affecting our planet each day. It does start to add up overtime and we can see this directly with our plants and more specifically, the cherry tree blossom dates. I think that this competition was a great way to open people up to the issue and also spread awareness and let them know that climate change is happening and it does affect everyone and everything in nature. I want to thank you for the opportunity, and I am excited to make more predictions next year.