Team SJCHS170 San Juan College High School Physics Dangers of Fire

Problem Definition: New Mexico is an arid state which increases the chance of fire. Inside the state there are many dead/dry plants in the area that if they come in contact with fire can burn and cause a chain reaction with other flammable dead/dry plants causing catastrophic damage. In 2000 the Cerro Grande Fire devastated New Mexico because of the burning wood embers (Gabber, Cerro Grande fire, 10 years ago today). So, what is a way we can stop this accident from happening again.

Problem Solution: To stop the repetition of that accident from occurring again it is possible to test many combinations of the flammable objects many people would use in a fire today. Fires have caused 11.6 billion dollars of damage in 2014 throughout the country (U.S. Fire Administration). That money could be saved by finding the effects of wind and power of combinations of common flammable materials to find the travel distance of the fire as it leaves its fuel. With this the world can avoid fires. By using the related rates of a circle we can calculate the maximum spread of a fire within a certain radius from a starting point. When you have a fire you can find a circle in which it fits in and how fast it the fire expanded by finding the change of the area divided by the change of time divided once again by the area of a circle to find the change of the radius over time which shows the fire expanding in a line.

Progress to date: We have currently made a simulation in Python using Tkinter as the GUI. We have programmed buttons to activate our factors in our “simulation mode.” Our “simulation mode” first starts the simulation then records how long the simulation ran for. We use this data and put it into an equation to find spread. Our buttons simulate the different combinations of flammable materials igniting. The fire spreads across the first combination of wood and gasoline. There is another combination, wood and fire, this mimics a dry fire. A dry fire is when the materials are burning because the temperature was hot enough to get the materials caught on fire.

Expected results: The program should be expected to show that fires caused by gasoline, strong wind, wood, tumbleweed, and a hot fire can be lit extremely fast and can start spreading to other plants. If these results are true, then people should heed the safety warnings that the United States have given. For example, people can know that on a windy day they should not put a fire anywhere near another flammable material. Another expectation that we want to expect from our program is to show that these fast burn rates can cause very big fires. When people have bonfires, they tend to be large warm and sometimes they can get out of control we hope to change that, and hope people listen and try to avoid the danger. Another expected result is that fires will decrease across the nation. If this is put into action changes can and will be made and there can be less fires in America.

Work cited

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