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CS346 - Final Project Proposal
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For our final project in CS346, we will start by implementing the basic fire spreading project laid out in the book. This will include variables for the probability of fire spread and utilize the simplistic neighborhood model of fire spread described in the book. As we progress, we will add complexity to the model to include rainfall, wind direction, and lightning strikes. Additionally, if there is a more accurate and complex way to model the spread of a forest fire other than just the neighborhood method employed in the book, we will implement that as well to get a more realistic idea of what the spread of a wildfire looks like.

Continuing to move forward, we hope to implement a multiscale model to simulate the different parts of the forest. This difference in granularity will allow us to model the small underbrush as well as the large trees in each grid square. Along with this model comes the ability to model regrowth over time. We hope to model forest regrowth, and by simulating over a large simulation length will allow us to see how the forest changes over decades.

Adding further complexity to the model, we may opt to make a more interesting grid or forest to model what forests actually look like in the real world. This may include rivers or topographical features, or human made objects like roads. This will allow us to simulate the impact of human presence on wildfires, under the assumption that the presence of humans means there is a higher chance of a wildfire to start in specific locations.

With this model in place, we hope to study the impact of forest density on the frequency and severity of wildfires. Specifically, with a multiscale model in place, we can study how putting out small brush fires impacts the strength of a large wildfire when it is left unchecked. We plan to simulate the model over a period of decades to understand how the human impact of putting out small fires leads to large, uncontrollable fires.

In regions such as California and Australia, we see that human presence has caused large wildfires. While drought plays a role in this, which we hope to model in our simulation, we also hypothesize that human presence has a negative impact on the devastation caused by forest fires, and that small fires are necessary for the health of the overall forest in these ecosystems.

If all goes as planned, we will be able to conclude from our model how forest density impacts fire spread, and if any human attempt to curb forest density or small fires impacts the power of the next fire to come. Ideally, this will all be visualized in a MP4 file as we hope to have data across many decades.