Headed towards Doom: Using AI to Visualize Anthropogenic Destruction

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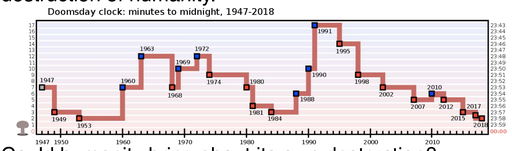
FOOTHILL COLLEGE RESEARCH & SERVICE LEADERSHIP SYMPOSIUM

Introduction

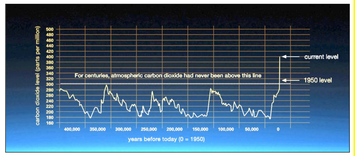
The Doomsday Clock was created by the Bulletin of the Atomic Scientists in 1947 and it represents the likelihood of a man-made global catastrophe. Currently, we are two minutes away from midnight, midnight meaning the destruction of humanity.

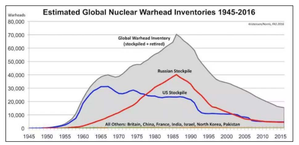


Could humanity bring about its own destruction?

These are the current threats to humanity:

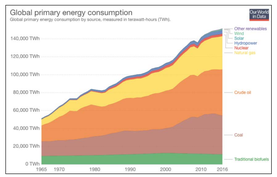
- Climate Change





- Nuclear Weapon Arsenal

- Political Climate



- Technologies

Project Goals

•Create a model that could accurately predict minutes to midnight.

•Use the tools available in machine learning to predict data.

•Inspire college students to take on seemingly impossible projects.

•Inspire students with no technical experience to get involved.

Data

Climate:
•Carbon dioxide concentration
•Ocean pH
•Ozone concentration.

Technologies(% of total energy produced per year):
•Sustainable technologies (geothermal, solar photovoltaic, solar thermal, tide, wind, hydroelectric, etc.)
•Non-sustainable technologies: Coal energy
•Nuclear energy

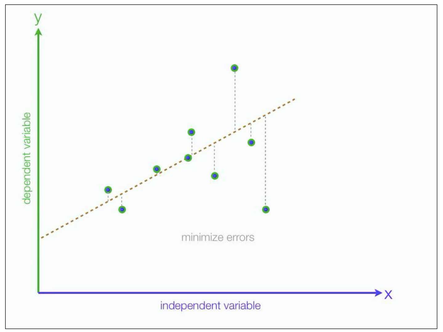
Policial climate:
•Global military expenditure (% of GDP)
•Global political alignment: Right wing, left wing, centrist, no executive, no information
•Amount of international conflicts started per year

Nuclear weapon arsenal

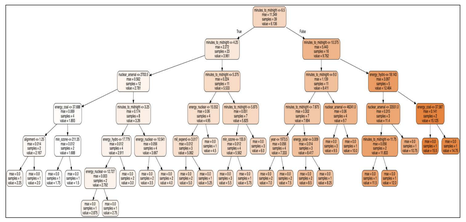
Algorithm: Starting with Linear Regression

Model a relationship or trend line between features/independent variables(s) and a target/dependent variable.

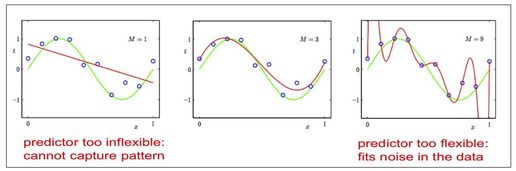
Least Squared Error: The squared difference between the actual and predicted values.



Next Step: Decision Trees



Random Forest: A Case For More Trees



Decision trees are notorious for overfitting the training data making them weak learners.
The Solution? Adding more randomly generated trees.
By aggregating the predictions of all the trees, a Random Forest model is able make much more accurate predictions.

Fitting the Model: Training and Testing

```
mean accuracy :
0.962386832327

average error % :
11.1413292998

 --- actual vs predicted minutes to midnight for testing data ---

    index  year  actual  predicted    % error
0      18  1965    9.50    9.51500   0.157895
1       2  1949    3.00    4.15625  38.541667
2      53  2000    8.00    8.92000  11.500000
3      27  1974    9.00    9.91000  10.111111
4      45  1992   16.25   14.73625   9.315385
5      32  1979    7.50    8.24750   9.966667
6      33  1980    7.00    7.67250   9.607143
7      58  2005    6.00    5.76250   3.958333
8      60  2007    5.00    5.50500  10.100000
9      17  1964   10.75    9.42250  12.348837
10     40  1987    5.25    5.28250   0.619048
11     15  1962    9.50    9.25250   2.605263
12     13  1960    7.00    7.93875  13.410714
13     49  1996   11.50   14.26625  24.054348
14     28  1975    8.50    9.42000  10.823529
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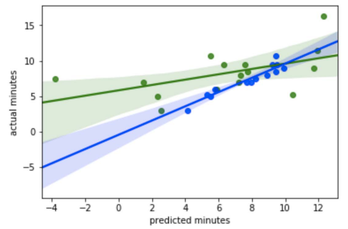

Expectations vs. Predictions

Four different scenarios:

1. Increased military expenditures and nuclear arsenal
Expectation: the clock will get closer to midnight
Reality: the clock got further away from midnight

2. Doubled the use of sustainable energy, and increased harmful effects of C02 emissions, ozone depletion, and acidification
Expectation: the clock won't have significant changes
Reality: the clock closer to midnight

3. Decrease the harmful effects of C02 emissions, ozone depletion, and acidification by 60%
Expectation: the clock will get further away from midnight
Reality: the clock got slightly closer to midnight

4. Doubled the use of sustainable energy
Expectation: the clock will get a bit further away from midnight
Reality: the clock got closer to midnight

Conclusions

•We used different variables than the Atomic Scientists: while we focus on numerical data, they take a holistic look at the world.

•We built a model that is too objective. It didn't take into account the vision of policymakers, nor a look at the future.

•The next step for the project would be to add sentiment analysis on news sources to better predict the time.

Data Sources:

World Bank, Nasa, Noaa, SOEST.