Strokes

The Wizards

What is a Stroke?

A stroke kills brain cells, and can happen in 2 ways:

Ischemic: Occurs when blood flow to the brain is blocked.

Hemorrhagic: Occurs when a blood vessel in the brain leaks or bursts.

There are factors that can lead to a stroke:

- Obesity
- Drinking
- Smoking
- Age
- Sex
- Heart issues
- Diabetes
- Other health issues

How to Prevent a Stroke

You can reduce the risk of having a stroke by doing the following:

- Education on strokes
- Early detection
- Knowing your risks

The acronym “FAST” describe what to look for in a person who may be having a stroke:

F - Face - ask the person to smile, does one side of their face droop?

A - Arms - ask the person to raise both of their arms, dose one arm have trouble getting or staying up?

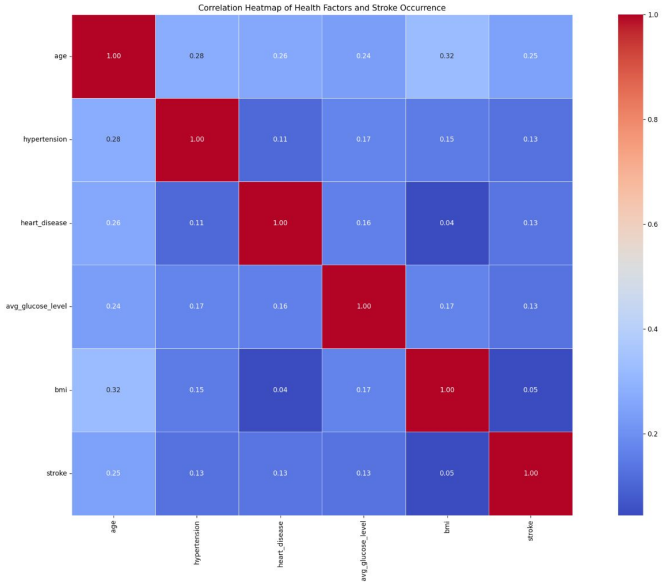
S - Speech - ask the person to repeat a simple phrase like “Pineapples don’t belong on Pizza”, do they have trouble repeating the phrase?

T - TIme - if the answer is yes to any of these questions, call 911 or emergency services right away.

Knowing your health risks

Risk factors include (based on the provided dataset):

- Age (25%)
- Hypertension (13%)
- Heart disease (13%)
- Average glucose level (13%)
- BMI (5%)



A.I. and its Applications

There are two ways of how AI can be used with strokes:

- It can be used to determine if someone is at higher risk.
- It can help a patient learn if there is something that they can do to reduce their risk.

The dataset

The dataset consists of information on gender, age, hypertension, heart disease, if they were ever married, their work type, residence type, average glucose level, bmi, smoking status, and if they have ever had a stroke before.

However, we are missing information on BMI for some of the people, so we used an interpolation function within pandas to solve it.

There was also an issue with the model taking in the ID section; this section was removed when running the model.

Original Model

With the original model, the F1 score was low (4%), which showed that there was an imbalance.

Data: 4,861 non-stroke, 249 stroke

Using SMOTE to Fix Imbalances

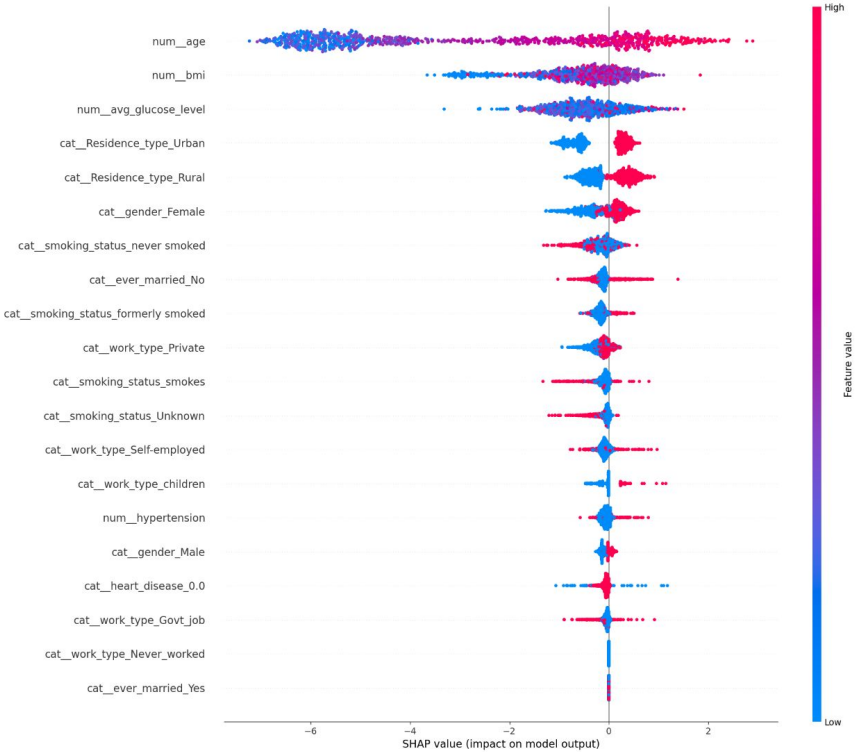
SMOTE causes the dataset to create the same amount of stroke values for non-stroke values, equalizing out the dataset.

Although, it does cause some issues with how that data is like (not entirely accurate).

All Models Compared

	Logistic Regression	Decision Tree	Random Forest	XGB
Accuracy	84%	89%	94%	93%
Precision	19%	13%	21%	24%
F1 Score	30%	17%	15%	19%
Recall	7%	22%	12%	16%

SHAP Implementation



Educating the Public

We can educate the public by making a website that can be easily accessible by anyone.

We can also include our research in A.I. and strokes, and include a page where you can enter your symptoms and have the A.I. determine whether it is a stroke or not.

Additional Models Compared

	XGB	GBM	MLP	LDA
Accuracy	84%	94%	91%	83%
Precision	19%	33%	16%	19%
F1 Score	30%	29%	17%	31%
Recall	7%	26%	18%	76%

Also tried SVM-L, SVM-NL, KNN, GNB

Thank you!

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