

Machine Learning and Dementia

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A machine Learning algorithm is simply a computer program that can learn to accurately predict something. The goal of this research was to see if I could write one that could accurately diagnose Dementia, a degenerative neural disease that effects mostly the elderly. I used Naïve Bayes, which learns essentially by memorization, and an algorithm, called metaCost, to boost its accuracy.

The data came from a study of patients in Ireland, called A Prospective 14 Year Longitudinal Follow-up of Persons with Down Syndrome.

True Positive: number of correct predictions of Dementia

False Positive: Number of false predictions of Dementia

True Negative: Number of true predictions of not dementia

False Negative: Number of false predictions of not dementia

$$Q_{Dementia} = \frac{TP}{(TP+FP)}$$

$$Q_{NotDementia} = \frac{TN}{(TN+FN)}$$

$$R_{Dementia} = \frac{TP}{(TP+FN)}$$

$$R_{NotDementia} = \frac{TN}{(TN+FP)}$$

$$C = \frac{(TP+TN) - (FN+FP)}{\sqrt{(TP+FN)(TP+FP)(TN+FN)(TN+FP)}}$$

Where:
 TP= True Positive
 FP= False Positive
 TN= True Negative
 FN= False Negative

Results:

Algorithm not much better than random, Probably due to insufficient data.

Conclusions:

I do not know if my algorithm is accurate.

Direction for Future Work:

Obtain bigger data set to better evaluate algorithm, modify and test it to work on general population, distribute as software.

Algorithm	Random Guessing
True Positive: •3355	True Positive: •2257
False Positive: •935	False Positive: •629
True Negative: •391	True Negative: •697
False Negative: •1403	False Negative: •2501
Q Dementia: •0.7820513	Q Dementia: •0.7820513
Q Not Dementia: •0.2179487	Q Not Dementia: •0.2179487
Recal Dementia: •0.7051282	Recall Dementia: •0.474359
Recal Not Dementia: •0.2948718	Recall Not Dementia: •0.525641
Overall Accuracy: •0.6157133	Overall Accuracy: •0.4855358
Correlation: •0	Correlation: •0