Automated Benevolent Text Evaluation

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Automation and the future.

How does the Automation of text help?

Uses of Text Automation

Automation is used everywhere these days to save time and money

- Examinations
- Text to speech tools
- Wave Analysis tools

Objective

The Approaches

The work and approaches taken to solve the problem

- Our initial Approach to the problem
- Approaches in previous Papers
- Our Current Approach to the problem

First Approach

First Approach

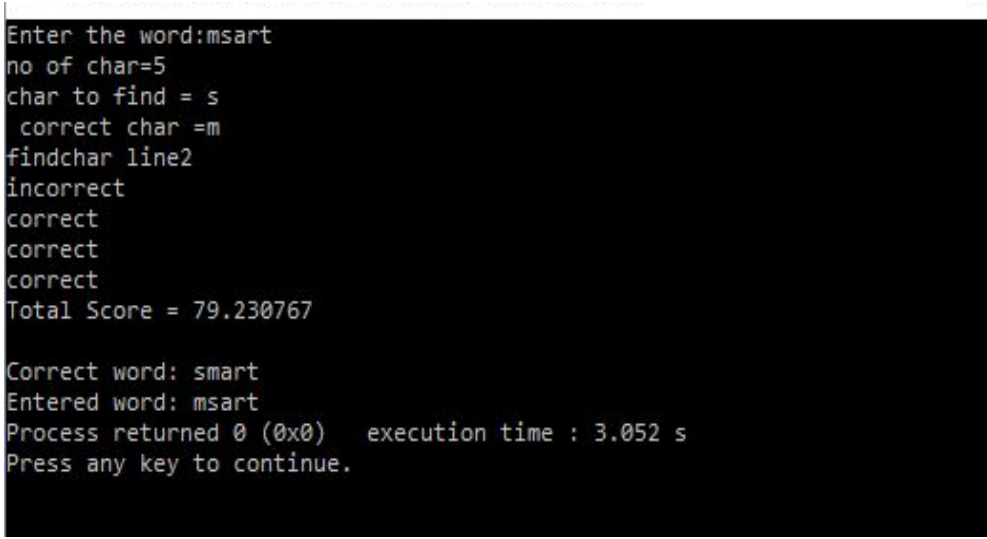
Objective:

The objective of these approach was to award marks on the basis of correctness.

Procedure:

The word was traversed letter by letter and correctness was awarded on substitution and transposition errors.

Here the person can set the acceptability of the score.



Second Approach

Second Approach

Objective:

The objective of the approach was similar to the first approach but instead we gave a word full score and penalized for wrong answer.

Procedure:

The word was traversed letter by letter and the score was deducted on substitution and transposition errors.

A threshhold value of 50% is set and as the score goes below 50, the answer is rejected and a score of 0 is given.

Initial Results

1. Result Approach 1

   (1-Accepted, 0-Not Accepted)

Approach 1				
S no.	Correct	Entered	Score	Acceptance
1	smart	smart	100	1
2	smart	smrat	79.23	1
3	smart	asdfg	19.23	0
4	smart	ismrt	40	0
5	smart	dmart	99.23	1
6	smart	amart	99.23	1
7	smart	rsmat	20	0
8	smart	ffart	60	1
9	smart	snart	99.23	1
10	smart	smsrt	99.23	1
11	smart	asdas	19.23	0

2. Result Approach 2

   (1-Accepted, 0-Not Accepted)

Approach 2				
1	smart	smart	100	1
2	smart	smrat	90	1
3	smart	asdfg	0	0
4	smart	ismrt	0	0
5	smart	dmart	90	1
6	smart	amart	90	1
7	smart	rsmat	0	0
8	smart	ffart	60	1
9	smart	snart	90	1
10	smart	smsrt	90	1
11	smart	asdas	0	0

Review Of Literature

Papers

- Algorithm was limited to single word evaluation.
- Algorithm was used to check the pre and post expressions which includes the start and stop words with conjunctions.
- Knowledge network map a scheme to analyse and evaluate the long textual answers written over E-Learning platform.

Formal notions:

- Alphabet
- String
- Grammar

Spell Checker:

Checks the spelling of the entered word with respect to the correct word.

Fuzzy Logic

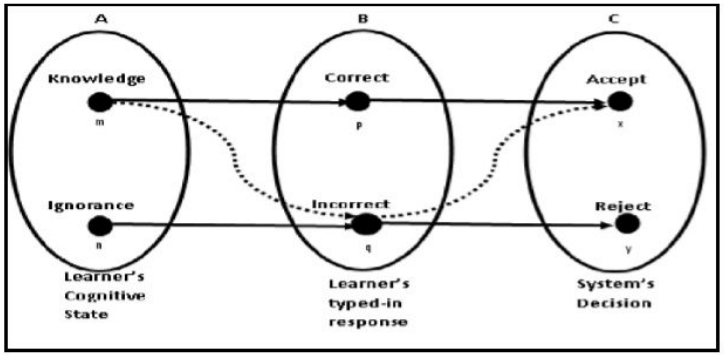


Fig.1. Cognitive model to intelligently recognize learners' response

The Automata

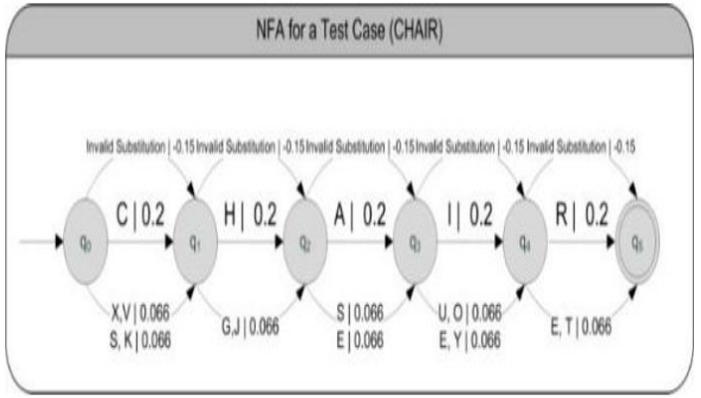


Fig.2. NFA (Non Deterministic Finite Automata) for System Design

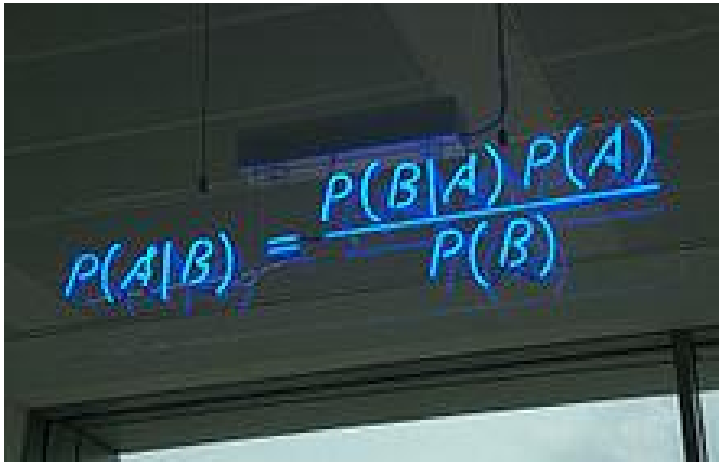
Bayes Theorem

Formal definition of bayes theorem is, the description of the probability of an event, based on prior knowledge of conditions that might be related to the event.

Bayes theorem is used in usual day to day scenarios and computing without us knowing it being there.

For example, in spam filters there is a bayes function which filters the text on the basis of prior emails which are marked as spam.

That is how some mails are easily sent to spam folder without any confirmation.



Hypothesis Naive Bayes

Naive Bayes.
The Probabilities.

Hypothesis support

We think this is what's going to happen because...

Naive bayes model works on training data sets and corresponding target variable (in our case ACCEPTABILITY).

With the help of naive bayes equation we found out the posterior probability of that particular class.

Variables that may affect the outcome...

- Bias of Naive Bayes.
- False majority problem.

Using Naive Bayes as learning Algorithm

Naive Bayes Works on numbers and probabilities.

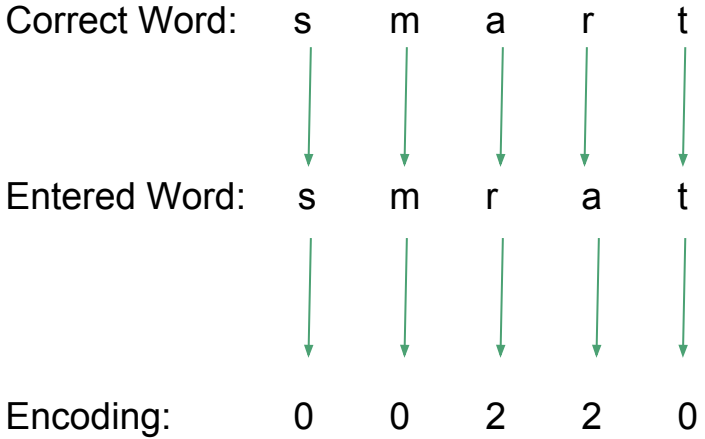
So we had to Encode the data using basic encoding for Naive bayes to work.

This encoding was on the basis of previous approaches i.e. correctness of the word.

Encoding:

0- Correct
1- Substitution
2- Transposition
3- Incorrect

<u>Encoding:</u>



Results

Results using Encoding and Naive bayes Classifier as a machine learning technique.

correct word	input	encoding	acceptance
smart	smrat	0,0,2,2,0	1
	asdfg	1,3,3,3,3	0
	ismrt	3,3,3,0,0	1
	dmart	1,0,0,0,0	1
	amart	1,0,0,0,0	1
	rsmat	3,3,3,3,0	0
	ffart	3,3,0,0,0	0
	snart	0,1,0,0,0	1
	smsrt	0,0,1,0,0	1
	asdas	1,3,3,3,3	0
	test case	**encoding**	**predicted acceptance**
	msart	2,2,0,0,0	1
	legends		
	0 - correct literal. 1 - substitution . 2 - transposition . 3 - fully incorrect.		

Conclusion and Future Development

We worked with the Naive Bayes Theorem Encoding part where the naive bayes classifier works on the training data with the input as the results are much more promising than the older previous approach.

Right now the approach only works for the single word evaluation but in the upcoming scenarios we would be developing this system for the comprehensive text evaluation.

References

- Aritra Saha, Pritha Banerjee(2015): Benevolent One-Word Text Response Testing System

- Udit Kr. Chakraborty,Samir Roy and Sankhayan Choudhury(2014): A Novel Semantic Similarity Based Technique for Computer Assisted Automatic Evaluation of Textual Answers

- Udit Kumar Chakraborty, Sampa Das(2015): Automatic Free Text Answer Evaluation using Knowledge Network

Questions?

Thank You :)