

BRAIN MATHEMATICS ----- MATHEMATICS OF JOKES

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ABSTRACT; Brain is a biocomputer. Hence, it is natural to expect that brain is working by many lines of programs. In other words, we must be possible to discover the principle of activities of brain by mathematics. When I was studying about mathematical logic and looking for the equation about the "sense" of sense, I also discovered the mathematical rule of interestingness. The true color of it was, "PARADOX".

If you saw a super computer mistaking calculation, such as " $1 + 1 = 3$ ", you will laugh because it is an easy calculation for us.

Why is it interesting for our brain? Does it have mathematical rule?

To begin this paper with result, it is controlled by mathematical rule which belongs to mathematical logic^[1]. And also, interestingness can be measured mathematically. Our emotion is under control of mathematics. Interestingness was a result of calculation of our brain.

Here, I show the rule of calculation of interestingness which our brain does.

First, construct a triangle of concepts and words. At the peak, the concept of interpretation, such as color(of crow) or peacefulness is placed. And at the two corners of bottom of this triangle, words and its antonyms, such as black crow and white crow or violent man and Gandhi will be placed.

When words became its antonyms, our brain judges it interesting. For example;

Joke1."Black crow became white (because someone sprinkled white paint to it)".

Joke2."A violent man pretend Gandhi."

In this way, our brain is thinking about the structure of logic all time, and judging logics if it is a serious one or interesting one.

Let's think about this from opposite point of view. Please judge following two jokes if they are interesting or not.

Joke3."A monkey is counting bills like human beings do".

Joke4."A man is walking with his hands on the ground like a monkey".

I think many readers of this paper think these jokes interesting.

Now, let's analyze the structure of these jokes.

Relationship between monkey and human being is a word and its antonym under the interpretation of "primates". When words became its antonyms under a concept of interpretation, our brain judges it interesting.

These two jokes are satisfying this condition. So they look interesting.

This is the rule of interestingness for our brain. Our brain is calculating logics mathematically, if it is "paradoxical" or not. Jokes are paradoxes^[2], in short.

But, not all jokes are interesting. Some of them are not interesting.

Let's think about this case.

Change color of white to light gray of the joke1.

Joke5. "A crow was changed its color from black into light gray (because someone sprinkled light grayish paint to it)".

I think most people felt interestingness of this joke is less than joke1. And if the changed color were gray, I think almost no one feel it interesting.

In this way, plot black crow at the left edge of axis and plot white crow at the other edge of axis and measure the distance from left edge to the point of color(density of greyness) of crow, interestingness can be measured along this axis mathematically.

This is the "distance between words", DBW. To follow this definition, we can calculate interestingness of jokes mathematically. In general, jokes become more interesting as DBW becomes larger.

I want to define the DBW between a word and its antonym as 10. 10 is the maximum DBW. Therefore, when DBW were 10, jokes become most interesting. And also, "sharpness" of jokes derives from DBW.

But, not all concepts are continuum like color. Then, what is the true color of DBW? Is it generalizable?

To understand this, I prepared following words.

1.cellular phone, 2.ordinary telephone, 3.telephone made from two cans and a piece of string(=tcs)

I enumerated these words along axis under the interpretation of "technology of telephone". I gave coordinates of ZERO to the tcs. And also, I gave coordinates of 10 to the cellular phone. I think coordinates of ordinary telephone is 8. So DBW between cellular phone and tcs is 10, and DBW between cellular phone and ordinary telephone is 2, and DBW between ordinary telephone and tcs is 8.

Under this condition, I prepared two jokes with these words.

Joke6."A cellular phone is connected to the other cellular phone by tighten string at antenna and working(case of DBW=10)".

Joke7."An ordinary telephone is connected to the other ordinary telephone by tighten

string as cable and working(case of DBW=8)".

How do you think them? I think Joke6 is more interesting than Joke7 with little difference. In this case, I think I could show the principle of measuring interestingness of jokes.

If you want to make an interesting joke intentionally, you should try to find a pair of words of which DBW is 10.

Following is the mathematical expression(formula) of jokes which I defined. Sense of the symbol ">" is "became".

Formula of jokes;

{"interpretation" | [words > antonyms](DBW=(value of DBW))}

For example, expression of joke1, joke6 and joke7 become following;

Joke1; {"color of crow" | [black crow > white crow](DBW=10)}

Joke6; {"technology of telephone" | [cellular phone > tcs](DBW=10)}

Joke7; {"technology of telephone" | [ordinary telephone > tcs](DBW=8)}

In conclusion, our brain is calculating DBW and judging if the sentence is interesting or not. This is the direct proof in the area of medicine that emotion(interestingness) is the appearance of calculation of our brain. For our brain, interestingness is an object of calculation. And, other emotions, such as sadness or anger are also the appearance of calculation in our brain, I think. I think they are paradoxical, too.

Definition of brain mathematics is, "mathematical approach about activities of brain, such as emotion, understanding, language(mathematical language), thinking, etc".

Quantum mind^[3] is a theory about hardware of our brain. And brain mathematics is a theory about software of our brain and will clarify the mathematical structure of our brain(mind) completely, someday.

Referances

[1]Wikipedia, "Mathematical logic", https://en.wikipedia.org/wiki/Mathematical_logic

[2]Wikipedia, "Paradox", <https://en.wikipedia.org/wiki/Paradox>

[3]Wikipedia, "Quantum mind", https://en.wikipedia.org/wiki/Quantum_mind