Perfect Your Theory Using the Principle of Harmony in Gradation

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Abstract

For hundreds of years, experts have made mistakes when making the research conclusions and compiling the theory since they have hold to an inaccurate interpretation of the original nature of the measurement data in the system being observed. In detail, so far all methods of parsing and interpreting the nature of a system are based on a one-sided formula, which only sees the "good side" or vice versa only sees the "bad side" of the system being observed, then the results impossible to be accurate.

The principle of Harmony in Gradation bases on a combination of formula that observe the "good side" of the system referred to as "the Harmony" and formula that observe the "bad side" of the system referred to as "the Gradation". Then, the resulting calculation will be able to accurately represent the original nature of the observed data. Thus, by adhering to the principle of Harmony in Gradation, experts will be able to make the accurate research conclusions and theoretical formulations. Finally, this article is equipped with a report of simulation results which proves the validity of the proposed method, online method and discussion for further use of the method.

Keywords: *data interpretation; nature of data; the Harmony; the Gradation; Harmony in Gradation*

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Introduction

A painting or natural landscape that has a combination of shapes and colors look beautiful if there is a harmony of the gradation of the shapes and colors that lie in suitable positions. Also, a musical composition that has a combination of tone and rhythm will sound melodious if there is a harmony of the tonal gradation and the rhythm that lies in the appropriate time sequence. Then, inspired by paintings, natural scenery, and music, we came up with the idea that in order for us to interpret the nature of the measurement data of a system, we should base our analysis using a formula that contains the harmony of gradations that exist between each element of the data.

More specifically, the branch of science that is worth considering the Harmony of a system or that it uses "the level of harmony" which represents "the beauty" as the keyword of the research, which are called in different terms such as "level of balance", "equilibrium level", "stability level", "level of parity", "equipoise level", "level of competition", "level of justice", "fairness level", "level of correlation", "level of performance", "Level of quality", "level of certainty", "level of health", "level of similarity", "confidence level", "level of consistency", "level of equity", "level of equality", and others. And, in the science which prefer to use the negative terms, then the spirit of the Harmony will corresponds to the terms of "the level of imbalance", "entropy", "the level of concentration", "the level of injustice", "unfairness level", "complement level", "counterbalance level", "level of uncertainty", "level of relativity", "level of inequality", "level of inequity", and others.

The method in this article will help experts in each field of science to correct their respective theories, because, only this method is able to accurately represent the original nature of a measurement data. Otherwise, all experts will make a wrong research conclusion and inaccurate theory, if they hold to an inaccurate interpretation of the nature of the measurement data in the system being observed.

Method

The principle of Harmony in Gradation states that the original nature of a system can only be represented by a formula that simultaneously measure the “good side” or the “harmony” and the “bad side” or the “gradations” of the elements in the system.

A formula that fulfills the requirements of the principle of Harmony in Gradation is should have two parts at once, the first is a formula that measures the “good side” or we call as the “harmony” in the system without regard to the level of disharmony, and the second part is a formula that measures the “bad side” or we call as the “gradation” in the system without regard to its harmony. Then, take a look an example formula (*please note that this formula is not the only one*) that meets the principle of Harmony in Gradation as follows [1], [2], [3], [4], [5], [6], [7], [8] :

$$\text{Harmony in Gradation Index} = \frac{1}{N\{\sum_{i=1}^N S_i^2 + \sum_{i=1}^N \sum_{j=1}^N (S_i - S_j)^2\}}; i > j \quad (1)$$

The formula for calculating the harmony index in equation 1 is only used in a measurement data of a system where all elements have a real positive value, where S_i is the elemental strength, whose magnitude is equal to the ratio between the value of an element and the total value of all elements. Thus, the sum of the element strengths of all elements in the system is equal to one, and the maximum value of harmony in gradation index is equal to one, which occurs in a system if all elements in the system have the same value.

Furthermore, the formula in equation 1 is stated as meeting the principle of Harmony in Gradation, because it has both the $\sum_{i=1}^N S_i^2$ part (which we call as the Harmony) and the $\sum_{i=1}^N \sum_{j=1}^N (S_i - S_j)^2$ part (which we call as the Gradation). Where, the Harmony is representing the level of harmony of the elements in the system without is taken into account the level of disharmony between the elements, and the mathematical evidence that can be learned to in reference [9] and [10], wherein the harmony used in those references is called as “the Competition”. On the contrary, the Gradation is representing the level of disharmony of the elements in the system without taking into account the level of its harmony, where the mathematical evidence can be seen in reference [11] and [12], wherein the gradation used in those references is called as “the Inequality”.

Furthermore, the proof that the formula in equation 1 is one example of a formula that can

interpret the original nature of a measurement data on a system is to use a simple logic. That is: if A complies X but does not meet Y, and B complies Y but does not meet X, then there is an opportunity to combine A and B in such a way as to meet X and Y at once. Then, in the case in equation 1, the formula that fulfill this statement (meets X and Y at once) is a formula that combines $C = (1/A)$ and $D = (1/B)$.

Moreover, when we are analyzing a system that we believe that there is should be a harmony, but the result of calculation using the formula in equation 1 had produced a low index, then we must take certain steps before starting to interpret our data, among others are by way of:

- I. Dividing the system into several sub-systems such that there is a good level of harmony between sub-systems. Where, the Harmony in Gradation formula measures on a new system which are the combinations of sub-systems that have been done using simple mathematical functions (division or difference) or using complex mathematical functions depending on the level of complexity of the system being observed.
- II. Combining several elements that have relatively small strength so that the system population will be less but there will be a balance of power between the existing elements that have high power and the new elements which are a combination of existing small elements.
- III. Let the population not change but shift or give a portion of the strength of the elements that are relatively large to the small strength elements.
- IV. The fourth way is similar to the first way, but the improvement of the harmony of a system is done by creating a new system which is a combination of the system being observed with another system, if any, that has the similar elemental distribution to the system being observed.
- V. And the other ways.

Result

The simulation results as follows:

Only formulas that meet the principle of Harmony in Gradation are able to interpret the original nature of a system accurately. Exactly, the index produced by the unit of percent is representing

the percentage of perfection of the harmony level. In other word, the systems which have the harmony level of index% of perfect will get the harmony in gradation index as index%. There is no formula that can interpret the original nature of a system as can be done by a formula that meets the principles of Harmony in Gradation.

Simply put, take a look the comparison between the interpretations of nature of several systems that have different nature as presented in Figure 1. Thus, the weakness of the harmony-only formula is that it can only correctly interpret the original nature of the data when the resulting index is the biggest, but erroneously interpret the nature of systems that have almost similar nature even though they are significantly different. On the other hand, the weakness of the Gradation-only formula is that it can only correctly interpret the original nature of the data when the resulting index is the smallest but would misinterpret the nature of the some systems as a system that has the same nature when in fact the natures have a slight difference. In detail, the misinterpretation of the Harmony-only formula will occur if the level of disharmony of the system elements is significant so it can no longer be ignored anymore. Conversely, the misinterpretation of the Gradation-only formula will occur if the harmony level of the system elements is significant so that it can no longer be ignored anymore.

	Original Nature of Measurement Data of a System	Data interpretation by Harmony in Gradation Formula	Data interpretation by Harmony-Only Formula	Data interpretation by Gradation-Only Formula
system 1 has the maximum index				
system 2 has a lowerr index than system 1				
system 3 has a lower index than system 2				
system 4 has a lower index than system 3				
system 5 has a minimum index				

Figure 1 Only Harmony in Gradation Can Interpret the Original Nature of Data

Discussion

Since the formula in equation 1 is only used if all elements in the system have positive real values as they do in the "information entropy" calculation [13] and [14]. However, because the original formula have the units of bits, then certain manipulations are needed to perfect it so that it meets the principle of Harmony in Gradation. In detail, equation 2 should be considered to replace the formula in reference book [13] and [14], where the term "information entropy" is identical to the term "disharmony" in this paper. However, because the soul of the method in this

article is to measure the harmony level instead of disharmony, then here we use the term "channel cavity" as the inverse of "entropy". Finally, in equation 3 we write a formula to calculate the level of disharmony, or which currently uses the term "information entropy", with the note: *if we want to get the maximum entropy values that are the same as the existing formula, then the calculation results in equations 2 and 3 must be divided by 2.*

$$\text{Harmony Index in bit} = \log_2[N * \{ \sum_{i=1}^N S_i^2 + \sum_{i=1}^N \sum_{j=1}^N (S_i - S_j)^2 \}] \quad (2)$$

$$\text{Disharmony Index in bit} = 2\log_2 N - \log_2[N * \{ \sum_{i=1}^N S_i^2 + \sum_{i=1}^N \sum_{j=1}^N (S_i - S_j)^2 \}] \quad (3)$$

Where, pi is the probability of the symbol occurrence.

Further Study of the Harmony in Gradation Principle

Further developments of the Harmony in Gradation principle are the formulation of other formulas that meet the principles of Harmony in Gradation other than those in equation 1 and 2, including those in the formula containing the parameters of physics and biology.

Online Method

We have made several "internet calculators" that can be used online related to the calculation of harmony in gradation levels, especially those in existing conditions which have been translated into scientific terms in their respective fields of science into "competition level", "equality level (instead of inequality) ", "inverse of entropy" (instead of entropy), and others.

We have made several online calculators that can be used by practitioners, researchers, and theorists. Here are the lists.

- 1) Calculation the Competition Level in the Industry [15], [16], [17], [18], [19], [20] at :
<https://www.haryadi.org/competition-level-in-the-industry/>
- 2) Equality Correlation Calculation [21], [22], [23], [24] at:
<https://www.haryadi.org/equality-correlation/>
- 3) Calculation the Income Equality [25], [26], [27] at:
<https://www.haryadi.org/income-equality/>
- 4) Calculation the Inequality of Human Development Index [28], [29], [30] at:

<https://www.haryadi.org/inequality-of-human-development-index/>

5) Calculation the Internet Service Equity [31], [32], [33] at:

<https://www.haryadi.org/internet-service-equity/>

6) Calculation the Linear Regression without Intercept [34], [35], [36], [37], [38] at:

<https://www.haryadi.org/linear-regression-without-intercept/>

7) Calculation the Modified Information Entropy [39], [40], [41] at:

<https://www.haryadi.org/channel-cavity/>

8) Physics Equilibrium Index Calculation [42], [43], [44], [45], [46], [47] at:

<https://www.haryadi.org/a-new-equilibrium-index/>

9) Calculation the Competition Levels among Students 48], [49], [50] at:

<https://www.haryadi.org/competition-levels-among-students-in-class/>

10) Calculation the Consistency Score [51], [52], [53] at:

<https://www.haryadi.org/consistency-test/>

11) Calculation the Fairness over Inequality [54], [55], [56], [57], [58], [59], [60], [61], [62]

at: <https://www.haryadi.org/fairness-over-inequality/>

Closing

The proposed method is not intended to judge the theories of various sciences, but rather is presented here in the hope that experts will be able to evaluate their theories, and refine it if deemed necessary.

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