

Impact of T-Consciousness Fields on Two-Dimensional Monte Carlo Simulations (Surface)

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Abstract

Following the previous computations and assessments of the impact of T-Consciousness Fields (TCFs) on one-dimensional calculations, this study takes a step further and utilizes two series of random numbers to estimate the area of a rectangle. Such a complexity provides an opportunity to further elucidate the potential effects of TCFs, namely, the frequency of the calculated values, which are different in sample 1 and sample 2, unlike the previous study. The results, which are based on the values aligned the most to the desired answer, show that sample 2 and control have a significant difference of at least 9% with respect to sample 1. Furthermore, the Shannon entropy value in both samples is higher than that of the control. For sample 2, this parameter is approximately 2% higher than the control.

Keywords: T-Consciousness Fields, Random Numbers, Monte Carlo, Area Calculation.

Introduction

Monte Carlo methods are inherently probabilistic simulations [1] and are based on simulated random numbers, whereby certain parameters of a probability distribution can be estimated. When a problem is formulated with components that can be described as a function of a random variable, it can be solved by estimating an expected value using simulated sampling that is built from the distribution of the random variable [2]. Such a capability is utilized in this study to investigate the impact of T-Consciousness Fields (TCFs) on two-dimensional computations.

Method

In this section of the study, calculations are performed using a program that computes a specific area. The analytical value of this area is equal to eight (for more details, see section 2-2-

2 of the common considerations). Additionally, a descriptive analysis of all the obtained values from the area calculations is performed for the control, sample 1, and sample 2. Then, with a binning of 0.02, the related distributions are obtained and compared to assess the difference between the samples and the control.

Results and Conclusions

Table 1 represents a descriptive statistical analysis of the control and the samples, with median and mean values highlighted in cyan.

Table 1 - Descriptive analysis of calculated values for area in the control and samples

	Control	TCF1	TCF2
Number of values	100	100	100
Minimum	7.809	7.826	7.846
25% Percentile	7.952	7.928	7.936
Median	7.991	7.980	7.999
75% Percentile	8.035	8.034	8.040
Maximum	8.155	8.165	8.169
Range	0.346	0.339	0.323
Actual confidence level	96.48%	96.48%	96.48%
Lower confidence limit	7.971	7.959	7.983
Upper confidence limit	8.011	8.009	8.014
Mean	7.995	7.981	7.993
Std. Deviation	0.070	0.067	0.069
Std. Error of Mean	0.007	0.007	0.007
Lower 95% CI of mean	7.981	7.967	7.979
Upper 95% CI of mean	8.009	7.994	8.006
+1 Sigma (round 0.1) of Mean	8.1	8.0	8.1
-1 Sigma (round 0.1) of Mean	7.9	7.9	7.9

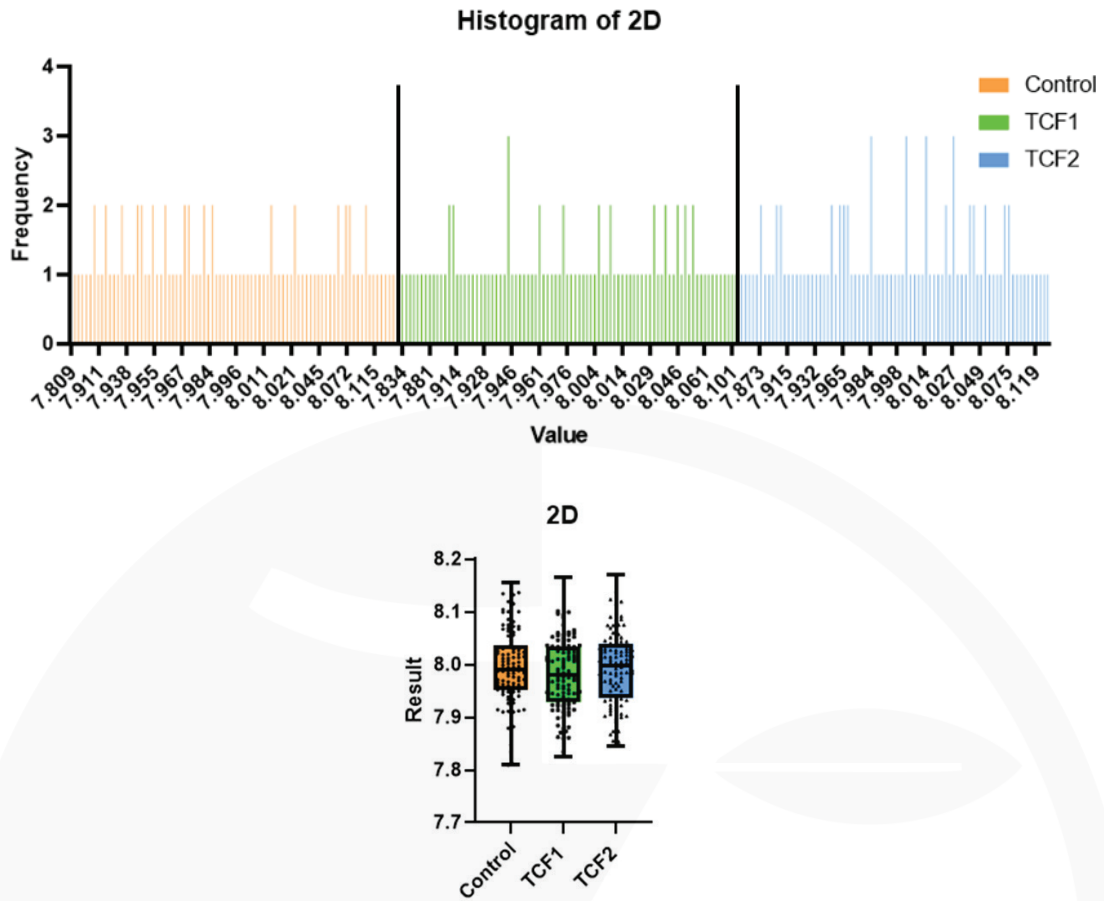


Figure 1. Histogram of all generated values (top) with box plot analysis of generated values (bottom).

The distribution of all the generated values, the drift of the calculated values with respect to the theoretical value, and the box plots of the output data for all the studied cases are provided in

Figure 2. As can be seen from the right plot, the median of sample 2 is noticeably different. In addition, the closest mean to the analytical value belongs to the control.

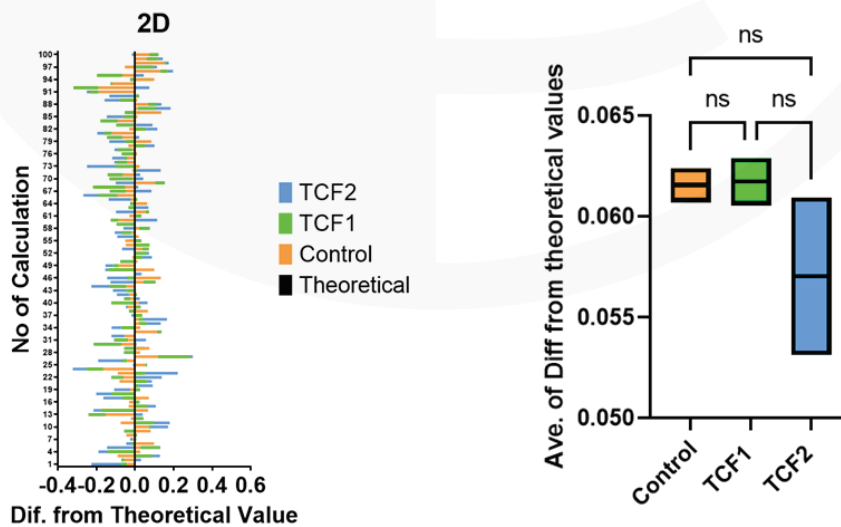


Figure 2 - (Left) Display of comparisons of the difference values between calculated and analytical values in control and samples over 100 calculation runs. The zero line represents the calculation equivalent to the analytical value, and the difference is zero. (Right) Box plot analysis of the average calculation uncertainty (average distance from the analytical value) in control and samples over three repetitions of each.

In sample 2, the average uncertainty values (average distance from the analytical value) also tend to lean towards lower values, although the difference between the two samples and the control is not significant.

Table 2 represents the frequency of the calculated values in different intervals (bins) for the control, sample 1, and sample 2. Here, the analytical value (the area magnitude) is highlighted in blue and in the first column. In addition, because the frequencies are calculated in the nearest intervals with respect

to the analytical value, one interval less and one interval more on both sides of the analytical value are highlighted. The overall frequency of the calculated values in this range is also calculated and provided at the bottom of the table. In the entropy row, the Shannon entropy value is calculated according to the equation provided in the common consideration section, for the entire range of values in Table 2.

Table 2 - The data categorized in the two-dimensional calculation test along with the calculation of the total Shannon entropy for the interval; the specified value in column 1 is the expected analytical value.

Bin Center	Control	TCF1	TCF2
7.80	1	0	0
7.82	1	1	0
7.84	2	1	1
7.86	0	3	4
7.88	2	5	2
7.90	0	3	7
7.92	9	13	7
7.94	9	10	5
7.96	14	10	9
7.98	12	7	11
8.00	10	10	12
8.02	15	10	15
8.04	2	10	7
8.06	7	10	6
8.08	6	2	8
8.10	4	4	1
8.12	2	0	3
8.14	3	0	1
8.16	1	1	1
Entropy	2.52	2.54	2.57
The percentage of calculation output in the closest intervals to the analytical	37%	27%	38%

In Table 2, by categorizing the calculated numbers into different intervals, the frequencies of the estimated numbers in the control and the samples were obtained. Since the expected analytical value specified in this study is eight, the interval with the binning center of eight and the closest intervals to it (highlighted rows in

Table 2) are considered the nearest regions to the expected answer. The frequency of the estimated numbers within this range and relative to the total calculations is reported as the occurrence or the counts in the nearest regions. This is shown in the last row of Table 2. As evident, sample 2 and the control exhibit a significant difference

of at least 9% in the interval. These two studied cases also show the highest agreement with the desired answer, as compared to sample 1. Lastly, the Shannon entropy value for both samples is higher than that of the control. In sample 2, this parameter is approximately 2% higher than in the control.

References

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