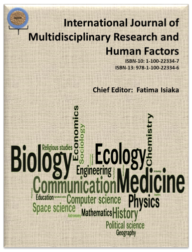

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Custom Pseudo Code For Natural Structures in User Perception

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Abstract

The main reason why users and vendors convey their business online is that it gives unique advantages over purchases online and also to their store-bound opponents online. The most advantages are the flexibility, speed, and low cost of the high levels of data. Since early 2016, data has been considered the main source of information integrity. Most e-commerce websites use everyday time frames to collect tons of data about user interaction to learn how they surf the web, what kind of things they purchase, and what sort of sites they visit to get their product. The forms of data give different analytical processing speeds to preserve and visualise the data. Most methods of data visualisation are very complex to understand thereby making less for people who might want to make use of the data online. This paper looks into a pseudo algorithm for processing and understanding natural structures in user interaction data to e-commerce websites, these data contain fixation locations and durations and also the stress level of the users while they look for a certain product online. The data is analysed based on this cognitive level to determine the level of stress or relaxation mood of the user to arrive at a particular choice of product. The result shows that for a less complex website, the relaxed mood is the most significant expression of the users and most likely the ergonomics attributes to building an e-commerce website.

Keywords : Data visualisation, Natural structures, Custom Pseudo Algorithm, Cognitive response, Online web transactions, Information integrity

1 Introduction

Vendors of e-commerce sites will collect data on how long a person can stay on the site and what they look at, and how they make their purchases. This gives direct insight into what makes them click the buy button or what hinders them from buying a certain product. The information and data collected can be used to improve the shopping experience and the likelihood that the site patronisers will become potential customers. Sometimes this information is very difficult to obtain on some sites because there is no record of what every customer looked at and how long it took them on a particular product of their choice. One of the powerful models in structural data classification is the Forward Search Algorithm (FSA) which allows for the determination of natural structure in a form of atomic coordinates for all attributes related to datasets.

A compilation of data such as user behaviour relating to fixations on visual interface continues to be a primary source of mechanistic knowledge of physiological and cognitive perceptive attributes of users in e-commerce, the implications of such data extend from basic research to translational studies and rationale behind the design and nature of the data. A reflection on some of the importance of the technique, the number of published work in behavioural user data structures has rapidly grown to more than a thousand within numerous research areas within structural data analysis. To support the need for an increasing structural representation in data on user behavioural scenarios, a set of network structures in data based on the residual plot with baseline estimates has been established in this work and made available to researchers in field of data science and data structures. While the need for data collection methods has been increasingly rationalized, deployment of data integrity and management to archived datasets relating to human behaviour has been slow and uncertain. Hence the need to represent these data in an assembled manner since vivid understanding and user assessment have gone to an advanced level. This paper presents a custom pseudo method of data representation in residual form rather than the standardised form of data presentation.

2 Literature Review

In recent times, every research area relies on numbers, figures, and data, a lot of data is considered and investigated through visualisation, and decisions are made through this initial stage [*Alhadad [1], Bishop et al. [4], Kinkeldey et al. [14], Loos et al. [16], Moore [17]*]. Sometimes, it is not always easy to understand the complexity of the data presented in front of us for evaluation purposes and certain issues such as data presentation may prove to be bogus [*Huang et al. [12], Ioannidis [13], Liu et al. [15], Power et al. [19], Simmons et al. [23]*]. The brain may have some form of comprehension of data it could also be quite cumbersome to assume or make anything significant value it.

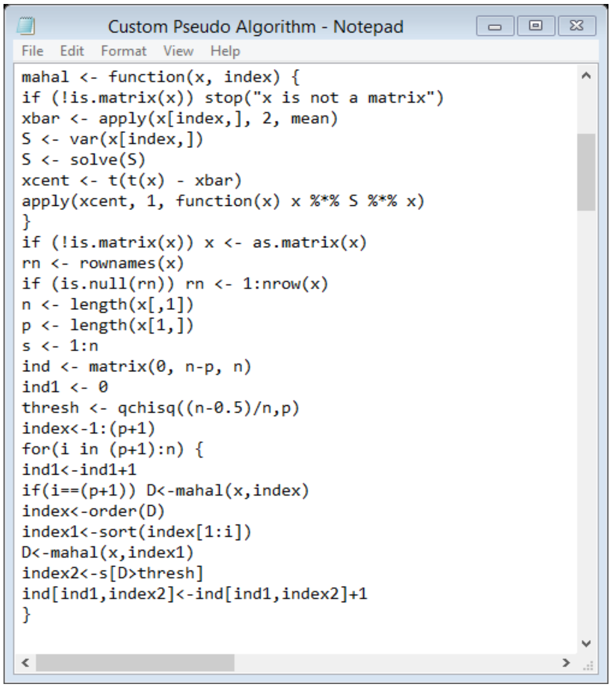
Data presentation is the change of rudimentary information into numeric delineations that tell a story [*Hagood [8], Sazu and Jahan [22]*]. Choosing what data to share and how to share it is the principle of decision-making in data visualisation. Data visualisation and analysis can take numerous structures, so as a rule the perceptions presented in diagrams outline the structure and different types of mathematical clarifications that define it. Information presentation does not only end at data visualisation, there are also logic flows, pocket diagrams, and guides that are additional sorting for information perception [*Arnowitz et al. [3], Hanington and Martin [9], Holt [11], Resmini and Rosati [20]*]. Every time we are introduced to the logic behind a concept in nations featured for accentuation we are given an eclipse about the information representation.

The utilisation of intelligent analytics is used as an elevated kind of information presentation for standalone purposes and other uses, this gives an insight into the utilisation of channels in the standard representation of data [*Anderson and Weitz [2], George and Marcel [5], Grasso et al. [7], Russell et al. [21]*]. Structural assemblies are very important in information representation which gives a message or a story behind its information perception, this is a basic apparatus for every field of research. Information perception is very fundamental in strategizing the key data presentation and dynamic analysis of the presented data. One of the main advantages of structural data analysis is that it tackles the difficulty of placing the information in perspectives to diagrammatical structure in addition to the adjustment of information for investigating openings and patterns. Its disadvantage is that gives an assessment and not the exactness of behaviour patterns, and also one-sided in the human interface for the base of perception [*Giang et al. [6], Hoffman [10], Pold [18]*].

3 Method

The initial stage of the process started with collecting data online from e-commerce webites, such as Amazon, *zyro.com*, and *www.ui.org*. These websites are visited by buyers and students online for both online shopping and e-learning. The dataset mainly contains fixation locations, durations, pupil changes (constriction and dilation), and timestamps. The physiological metrics used for cognitive perception the pupil constriction and dilation. The metrics are used to determine whether a user is stressed or in a relaxed mood while surfing, in most cases we use deep learning techniques such as convolution neural network (CNN) and recurrent neural network (RNN) to track user behaviour and interaction based on these categories, but here we applied a custom pseudo algorithm (Figure 1) to detect the patterns in the classification of the moods of the users. The steps in the algorithm are run from R through notepad (Figure 1). The residual output is based on determining the residual score based on R_2 computation from FSA method, using the least squares on the Malnoboies squared distances (mahal) from the starting point. Here the x is the input matrix that contains user attributes, this is also computed based on the Qui Square differences. The residuals produced from the data matrix are used as annotations on the graph, where each data point is first considered as an outlier, then the most outlier case appears sequential and every residual output follows this pattern till a systematic set of structural representation of the data is obtained. The aggregate of two main graphs was derived from user search patterns and this is discussed in the result section.

Figure 2 shows the stalactite output of user inter-



```
mahal <- function(x, index) {
if (!is.matrix(x)) stop("x is not a matrix")
xbar <- apply(x[index,], 2, mean)
S <- var(x[index,])
S <- solve(S)
xcent <- t(t(x) - xbar)
apply(xcent, 1, function(x) x %*% S %*% x)
}
if (!is.matrix(x)) x <- as.matrix(x)
rn <- rownames(x)
if (is.null(rn)) rn <- 1:nrow(x)
n <- length(x[,1])
p <- length(x[1,])
s <- 1:n
ind <- matrix(0, n-p, n)
ind1 <- 0
thresh <- qchisq((n-0.5)/n,p)
index<-1:(p+1)
for(i in (p+1):n) {
ind1<-ind1+1
if(i==(p+1)) D<-mahal(x,index)
index<-order(D)
index1<-sort(index[1:i])
D<-mahal(x,index1)
index2<-s[D>thresh]
ind[ind1,index2]<-ind[ind1,index2]+1
}
```

Figure 1 – The Custom pseudo algorithm for detecting the natural residuals in data.

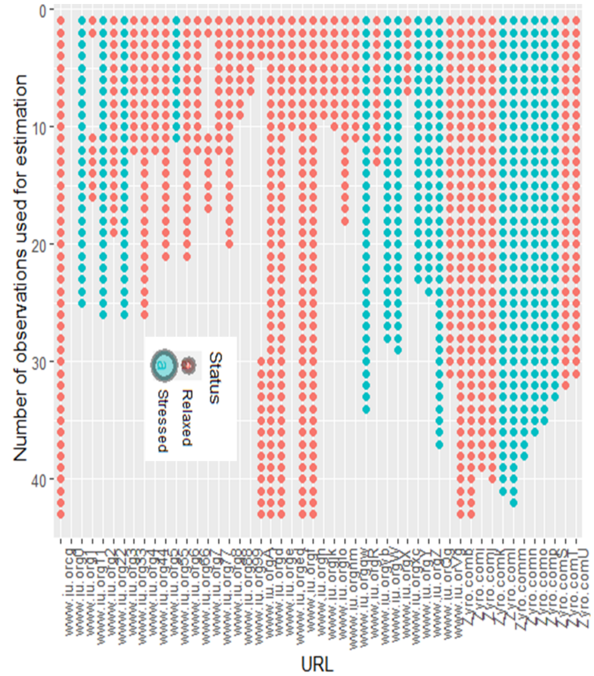


Figure 2 – Stalactite natural structure of user interaction on Complex e-commerce and learning websites.

actions with complex e-commerce and learning websites. The decisions that a potential customer makes have to be either an easy process or a tedious process depending on the shopping experience. Most e-commerce websites display minimal graphical orientation in a 2D visual scheme and this is sometimes difficult to visualise the displayed product in a real-life scenario. Some sites also embed video frames of the product on display for the customer to have a real-life experience of physical shopping, this helps to reduce the amount of stress in the shopping experience. In this order datasets obtained from these sites are classified as stress and relaxed mood depending on the change in pupil size based on dilation and constriction. In the diagram below, stress is structured as the main emotional response of the users to complex webpages, even though the relaxed mood standout to be the most significant outlying.

These entries were found mostly on the *'zyro.com'* websites and the *'ui.org'* websites are mostly e-learning websites. The aggregate number of instances was fifty and the residual output for this start point is 65%, this represents the performance on R_2 of the model on these websites. For behaviour data, this is highly probable. Figure 3 shows the stalactite structure of user interaction data to non-complex websites, the cognitive response to these sites shows that the relaxed mood is the most significant expression of the users. This shows most eye changes are usually constriction to relaxed mood during their purchase or surfing. The starting point of this structure has a score of 55% and is also considered as most probable since behaviour data is highly complex and difficult to predict.

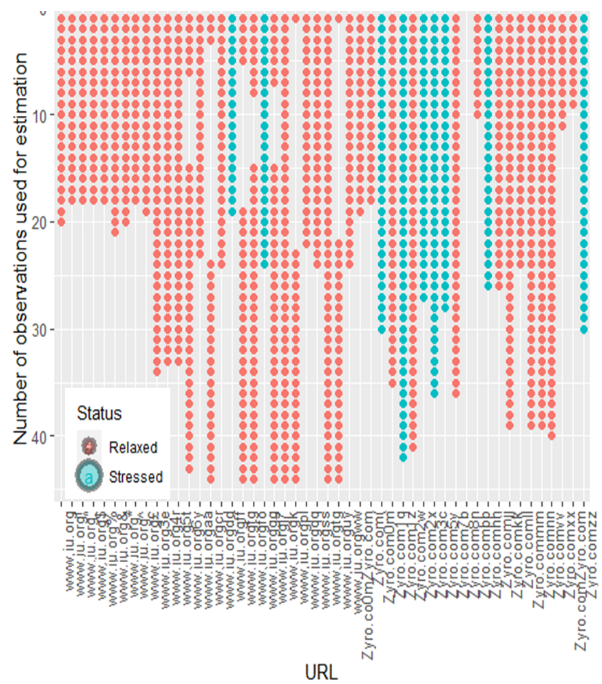


Figure 3 – Stalactite natural structure of user interaction on non-complex e-commerce and learning websites.

The ROC shows a performance of 0.98% for the custom Pseudo algorithm, this is predicting the true positive rate and the false positive. Since behaviour data is most probable, R2 alone is not sufficient for determining the performance in pattern recognition in the data set and hence the ROC is computed from the residual vector-matrix using the probability or likelihood of occurrence of each instance. Figure 4 shows that this high performance is detected at −0.5 residual rating and close to a 100% prediction rate. Based on the similarity in a search pattern for both non-complex and complex sites, these two methods are authentic enough for multimodal comparison techniques on behaviour data, as relying alone on R_2 is not feasible in terms of user interaction data.

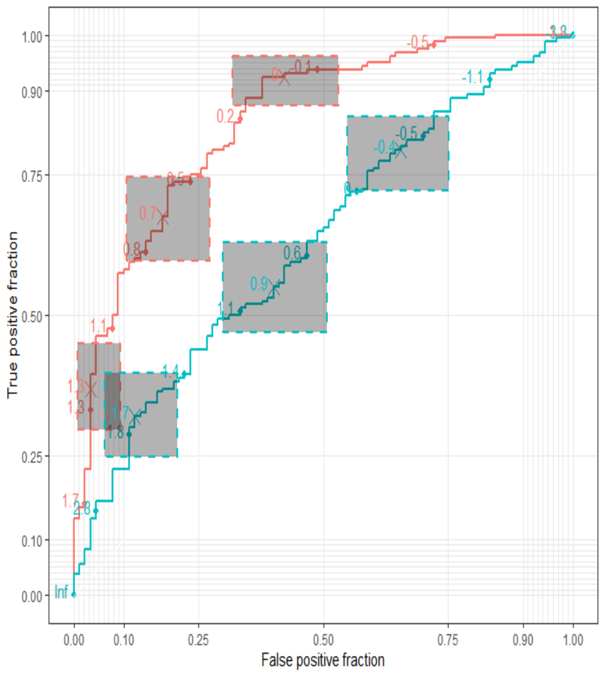


FIGURE 4 – High performance is detected at -0.5 residual rating and close to a 100% prediction rate.

4 Conclusion

This paper seeks to investigate a custom pseudo algorithm for understanding natural structures in user perception of e-commerce webpages. This process is very significant in user behaviour data online for optimising purchases and site maintenance. The residual output from the pseudo algorithm was used as the input matrix for the natural stalactite structure of the data. In this case, instead of using the dataset as an input matrix for the natural assembly, the vector residuals produced by both models are used to plot the natural structure of the data. The performance in residual output is calculated using ROC and this has the highest performance compared to R_2. Future work would be to use the residual data as a form of input matrix to predict another set of response data and demonstrate another high-level model of data presentation in a simplified and decoded form based on sequential user demography.

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