A Analysis of Women Getting Computer and Internet Addiction using Combined Block Fuzzy Cognitive Maps (CBFCMs)

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Abstract

The Internet provides a constant, ever-changing source of information and entertainment and can be accessed from most smart phones as well as tablets, laptops, and computers. Email, blogs, social networks and message boards allow for both public and anonymous communication. Each person's Internet use is different ways. Many people turn to the Internet in order to manage unpleasant feelings such as stress, loneliness, depression and anxiety. Internet addiction had become a global common to the human society. In this paper we analyzed women getting computer and internet addiction using Combined Disjoint Block Fuzzy Cognitive Maps (CDBFCMs). This method is introduced by W.B. Vasantha Kandasamy. The Combined Block FCM is defined in this method becomes effective when the number of concepts can be grouped and are in large numbers. This paper has five sections. First section gives the information about development of Fuzzy Cognitive Maps and computer and internet addiction. Second Section gives preliminaries of Fuzzy Cognitive maps and Combined Block Fuzzy Cognitive Maps. In Section three, we explain method of determining the hidden pattern. In the fourth section, we give the concepts of problem. Final section gives the conclusion based on our study we derived suggestions.

Keywords

Computer and Internet addiction, Fuzzy Cognitive Maps, Combined Block Fuzzy Cognitive Maps and Women.

1. Introduction

In 1965, L.A. Zadeh has introduced a mathematical model called Fuzzy Cognitive Maps. After a decade in the year 1976, Political scientist R. Axelord [23] used this fuzzy model to study decision making in social and political systems. Then B. Kosko [4], [5], [6] enhanced the power of cognitive maps considering fuzzy values for the concepts of the cognitive map and fuzzy degrees of interrelationships between concepts. FCMs can successfully represent knowledge and human experience, introduced concepts to represent the essential elements and the cause and effect relationships among the concepts to model the behavior of any system. It is a very convenient simple and powerful tool, which is used in numerous fields such as social economical and medical etc.,

The use of the Internet on school campuses and in society has increased dramatically in recent years. Whereas the academic use of the Internet is primarily intended for learning and research, the Internet has also become an important part of student life. However, from time to time, cases of over involvement with the Internet have been observed on different campuses [7]. Academic attention has been given in recent years to what some researcher team "Internet Addiction". Although the concept is still evolving and debated, some empirical studies have been done in recent years. Some argue that the term "addiction" should be applied only to cases involving chemical substances [25] similar diagnostic criteria have been applied to a number of problematic behaviors such as pathological gambling [17]. Popular use of the term may associate "addiction" with almost any substance or activity [20]. People are said to be "addicted" to food, smoking, gambling, shopping, work and play [8]. The typical research participant was a young "solitary male loner" with a long-standing interest in technology and science. The explosive growth of the Internet over the past decade has almost certainly changed the profile of the "computer addict" [26], [18]. With its convenient communication options and the World Wide Web, the Internet provides remote access to other people and abundant information in all areas of interest. It is an environment that could be abused by virtually anyone, regardless of their interest in technology and science[22]. Griffiths further considers Internet

addiction to be a kind of technological addiction i.e., computer addiction and one in a subset of behavioral addictions Kandell defined Internet addiction as "a psychological dependence on the Internet, regardless of the type of activity once logged on Maladaptive patterns of Internet use do indeed constitute behavioral addiction [14]. The phenomenon of Internet addiction focused on articulating criteria by which Internet addiction could be described and diagnosed, such as the well described set of diagnostic criteria provided by Goldberg and six criteria developed by Griffiths [12], [22]. The terms "overuse" and excessive use, which appear in many Internet addiction studies, usually indicate that time online is an important factor or index for determining Internet addiction [18], Internet dependents reported a striking average of 39 hr per week spent online, compared to the 5 hr of non-dependents. In otherworld's, dependents spent the equivalent of a "full-time job" on the Internet and spent nearly 8 times the number of hours per week online than did not-dependents.

Are male users more subject to Internet addiction than female users? A few empirical studies have examined the stereotype of the excessive Internet user-males in their late teens, as discussed [22]. Although not included in Chou and Hsiao's said only three respondents were female students out of a total of 54 Internet addiction cases gleaned from more than 900 college student respondents. Regression analysis indicates that gender is one of the predicting factors in Internet addiction, that is, males are more likely than females to become Internet addicts. Scherer reported that depends Internet users included a significantly larger proportion of men to women (71% men and 29% women respectively) than the non-dependent users (50 % are men and women) [16]. In Brenner's study, men and women did not differ in either time on line or number of related problems experienced [26]. Young used her eight-item DQ to assess self-selected samples and reported that her sample of Internet Dependents included 157 males and 239 females [17].

The difference between these two groups of studies seems to lie in the methodology used and the respondents recruited for each group. The studies showing that males are more likely addicted distributed paper-and-pencil questionnaires on college campuses. Although these studies did not include random sampling, the sampling plans did not exhibit systematic bias. On the other hand, the studies showing no male-female differences in addiction employed self-selected samples from online solicitation, and thus the sampling bias may have been stronger. Griffiths commented that because females are generally more willing than males to discuss emotional issues and problems or perhaps because Young is female researcher, female respondents were more willing to take part in the study than would otherwise have been the case [22]. The issue of gender in regard to the question of Internet use and its effects in an important one. Do men and women use the Internet differently and engage different Internet applications? Young observed that men tend to seek out dominant activities or content online. Those interactive online games that rely particularly on power, dominance, control and/or violence attract more men than women. Women, on the other hand, seek out close friendships and prefer anonymous communication in which they can hide their appearance [19]. Virtual communities give women a sense of belonging and the ability to share their feelings and emotions in private and convenient ways. Whereas men tend to explore sexual fantasies online, women tend to look for romance in cyberspace. Young states that although it is not unusual for women to engage in random cybersex or cyber sex chat, they often prefer to form some type of relationship prior to the sexual chat. In Chen's Study, hierarchical regression analysis indicated that time-management problems and compulsion symptoms are common predictors for both genders weekly time spent on the Internet [24]. Shyness and withdrawal symptoms are predictive only for female college students, whereas experiences and tolerance symptoms are predictive only for males. Based on the aforementioned studies, tentative conclusions can be drawn that men use the Internet differently from women and that men are more likely subject to Internet addiction. Nowadays most of the women using Internet, in our research we analysed that the women getting computer and Internet addiction using CBFCMs. More over the data in an unsupervised one and also there is uncertainly in the concepts. Hence Fuzzy tool alone has the capacity to analyse these concepts. Hence it is chosen here.

2. Basic Definitions and Notations

Fuzzy Cognitive Maps (FCMs) are more applicable when the data in the first place is an unsupervised one. The FCMs work on the opinion of experts. FCMs model the world as a collection of classes and causal relations between classes.

2.1 Definition

When the nodes of the FCM are fuzzy sets then they are called as fuzzy nodes.

2.2 Definition

FCMs with edge weights or causalities from the set {-1, 0, 1} are called simple FCMs.

2.3 Definition
A FCMs is a directed graph with concepts like policies, events etc, as nodes and causalities as edges, It represents causal relationships between concepts.

2.4 Definition
Consider the nodes/concepts $C_1, C_2, \ldots, C_n$ of the FCM. Suppose the directed graph is drawn using edge weight $e_{ij} \in \{-1, 0, 1\}$. The matrix E be defined by $E = (e_{ij})$ where e_{ij} is the weight of the directed edge C_iC_j. E is called the adjacency matrix of FCM, also known as the connection matrix of the FCM.
It is important to note that all matrices associated with an FCM are always square matrices with diagonal entries as zero.

2.5 Definition
Let $C_1, C_2, \ldots, C_n$ be the nodes of an FCM. $A=(a_1, a_2, \ldots, a_n)$ where $e_{ij} \in \{-1, 0, 1\}$. A is called the instantaneous state vector and it denotes the ON-OFF position of the node at an instant. $a_i = 0$ if a_i is OFF and $a_i = 1$ if a_i is ON for $i = 1, 2, \ldots, n$.

2.6 Definition
Let $C_1, C_2, \ldots, C_n$ be the nodes of and FCM. Let $\overrightarrow{C_1C_2}, \overrightarrow{C_2C_3}, \overrightarrow{C_3C_4}, \ldots, \overrightarrow{C_iC_j}$ be the edges of the FCM ($i \neq j$). Then the edges form a directed cycle. An FCM is said to be cyclic if it possesses a directed cycle. An FCM is said to be acyclic if it does not possess any directed cycle.

2.7 Definition
An FCM is said to be cyclic is said to have a feedback.

2.8 Definition
When there is a feedback in an FCM, i.e, when the causal relations flow through a cycle in a revolutionary way, the FCM is called a dynamical system.

2.9 Definition
Let $\overrightarrow{C_1C_2}, \overrightarrow{C_2C_3}, \overrightarrow{C_3C_4}, \ldots, \overrightarrow{C_{n-1}C_n}$ be a cycle. When C_i is switched ON and if the causality flows through the edges of a cycle and if it again causes C_i, we say that the dynamical system goes round and round. This is true for any node C_i for $i = 1,2,\ldots,n$. The equilibrium state for this dynamical system is called the hidden pattern.

2.10 Definition
If the equilibrium state of a dynamical system is a unique state vector, then it is called a fixed point. Consider a FCM with $C_1, C_2, \ldots, C_n$ as nodes. For example let us start the dynamical system by switching ON C_1. Let us assume that the FCM settles down with C_1 and C_n ON i.e., in the state vector remains as $(1, 0, 0, \ldots, 0)$ is called fixed point.

2.11 Definition
If the FCM settles down with a state vector repeating in the form $A_1 \rightarrow A_2 \rightarrow \ldots \rightarrow A_i \rightarrow A_1$ then this equilibrium is called a limit cycle.

2.12 Definition
Finite number of FCMs can be combined together to produce the point effect of all the FCMs. Let $E_1, E_2, \ldots, E_p$ be the adjacency matrices of the FCMs with nodes $C_1, C_2, \ldots, C_n$ then the combined FCM is got by adding all the adjacency matrices $E_1, E_2, \ldots, E_p$. We denote the combined FCM adjacency matrix by $E = E_1 + E_2 + \ldots + E_p$.

2.13 Definition
Let $C_1, C_2, \ldots, C_n$ be n distinct attributes of a problem n very large and a non prime. If we divide n into k equal classes i.e., $k/n = t$ which are disjoint and if we find the directed graph of each of there k classes of attributes with t attributes each, then their corresponding connection matrices are formed and these connection matrices are joined as blocks to form a n x n matrix. This n x n connection matrix forms the combined disjoint block FCM of equal classes. If the classes are not divided to have equal attributes but if they are disjoint classes we get a n x n connection matrix called the combined disjoint block FCM of unequal classess/size.

2.14 Definition
Suppose $A = (a_1, a_2, \ldots, a_n)$ is a vector which is passed into a dynamical system E. Then $AE = (a_1', a_2', \ldots, a_n')$ after thresholding and updating the vector suppose we get $(b_1, b_2, \ldots, b_n)$ we denote that by $(a_1', a_2', \ldots, a_n') \hookrightarrow (b_1, b_2, \ldots, b_n)$. Thus the symbol $\hookrightarrow$ ' means the resultant vector has been threshold and updated.
FCMs have several advantages as well as some disadvantages. The main advantages of this method it is simple. It functions on expert's opinion. When the data happens to be an unsupervised one the FCM comes handy. This is the only known fuzzy technique that gives the hidden pattern of the situation. As we have a very well known theory, which states that the strength of the data depends on, the number of expert's opinions. At the same time the disadvantages of the combined FCM is when the weightages are *1* and *-1* for the same C_iC_j, we have the sum adding to zero thus at all times the connection matrices $E_1, E_2, \ldots, E_k$ may not be conformable for addition.
Combined conflicting opinions tend to cancel out and assisted by the strong law of large numbers, a consensus emerges as the sample opinion approximates the underlying population opinion. This problem will be easily overcome if the FCM entries are only *0* and *1*.

3. Method of determining the hidden pattern

Let $C_1, C_2, \ldots, C_n$ be the nodes of an FCM, with feedback, Let E be the associated adjacency matrix. Let us find the hidden pattern when C_1 is switched on. When an input is given as the vector $A_1 = (1, 0, \ldots, 0)$, the data should pass through the relation matrix E. This is done by multiplying A_i by the matrix E. Let $A_iE = (a_1, a_2, \ldots, a_n)$ with the threshold operation that is by replacing a_i by 1 if $a_i > k$ and a_i by 0 if $a_i < k$ (k is a suitable positive integer). We update the resulting concept; the concept C_1 is included in the updated vector by making the first coordinate as 1 in the resulting vector. Suppose $A_iE \rightarrow A_2$ then consider A_2E and repeat the same procedure. This procedure is repeated till we get a limit cycle or a fixed point.

4. Concepts of the problem

Using the Computer and Internet addiction linguistic questionnaire and the expert's opinion we have taken the following twelve attributes $\{A_1, A_2 \ldots A_{12}\}$.

A_1- Increasing amounts of time spent on computer and internet activities.
A_2- Failed attempts to control behavior.
A_3- Heightened sense of eupheoria while involved in computer and internet activities.
A_4- Craving more time on the computer and internet
A_5- Neglecting friends and family.
A_6- Feeling restless when not engaged in the activity
A_7- Being dishonest with others.
A_8- Computer use interfering with school/college/job performance.
A_9- Feeling guilty, ashamed, anxious or depressed as a result of behavior.
A_{10}-Changes in sleep patterns.
A_{11}-Physical changes such as weight gain or loss, backaches, headaches, carple tunnel syndrome.
A_{12}-Withdrawing from other pleasurable activities.

Using these attributes we give the combined block fuzzy cognitive map of equal size. We take 3 experts opinion on the 3 classes so that each class has four attributes/nodes. Let the classes be C_1, C_2 and C_3 be divided by the following:

$C_1 = \{A_1, A_2, A_3, A_4\}$,
$C_2 = \{A_5, A_6, A_7, A_8\}$ and
$C_3 = \{A_9, A_{10}, A_{11}, A_{12}\}$

Now we collect the expert's opinion on each of the classes C_1, C_2 and C_3. The directed graph given by the expert on attributes A_1, A_2, A_3 and A_4 which forms the class C_1.

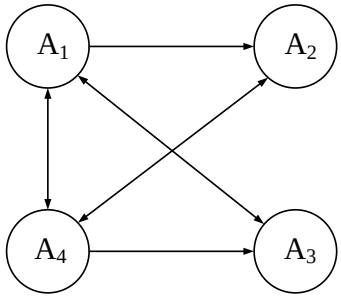

Fig.1

The related connection matrix B_1

$$B_1 = \begin{array}{c} \\ A_1 \\ A_2 \\ A_3 \\ A_4 \end{array} \begin{array}{c} \begin{array}{cccc} A_1 & A_2 & A_3 & A_4 \end{array} \\ \begin{bmatrix} 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 \\ 1 & 1 & 1 & 0 \end{bmatrix} \end{array}$$

The directed graph given by the expert on A_5, A_6, A_7 and A_8 which forms the class C_2

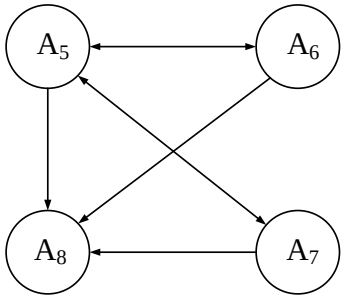

Fig. 2

According to the expert the nodes, neglecting friends and family is very much interrelated to feeling restless when not engaged in the activity and being dishonest with others. The related connection matrix B_2 is given below:

$$B_2 = \begin{array}{c} \\ A_5 \\ A_6 \\ A_7 \\ A_8 \end{array} \begin{array}{c} \begin{array}{cccc} A_5 & A_6 & A_7 & A_8 \end{array} \\ \begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix} \end{array}$$

Now we give the directed graph for the class C_3 as given by the expert $C_3 = \{A_9, A_{10}, A_{11}, A_{12}\}$

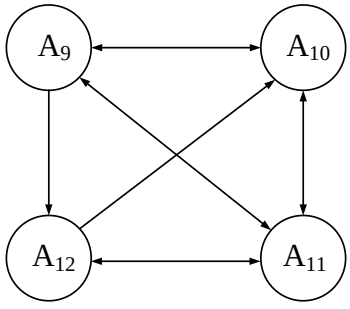

Fig. 3

According to this expert feelings guilty, ashamed, anxious or depressed as a result of behavior is interrelated with changes in sleep patterns and physical changes such weight gain or loss, backaches, headaches, carple tunnel syndrome. Withdrawing from other pleasurable activities is related to changes in sleep patterns. The related connection matrix

$$B_3 = \begin{array}{c} \\ A_9 \\ A_{10} \\ A_{11} \\ A_{12} \end{array} \begin{array}{c} \begin{array}{cccc} A_9 & A_{10} & A_{11} & A_{12} \end{array} \\ \begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix} \end{array}$$

Now the combined block connection matrix of the FCM is given by B

$$\begin{array}{c} \\ A_1 \\ A_2 \\ A_3 \\ A_4 \\ A_5 \\ A_6 \\ A_7 \\ A_8 \\ A_9 \\ A_{10} \\ A_{11} \\ A_{12} \end{array} \begin{array}{c} \begin{array}{cccccccccccc} A_1 & A_2 & A_3 & A_4 & A_5 & A_6 & A_7 & A_8 & A_9 & A_{10} & A_{11} & A_{12} \end{array} \\ \begin{bmatrix} 0 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \end{bmatrix} \end{array}$$

Suppose we consider the ON state of the attribute Increasing amounts of time spent on computer and internet activities and all other states are OFF the effect of X = (1 0 0 0 0 0 0 0 0 0 0 0) on the CBFCM is given by

XB = (1 1 1 1 0 0 0 0 0 0 0 0) = X_1(Say)

X_1B = (3 3 3 3 0 0 0 0 0 0 0 0)
↳ (1 1 1 1 0 0 0 0 0 0 0 0) = $X_2 = X_1$

X_1 is fixed point of the dynamical system. Thus increasing amounts of time spent on computer and internet activities, failed attempts to control behavior, heightened sense of eupheoria while involved in computer and internet activities, craving more time on the computer and internet.

Suppose we consider, the ON state of the attributes craving more time on the computer and internet to be in the ON state and all other nodes are in the OFF state. Now we study the effect on the dynamical system B. Let Z = (0 0 0 1 1 0 0 0 1 1 1 1) state vector depicting the ON state of neglecting friends and family, feeling guilty, ashamed, anxious or depressed as a result of behavior, changes in sleep patterns, Physical changes such as weight gain or loss, backaches, headaches, carple tunnel syndrome, withdrawing from other pleasurable activities, passing the state vector Z into the dynamical system B.

ZB = (1 1 1 1 1 1 1 1 1 1 1 1) = Z_1
Z_1B = (3 3 3 3 3 2 2 4 3 4 4 3)
↳ (1 1 1 1 1 1 1 1 1 1 1 1) = $Z_2 = Z_1$

Z_1 the fixed point of the dynamical system. Thus we have all attribute are ON stage.

5. Conclusion and Suggestions

5.1 Conclusion

We analyzed the main cause's women getting internet and computer addiction using CBFCM model. The limit point of the dynamical system reveals that the attributes A_1, A_2, A_3, A_4, A_5, A_6, A_7, A_8, A_9, A_{10}, A_{11} and A_{12} are the main reasons for their problems. This means, Increasing amounts of time spent on computer and internet activities, Failed attempts to control behavior, Heightened sense of eupheoria while involved in computer and internet activities, Craving more time on the computer and internet, Neglecting friends and family, Feeling restless when not engaged in the activity, Being dishonest with others, Computer use interfering with school/college/job performance, feeling guilty, ashamed, anxious or depressed as a result of behavior, Changes in sleep patterns, Physical changes such as weight gain or loss, backaches, headaches, carple tunnel syndrome, withdrawing from other pleasurable activities. Therefore these are all causes women getting internet and computer addictions.

The Internet is not the enemy just because people become dependent on it. It has many important and necessary benefits. It is fast, ecologically sound, convenient, and informative. In many ways it makes our lives much simpler. In many ways it makes our lives more complex. The Internet provides and escape from reality and everyday problems just like alcohol or drugs. Some argue that the interaction with other people on the Internet fills a social void. People can assume new identities; others interact with that identity and the person may assume these on-line relationships are the same as the real things. It becomes a problem when people become so engrossed and enmeshed in on-line activities and their "other" lives to the point of neglecting their health, relationships, jobs and other responsibilities. As with many of life's pleasures, moderation is the key.

5.2 Suggestions

Based on our research we derived some suggestion to computer and Internet adductors.

- **Realize that more and more people on the world are becoming addicted to the internet**. You are not the only one with this problem; it is becoming more and more common and more and better known. Do not be embarrassed, find others with the same problem and help each other beat it.
- **Get a hobby or an interest that doesn't involve the internet, video games, TV or computers**. Get involved with teams, clubs, sports, church, music, dancing, singing, etc. Go for a run with a friend or get exercise some other way. Go to bed on time and get a good night's rest. Keep up with the local events in your community. There may be talks, film screenings, concerts, local sporting events, and book signings etc. Find some, as long as it is not on the internet, and get involved.
- **Complete your studies**. If you are a student then do your homework and study. This is a great thing to do right away when you get home. You will feel great knowing that you did your homework early. Read books or research at the library instead of browsing Wikipedia for information. Teachers would rather have you use a real book than Wikipedia. Study lessons that you learned for the day, whether there's a test the next day or not.
- **Help with meals**. Your parents will be happier that you're helping out with dinner or dishes instead of chatting online. Cook or bake something one night for the family. Anything that gets you off the computer for a while will help and increase your confidence that you can stay off even longer.
- **Hang out with friends**. Plan a trip to the bowling alley, mall, or ice rink. Get a friend to walk a dog with you for the afternoon. Avoid places that have free internet access such as coffee shops.
- **Plan family nights**. Instead of watching TV or doing individual things during dinner time, eat dinner as a family on the table and plan games afterward.
- **Limit your computer time**. Make sure not to turn it on too many times a week. If you have a laptop, make sure to put it somewhere that you can remember but not somewhere that you see every day. Try keeping the lid closed when you are not using it; when the computer is not looking at you, you are less likely to use it. If you have a desktop PC, try not to go near it or put something over it like a sheet.
- **Call people instead of sending instant messages**. Call a friend and ask them to go outside for at least 3 hours a day. This will distract you from the computer. Also try doing your homework together.
- **Use an alarm clock or timer**. Before using your computer decide on a time limit such as 30 minutes. Set the clock or timer and make sure that you get off the computer when the time is up. Alternatively create a shutdown timer shortcut on your desktop (Google search "shutdown timer" for tutorials). This can be programmed to shutdown your computer after a predesignated time after it has been activated.

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