Certainty Factor for Online Game Addiction Scale Diagnosis — A Case Study of Informatics Student, University of Khairun

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Abstract. Online game addiction is the behavior of someone who wants to always play online games that lasts a long time and allows the individual concerned to not be able to control it so that it can have a negative impact that can have a negative impact on health and mental if too frequently play it. The aim of this study is to diagnose the online game addiction scale to students using the certainty factor algorithm. The level of online game addiction will be divided into three levels, namely: mild, moderate and severe addiction diagnoses. The calculation process starts from determining the weight value of each symptom and then determining the weight value of the user then calculating the weight value of each symptom with the user's weight value using the certainty factor method so as to produce how large the percentage level of online game addiction. The results showed that from a number of processed data the diagnostic results were obtained 13% of students with mild addiction, 37% of students with moderate addiction, 50% of students with severe addiction.

Keyword : *Scale Diagnosis, Certainty Factor, Online Game Addiction*

1 Introduction

The World Health Organization (WHO) has established a list of diseases in the International Statistical Classification of Diseases (ICD) and one of the diseases mentioned is gaming disease. The ICD is a list of medical classifications issued by the WHO containing a list of diseases and their symptoms, signs, and causes. ICD is an international standard for reporting diseases and health conditions, used by all health professionals around the world. In the latest version of ICD11, WHO pointed out that gaming addiction is a disorder caused by addictive behaviors or habits or addiction [8]. The negative consequences of online gaming addiction have prompted governments and health-care providers in South-East Asian countries to take the issue seriously and launch a series of initiatives to fight against and alleviate the problem. In South Korea, Online gaming addiction is regarded as a major public health concern, with up to 24 percent of children diagnosed with Internet addiction [6]. The negative impact of online games has been severe in several cities in Indonesia, such as teenagers in Banyumas experiencing mental disorders and youth in Palembang breaking into ATMs to play games. The classification of online games as a mental disease does not imply that they solely have a negative influence. Online games have a positive impact as well, such as increasing player concentration and encouraging teenagers to be smart, because online games require strong adolescent analytical skills and strategic planning in order to typically finish the game well. Whereas the

disadvantage, the most concerning situation is when online game players have acted unlawfully excessively while playing online games, causing mental problems in the gamers.

The students of the informatics study program at University of Khairun is very familiar with the internet, in consequence students have a lot of opportunities to learn about and play online games. It has been observed that students play online games for an extended period of time, which can be harmful if they are included in the addiction scale, but the level of addiction experienced by informatics students in general is unknown.

The main purpose of this study is to diagnose the level of addiction of students in the informatics engineering study program using the factor certainty algorithm. The results of the addiction level diagnosis will be split into three levels of addiction, namely mild, moderate, and severe addiction.

2 Literature

2.1 Online Game

The network can be wired or wireless, and players can connect via LAN or the Internet.[3] Online gaming is one of the most popular leisure activities among many people. Some argue that playing video games can be used for a variety of purposes, including stress relief, challenge and competition, relaxation, enjoyment, social interaction, and even mentally escaping from the real

world [1]. Online gaming is one of the most popular pastimes among most people, particularly teenagers, children, and students [5]. Online games are technically video games that can be played on Smartphones, Laptop, Computer, or any advanced technology with a connection through the internet or any other computer network available [2].

2.2 Online Game Addiction

Online gaming addiction is defined as a person's desire to continue playing online games that consume a significant amount of time, and it is possible that the individual in question is unable to control or control it [4].

2.3 Certainty Factor

Certainty *factor* expresses confidence in an event (fact or hypothesis) based on evidence or expert assessment. Certainty factor is defined as the following equation.

$$CF[H, E] = MB[H, E] - MD[H, E]$$

Description:

CF[H, E]: certainty factors hypothetically influenced by evidence e are known with certainty.

MB[H, E]: measure of belief against hypothesis H, if given evidence E (between 0 and 1)

MD: Measure of Disbelief

Q: Probability.

E: *Evidence* (Events/Facts)

Certainty Factor for rules with single premise / symptom (single premise rules):

$$CFSymptom = CF[user] * CF[expert]$$

If there are rules with similar conclusions(similary concluded rules)or more than one symptom, then cf is then calculated by equation:

$$CFcombine = CFold + CFSymptom * (1 - CFold)$$

As for calculating the percentage against the disease, the equation is used:

$$CFpercentase = CFcombine * 100$$

3 Result

3.1 Data Set

In collection of primary data, the author use observation and interview method. The author uses a questionnaire to collect data from respondents. and collects 100 amount of data that can be used as data sets for analysis.

3.2 Designing Certainty Factor

What needs to be designed in the certainty factor technique is the determination (expert CF) as the certainty value given by the expert to a rule, symptom data, and expert CF value based on the expert's scientific journal literature results. Based on the results of the scientific journal literature [7] with a psychiatrist as an expert in his research. Can be seen in the following table:

Table 1. Expert CF Value

No	Indication	CF Expert Value
1	G1	0,2
2	G2	0,3
3	G3	0,15
4	G4	0,45
5	G5	0,4
6	G6	0,6
7	G7	0,65
8	G8	0,85
9	G9	0,8
10	G10	0,8

Description:

G1: Often play games

G2: Life pattern is starting to become irregular/disturbed (forgetting to eat, forgetting to take a shower, not doing homework)

G3: Lazy to do anything other than play games

G4: Very enthusiastic when asked about the game

G5: Can't concentrate when doing anything except playing games

G6: Often sleepy due to playing too many online games

G7: Easily emotional when playing online games

G8: Often imitates game characters in real life

G9: Disconnected from social life (prefers playing games over interacting with people)

G10: Willing to spend a lot of money to play the game

After the identification of the Expert CF value, we will turn to the identification of the User CF value, which will be set by the user himself.

Tabel 2. CF User Value

Description	CF User Value
Unconfident	0
Confident	0,8

3.3 The rules of the online gaming addiction diagnosis

The following step is to establish the rules that will be used to assess the level of online game addiction. The rules of the online gaming addiction diagnostic system to get addiction results:

- R1: *IF* percentage of addiction 1%-64% *then* mild addiction

- R2: IF addiction percentage 65%-97% then moderate addiction
- R3: IF the percentage of addiction $\geq 97\%$ then severe addiction

3.4 Test Result

On the test results using the data that has been collected, the results are shown in the diagram of the results of the diagnosis that has been carried out using the certainty factor.

The percentage of symptoms encountered by students of informatics study program can be seen in the diagram, the percentage of symptoms experienced can be shown in figure 1 based on the results of tests that have been completed in the informatics program.

Fig.1. Symptom Percentage Diagram

The percentage level of addiction of online games experienced by Informatics Study Program students can be seen in figure 2.

Fig.2. Online game level addiction scale

Figure 2 shows the percentage of online game addiction as a result of the analysis. It shows about 13 percent experiencing mild addiction, 37 percent experiencing moderate addiction and 50 percent experiencing severe severe addiction.

3.5 Deployment

The results of the use of the certainty factor approach are then built into applications that others can use to assess their level of online game addiction.

Kode	Gejala	Kondisi
G1	sering memainkan game	Tidak
G2	pada hidup mulai tidak teratur/terganggu (lupa makan, lupa mengerjakan tugas kuliah dan sering terlambat ke kampus)	Tidak
G3	malas mengerjakan sesuatu selain bermain game	Tidak
G4	Sangat antusias jika diajarkan mengenai game	Tidak
G5	Tidak bisa konsentrasi saat melakukan suatu pekerjaan kecuali bermain game	Tidak
G6	sering mengantuk karena terlalu banyak bermain game online	Tidak
G7	Mudah emosional saat sedang bermain game online	Tidak
G8	sering menaruh karakter game dalam kehidupan nyata	Tidak
G9	terputus dari kehidupan sosial (tidak memilih bermain game daripada berinteraksi dengan orang)	Tidak
G10	tidak mengeluarkan banyak uang demi bermain game	Tidak

Hasil Diagnosis
 Persentase Jenis Kecanduan = 64.045312 %
 Anda Terdiagnosis = Kecanduan Sedang

Solusi
 Solusi Untuk Anda Sebagai Berikut:
 1. Mengubah Pola Bermain
 2. Tentukan Waktu Bermain Yang Pantas
 3. Kurangi Game Pada Perangkat-Handphone Anda
 4. Pilih Game Yang Memerlukan Aktivitas Fisik

Fig.3. Consultation page

Figure 3 shows a consultation page that can be used to input the symptoms experienced by respondents. This page also offers information about the level of addiction encountered, as well as recommendations based on the results acquired.

Kode	Nama Gejala	Bobot	Aksi
G1	sering memainkan game	0.2	20% 100%
G2	pada hidup mulai tidak teratur/terganggu (lupa makan, lupa mengerjakan tugas kuliah dan sering terlambat ke kampus)	0.3	30% 100%
G3	malas mengerjakan sesuatu selain bermain game	0.15	15% 100%
G4	tidak bisa konsentrasi saat melakukan suatu pekerjaan kecuali bermain game	0.4	40% 100%
G5	sering mengantuk karena terlalu banyak bermain game online	0.8	80% 100%
G6	mudah emosional saat sedang bermain game	0.05	5% 100%
G7	IPS (Indeks Prestasi dan Semangat) sering turun karena terlalu sering memainkan game	0.83	83% 100%
G8	sering menaruh karakter game dalam kehidupan nyata	0.85	85% 100%
G9	terputus dari kehidupan sosial (tidak memilih bermain game daripada berinteraksi dengan orang)	0.8	80% 100%
G10	tidak mengeluarkan banyak uang demi bermain game	0.8	80% 100%

Fig.4. List of Symptoms

Figure 4 depicts the symptom data that was used as a variable in the diagnosis. This symptom has been recorded in the database and can be accessed via the consultation page by respondents. These symptoms can be added and deleted based on the factors that will be used.

No.	Tanggal / Waktu	Nama User	Jenis Kecanduan	Persentase	Ket.
1	02-07-2020 / 07:27:35	test	Kecanduan Berat	89.307136	200%
2	06-07-2020 / 04:24:01	test	Kecanduan Berat	89.307136	200%
3	05-07-2020 / 23:04:27	test	Kecanduan Berat	89.307136	200%
4	05-07-2020 / 23:14:19	Iham	Kecanduan Ringan	48	200%
5	13-07-2020 / 01:43:12	Abdul Mubarak	Kecanduan Ringan	16	200%
6	06-08-2020 / 05:32:59	abdul	Kecanduan Sedang	70.2976	200%

Fig.5. History of test

Figure 5 depicts a list of users who took the test, as well as the results of the addiction test they completed. There is also a link on this page to view the specifics of the diagnostic findings that have been performed.

4 Conclusion

Certainty factor method was successfully applied to the system of online gaming addiction diagnosis, the application of certainty factor method was successfully applied to some students with three levels of addiction, namely mild addiction with a percentage of addiction

13%, moderate addiction with a percentage of 37% and severe addiction with a percentage of 50%.

The results of this study show that the *certainty factor* method has successfully diagnosed the level of addiction in Students of Khairun University Informatics Study Program.

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