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DECISION MAKING PROCESS FOR SERVING RESTAURANTS USING INTUITIONISTIC FUZZY SET THEORY VIA CONTROLLED SETS

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ABSTRACT. The Intuitionistic fuzzy set theory gives quite successful results in decision-making processes when compared to other set theories. For this reason, it finds application areas in many areas of daily life such as political science, robotic systems, economic research, medical studies. The success of the IFS concept in decision-making processes in these areas has also been proven. In this study, it is aimed to create an IFS model that can make suggestions to support the end user in the process of choosing a product. Hamming measure will be used to achieve this goal. As per the definition of this measure, the degree of non-membership of the data is as important as the degree of membership. These values also determine the degree of intuition. However, the easier it is to estimate the yield value of a property of an object, the more difficult it is to estimate the non-fulfillment value. For this reason, in this study, the data will be intuitiveized by the controlled set theory and the relationships with the results will be determined. In all these processes The Microsoft SQL Server data structure for coding was used and algorithms were created according to this coding. A healthy evaluation of the data is as important as the value of the data's feature of not having that feature. This situation is the most important factor determining the value of intuition.

1. INTRODUCTION

The concept of fuzzy cluster, membership degrees and the degree of non-membership given by the fuzzy logic rules are easily obtained. Thus, the classification of an object is easily made over a chain, specifically unit range. However, the heuristic fuzzy set theory revealed that this situation would not be so clear and the degree of intuition was also important. The biggest problem in this theory is determining the degree of non-membership rather than determining the degree to which an object has a feature. Because the degree of intuition also appears depending on these two values. In fact, in heuristic fuzzy set theory, the fact that an object has a property is explained by two independent variables and the third dependent variable connected to them. The biggest challenge faced by many scientists working in this field is choosing two independent variables separately. Because this choice determines the degree of intuition. For example, in determining the height degree of a person whose height is 180 cm as 0.825 and the degree of not being as 0.175, what criterion has been set for the value 0.175? The intuition level for this person is 0.1.

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Is this intuition a human intuition? It is clear that the answer is no. Because, some different methods can be followed in determining the degree of membership, but the degree of non-membership should be linked to our intuition. It is our experience that strengthens our intuition. Then the degree of non-membership of a person whose height is 180 cm should vary according to the group to which he belongs. For example, a value of 0.175 may be acceptable according to people in a city, but in the group with basketball athletes this value is 0 or the membership level should be re-examined.

To solve the above-mentioned situation, controlled sets were defined by Çuvalcıoğlu [3] in 2014, and the fact that an object has a property is expressed by one independent two dependent variables.

Due to the conflicts in the results obtained in the decision-making processes made so far, some improvements have been made or given as they are. The reason for this is that the degree of non-membership and the degree of intuition cannot be determined exactly. However, distance measures use all three values. In that case, the relationship results to be obtained from the distance measures by not being a member closest to the line and using the degree of intuition will be successful. The resulting models will have a more similar structure to human intuition. For distance measurements, see [4,5] respectively.

In this study, the purpose of using this method is to successfully complete the relation of hundreds of features of thousands of products with hundreds of products in a short time and successfully.
The article is organized as follows. In Chapter 2, some basic concepts are given, and in Chapter 3, the controlled set theory to be used in heurization is mentioned. In addition, information was given about the dimensions and properties used in the study. In the section, coding, obtaining the results and evaluating the results were made.

2. PRELIMINARY PREPARATIONS

We recall some basic concepts of IFS, [1, 2].

Definition 2.1. A fuzzy set A in a nonempty set X is an object having the form $A = \{(x, \mu_A(x), 1 - \mu_A(x))xX\}$
where the function $\mu_A: X \to [0,1]$ denoted the degree of membership and 1-μ_A denoted degree of non membership degree of x.

Definition 2.2. An Intuitionistic fuzzy set (briefly I F S see[1]) A in a nonempty set X is an object having the form $A = \{(x, \mu_A(x), \gamma_A(x))xX\}$ where the functions $\mu_A, \gamma_A: X \to [0,1]$ denote the degree of membership and degree of non membership, respectively and $0 \leq \mu_A(x), \gamma_A(x) \leq 1$ for all x∈X. The value $\pi_A(x) = 1 - \mu_A(x) - \gamma_A(x)$ is called hesitation degree of x.

Example 2.3. Let X = {a,b,c,d} an universal and

$$A = \{(a, 0.875, 0.125), (b, 0.54, 0.16), (c, 0.25, 0.35), (d, 0.95, 0.0)\}$$

Intuitionistic fuzzy set on X.The hesitation degrees of a,b,c,d∈X are as follow, respectively

$$\pi_A(a) = 0, \pi_A(b) = 0.3, \pi_A(c) = 0.4, \qquad \pi_A(d) = 0.05$$

Definition 2.4. Let A, B ∈ IFS (X).
i. $A \subseteq B \Leftrightarrow \mu_A(x) \leq \mu_B(x)$ ve $\gamma_A(x)\ \gamma_B(x)\ \forall x \in X$.
ii. $A = B \Leftrightarrow A \subseteq B$ ve $B \subseteq A$
iii. $A^c = \{(x, \gamma_A(x), \mu_A(x))xX\}$
iv. $AB = \{(x, \max\{\mu_A(x), \mu_B(x)\}, \min\{\gamma_A(x), \gamma_B(x)\}) \mid x \in X\}$

v. $AB = \{(x, \min\{\mu_A(x), \mu_B(x)\}, \max\{\gamma_A(x), \gamma_B(x)\}) \mid x \in X\}$

Örnek 2.5. $X = \{a, b, c\}$ be an universal.
$A = \{(a, 0.45, 0.25), (b, 0.75, 0.25), (c, 0.50, 0.15)\}$,
$B = \{(a, 0.35, 0.15), (b, 0.90, 0.05), (c, 0.65, 0.45)\}$
Intuitionistic fuzzy sets on X. Then,
$A^c = \{(a, 0.25, 0.45), (b, 0.25, 0.75), (c, 0.15, 0.50)\}$
$AB = \{(a, 0.45, 0.15), (b, 0.90, 0.05), (c, 0.65, 0.15)\}$
$AB = \{(a, 0.35, 0.25), (b, 0.75, 0.25), (c, 0.50, 0.45)\}$

3. CONTROLLED SET THEORY

Hesitation value is of great importance in applications made using more data than theoretical studies on intuitionistic fuzzy sets, in the general name of decision-making processes. As can be seen from its definition, the calculation of the hesitation value is directly related to the membership degree and non-membership degree. In conventional methods, whether the degree of hesitation is effective on the degree of membership or non-membership is not taken into account. In many studies, the degree of non-membership is tried to be given without any justification. That is, the more concrete the determination of the degree of membership, the more abstract the degree of non-membership or, provided that the condition is met, it is random. This situation negatively affects the role of the hesitation value of the data in the decision-making process.

The Hamming measure to be used in this study works on all these values. Therefore, not only membership degree but also non-membership and hesitation value will be decisive for interpreting the decision-making process in a way that is close to correct.
Due to the situations discussed above, the method of forming controlled sets will be used to consistently determine the non-membership and hesitation value using the membership degrees of the obtained data. Controlled sets were first described by Çuvalcıoğlu [3] in 2014.
Zadeh's example about long peoples, the membership degree of one whose lenght 170 cm is almost 1, say 0.8. But, if we choose the universal as the people whose lenght is longer than 170 cm then the membership degree of the person 171 cm tall is subject of discussion. Because, in this universal, while the membership degree of the person 190 cm tall is almost 1, how can we say taht the membership degree of the person 171 cm tall is 0.8? In Zadeh's example $\mu(171)=0.8$, $1-\mu(171)=0.2$. But, if we choose the universal as above, then we are in the expectations that the universal have an element which membership degree is 0.2. Hence, the membership degree of the persons which 171cm is 0.8. This is a contradiction. In this statement, the best solution can be the membership degree of the persons which 171cm is 0.5. Also in this case, the membership degree of the persons which 180cm is 0.9 thus the non-membership degree of the persons which 180cm is 0.1. This is a contradiction, too.

This problem can be solve by defining a bijective and order preserving function between the image of fuzzy set on Zadeh's universal as above and the image of fuzzy set on subset of Zadeh's same universal. However, in this case, problems associated with the concept appears to be taller. So, in order to find any element in universal with its membership and non-membersip degree, there must also have an element such that it control the other. With this idea, if we use the Zadeh's universal for the long people then the membership degree of the persons which 171cm is 0.8 and thus the non-membership degree of the persons which 171cm is 0.2. But, If we use the subuniversal of the Zadeh's universal then the membership degree of the persons which 171cm is 0.8 and thus the non-membership degree of the persons which 171cm is 0.0. Because, there is not an element which control the non-membership degree of the persons which 171cm.

An extension of the fuzzy theory is the intuitionistic fuzzy theory which have the hessitation degree that is not belong the fuzzy theory. But, there are same problems in Intuitionistic fuzzy theory like Fuzzy theory's. Because, there is not any criterion for non-membership degree of an element. For example, the set A={(x, 0.8, 0.2), (y, 0.4, 0.3)} is an intuitionistic fuzzy set on U={x,y}. But, there is not any controller element for x, like y.

As a result of these discussions, controlled sets were defined by Çuvalcıoğlu [3] as follows.

Definition 4.1: Let E be an universal, μ is a fuzzy set on E. The set E is called μ-controlled set if
$\forall x \in E, \exists\, y \in E \ni 1- \mu(x) = \mu(y)$.
If E is μ-controlled set then we write $E \in CS(\mu)$.

Example4.2: Let $X = \{a, b, c, d, e, f\}$ be an universal.
$A = \{(a, 0.45), (b, 0.05), (c, 0.50), (d, 0.35), (e, 0.90), (f, 0.65)\}$ is not a controlled set. But,
$B = \{(a, 0.45), (b, 0.10), (c, 0.50), (d, 0.45), (e, 0.90), (f, 0.55)\}$ is a controlled set. In B, a is controled by f, c is controlled by itself, f controlled by a and d, etc.

4.1 Controlled sets on classical set theory

In this study, it has been shown that the $\mathcal{C} =\{X \subset E: X \in CS(\mu) \}$ family has the maximal element property. We define the set $\tilde{a} = \{b \in E : 1- \mu(a) = \mu(b) \}$.

Proposition4.1.1: Let E be an universal, μ is fuzzy set, $\mathcal{C} =\{X \subset E: X \in CS(\mu) \}$ and $A \in \mathcal{C}$. For $a \in A$, we define $\mathcal{C}' = \{Y_a : a \in A \} \subset \mathcal{C}$ where $\breve{a} = \{c\tilde{a} : cA\}$, $Y_a=\{a\} \cup \breve{a}$ then, we get $A=\cup\, \mathcal{C}'$

With the above proposition, it can be easly seen the family $\mathcal{C}$ has a base as following,

$$\underline{A} = A \cup \widetilde{A}$$

where $\widetilde{A} = \bigcup_{a \in A} \tilde{a}$.

Theorem 4.1.2: Let E be an universal, μ is fuzzy set, $A \in \mathcal{P}(E)$. The mapping $J: P(E) \longrightarrow P(E)$ defined by $J(X) = \underline{X}$ is a closure operator.

From this theorem, it is concluded that the $\mathcal{C}$ family is a closed system, $(\mathcal{C},\subseteq)$ is complete lattice, and every closed subsystems C' of $\mathcal{C}$ is complete lattice. As a result of these, it was obtained that $\mathcal{C}$ is a Moore family. It has also been shown that the $\mathcal{C}$ closed system is algebraic. According to Schimid's theorem $\mathcal{C}$ closed system is inductive, as a result every chain in $\mathcal{C}$ have a supremum in $\mathcal{C}$.
As a result of these properties, it can be easily seen that cluster theoretic properties are workable on controlled sets.

4.2. (α, α^*)-Controlled sets

Another problem is whether a fuzzy set can be created as a controlled set. Considering the studies on intuitionistic fuzzy sets, the main reason for this problem can be explained as follows, The membership degree is very important for an element in any set. But the non-membership degree is very important, too. We can not claim that all sets are controlled set. However, it is possible to construct a set in such a way that it can have a controlled set property. We can introduce controlled set using the membership degrees of elements. The study on the solution of this problem is given by Çuvalcıoğlu [3] as follows.

Definition 4.2.1: Let E be an α-set. We define the following mapping on E as following,

$$\alpha^*(x) = \{\sup_{y\in E}\alpha(y), \alpha(x) \leq 1-\alpha(y)\ \ 0 \qquad ,\text{otherwise}$$

It is clear that α^* is a mapping from E to I. In addition, it can be easily seen that the sum of α and α^* is less or equal than 1. From this properties, we can give the following definition

Definition 4.2.2: Let E be α-set. Then the set $A = \{< x, \alpha(x), \alpha^*(x) x \in E\}$ is called (α, α^*)-controlled set.

Example 4.2.3: If we use the set A used in above example, A is not a controlled set. But if we use the definition5. We get a new set A^* of which element's membership degrees have the same membership with the same elements of A

$A^* = \{(a, 0.45,0.50), (b, 0.05,0.90), (c, 0.50,0.50), (d, 0.35,0.65), (e, 0.90,0.05), (f, 0.65,0.35)\}$

In this set, a and c are controlled by c, e is controlled by b, etc.

If we examine the controlled set B using Definition 5., then we get, $B^* = \{(a, 0.45,0.55), (b, 0.10,0.9), (c, 0.50,0.50), (d, 0.45,0.55), (e, 0.90,0.10), (f, 0.55,0.45)\}$ is a controlled set. In B^*, like as B, a is controled by f, c is controlled by itself, f controlled by a and d, etc.

From the definition, it can be easily seen that every (α, α^*)-controlled set is an intuitionistic fuzzy set. But the converse of this is not true generaly.

5. HAMMING DISTANCE BETWEEN IFSS

In this section, we will provide information about the Hamming measure between IFSs, which we will use in the process of deciding the relationship between our data. The hamming measure, like other measures, can be associated with a similarity measure between IFSs..

Tanım 5.1: Let X be a nonempty set and A, B, C IFS (X). The distance measure between A and B is a function d: IFS × IFS → [0, 1].

i. $0\ d(A,B)\ 1$

ii. $d(A,B) = 0\ \ A = B$

iii. $d(A,B) = d(B,A)$

iv. $d(A,C) + d(B,C) \geq d(A,B)$

v. If $A \subseteq B \subseteq C$ then $d(A,C) \geq d(A,B)$ and $d(A,C) \geq d(B,C)$.

Hamming measure is defined as follow;

$$d(A,B) = \sum_{i=1}^{n} \left(|\mu_A(x)-\mu_B(x)| + |\gamma_A(x)-\gamma_B(x)| + |\pi_A(x)-\pi_B(x)|\right)$$

6. MAIN RESULTS

In this study, the Hamming measure will be run on controlled sets. Therefore, in this section, first of all, controlled sets will be created with the data obtained by experts in the field. For this purpose, blurring will be done with SQL (Structured Query Language) using Microsoft SQL Server program.

6.1. Case study.

Let A = {GR1, GR2, GR3, GR4, GR5} grape varieties,
Let C = {x │x property of beverage product} be properties of product obtained from grapes.
Let S = {x│x types of food} be the set of foods to be consumed according to product characteristics.
The membership degrees of the relations of these data with each other were determined by experts as follows.

	WHITE	RED	D. ACID	O. ACID	Y. ACID	D. ALCO	O. ALCO	Y. ALCO	D. SUGA	O. SUGA	Y. SUGA	NARENÇİYE	HARD D.	HARD O.	HARD Y.	GRAMINEO	SPICE	BİBER
DRIN	1	0	0,001	0,255	0,985	0,755	0,625	0,245	0,255	0,355	0,785	0,025	0,155	0,955	0,125	0,925	0,785	0,91
DRIN	1	0	0,865	0,625	0,165	0,125	0,945	0,345	0,125	0,255	0,852	0,125	0,755	0,455	0,352	0,652	0,698	0,569
DRIN	0	1	0,125	0,355	0,854	0,055	0,255	0,945	0,855	0,455	0,145	0,256	0,325	0,955	0,255	0,254	0,985	0,254
DRIN	0	1	0,125	0,855	0,245	0,155	0,455	0,845	0,125	0,255	0,865	0,452	0,855	0,455	0,015	0,845	0,254	0,125
DRIN	0	1	0,015	0,985	0,255	0,255	0,455	0,652	0,008	0,125	0,912	0,024	0,125	0,125	0,867	0,256	0,456	0,854
DRIN	0	1	0,005	0,955	0,455	0,355	0,5	0,736	0,125	0,255	0,721	0,362	0,855	0,455	0,236	0,352	0,845	0,785

Tablo 1

	RED MEAT	OILY RED MEAT	VENISON	CHICKEN	TURKEY	FISH	CHEESE	FRUIT	VEGETABLES	PORK	SHRIMP	SPICE
WHITE	0,245	0,015	0,15	0,853	0,952	0,895	0,85	0,785	0,825	0,865	0,845	0,845
RED	0,855	0,855	0,925	0,555	0,245	0,855	0,955	0,655	0,15	0,525	0,425	0,852
D. ACID	0,015	0,015	0,015	0,125	0,015	0,325	0,225	0,245	0,455	0,225	0,225	0,225
O. ACID	0,225	0,225	0,225	0,425	0,225	0,555	0,425	0,585	0,325	0,425	0,425	0,425
Y. ACID	0,952	0,952	0,952	0,853	0,952	0,75	0,85	0,785	0,015	0,865	0,845	0,845
D. ALCOHOL	0,125	0,015	0,015	0,625	0,625	0,625	0,545	0,625	0,525	0,015	0,625	0,125
O. ALCOHOL	0,425	0,225	0,225	0,425	0,425	0,425	0,45	0,425	0,125	0,225	0,425	0,425

Y. ALCOHOL	0,853	0,952	0,952	0,125	0,125	0,125	0,785	0,125	0,15	0,952	0,125	0,853
D. SUGARY	0,745	0,525	0,525	0,325	0,325	0,325	0,825	0,845	0,425	0,425	0,325	0,825
O. SUGARY	0,525	0,325	0,325	0,825	0,825	0,825	0,455	0,545	0,125	0,15	0,845	0,425
Y. SUGARY	0,125	0,125	0,125	0,455	0,495	0,855	0,35	0,45	0,15	0,015	0,255	0,355
NARENCİYE	0,35	0,55	0,55	0,853	0,952	0,895	0,85	0,785	0,425	0,865	0,845	0,845
D. HARD	0,125	0,125	0,125	0,125	0,125	0,125	0,225	0,125	0,425	0,125	0,125	0,545
O. HARD	0,255	0,425	0,425	0,255	0,255	0,745	0,455	0,345	0,125	0,255	0,255	0,345
Y. HARD	0,855	0,753	0,753	0,952	0,955	0,125	0,75	0,85	0,015	0,855	0,85	0,245
GRAMINEOUS	0,425	0,75	0,75	0,853	0,952	0,895	0,85	0,785	0,925	0,865	0,845	0,845
SPICE	0,755	0,75	0,89	0,745	0,745	0,85	0,985	0,125	0,855	0,95	0,725	0,56
RED FRUIT	0,75	0,55	0,455	0,855	0,745	0,854	0,855	0,125	0,255	0,125	0,125	0,325
PIPER	0,855	0,865	0,985	0,845	0,845	0,752	0,985	0,125	0,755	0,95	0,825	0,125
FRUIT FLAVORS	0,546	0,325	0,256	0,325	0,325	0,125	0,725	0,125	0,125	0,526	0	0,125

Table2

6.2 Data Structure

The Microsoft SQL Server data structure is created as follows.
Beverage Products Chart
Food Types Chart
Table of features of the product

```
CREATE TABLE [dbo].[TBL_PROPERTY](
	[ID] [bigint] IDENTITY(1,1) NOT NULL,
	[DESCRIPTION] [nvarchar](50) NULL,
 CONSTRAINT [PK_TBL_PROPERTY] PRIMARY KEY CLUSTERED
(
	[ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF,
ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON) ON [PRIMARY]
) ON [PRIMARY]
```

```
CREATE TABLE [dbo].[TBL_DATA](
	[ID] [bigint] IDENTITY(1,1) NOT NULL,
	[TYPE] [int] NULL,
	[TYPE_ID] [bigint] NULL,
	[PROPERTY_ID] [bigint] NULL,
	[MU] [float] NULL,
	[NU] [float] NULL,
	[PI] [float] NULL,
 CONSTRAINT [PK_TBL_DATA] PRIMARY KEY CLUSTERED
(
	[ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF,
ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON) ON [PRIMARY]
) ON [PRIMARY]
```

Veri Tablosu

6.3 Data Arrangement

Data entry on Microsoft SQL Server is done as followsTBL_DRINK

ID	DESCRIPTION
1	DRINK NO.1
2	DRINK NO.2
3	DRINK NO.3
4	DRINK NO.4
5	DRINK NO.5
6	DRINK NO.6

Table-3

TBL_FOOD

ID	DESCRIPTION
1	RED MEAT
2	OILY RED MEAT
3	VENISON
4	CHICKEN
5	TURKEY
6	FISH
7	CHEESE
8	FRUIT
9	VEGETABLES
10	PORK
11	SHRIMP
12	SPICE

Table-4

TBL_PROPERTY

ID	DESCRIPTION
1	RED
2	WHITE
3	ACIDITYL
4	ACIDITYM
5	ACIDITYH
6	ALCOHOLL
7	ALCOHOLM
8	ALCOHOLH
9	SWEETL
10	SWEETM
11	SWEETH
12	CITRUS

Table-5

Each value that gives the relationship between the elements of the A-C and C-S sets is determined by the degree of membership, degree of non-membership, and degree of intuition.

The C property of each element of A is entered one by one.

S relation of each element of C is entered one by one.

TBL_DATA

ID	TYPE	TYPE_ID	PROPERTY_ID	MU
2	1	1	1	0
3	1	1	2	1
4	1	1	3	0,001
5	1	1	4	0,255
6	1	1	5	0,985
7	1	1	6	0,755
8	1	1	7	0,625
9	1	1	8	0,245
10	1	1	9	0,255
11	1	1	10	0,355
12	1	1	11	0,785
13	1	1	12	0,025
14	1	1	13	0,155
15	1	1	14	0,955
16	1	1	15	0,125
17	1	1	16	0,925
18	1	1	17	0,785
19	1	1	18	0,001
20	1	1	19	0,91
21	1	1	20	0,895
22	1	2	1	0
23	1	2	2	1
24	1	2	3	0,865
25	1	2	4	0,625
26	1	2	5	0,165

27	1	2	6	0,125
28	1	2	7	0,945
29	1	2	8	0,345
30	1	2	9	0,125
31	1	2	10	0,255
32	1	2	11	0,852
33	1	2	12	0,125
34	1	2	13	0,755
35	1	2	14	0,455
36	1	2	15	0,352
37	1	2	16	0,652
38	1	2	17	0,698
39	1	2	18	0,021
40	1	2	19	0,569
41	1	2	20	0,825
42	1	3	1	1
43	1	3	2	0
44	1	3	3	0,125
45	1	3	4	0,355
46	1	3	5	0,854
47	1	3	6	0,055
48	1	3	7	0,255
49	1	3	8	0,945
50	1	3	9	0,855
51	1	3	10	0,455
52	1	3	11	0,145
53	1	3	12	0,256
54	1	3	13	0,325
55	1	3	14	0,955
56	1	3	15	0,255
57	1	3	16	0,254
58	1	3	17	0,985
59	1	3	18	0,985
60	1	3	19	0,254
61	1	3	20	0,785
62	1	4	1	1
63	1	4	2	0
64	1	4	3	0,125
65	1	4	4	0,855
66	1	4	5	0,245
67	1	4	6	0,155
68	1	4	7	0,455
69	1	4	8	0,845
70	1	4	9	0,125
71	1	4	10	0,255
72	1	4	11	0,865
73	1	4	12	0,452
74	1	4	13	0,855
75	1	4	14	0,455

76	1	4	15	0,015
77	1	4	16	0,845
78	1	4	17	0,254
79	1	4	18	0,654
80	1	4	19	0,125
81	1	4	20	0,645
82	1	5	1	1
83	1	5	2	0
84	1	5	3	0,015
85	1	5	4	0,985
86	1	5	5	0,255
87	1	5	6	0,255
88	1	5	7	0,455
89	1	5	8	0,652
90	1	5	9	0,008
91	1	5	10	0,125
92	1	5	11	0,912
93	1	5	12	0,024
94	1	5	13	0,125
95	1	5	14	0,125
96	1	5	15	0,867
97	1	5	16	0,256
98	1	5	17	0,456
99	1	5	18	0,985
100	1	5	19	0,854
101	1	5	20	0,856
102	1	6	1	1
103	1	6	2	0
104	1	6	3	0,005
105	1	6	4	0,955
106	1	6	5	0,455
107	1	6	6	0,355
108	1	6	7	0,5
109	1	6	8	0,736
110	1	6	9	0,125
111	1	6	10	0,255
112	1	6	11	0,721
113	1	6	12	0,362
114	1	6	13	0,855
115	1	6	14	0,455
116	1	6	15	0,236
117	1	6	16	0,352
118	1	6	17	0,845
119	1	6	18	0,995
120	1	6	19	0,785
121	1	6	20	0,886
122	2	1	1	0,855
123	2	1	2	0,245
124	2	1	3	0,015

125	2	1	4	0,225
126	2	1	5	0,952
127	2	1	6	0,125
128	2	1	7	0,425
129	2	1	8	0,853
130	2	1	9	0,745
131	2	1	10	0,525
132	2	1	11	0,125
133	2	1	12	0,35
134	2	1	13	0,125
135	2	1	14	0,255
136	2	1	15	0,855
137	2	1	16	0,425
138	2	1	17	0,755
139	2	1	18	0,75
140	2	1	19	0,855
141	2	1	20	0,546
142	2	2	1	0,855
143	2	2	2	0,015
144	2	2	3	0,015
145	2	2	4	0,225
146	2	2	5	0,952
147	2	2	6	0,015
148	2	2	7	0,225
149	2	2	8	0,952
150	2	2	9	0,525
151	2	2	10	0,325
152	2	2	11	0,125
153	2	2	12	0,55
154	2	2	13	0,125
155	2	2	14	0,425
156	2	2	15	0,753
157	2	2	16	0,75
158	2	2	17	0,75
159	2	2	18	0,55
160	2	2	19	0,865
161	2	2	20	0,325
162	2	3	1	0,925
163	2	3	2	0,15
164	2	3	3	0,015
165	2	3	4	0,225
166	2	3	5	0,952
167	2	3	6	0,015
168	2	3	7	0,225
169	2	3	8	0,952
170	2	3	9	0,525
171	2	3	10	0,325
172	2	3	11	0,125
173	2	3	12	0,55

174	2	3	13	0,125
175	2	3	14	0,425
176	2	3	15	0,753
177	2	3	16	0,75
178	2	3	17	0,89
179	2	3	18	0,455
180	2	3	19	0,985
181	2	3	20	0,256
182	2	4	1	0,555
183	2	4	2	0,853
184	2	4	3	0,125
185	2	4	4	0,425
186	2	4	5	0,853
187	2	4	6	0,625
188	2	4	7	0,425
189	2	4	8	0,125
190	2	4	9	0,325
191	2	4	10	0,825
192	2	4	11	0,455
193	2	4	12	0,853
194	2	4	13	0,125
195	2	4	14	0,255
196	2	4	15	0,952
197	2	4	16	0,853
198	2	4	17	0,745
199	2	4	18	0,855
200	2	4	19	0,845
201	2	4	20	0,325
202	2	5	1	0,245
203	2	5	2	0,952
204	2	5	3	0,015
205	2	5	4	0,225
206	2	5	5	0,952
207	2	5	6	0,625
208	2	5	7	0,425
209	2	5	8	0,125
210	2	5	9	0,325
211	2	5	10	0,825
212	2	5	11	0,495
213	2	5	12	0,952
214	2	5	13	0,125
215	2	5	14	0,255
216	2	5	15	0,955
217	2	5	16	0,952
218	2	5	17	0,745
219	2	5	18	0,745
220	2	5	19	0,845
221	2	5	20	0,325
222	2	6	1	0,855

223	2	6	2	0,895
224	2	6	3	0,325
225	2	6	4	0,555
226	2	6	5	0,75
227	2	6	6	0,625
228	2	6	7	0,425
229	2	6	8	0,125
230	2	6	9	0,325
231	2	6	10	0,825
232	2	6	11	0,855
233	2	6	12	0,895
234	2	6	13	0,125
235	2	6	14	0,745
236	2	6	15	0,125
237	2	6	16	0,895
238	2	6	17	0,85
239	2	6	18	0,854
240	2	6	19	0,752
241	2	6	20	0,125
242	2	7	1	0,955
243	2	7	2	0,85
244	2	7	3	0,225
245	2	7	4	0,425
246	2	7	5	0,85
247	2	7	6	0,545
248	2	7	7	0,45
249	2	7	8	0,785
250	2	7	9	0,825
251	2	7	10	0,455
252	2	7	11	0,35
253	2	7	12	0,85
254	2	7	13	0,225
255	2	7	14	0,455
256	2	7	15	0,75
257	2	7	16	0,85
258	2	7	17	0,985
259	2	7	18	0,855
260	2	7	19	0,985
261	2	7	20	0,725
262	2	8	1	0,655
263	2	8	2	0,785
264	2	8	3	0,245
265	2	8	4	0,585
266	2	8	5	0,785
267	2	8	6	0,625
268	2	8	7	0,425
269	2	8	8	0,125
270	2	8	9	0,845
271	2	8	10	0,545

272	2	8	11	0,45
273	2	8	12	0,785
274	2	8	13	0,125
275	2	8	14	0,345
276	2	8	15	0,85
277	2	8	16	0,785
278	2	8	17	0,125
279	2	8	18	0,125
280	2	8	19	0,125
281	2	8	20	0,125
282	2	9	1	0,15
283	2	9	2	0,825
284	2	9	3	0,455
285	2	9	4	0,325
286	2	9	5	0,015
287	2	9	6	0,525
288	2	9	7	0,125
289	2	9	8	0,15
290	2	9	9	0,425
291	2	9	10	0,125
292	2	9	11	0,15
293	2	9	12	0,425
294	2	9	13	0,425
295	2	9	14	0,125
296	2	9	15	0,015
297	2	9	16	0,925
298	2	9	17	0,855
299	2	9	18	0,255
300	2	9	19	0,755
301	2	9	20	0,125
302	2	10	1	0,525
303	2	10	2	0,865
304	2	10	3	0,225
305	2	10	4	0,425
306	2	10	5	0,865
307	2	10	6	0,015
308	2	10	7	0,225
309	2	10	8	0,952
310	2	10	9	0,425
311	2	10	10	0,15
312	2	10	11	0,015
313	2	10	12	0,865
314	2	10	13	0,125
315	2	10	14	0,255
316	2	10	15	0,855
317	2	10	16	0,865
318	2	10	17	0,95
319	2	10	18	0,125
320	2	10	19	0,95

321	2	10	20	0,526
322	2	11	1	0,425
323	2	11	2	0,845
324	2	11	3	0,225
325	2	11	4	0,425
326	2	11	5	0,845
327	2	11	6	0,625
328	2	11	7	0,425
329	2	11	8	0,125
330	2	11	9	0,325
331	2	11	10	0,845
332	2	11	11	0,255
333	2	11	12	0,845
334	2	11	13	0,125
335	2	11	14	0,255
336	2	11	15	0,85
337	2	11	16	0,845
338	2	11	17	0,725
339	2	11	18	0,125
340	2	11	19	0,825
341	2	11	20	0
342	2	12	1	0,852
343	2	12	2	0,845
344	2	12	3	0,225
345	2	12	4	0,425
346	2	12	5	0,845
347	2	12	6	0,125
348	2	12	7	0,425
349	2	12	8	0,853
350	2	12	9	0,825
351	2	12	10	0,425
352	2	12	11	0,355
353	2	12	12	0,845
354	2	12	13	0,545
355	2	12	14	0,345
356	2	12	15	0,245
357	2	12	16	0,845
358	2	12	17	0,56
359	2	12	18	0,325
360	2	12	19	0,125
361	2	12	20	0,125

Table-6

These values are as in Table-1 and Table-2 and as in Table-6, “TYPE=1” Beverage Products, “TYPE=2” Food Types are arranged with TYPE_ID connections on Microsoft SQL Server.

By using the controlled set feature, these values are controlled through Description-1 and Description-2.

TYPE	TYPE_ID	PROPERTY_ID	MU	NU	PI
1	2	15	0,352	0,352	0,296
1	5	15	0,867	0,125	0,008
1	1	17	0,785	0	0,215
1	2	10	0,255	0,455	0,29
1	6	15	0,236	0,352	0,412
2	10	19	0,95	0	0,05
1	3	18	0,985	0,001	0,014
1	2	5	0,165	0,455	0,38
2	3	17	0,89	0	0,11
2	12	15	0,245	0,753	0,002
2	8	4	0,585	0,325	0,09
2	6	20	0,125	0,725	0,15
2	9	4	0,325	0,585	0,09
2	4	20	0,325	0,546	0,129
1	4	9	0,125	0,855	0,02
2	9	2	0,825	0,15	0,025
2	11	5	0,845	0,015	0,14
1	3	7	0,255	0,625	0,12
2	5	16	0,952	0	0,048
2	12	2	0,845	0,15	0,005
2	10	20	0,526	0,325	0,149
2	11	2	0,845	0,15	0,005
1	6	4	0,955	0	0,045
2	9	8	0,15	0,785	0,065
1	1	1	0	1	0
1	2	8	0,345	0,652	0,003

```
WITH M_SUBCALCULATE AS
(SELECT TBL_DATA.ID, TBL_DATA.TYPE, TBL_DATA.PROPERTY_ID, TBL_DATA.TYPE_ID, TBL_DATA.MU,
TBL_DATA_1.MU AS MU_S, TBL_DATA_1.ID AS ID_S, TBL_DATA_1.TYPE_ID AS TYPE_ID_S,
TBL_DATA_1.PROPERTY_ID AS PROPERTY_ID_S, CASE WHEN (TBL_DATA.MU + TBL_DATA_1.MU) > 1 THEN 0 ELSE
TBL_DATA_1.MU END AS CONTROL FROM TBL_DATA INNER JOIN TBL_DATA AS TBL_DATA_1 ON TBL_DATA.TYPE =
TBL_DATA_1.TYPE AND TBL_DATA.PROPERTY_ID = TBL_DATA_1.PROPERTY_ID)
,

M_CALCULATE AS(SELECT TOP (100) PERCENT TYPE, TYPE_ID, PROPERTY_ID, MU, MAX(CONTROL) AS NU, 1 -
MU - MAX(CONTROL) AS PI FROM M_SUBCALCULATE GROUP BY TYPE, TYPE_ID, MU, PROPERTY_ID)

SELECT * FROM M_CALCULATE
```

2	4	11	0,455	0,495	0,05
1	2	4	0,625	0,355	0,02
2	12	16	0,845	0	0,155
1	3	3	0,125	0,865	0,01
1	5	12	0,024	0,452	0,524
2	10	8	0,952	0	0,048
2	1	5	0,952	0,015	0,033
2	1	13	0,125	0,545	0,33
2	5	2	0,952	0,015	0,033
2	9	19	0,755	0,125	0,12
2	6	5	0,75	0,015	0,235
2	7	16	0,85	0	0,15
2	2	11	0,125	0,855	0,02
2	3	12	0,55	0,425	0,025
2	8	6	0,625	0,125	0,25
1	1	10	0,355	0,455	0,19
2	2	9	0,525	0,425	0,05
2	11	16	0,845	0	0,155
2	1	17	0,755	0,125	0,12
2	7	7	0,45	0,45	0,1
2	8	1	0,655	0,245	0,1
2	7	10	0,455	0,545	-1,11E-16
1	5	20	0,856	0	0,144
2	4	4	0,425	0,555	0,02
2	5	15	0,955	0,015	0,03
1	5	8	0,652	0,345	0,003
2	5	13	0,125	0,545	0,33
1	2	2	1	0	0
1	3	10	0,455	0,455	0,09
1	4	6	0,155	0,755	0,09
2	6	4	0,555	0,425	0,02
1	1	13	0,155	0,755	0,09
2	10	12	0,865	0	0,135
1	2	20	0,825	0	0,175
1	3	6	0,055	0,755	0,19
1	5	10	0,125	0,455	0,42
2	2	1	0,855	0	0,145
2	6	18	0,854	0,125	0,021
2	8	18	0,125	0,855	0,02
1	5	13	0,125	0,855	0,02
1	6	9	0,125	0,855	0,02
2	3	14	0,425	0,455	0,12
2	9	15	0,015	0,955	0,03

1	6	14	0,455	0,455	0,09
1	1	4	0,255	0,625	0,12
1	3	14	0,955	0	0,045
2	5	9	0,325	0,525	0,15
2	3	2	0,15	0,85	0
2	4	5	0,853	0,015	0,132
2	5	3	0,015	0,455	0,53
2	5	5	0,952	0,015	0,033
2	7	11	0,35	0,495	0,155
1	6	8	0,736	0,245	0,019
2	11	3	0,225	0,455	0,32
1	1	16	0,925	0	0,075
1	6	1	1	0	0
1	6	11	0,721	0,145	0,134
2	10	14	0,255	0,745	0
1	3	9	0,855	0,125	0,02
2	7	18	0,855	0,125	0,02
1	3	16	0,254	0,652	0,094
1	1	20	0,895	0	0,105
1	6	19	0,785	0,125	0,09
2	8	7	0,425	0,45	0,125
2	10	17	0,95	0	0,05
2	12	17	0,56	0,125	0,315
1	4	20	0,645	0	0,355
2	6	8	0,125	0,853	0,022
2	9	13	0,425	0,545	0,03
2	1	3	0,015	0,455	0,53
2	8	13	0,125	0,545	0,33
2	1	1	0,855	0	0,145
2	4	14	0,255	0,745	0
2	7	15	0,75	0,245	0,005
2	10	15	0,855	0,125	0,02
2	9	17	0,855	0,125	0,02
2	1	7	0,425	0,45	0,125
1	5	14	0,125	0,455	0,42
1	6	6	0,355	0,355	0,29
2	3	4	0,225	0,585	0,19
2	5	6	0,625	0,125	0,25
2	5	7	0,425	0,45	0,125
2	12	13	0,545	0,425	0,03
1	4	15	0,015	0,867	0,118
1	6	10	0,255	0,455	0,29
2	4	6	0,625	0,125	0,25
2	5	1	0,245	0,655	0,1

2	3	20	0,256	0,725	0,019
2	4	13	0,125	0,545	0,33
2	8	19	0,125	0,865	0,01
2	2	12	0,55	0,425	0,025
2	8	12	0,785	0	0,215
2	7	2	0,85	0,15	2,78E-17
2	12	18	0,325	0,55	0,125
1	6	13	0,855	0,125	0,02
2	1	11	0,125	0,855	0,02
2	4	12	0,853	0	0,147
2	8	14	0,345	0,455	0,2
2	7	19	0,985	0	0,015
1	1	19	0,91	0	0,09
1	3	19	0,254	0,569	0,177
2	2	6	0,015	0,625	0,36
2	2	18	0,55	0,325	0,125
2	12	9	0,825	0	0,175
1	1	14	0,955	0	0,045
2	1	15	0,855	0,125	0,02
1	4	17	0,254	0,698	0,048
2	7	8	0,785	0,15	0,065
2	5	18	0,745	0,255	0
2	9	3	0,455	0,455	0,09
2	12	19	0,125	0,865	0,01
1	4	4	0,855	0	0,145
1	5	2	0	1	0
1	1	6	0,755	0,155	0,09
1	3	4	0,355	0,625	0,02
2	2	19	0,865	0,125	0,01
2	5	11	0,495	0,495	0,01
2	6	2	0,895	0,015	0,09
2	1	16	0,425	0,425	0,15
2	4	10	0,825	0,15	0,025
1	4	14	0,455	0,455	0,09
1	6	2	0	1	0
1	2	18	0,021	0,654	0,325
1	5	6	0,255	0,355	0,39
1	6	18	0,995	0,001	0,004
2	3	19	0,985	0	0,015
2	12	8	0,853	0,125	0,022
2	11	6	0,625	0,125	0,25
2	7	3	0,225	0,455	0,32
1	1	18	0,001	0,995	0,004

2	12	5	0,845	0,015	0,14
1	5	16	0,256	0,652	0,092
1	1	7	0,625	0,255	0,12
2	10	3	0,225	0,455	0,32
2	12	1	0,852	0	0,148
2	8	9	0,845	0	0,155
1	5	1	1	0	0
1	5	9	0,008	0,855	0,137
2	2	14	0,425	0,455	0,12
2	3	7	0,225	0,45	0,325
2	5	8	0,125	0,853	0,022
2	9	14	0,125	0,745	0,13
2	8	10	0,545	0,455	-5,55E-17
2	11	9	0,325	0,525	0,15
2	7	5	0,85	0,015	0,135
1	2	6	0,125	0,755	0,12
2	2	20	0,325	0,546	0,129
2	4	9	0,325	0,525	0,15
2	9	20	0,125	0,725	0,15
1	4	11	0,865	0	0,135
2	6	1	0,855	0	0,145
2	2	17	0,75	0,125	0,125
2	9	11	0,15	0,495	0,355
2	11	18	0,125	0,855	0,02
2	9	6	0,525	0,125	0,35
2	5	14	0,255	0,745	0
2	9	5	0,015	0,952	0,033
1	6	3	0,005	0,865	0,13
2	1	8	0,853	0,125	0,022
2	4	1	0,555	0,425	0,02
1	1	5	0,985	0	0,015
2	8	3	0,245	0,455	0,3
2	11	1	0,425	0,555	0,02
1	2	9	0,125	0,855	0,02
2	12	12	0,845	0	0,155
2	12	20	0,125	0,725	0,15
1	2	11	0,852	0,145	0,003
2	10	9	0,425	0,525	0,05
1	5	19	0,854	0,125	0,021
1	3	1	1	0	0
1	5	5	0,255	0,455	0,29
2	2	15	0,753	0,245	0,002
2	3	6	0,015	0,625	0,36

2	5	12	0,952	0	0,048
2	2	3	0,015	0,455	0,53
2	6	10	0,825	0,15	0,025
2	11	7	0,425	0,45	0,125
2	3	13	0,125	0,545	0,33
1	4	16	0,845	0	0,155
2	10	5	0,865	0,015	0,12
2	12	10	0,425	0,545	0,03
2	8	17	0,125	0,855	0,02
2	11	19	0,825	0,125	0,05
2	11	13	0,125	0,545	0,33
1	3	5	0,854	0	0,146
2	3	16	0,75	0	0,25
2	5	19	0,845	0,125	0,03
2	11	11	0,255	0,495	0,25
2	12	11	0,355	0,495	0,15
2	2	4	0,225	0,585	0,19
2	7	4	0,425	0,555	0,02
2	6	6	0,625	0,125	0,25
2	7	17	0,985	0	0,015
1	4	2	0	1	0
2	3	5	0,952	0,015	0,033
2	7	14	0,455	0,455	0,09
1	1	2	1	0	0
1	3	12	0,256	0,452	0,292
2	3	3	0,015	0,455	0,53
2	11	14	0,255	0,745	0
2	1	19	0,855	0,125	0,02
1	3	13	0,325	0,325	0,35
2	1	6	0,125	0,625	0,25
2	1	20	0,546	0,325	0,129
1	2	12	0,125	0,452	0,423
2	6	14	0,745	0,255	0
1	1	12	0,025	0,452	0,523
2	11	4	0,425	0,555	0,02
2	10	6	0,015	0,625	0,36
1	4	10	0,255	0,455	0,29
2	12	14	0,345	0,455	0,2
1	1	8	0,245	0,736	0,019
2	11	12	0,845	0	0,155
2	6	13	0,125	0,545	0,33
2	8	8	0,125	0,853	0,022
2	10	16	0,865	0	0,135
2	3	1	0,925	0	0,075

2	3	9	0,525	0,425	0,05
1	2	16	0,652	0,256	0,092
2	2	7	0,225	0,45	0,325
1	3	20	0,785	0	0,215
2	4	18	0,855	0,125	0,02
1	4	19	0,125	0,854	0,021
2	4	8	0,125	0,853	0,022
2	12	7	0,425	0,45	0,125
2	1	14	0,255	0,745	0
1	4	1	1	0	0
1	4	5	0,245	0,455	0,3
2	7	6	0,545	0,125	0,33
2	8	20	0,125	0,725	0,15
1	1	3	0,001	0,865	0,134
2	10	2	0,865	0,015	0,12
2	6	3	0,325	0,455	0,22
2	6	16	0,895	0	0,105
2	10	7	0,225	0,45	0,325
2	10	18	0,125	0,855	0,02
1	4	13	0,855	0,125	0,02
1	5	18	0,985	0,001	0,014
2	3	8	0,952	0	0,048
2	10	1	0,525	0,425	0,05
2	9	18	0,255	0,745	0
2	3	10	0,325	0,545	0,13
2	4	19	0,845	0,125	0,03
2	8	11	0,45	0,495	0,055
1	3	8	0,945	0	0,055
1	6	17	0,845	0	0,155
2	5	10	0,825	0,15	0,025
2	8	5	0,785	0,015	0,2
1	6	7	0,5	0,5	0
2	1	9	0,745	0	0,255
1	4	3	0,125	0,865	0,01
2	9	9	0,425	0,525	0,05
1	2	3	0,865	0,125	0,01
2	1	10	0,525	0,455	0,02
1	1	15	0,125	0,867	0,008
2	5	17	0,745	0,125	0,13
2	7	1	0,955	0	0,045
1	1	11	0,785	0,145	0,07
1	5	3	0,015	0,865	0,12
2	5	4	0,225	0,585	0,19
2	9	7	0,125	0,45	0,425

1	4	7	0,455	0,5	0,045
2	1	2	0,245	0,245	0,51
1	4	12	0,452	0,452	0,096
1	5	11	0,912	0	0,088
1	6	20	0,886	0	0,114
2	10	11	0,015	0,855	0,13
2	12	4	0,425	0,555	0,02
2	5	20	0,325	0,546	0,129
1	2	13	0,755	0,155	0,09
2	11	15	0,85	0,125	0,025
2	7	13	0,225	0,545	0,23
2	4	15	0,952	0,015	0,033
2	10	13	0,125	0,545	0,33
1	3	15	0,255	0,352	0,393
2	3	11	0,125	0,855	0,02
2	8	16	0,785	0	0,215
1	6	12	0,362	0,452	0,186
2	11	17	0,725	0,125	0,15
1	3	17	0,985	0	0,015
2	4	3	0,125	0,455	0,42
2	4	7	0,425	0,45	0,125
2	7	20	0,725	0,256	0,019
2	10	10	0,15	0,845	0,005
1	6	16	0,352	0,352	0,296
2	8	2	0,785	0,15	0,065
1	2	17	0,698	0,254	0,048
1	2	19	0,569	0,254	0,177
2	2	16	0,75	0	0,25
2	2	5	0,952	0,015	0,033
2	2	13	0,125	0,545	0,33
2	7	12	0,85	0	0,15
2	1	18	0,75	0,125	0,125
1	2	1	0	1	0
1	4	8	0,845	0	0,155
2	1	4	0,225	0,585	0,19
2	4	16	0,853	0	0,147
1	5	7	0,455	0,5	0,045
2	6	19	0,752	0,125	0,123
2	10	4	0,425	0,555	0,02
1	6	5	0,455	0,455	0,09
1	1	9	0,255	0,255	0,49
2	4	2	0,853	0,015	0,132
2	9	12	0,425	0,55	0,025
2	9	10	0,125	0,845	0,03

2	9	16	0,925	0	0,075
1	2	7	0,945	0	0,055
2	7	9	0,825	0	0,175
1	2	14	0,455	0,455	0,09
2	4	17	0,745	0,125	0,13
2	2	2	0,015	0,952	0,033
2	11	10	0,845	0,15	0,005
2	6	15	0,125	0,855	0,02
2	6	9	0,325	0,525	0,15
2	11	8	0,125	0,853	0,022
2	3	18	0,455	0,455	0,09
2	6	11	0,855	0,125	0,02
2	12	6	0,125	0,625	0,25
2	3	15	0,753	0,245	0,002
2	8	15	0,85	0,125	0,025
2	1	12	0,35	0,55	0,1
1	5	17	0,456	0,456	0,088
1	3	11	0,145	0,852	0,003
1	5	4	0,985	0	0,015
2	9	1	0,15	0,655	0,195
1	4	18	0,654	0,021	0,325
1	3	2	0	1	0
2	6	12	0,895	0	0,105
2	2	10	0,325	0,545	0,13
2	6	17	0,85	0,125	0,025
2	11	20	0	0,725	0,275
2	12	3	0,225	0,455	0,32
2	2	8	0,952	0	0,048
2	6	7	0,425	0,45	0,125

Table-7

The clusters obtained as in Table-7 are intuitive fuzzy sets.
Description-3
When Hamming measure is applied to these clusters using definition-3, the relationship between A and S can be seen as in Table-8.

DRINK_ID	DRINK	FOOD_ID	FOOD	DISTANCE
4	DRINK NO.4	4	CHICKEN	21,062
2	DRINK NO.2	4	CHICKEN	18,612
3	DRINK NO.3	4	CHICKEN	18,516
5	DRINK NO.5	4	CHICKEN	17,674
6	DRINK	4	CHICKEN	17,41

	NO.6			
1	DRINK NO.1	4	CHICKEN	15,002
2	DRINK NO.2	7	CHEESE	19,302
4	DRINK NO.4	7	CHEESE	18,028
5	DRINK NO.5	7	CHEESE	16,242
1	DRINK NO.1	7	CHEESE	15,434
6	DRINK NO.6	7	CHEESE	14,214
3	DRINK NO.3	7	CHEESE	13,11
5	DRINK NO.5	6	FISH	18,3
4	DRINK NO.4	6	FISH	18,088
2	DRINK NO.2	6	FISH	17,864
3	DRINK NO.3	6	FISH	17,774
6	DRINK NO.6	6	FISH	16,218
1	DRINK NO.1	6	FISH	13,61
6	DRINK NO.6	8	FRUIT	20,962
5	DRINK NO.5	8	FRUIT	19,944
2	DRINK NO.2	8	FRUIT	19,186
4	DRINK NO.4	8	FRUIT	19,174
3	DRINK NO.3	8	FRUIT	19,122
1	DRINK NO.1	8	FRUIT	17,284
2	DRINK NO.2	3	VENISON	20,774
1	DRINK NO.1	3	VENISON	18,044
4	DRINK NO.4	3	VENISON	17,184
5	DRINK NO.5	3	VENISON	16,798
6	DRINK NO.6	3	VENISON	14,89

3	DRINK NO.3	3	VENISON	12,33
2	DRINK NO.2	2	OILY RED MEAT	20,386
1	DRINK NO.1	2	OILY RED MEAT	18,404
4	DRINK NO.4	2	OILY RED MEAT	16,012
5	DRINK NO.5	2	OILY RED MEAT	15,696
6	DRINK NO.6	2	OILY RED MEAT	14,228
3	DRINK NO.3	2	OILY RED MEAT	11,758
4	DRINK NO.4	10	PORK	20,64
5	DRINK NO.5	10	PORK	19,416
6	DRINK NO.6	10	PORK	18,72
2	DRINK NO.2	10	PORK	18,206
1	DRINK NO.1	10	PORK	16,454
3	DRINK NO.3	10	PORK	16,08
2	DRINK NO.2	1	RED MEAT	20,526
4	DRINK NO.4	1	RED MEAT	18,65
1	DRINK NO.1	1	RED MEAT	18,396
5	DRINK NO.5	1	RED MEAT	15,464
6	DRINK NO.6	1	RED MEAT	15,1
3	DRINK NO.3	1	RED MEAT	11,666
4	DRINK NO.4	11	SHRIMP	22,502
3	DRINK NO.3	11	SHRIMP	20,264
5	DRINK NO.5	11	SHRIMP	19,93
6	DRINK NO.6	11	SHRIMP	19,506
2	DRINK NO.2	11	SHRIMP	17,832
1	DRINK	11	SHRIMP	14,144

	NO.1			
5	DRINK NO.5	12	SPICE	20,286
2	DRINK NO.2	12	SPICE	18,256
1	DRINK NO.1	12	SPICE	17,602
6	DRINK NO.6	12	SPICE	17,322
4	DRINK NO.4	12	SPICE	15,002
3	DRINK NO.3	12	SPICE	14,406
4	DRINK NO.4	5	TURKEY	22,59
3	DRINK NO.3	5	TURKEY	20,296
5	DRINK NO.5	5	TURKEY	19,426
6	DRINK NO.6	5	TURKEY	19,124
2	DRINK NO.2	5	TURKEY	18,764
1	DRINK NO.1	5	TURKEY	13,802
3	DRINK NO.3	9	VEGETABLES	21,66
5	DRINK NO.5	9	VEGETABLES	21,222
4	DRINK NO.4	9	VEGETABLES	20,454
6	DRINK NO.6	9	VEGETABLES	19,152
2	DRINK NO.2	9	VEGETABLES	16,362
1	DRINK NO.1	9	VEGETABLES	14,832

Table-8

When the results in Table-8 are evaluated, the beverage consumed with "Chicken" food should be Drink no.4. It is clear that Drink no.1 and Drink no.2 drinks can be found in a service with "oily red meat" and "Venison", considering that there will be no fish and red meat in the same service, but fish and vegetable dishes.
As a different evaluation of the results, considering the Table-8, it can be considered that the Drink no.1 drink and the Drink no.2 drink have similar properties.

7. CONCLUSION

It is considered as an important problem that data with different characteristics reach the same results in studies conducted through the Hamming measure. In this study, it will be more difficult to associate data with different characteristics with the same data, since the data that does not provide a characteristic by means of controlled sets is expressed with data within its own universal region. At the very least, it is not possible for elements that control each other to match the same data. The method followed in this study can be tested by using it in old applications. In addition, these criteria can be taken into account so that they can be easily applied to multi-criteria decision making problems in future studies.

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The Declaration of Ethics Committee Approval

This study does not be necessary ethical committee permission or any special permission.

The Declaration of Research and Publication Ethics

The author(s) declared that they comply with the scientific, ethical, and citation rules of Journal of Universal Mathematics in all processes of the study and that they do not make any falsification on the data collected. Besides, the author(s) declared that Journal of Universal Mathematics and its editorial board have no responsibility for any ethical violations that may be encountered and this study has not been evaluated in any academic publication environment other than Journal of Universal Mathematics.

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