Bayesian Network Analysis for the Questionnaire Investigation on the Needs at Fuji Shopping Street Town under the View Point of Service Engineering

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Abstract—**Shopping streets at local city in Japan became old and are generally declining. In this paper, the area rebirth and/or regional revitalization of shopping street are handled. Fuji city in Japan is focused. Four big festivals are held at Fuji city (two for Fuji Shopping Street Town and two for Yoshiwara Shopping Street Town). Many people visit these festivals including residents in that area. Therefore a questionnaire investigation to the residents and visitors is conducted during these periods in order to clarify residents and visitors' needs for the shopping street, and utilize them to the plan building of the area rebirth and/or regional revitalization of shopping street. There is a big difference between Fuji Shopping Street Town and Yoshiwara Shopping Street Town. Therefore Fuji Shopping Street Town is focused in this paper. These are analyzed by using Bayesian Network. These are analyzed by sensitivity analysis and odds ratio is calculated to the results of sensitivity analysis in order to obtain much clearer results. The analysis utilizing Bayesian Network enabled us to visualize the causal relationship among items. Furthermore, sensitivity analysis brought us estimating and predicting the prospective visitors. Sensitivity analysis is performed by back propagation method. These are utilized for constructing a much more effective and useful plan building. Fruitful results are obtained. To confirm the findings by utilizing the new consecutive visiting records would be the future works to be investigated.**

Keywords—Fuji city; area rebirth; regional vitalization; Bayesian network; back propagation; service engineering

I. INTRODUCTION

Shopping streets at local city in Japan are generally declining. It is because most of them were built in the so-called "High Growth Period (1954-1973)". Therefore they became old and area rebirth and/or regional revitalization are required everywhere.

There are many papers published concerning area rebirth or regional revitalization. Author in [1] has pointed out the importance of tourism promotion. Author in [2] developed the project of shutter art to Wakkanai Chuo shopping street in Hokkaido, Japan. Author in [3] has made a questionnaire research at Jigenji shopping street in Kagoshima Prefecture,

Japan and analyzed the current condition and future issues. For about tourism, many papers are presented from many aspects as follows.

Author in [4] designed and conducted a visitor survey on the spot, which used a questionnaire to investigate the activities of visitors to the Ueno district in Taito ward, Tokyo. Author in [5] analyzed the image of the Izu Peninsula as a tourist destination in their 2003 study "Questionnaire Survey on the Izu Peninsula." Author in [6] conducted tourist behavior studies in Atami city in 2008, 2009, 2014 and in other years.

In this paper, the area rebirth and/or regional revitalization of shopping street are handled. Fuji city in Japan is focused. Fuji city is located in Shizuoka Prefecture. Mt. Fuji is very famous all around the world and its beautiful scenery from Fuji city can be seen, which is at the foot of Mt. Fuji. There are two big shopping streets in Fuji city. One is Yoshiwara shopping street and another one is Fuji shopping street. They became old and building area rebirth and regional revitalization plan have started. Following investigation was conducted by the joint research group (Fuji Chamber of Commerce & Industry, Fujisan Area Management Company, Katsumata Maruyama Architects, Kougakuin University and Tokoha University). The main project activities are as follows:

- Investigation on the assets which are not in active use

- Questionnaire Investigation to Entrepreneur

- Questionnaire Investigation to the residents and visitors

After that, area rebirth and regional revitalization plan were built.

In this paper, above stated C is handled.

Four big festivals are held at Fuji city. Two big festivals are held at Yoshiwara Shopping Street Town and two big festivals at Fuji Shopping Street Town.

At Yoshiwara Shopping Street Town, Yoshiwara Gion Festival is carried out during June and Yoshiwara Shukuba (post-town) Festival is held during October. On the other hand,

Kinoene Summer Festival is conducted during August and Kinoene Autumn Festival is performed during October at Fuji Shopping Street Town. Many people visit these festivals including residents in that area.

Therefore questionnaire investigation of C is conducted during these periods.

Finally, 982 sheets (Yoshiwara Shopping Street Town: 448, Fuji Shopping Street Town: 534) were obtained.

Basic statistical analysis and Bayesian Network analysis are executed based on that. This is really a quite new approach in this field and there is no related paper on this theme as far as searched.

In recent years, the Bayesian network is highlighted because it has the following good characteristics (Neapolitan, 2004).

- Structural Equation Modeling requires normal distribution to the data in the analysis. Therefore, it has a limitation in making analysis, but the Bayesian network does not require a specific distribution type to the data. It can handle any distribution type.

- It can handle the data which include partial data.

- Expert's know-how can be reflected in building a Bayesian Network model.

- Sensitivity analysis can be easily performed by settling evidence. The prospective purchaser can be estimated and predicted by that analysis.

- It is a probability model having a network structure. Related items are connected with directional link. Therefore, understanding becomes easy by its visual chart.

The field of service marketing generally handles the shapeless.

Therefore it is often the case that it is hard to catch the influence to consumers.

Bayesian Network analysis enables to visualize the relationship and/or influence of shapeless products to consumers which is the field of service marketing.

These are also applied to service engineering.

In this paper, a questionnaire investigation is executed in order to clarify residents and visitors' needs for the shopping street and utilize them to the plan building of the area rebirth and/or regional revitalization of shopping street. There is a big difference between Fuji Shopping Street Town and Yoshiwara Shopping Street Town. Therefore Fuji Shopping Street Town is focused in this paper. These are analyzed by using Bayesian Network. These are analyzed by sensitivity analysis and odds ratio is calculated to the results of sensitivity analysis in order to obtain much clearer results. By that model, the causal relationship is sequentially chained by the characteristics of visitors, the purpose of visiting and the image of the surrounding area at this shopping street. The analysis utilizing Bayesian Network enabled us to visualize the causal

relationship among items. Furthermore, sensitivity analysis brought us estimating and predicting the prospective visitors. Sensitivity analysis was conducted by back propagation method.

Some interesting and instructive results are obtained.

The rest of the paper is organized as follows. Outline of questionnaire investigation is stated in Section 2. In Section 3, Bayesian Network analysis is executed which is followed by the sensitivity analysis in Section 4. Conclusion is stated in Section 5.

II. Outline and the Basic Statistical Results of the Questionnaire Research

A. Outline of the Questionnaire Research

A questionnaire investigation to the residents and visitors is conducted during these periods in order to clarify residents and visitors' needs for the shopping street, and utilize them to the plan building of the area rebirth and/or regional revitalization of shopping street. The outline of questionnaire research is as follows. Questionnaire sheet is attached in Appendix 1.

(1)	Scope of investigation	:	Residents and visitors who have visited four big festivals at Fuji city in Shizuoka Prefecture, Japan
(2)	Period	:	Yoshiwara Gion Festival: June 11,12/2016 Yoshiwara Shukuba (post-town) Festival: October 9/2016 Kinoene Summer Festival: August 6,7/2016 Kinoene Autumn Festival: October 15,16/2016
(3)	Method	:	Local site, Dispatch sheet, Self writing
(4)	Collection	:	Number of distribution 1400 Number of collection 982(collection rate 70.1%) Valid answer 982

B. Basic Statistical Results

Now, the main summary results by single variable are shown.

1) Characteristics of answers

a) Sex (Q7): Male 43.3%, Female 56.7%

These are exhibited in Fig. 1.
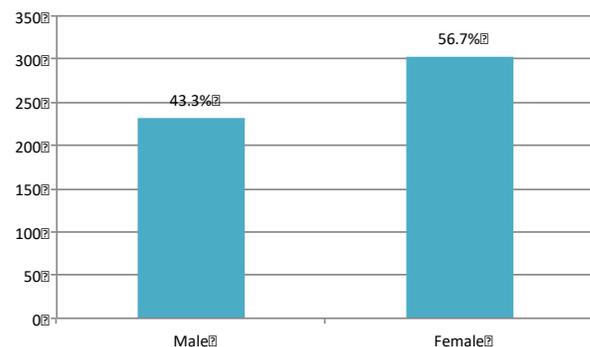
Fig. 1. Sex (Q7).

b) Age (Q8): 10th 20.6%, 20th 16.7%, 30th 25.3%, 40th 17.0%, 50th 10.1%, 60th 6.9%, More than 70 3.4%

These are exhibited in Fig. 2.

c) Residence (Q9): a. Fuji city 82.8%, b. Fujinomiya city 8.8%, c. Numazu city 2.1%, d. Mishima city 0.7%, e. Shizuoka city 0.9%, F. Else (in Shizuoka Prefecture) 2.1%, g. Outside of Shizuoka Prefecture 2.6%

These are exhibited in Fig. 3.

d) How often do you come to this shopping street? (Q1)

Everyday 21.2%, More than 1 time a week 17.2%, More than 1 time a month 22.7%,

More than 1 time a year 26.8%, First time 3.0%, Not filled in 4.1%

These are exhibited in Fig. 4.

e) What is the purpose of visiting here? (Q2)

Shopping 17.2%, Eating and drinking 13.6%, Business 7.4%, Celebration, event 34.1%,

Leisure, amusement 6.1%, miscellaneous 21.6%

These are exhibited in Fig. 5.
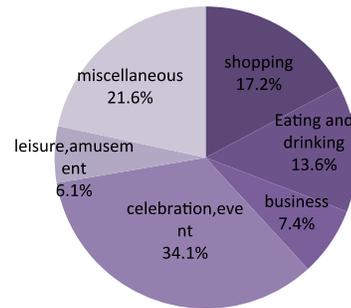
Fig. 2.   Age (Q8).

Fig. 3.   Residence (Q9).

Fig. 4.   How often do you Come to this Shopping Street? (Q1).

Fig. 5.   What is the Purpose of Visiting here? (Q2).
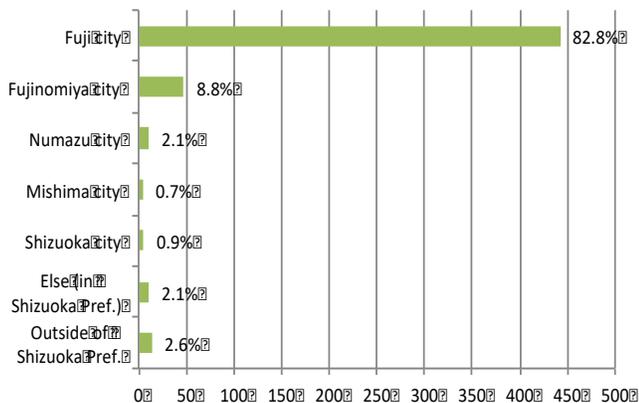
f) How do you feel about the image of the surrounding area at this shopping street? (Q3)

Beautiful 51.2%, Ugly 48.8%, of the united feeling there is 44.3%, Scattered 55.7%,

Varied 38.5%,Featureless 61.5%, New 37.1%, Historic 62.9%, Full of nature 37.1%,Urban 62.9%,

Cheerful 44.1%, Gloomy 55.9%, Individualistic 42.0%, Conventional 58.0%, Friendly 57.8%,

Unfriendly 42.2%, Healed 53.3%, Stimulated 46.7%, Open 44.8%, exclusive 55.2%, want to reside 43.6%,

Do not want to reside 56.4%, Warm 55.1%, Aloof 44.9%, Fascinating 42.1%, not fascinating 57.9%,

Want to play 47.1%, Want to examine deliberately 52.9%, lively 36.8%, Calm 63.2%,

Atmosphere of urban 28.0%, Atmosphere of rural area 72.0%

These are exhibited in Fig. 6.

g) There are many old building at the age of nearly 50 years. Do you think we can still use them? (Q4)

Can use it 48.7%, Cannot use it 29.2%, Have no idea 22.1%

These are exhibited in Fig. 7.
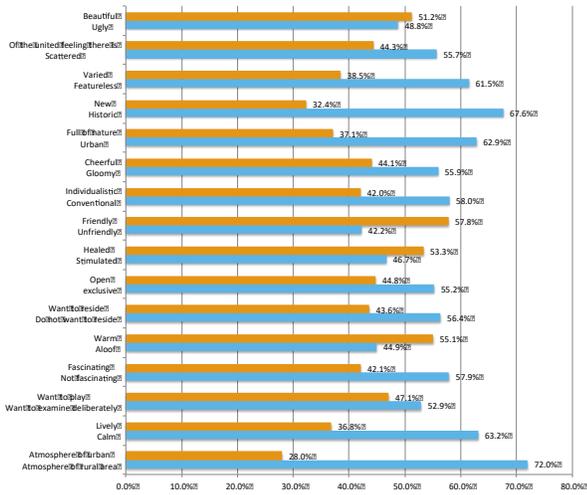
Fig. 6. How do you Feel about the Image of the Surrounding Area at this Shopping Street? (Q3).
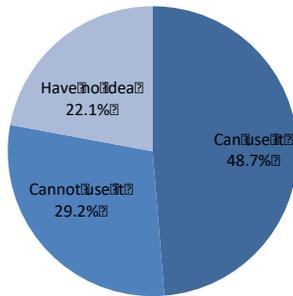
Fig. 7. There are Many Old Building at the Age of Nearly 50 years. Do you think we Can Still use them? (Q4).

III. BAYESIAN NETWORK ANALYSIS

In constructing Bayesian Network, it is required to check the causal relationship among groups of items.

BAYONET software (http://www.msi.co.jp/BAYONET/) is used. When plural nodes exist in the same group, it occurs that causal relationship is hard to set a priori. In that case, BAYONET system set the sequence automatically utilizing AIC standard. Node and parameter of Fig. 8 are exhibited in Table I.

In the next section, sensitivity analysis is achieved by back propagation method. Back propagation method is conducted in the following method (Fig. 9).
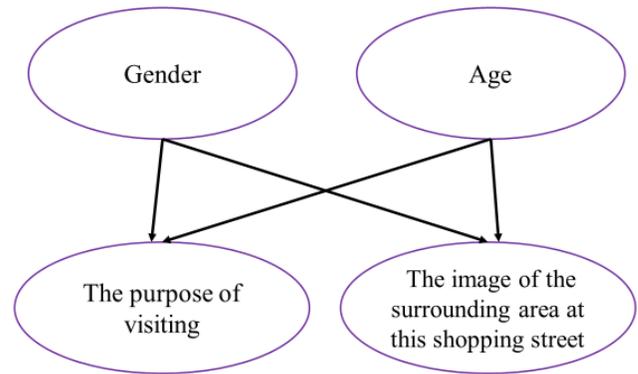
Fig. 8. A Built Model.

$$Pr(X = x) = \alpha\lambda(x)\pi(x)$$

$$\pi(x) = \sum_u P(x|U = u)\prod_{U_i}\pi_{U_i X}(u)$$

$$\lambda(x) = \prod_{Y_j}\lambda_{Y_j X}(x)$$

$$\pi_{XY_j}(x) = \pi(x)\prod_{k \neq j}\lambda_{Y_k X}(x)$$

$$\lambda_{XU_i}(u) = \sum_x \lambda(x)\sum_{k \neq i} P(x|U)\prod_{k \neq i}\pi_{U_k X}(u_k)$$
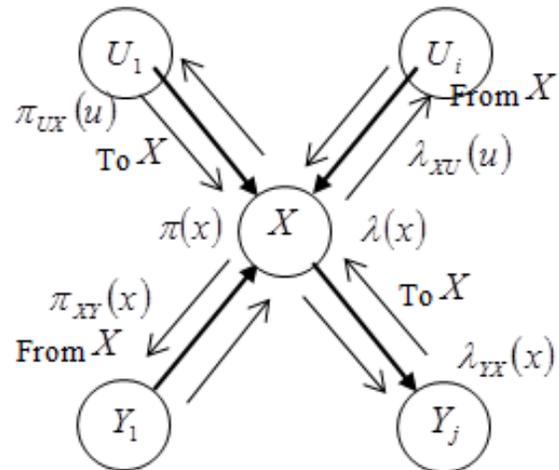
Fig. 9. Back Propagation Method (Takeyasu et al., 2010).

TABLE I.   NODE AND PARAMETER

Node	Parameter									
	1	2	3	4	5	6	7	8	9	10
Gender	Male	Female								
Age	10th	20th	30th	40th	50th	60th	More than 70			
The purpose of visiting	Shopping	Eating and drinking	Business	Celebration、event	Leisure, amusement	miscellaneous				
The image of the surrounding area at this shopping street	Beautiful	Ugly	Of the united feeling there is	Scattered	Varied	Featureless	New	Historic	Full of nature	Urban

Node	Parameter									
	11	12	13	14	15	16	17	18	19	20
The image of the surrounding area at this shopping street	Cheerful	Gloomy	Individualistic	Conventional	Friendly	Unfriendly	Healed	Stimulated	Open	Exclusive

Node	Parameter									
	21	22	23	24	25	26	27	28	29	30
The image of the surrounding area at this shopping street	Want to reside	Do not want to reside	Warm	Aloof	Fascinating	Not fascinating	Want to play	Want to examine deliberately	Lively	Calm

Node	Parameter	
	31	32
The image of the surrounding area at this shopping street	Atmosphere of urban	Atmosphere of rural area

IV. SENSITIVITY ANALYSIS

Now, posterior probability is calculated by setting evidence as, for example, 1.0. Comparing Prior probability and Posterior probability, the change can be seen and the preference or image of the surrounding area at this shopping street can be confirmed. Evidence is set to all parameters. Therefore the analysis volume becomes too large. In this paper, nearly 1/3 of the total cases are picked up and analysis is executed. Nodes that are analyzed here are "Gender", "Age" and "The purpose of visiting". Another paper for the rest of them is prepared.

As stated above, evidence is set to each parameter, and the calculated posterior probability is exhibited in Appendix 2 which includes the calculation results of odds ratio.

Here, each item is classified by the strength of the odds ratio.

- Very Strong (+++): Select major parameter of which the odds ratio is more than 1.6

- Strong (++): Select major parameter of which the odds ratio is more than 1.3

- Medium (+): Select major parameter of which the odds ratio is more than 1.08

- Weak: Else

Now each of them is examined for Very Strong, Strong and Medium case.

A. Sensitivity Analysis for "The Purpose of Visiting"

1) Setting evidence to "Shopping": After setting evidence to "Shopping", the result is exhibited in Table II.

Those who visit for "Shopping" had come with the purpose of visiting for "Leisure, amusement" of an age of "20th", "60th", or "*More than 70*" in which the gender is "*Female*".

(Very Strong part is indicated by bold character and Strong is indicated by italic.)

2) Setting evidence to "Eating and drinking": After setting evidence to "Eating and drinking", the result is exhibited in Table III.

Those who visit for "Eating and drinking" had come with the purpose of visiting for "Business", "Celebration、event" under the image of the surrounding area at this shopping street as "Scattered", "Conventional" or "Exclusive" of an age of "*20th*", "*40th*" or "*50th*" in which the gender is "Male".

TABLE II.   SETTING EVIDENCE TO "SHOPPING" CASE

Leisure, amusement	+
Female	++
Age: 20th	+
Age: 60th	+
Age: More than 70	++

TABLE III.   SETTING EVIDENCE TO "EATING AND DRINKING" CASE

Business	+
Celebration、event	+
Scattered	+
Conventional	+
Exclusive	+
Male	+
Age: 20th	++
Age: 40th	++
Age: 50th	++

3) Setting evidence to "Business": After setting evidence to "Business", the result is exhibited in Table IV.

Those who visit for "Business" had come with the purpose of visiting for "Eating and drinking", "Celebration、event" under the image of the surrounding area at this shopping street as "Conventional" or "Aloof" of an age of "**20th**", "30th" or "*50th*" in which the gender is "**Male**".

4) Setting evidence to "Celebration、event": After setting evidence to "Celebration、event", the result is exhibited in Table V.

Those who visit for "Celebration、event" had come with the purpose of visiting for "Eating and drinking", "Business" under the image of the surrounding area at this shopping street as "Scattered", "Conventional" or "Exclusive" of an age of "30th", "40th" or "*50th*" in which the gender is "*Male*".

TABLE IV.   SETTING EVIDENCE TO "BUSINESS" CASE

Eating and drinking	+
Celebration、event	+
Conventional	+
Aloof	+
Male	+++
Age: 20th	+++
Age: 30th	+
Age: 50th	++

TABLE V.   SETTING EVIDENCE TO "CELEBRATION、EVENT" CASE

Eating and drinking	+
Business	+
Scattered	+
Conventional	+
Exclusive	+
Male	++
Age: 30th	+
Age: 40th	+
Age: 50th	++

5) Setting evidence to "Leisure, amusement": After setting evidence to "Leisure, amusement", the result is exhibited in Table VI.

Those who visit for "Leisure, amusement" had come with the purpose of visiting for "Shopping" under the image of the

surrounding area at this shopping street as "Unfriendly" of an age of "*60th*" or "*More than 70* "in which the gender is "*Female*".

B. Sensitivity Analysis for "Gender"

1) Setting Evidence to "Male": After setting evidence to "Male", the result is exhibited in Table VII.

Those who are "Male" had come with the purpose of visiting for "Eating and drinking", "*Business*", or "Celebration、event" under the image of the surrounding area at this shopping street as "Gloomy", "Conventional" or "Aloof".

2) Setting Evidence to "Female": After setting evidence to "Female", the result is exhibited in Table VIII.

Those who are "Female" had come with the purpose of visiting for "Shopping", or "Leisure, amusement" under the image of the surrounding area at this shopping street as "Beautiful", "New", "Full of nature", "Cheerful", "Individualistic", "Warm" or "Want to play".

TABLE VI.   SETTING EVIDENCE TO "LEISURE, AMUSEMENT" CASE

Shopping	+
Unfriendly	+
Female	++
Age: 60th	++
Age: More than 70	++

TABLE VII.   SETTING EVIDENCE TO "MALE" CASE

Eating and drinking	+
Business	++
Celebration、event	+
Gloomy	+
Conventional	+
Aloof	+

TABLE VIII.   SETTING EVIDENCE TO "FEMALE" CASE

Shopping	+
Leisure, amusement	+
Beautiful	+
New	+
Full of nature	+
Cheerful	+
Individualistic	+
Warm	+
Want to play	+

C. Sensitivity Analysis for "Age"

1) Setting evidence to "10th": After setting evidence to "10th", the result is exhibited in Table IX.

Those who are at the age of "10th" had come under the image of the surrounding area at this shopping street as "*Beautiful*", "*Of the united feeling there is*", "*Varied*", "*Full of nature*", "Urban", "*Cheerful*", "**Individualistic**", "**Friendly**",

"*Healed*", "**Open**", "*Want to reside*", "**Warm**", "**Fascinating**", "**Want to play**" or "*Lively*".

2) Setting evidence to "20th": After setting evidence to "20th", the result is exhibited in Table X.

Those who are at the age of "20th" had come with the purpose of visiting for "*Shopping*", "*Eating and drinking*" or "**Business**" under the image of the surrounding area at this shopping street as "Beautiful", "New", "Full of nature", "*Cheerful*", "Conventional", "Healed", "Stimulated", "Open", "Want to reside", " Fascinating", "Want to play", "Want to examine deliberately" or "Lively".

TABLE IX.   SETTING EVIDENCE TO "10TH" CASE

Beautiful	＋＋
Of the united feeling there is	＋＋
Varied	＋＋
Full of nature	＋＋
Urban	＋
Cheerful	＋＋
Individualistic	＋＋＋
Friendly	＋＋＋
Healed	＋＋
Open	＋＋＋
Want to reside	＋＋
Warm	＋＋＋
Fascinating	＋＋＋
Want to play	＋＋＋
Lively	＋＋

TABLE X.   SETTING EVIDENCE TO "20TH" CASE

Shopping	＋＋
Eating and drinking	＋＋
Business	＋＋＋
Beautiful	＋
New	＋
Full of nature	＋
Cheerful	＋＋
Conventional	＋
Healed	＋
Stimulated	＋
Open	＋
Want to reside	＋
Fascinating	＋
Want to play	＋
Want to examine deliberately	＋
Lively	＋

3) Setting evidence to "30th": After setting evidence to "30th", the result is exhibited in Table XI.

Those who are at the age of "30th" had come with the purpose of visiting for "Business" or "Celebration、event" under the image of the surrounding area at this shopping street as "Conventional" or "Want to play".

4) Setting evidence to "40ᵗʰ": After setting evidence to "40ᵗʰ", the result is exhibited in Table XII.

Those who are at the age of "40th" had come with the purpose of visiting for "*Eating and drinking*" or "*Celebration、event*" under the image of the surrounding area at this shopping street as "Scattered", "Featureless", "New", "Gloomy", "*Exclusive*", "*Do not want to reside*", "Aloof", "Not fascinating", "Calm", "*Atmosphere of urban*" or "Atmosphere of rural area".

TABLE XI.   SETTING EVIDENCE TO "30TH" CASE

Business	＋
Celebration、 event	＋
Conventional	＋
Want to play	＋

TABLE XII.   SETTING EVIDENCE TO "40ᵀᴴ" CASE

Eating and drinking	＋＋
Celebration、 event	＋＋
Scattered	＋
Featureless	＋
New	＋
Gloomy	＋
Exclusive	＋＋
Do not want to reside	＋＋
Aloof	＋
Not fascinating	＋
Calm	＋
Atmosphere of urban	＋＋
Atmosphere of rural area	＋

TABLE XIII.   SETTING EVIDENCE TO "50TH" CASE

Eating and drinking	＋＋
Business	＋＋
Celebration event	＋＋＋
Ugly	＋＋＋
Scattered	＋＋＋
Featureless	＋
Urban	＋
Gloomy	＋＋
Individualistic	＋
Conventional	＋
Unfriendly	＋＋
Stimulated	＋＋
Exclusive	＋＋
Aloof	＋＋
Not fascinating	＋＋
Calm	＋
Atmosphere of urban	＋
Atmosphere of rural area	＋

5) Setting evidence to "50th": After setting evidence to "50th", the result is exhibited in Table XIII.

Those who are at the age of "50th" had come with the purpose of visiting for "*Eating and drinking*", "*Business*" or "**Celebration、event**" under the image of the surrounding area at this shopping street as "**Ugly**", "**Scattered**",

"Featureless", "Urban", "*Gloomy*", "Individualistic", "Conventional", "*Unfriendly*", "*Stimulated*", "*Exclusive*", "*Aloof*", "*Not fascinating*", "Calm", "Atmosphere of urban" or "Atmosphere of rural area".

6) Setting evidence to "60th": After setting evidence to "60th", the result is exhibited in Table XIV.

Those who are at the age of "60th" had come with the purpose of visiting for "Shopping", "**Leisure, amusement**" under the image of the surrounding area at this shopping street as **"Scattered"**, **"Featureless"**, "New", **"Urban"**, **"Gloomy"**, "*Conventional*", **"Unfriendly"**, **"Stimulated"**, "*Exclusive*", "**Do not want to reside**", "Aloof", "*Not fascinating*", "**Want to examine deliberately**", "**Calm**" or "**Atmosphere of rural area**".

7) Setting evidence to "More than 70": After setting evidence to "More than 70", the result is exhibited in Table XV.

Those who are at the age of "More than 70" had come with the purpose of visiting for "**Shopping**", "Celebration、event" or "**Leisure, amusement**" under the image of the surrounding area at this shopping street as "Ugly", "Featureless", "*Historic*", "Full of nature", "**Gloomy**", "Conventional", "**Unfriendly**", "**Stimulated**", "**Exclusive**", "*Do not want to reside*", "**Aloof**", "Not fascinating", "*Want to examine deliberately*", "**Calm**" or "Atmosphere of rural area".

TABLE XIV.   SETTING EVIDENCE TO "60TH" CASE

Shopping	+
Leisure, amusement	+++
Scattered	+++
Featureless	+++
New	+
Urban	+++
Gloomy	+++
Conventional	++
Unfriendly	+++
Stimulated	+++
Exclusive	++
Do not want to reside	+++
Aloof	+
Not fascinating	++
Want to examine deliberately	+++
Calm	+++
Atmosphere of rural area	+++

TABLE XV.   SETTING EVIDENCE TO "MORE THAN 70" CASE

Shopping	+++
Celebration、event	+
Leisure, amusement	+++
Ugly	+
Featureless	+
Historic	++
Full of nature	+
Gloomy	+++
Conventional	+
Unfriendly	+++
Stimulated	+++
Exclusive	+++
Do not want to reside	++
Aloof	+++
Not fascinating	+
Want to examine deliberately	++
Calm	+++
Atmosphere of rural area	+

V.   CONCLUSION

Shopping streets at local city in Japan became old and are generally declining. In this paper, the area rebirth and/or regional revitalization of shopping street are handled. Fuji city in Japan is focused. Four big festivals are held at Fuji city (two for Fuji Shopping Street Town and two for Yoshiwara Shopping Street Town). Many people visit these festivals including residents in that area. There is a big difference between Fuji Shopping Street Town and Yoshiwara Shopping Street Town. Therefore Fuji Shopping Street Town is focused in this paper. A questionnaire investigation to the residents and visitors is conducted during these periods in order to clarify residents and visitors' needs for the shopping street, and utilize them to the plan building of the area rebirth and/or regional revitalization of shopping street. These are analyzed by using Bayesian Network. By that model, the causal relationship is sequentially chained by the characteristics of visitors, the purpose of visiting and the image of the surrounding area at this shopping street. This is really a quite new approach in this field and there is no related paper on this theme as far as searched.

In the Bayesian Network Analysis, model was built under the examination of the causal relationship among items. These are analyzed by sensitivity analysis and odds ratio is calculated to the results of sensitivity analysis in order to obtain much clearer results. The main result of sensitivity analysis is as follows.

Those who visit for "Business" had come with the purpose of visiting for "Eating and drinking", "Celebration、event" under the image of the surrounding area at this shopping street as "Conventional" or "Aloof" of an age of "20th", "30th" or "50th" in which the gender is "Male".

Those who are "Male" had come with the purpose of visiting for "Eating and drinking", "Business", or "Celebration、event" under the image of the surrounding area at this shopping street as "Gloomy", "Conventional" or "Aloof".

Those who are at the age of "10th" had come under the image of the surrounding area at this shopping street as "Beautiful", "Of the united feeling there is", "Varied", "Full of nature", "Urban", "Cheerful", "Individualistic", "Friendly", "Healed", "Open", "Want to reside", "Warm", "Fascinating", "Want to play" or "Lively".

Those who are at the age of "50th" had come with the purpose of visiting for "Eating and drinking", "Business" or "Celebration、event" under the image of the surrounding area at this shopping street as "Ugly", "Scattered", "Featureless", "Urban", "Gloomy", "Individualistic", "Conventional", "Unfriendly", "Stimulated", "Exclusive", "Aloof", "Not fascinating", "Calm", "Atmosphere of urban" or "Atmosphere of rural area".

Those who are at the age of "More than 70" had come with the purpose of visiting for "Shopping", "Celebration、event" or "Leisure, amusement" under the image of the surrounding area at this shopping street as "Ugly", "Featureless", "Historic", "Full of nature", "Gloomy", "Conventional", "Unfriendly", "Stimulated", "Exclusive", "Do not want to reside", "Aloof", "Not fascinating", "Want to examine deliberately", "Calm" or "Atmosphere of rural area".

The analysis utilizing Bayesian Network enabled us to visualize the causal relationship among items. Furthermore, sensitivity analysis brought us estimating and predicting the prospective visitors. Sensitivity analysis was achieved by back propagation method. These are utilized for constructing a much more effective and useful plan building.

Although it has a limitation that it is restricted in the number of researches, the fruitful results could be obtained. To confirm the findings by utilizing the new consecutive visiting records would be the future works to be investigated.

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APPENDIX 1

Questionnaire Sheet about the Image around the Shopping Street

1. How often do you come to this shopping street?
a. Everyday b. ( ) times a week c. ( ) times a month d. ( ) times a year
e. miscellaneous (   )

2. What is the purpose of visiting here? (Plural answers allowed)
a. shopping b. eating and drinking c. business d. celebration、event e. leisure, amusement
f. miscellaneous (   )

3. How do you feel about the image of the surrounding area at this shopping street?
Select the position

Beautiful	·	·	·	·	·	Ugly
Of the united feeling there is	·	·	·	·	·	Scattered
Varied	·	·	·	·	·	Featureless
New	·	·	·	·	·	Historic
Full of nature	·	·	·	·	·	Urban
Cheerful	·	·	·	·	·	Gloomy
Individualistic	·	·	·	·	·	Conventional
Friendly	·	·	·	·	·	Unfriendly
Healed	·	·	·	·	·	Stimulated
Open	·	·	·	·	·	exclusive

Want to reside	·	·	·	·	·	Do not want to reside
Warm	·	·	·	·	·	Aloof
Fascinating	·	·	·	·	·	Not fascinating
Want to play	·	·	·	·	·	Want to examine deliberately
Lively	·	·	·	·	·	Calm
Atmosphere of urban	·	·	·	·	·	Atmosphere of rural area

4. There are many old building at the age of nearly 50 years. Do you think we can still use them?
a. Can use it b. Cannot use it c. Have no idea

5. Is there any functions or facilities that will be useful?

6. Comments

7. Sex
a. Male b. Female

8. Age
a.10th b.20th c.30th d.40th e.50th f.60th g. More than70

9. Residence
a. Fuji City b. Fujinomiya City c. Numazu City d. Mishima City e. Shizuoka City f. Miscellaneous in Shizuoka Prefecture
g. Outside of Shizuoka Prefecture 〔   〕

APPENDIX 2

Calculated posterior probability

name_fuji	state	Prior	The purpose of visiting									
			Shopping	Shopping_odds	Eating and drinking	Eating and drinking_odds	Business	Business_odds	Celebration、event	Celebration、event_odds	Leisure, amusement	Leisure, amusement_odds
The purpose of visiting	Shopping	0.215	1	–	0.211	0.976	0.208	0.964	0.211	0.981	0.233	1.114
	Eating and drinking	0.174	0.172	0.988	1	–	0.197	1.163	0.191	1.121	0.155	0.867
	Business	0.103	0.101	0.985	0.117	1.164	1	–	0.113	1.115	0.090	0.866
	Celebration、event	0.396	0.392	0.983	0.433	1.167	0.435	1.177	1	–	0.374	0.913
	Leisure, amusement	0.089	0.098	1.111	0.080	0.890	0.079	0.878	0.084	0.945	1	–
The image of the surrounding area at this shopping street	Beautiful	0.339	0.342	1.013	0.324	0.933	0.328	0.949	0.326	0.942	0.346	1.028
	Ugly	0.292	0.287	0.977	0.299	1.036	0.299	1.033	0.300	1.039	0.285	0.969
	Of the united feeling there is	0.255	0.251	0.983	0.239	0.919	0.241	0.926	0.240	0.926	0.253	0.989
	Scattered	0.381	0.381	1.000	0.399	1.081	0.392	1.048	0.400	1.084	0.390	1.039
	Varied	0.175	0.171	0.968	0.167	0.943	0.167	0.944	0.168	0.952	0.171	0.969
	Featureless	0.490	0.491	1.004	0.491	1.008	0.487	0.990	0.496	1.025	0.503	1.056
	New	0.124	0.128	1.039	0.129	1.047	0.124	1.002	0.127	1.026	0.128	1.036
	Historic	0.561	0.565	1.014	0.557	0.983	0.556	0.980	0.559	0.992	0.570	1.038
	Full of nature	0.370	0.374	1.017	0.350	0.919	0.358	0.950	0.355	0.936	0.381	1.046
	Urban	0.231	0.228	0.983	0.225	0.963	0.223	0.955	0.228	0.982	0.235	1.022
	Cheerful	0.259	0.259	1.002	0.251	0.959	0.249	0.952	0.244	0.925	0.249	0.950
	Gloomy	0.432	0.434	1.008	0.444	1.053	0.445	1.057	0.447	1.064	0.435	1.015
	Individualistic	0.238	0.232	0.964	0.214	0.869	0.213	0.866	0.218	0.891	0.237	0.994
	Conventional	0.438	0.440	1.005	0.471	1.143	0.479	1.177	0.466	1.120	0.432	0.975
	Friendly	0.443	0.434	0.966	0.413	0.883	0.416	0.897	0.417	0.900	0.435	0.967
	Unfriendly	0.236	0.245	1.047	0.242	1.032	0.242	1.030	0.246	1.053	0.257	1.122
	Healed	0.285	0.279	0.969	0.279	0.970	0.282	0.986	0.275	0.953	0.267	0.913
	Stimulated	0.180	0.187	1.050	0.182	1.016	0.185	1.036	0.183	1.022	0.193	1.091
	Open	0.257	0.254	0.984	0.236	0.894	0.239	0.911	0.237	0.900	0.256	0.995
	Exclusive	0.393	0.407	1.060	0.413	1.087	0.404	1.048	0.411	1.080	0.407	1.061
	Want to reside	0.241	0.243	1.009	0.230	0.939	0.231	0.946	0.230	0.942	0.246	1.026
	Do not want to reside	0.395	0.397	1.010	0.396	1.007	0.392	0.987	0.400	1.022	0.406	1.049
	Warm	0.398	0.393	0.980	0.375	0.907	0.370	0.889	0.375	0.907	0.395	0.988
	Aloof	0.252	0.254	1.011	0.264	1.067	0.269	1.093	0.265	1.072	0.251	0.995
	Fascinating	0.223	0.222	0.994	0.205	0.900	0.210	0.928	0.208	0.912	0.223	0.999
	Not fascinating	0.423	0.424	1.004	0.435	1.050	0.430	1.029	0.436	1.053	0.428	1.019
	Want to play	0.218	0.217	0.996	0.202	0.908	0.198	0.886	0.200	0.898	0.216	0.991
	Want to examine deliberately	0.312	0.321	1.042	0.314	1.009	0.312	0.999	0.313	1.002	0.330	1.086
	Lively	0.181	0.178	0.982	0.175	0.960	0.176	0.967	0.173	0.948	0.174	0.949
	Calm	0.520	0.530	1.041	0.528	1.035	0.527	1.030	0.528	1.035	0.538	1.076
	Atmosphere of urban	0.097	0.095	0.981	0.099	1.031	0.097	1.003	0.099	1.022	0.090	0.928
	Atmosphere of rural area	0.629	0.630	1.004	0.633	1.017	0.626	0.988	0.635	1.028	0.643	1.061
Gender	Male	0.433	0.364	0.751	0.485	1.235	0.556	1.642	0.492	1.267	0.285	0.522
	Female	0.567	0.636	1.331	0.515	0.810	0.444	0.609	0.508	0.789	0.715	1.916
Age	10th	0.205	0.172	0.804	0.082	0.348	0.088	0.373	0.111	0.484	0.197	0.948
	20th	0.166	0.203	1.279	0.219	1.406	0.256	1.727	0.169	1.018	0.124	0.708
	30th	0.251	0.229	0.886	0.263	1.064	0.286	1.191	0.277	1.143	0.261	1.051
	40th	0.170	0.168	0.984	0.225	1.414	0.139	0.786	0.203	1.246	0.143	0.813
	50th	0.102	0.081	0.775	0.140	1.443	0.146	1.515	0.136	1.396	0.058	0.542
	60th	0.070	0.079	1.129	0.051	0.712	0.053	0.735	0.066	0.933	0.133	2.025
	More than70	0.035	0.069	2.023	0.019	0.535	0.032	0.920	0.037	1.061	0.086	2.571

The image of the surrounding area at this shopping street

Beautiful	Beautiful_odds	Ugly	Ugly_odds	Of the united feeling there is	Of the united feeling there is_odds	Scattered	Scattered_odds	Varied	Varied_odds	Featureless	Featureless_odds	New	New_odds
0.216	1.009	0.211	0.977	0.212	0.987	0.214	0.996	0.209	0.968	0.215	1.002	0.222	1.047
0.167	0.950	0.178	1.029	0.163	0.928	0.183	1.060	0.166	0.946	0.175	1.005	0.181	1.047
0.099	0.965	0.105	1.025	0.096	0.932	0.106	1.035	0.098	0.955	0.102	0.995	0.103	1.006
0.380	0.937	0.407	1.046	0.374	0.912	0.416	1.088	0.381	0.939	0.401	1.022	0.404	1.035
0.091	1.029	0.086	0.965	0.088	0.991	0.090	1.015	0.087	0.977	0.091	1.029	0.092	1.041
1	–	0	0.000	0.347	1.036	0.328	0.952	0.347	1.036	0.336	0.983	0.336	0.984
0.000	0.000	1	–	0.288	0.979	0.301	1.042	0.293	1.007	0.294	1.012	0.288	0.984
0.260	1.030	0.251	0.980	1	–	0	0.000	0.264	1.047	0.250	0.978	0.248	0.964
0.368	0.949	0.392	1.049	0	0.000	1	–	0.368	0.947	0.392	1.049	0.389	1.036
0.179	1.029	0.176	1.006	0.181	1.042	0.169	0.960	1	–	0	0.000	0.170	0.961
0.484	0.977	0.494	1.017	0.481	0.967	0.504	1.059	0	0.000	1	–	0.493	1.015
0.123	0.990	0.122	0.987	0.120	0.969	0.127	1.025	0.120	0.964	0.125	1.009	1	–
0.564	1.010	0.563	1.008	0.562	1.001	0.560	0.994	0.564	1.009	0.561	0.998	0	0.000
0.380	1.046	0.367	0.987	0.379	1.038	0.359	0.954	0.379	1.039	0.367	0.985	0.364	0.976
0.231	1.001	0.233	1.011	0.233	1.011	0.235	1.020	0.233	1.010	0.234	1.016	0.227	0.977
0.268	1.049	0.252	0.968	0.273	1.076	0.241	0.909	0.269	1.053	0.250	0.956	0.256	0.985
0.421	0.956	0.438	1.024	0.419	0.950	0.448	1.069	0.420	0.952	0.439	1.030	0.435	1.014
0.247	1.047	0.240	1.012	0.255	1.096	0.226	0.935	0.254	1.087	0.235	0.980	0.226	0.935
0.426	0.952	0.445	1.028	0.416	0.912	0.458	1.084	0.422	0.937	0.444	1.025	0.447	1.034
0.456	1.057	0.439	0.986	0.465	1.093	0.421	0.914	0.464	1.087	0.435	0.967	0.427	0.938
0.230	0.968	0.241	1.029	0.225	0.938	0.252	1.089	0.226	0.946	0.244	1.044	0.242	1.035
0.291	1.031	0.283	0.992	0.295	1.052	0.271	0.934	0.295	1.051	0.278	0.966	0.277	0.962
0.178	0.986	0.183	1.021	0.176	0.976	0.188	1.053	0.174	0.964	0.184	1.027	0.182	1.015
0.266	1.051	0.247	0.948	0.273	1.090	0.238	0.903	0.268	1.059	0.250	0.964	0.248	0.957
0.381	0.953	0.401	1.033	0.377	0.934	0.412	1.086	0.376	0.932	0.400	1.033	0.406	1.056
0.246	1.029	0.239	0.987	0.250	1.052	0.233	0.958	0.247	1.031	0.239	0.986	0.237	0.978
0.388	0.973	0.395	1.001	0.390	0.982	0.405	1.043	0.387	0.968	0.401	1.025	0.398	1.012
0.409	1.049	0.393	0.978	0.416	1.080	0.381	0.932	0.413	1.066	0.392	0.975	0.391	0.972
0.244	0.956	0.259	1.040	0.243	0.951	0.263	1.062	0.244	0.957	0.256	1.023	0.253	1.008
0.232	1.052	0.217	0.965	0.237	1.081	0.207	0.910	0.233	1.060	0.217	0.966	0.216	0.958
0.415	0.966	0.429	1.026	0.413	0.958	0.438	1.061	0.415	0.966	0.429	1.025	0.427	1.017
0.228	1.064	0.207	0.941	0.233	1.090	0.198	0.888	0.229	1.068	0.210	0.953	0.215	0.985
0.310	0.991	0.310	0.991	0.310	0.987	0.318	1.025	0.306	0.970	0.316	1.015	0.317	1.024
0.186	1.036	0.179	0.983	0.188	1.048	0.172	0.939	0.188	1.044	0.177	0.971	0.177	0.974
0.514	0.976	0.521	1.006	0.511	0.965	0.533	1.056	0.508	0.954	0.526	1.027	0.527	1.031
0.095	0.984	0.099	1.023	0.097	0.999	0.097	1.004	0.097	1.005	0.096	0.995	0.097	1.004
0.623	0.977	0.631	1.011	0.622	0.971	0.641	1.054	0.623	0.973	0.635	1.028	0.633	1.018
0.390	0.837	0.444	1.047	0.425	0.969	0.442	1.036	0.416	0.935	0.431	0.993	0.380	0.804
0.610	1.195	0.556	0.955	0.575	1.032	0.558	0.965	0.584	1.070	0.569	1.007	0.620	1.243
0.244	1.248	0.195	0.939	0.292	1.597	0.137	0.613	0.273	1.454	0.185	0.878	0.141	0.635
0.177	1.079	0.136	0.788	0.168	1.014	0.133	0.770	0.148	0.873	0.142	0.833	0.189	1.167
0.263	1.060	0.240	0.941	0.216	0.819	0.247	0.977	0.258	1.036	0.248	0.980	0.253	1.011
0.130	0.728	0.174	1.027	0.159	0.922	0.198	1.204	0.140	0.793	0.179	1.065	0.212	1.315
0.089	0.864	0.160	1.685	0.079	0.755	0.146	1.508	0.108	1.068	0.115	1.143	0.089	0.864
0.063	0.893	0.056	0.785	0.056	0.787	0.103	1.515	0.048	0.669	0.093	1.364	0.080	1.158
0.034	0.982	0.039	1.111	0.030	0.859	0.037	1.049	0.025	0.698	0.038	1.092	0.035	0.999

Historic	Historic_odds	Full of nature	Full of nature_odds	Urban	Urban_odds	Cheerful	Cheerful_odds	Gloomy	Gloomy_odds	Individualistic	Individualistic_odds	Conventional	Conventional_odds
0.216	1.007	0.217	1.014	0.211	0.982	0.214	0.998	0.215	1.002	0.208	0.961	0.214	0.997
0.173	0.990	0.166	0.942	0.169	0.963	0.169	0.966	0.180	1.039	0.157	0.884	0.187	1.091
0.102	0.991	0.099	0.966	0.099	0.964	0.099	0.961	0.106	1.042	0.092	0.888	0.112	1.104
0.394	0.995	0.380	0.935	0.390	0.975	0.372	0.906	0.410	1.062	0.364	0.873	0.421	1.109
0.090	1.014	0.092	1.039	0.090	1.018	0.085	0.959	0.089	1.005	0.088	0.993	0.087	0.979
0.341	1.006	0.349	1.044	0.339	0.999	0.352	1.056	0.331	0.963	0.352	1.058	0.330	0.959
0.293	1.005	0.290	0.989	0.295	1.013	0.284	0.964	0.296	1.019	0.294	1.011	0.296	1.022
0.255	1.001	0.260	1.030	0.257	1.011	0.268	1.071	0.247	0.961	0.273	1.098	0.241	0.931
0.380	0.996	0.369	0.953	0.386	1.025	0.354	0.890	0.395	1.062	0.361	0.919	0.398	1.075
0.176	1.005	0.180	1.030	0.177	1.009	0.182	1.046	0.170	0.967	0.187	1.080	0.169	0.955
0.489	0.998	0.485	0.982	0.496	1.025	0.473	0.935	0.497	1.032	0.482	0.970	0.496	1.027
0	0.000	0.122	0.983	0.122	0.983	0.123	0.992	0.125	1.010	0.117	0.940	0.126	1.024
1	–	0.564	1.012	0.560	0.995	0.561	0.999	0.560	0.994	0.564	1.010	0.559	0.992
0.372	1.008	1	–	0	0.000	0.382	1.050	0.362	0.967	0.386	1.069	0.360	0.956
0.231	0.997	0	0.000	1	–	0.228	0.984	0.233	1.008	0.239	1.044	0.229	0.988
0.259	1.001	0.267	1.043	0.255	0.983	1	–	0	0.000	0.277	1.097	0.244	0.928
0.431	0.995	0.422	0.962	0.434	1.011	0	0.000	1	–	0.413	0.928	0.445	1.058
0.239	1.006	0.248	1.055	0.246	1.042	0.254	1.088	0.228	0.945	1	–	0	0.000
0.437	0.994	0.426	0.953	0.434	0.983	0.414	0.905	0.453	1.060	0	0.000	1	–
0.445	1.007	0.457	1.058	0.447	1.015	0.468	1.105	0.427	0.938	0.479	1.154	0.420	0.910
0.236	1.001	0.232	0.978	0.240	1.022	0.218	0.900	0.246	1.057	0.223	0.931	0.246	1.058
0.285	1.001	0.291	1.029	0.283	0.991	0.301	1.083	0.276	0.955	0.300	1.074	0.275	0.954
0.179	0.996	0.180	1.000	0.184	1.031	0.174	0.961	0.185	1.039	0.178	0.985	0.184	1.030
0.256	0.999	0.265	1.047	0.257	1.004	0.276	1.105	0.245	0.942	0.276	1.106	0.240	0.915
0.393	1.001	0.383	0.959	0.391	0.994	0.373	0.920	0.407	1.060	0.370	0.908	0.408	1.066
0.241	1.001	0.247	1.033	0.244	1.014	0.252	1.060	0.236	0.974	0.256	1.081	0.232	0.950
0.394	0.996	0.389	0.976	0.399	1.019	0.382	0.948	0.403	1.036	0.388	0.974	0.399	1.019
0.398	1.003	0.409	1.046	0.402	1.016	0.422	1.107	0.383	0.941	0.427	1.130	0.377	0.916
0.252	0.999	0.245	0.964	0.252	1.002	0.237	0.921	0.262	1.053	0.240	0.937	0.263	1.061
0.224	1.005	0.232	1.051	0.223	0.998	0.240	1.099	0.214	0.948	0.242	1.108	0.210	0.923
0.422	0.998	0.416	0.970	0.425	1.009	0.406	0.933	0.432	1.039	0.410	0.948	0.433	1.043
0.218	1.005	0.226	1.051	0.214	0.978	0.242	1.146	0.204	0.919	0.235	1.106	0.201	0.905
0.311	0.996	0.312	0.997	0.315	1.013	0.307	0.978	0.316	1.018	0.308	0.980	0.314	1.010
0.181	1.000	0.186	1.032	0.180	0.995	0.193	1.081	0.175	0.956	0.191	1.064	0.174	0.954
0.519	0.996	0.515	0.982	0.523	1.015	0.507	0.950	0.530	1.040	0.508	0.954	0.529	1.038
0.097	1.002	0.095	0.980	0.096	0.986	0.097	1.008	0.097	0.998	0.097	1.004	0.097	1.002
0.628	0.997	0.624	0.978	0.633	1.019	0.615	0.942	0.636	1.031	0.621	0.967	0.635	1.025
0.419	0.945	0.392	0.843	0.436	1.014	0.384	0.816	0.476	1.188	0.393	0.849	0.477	1.193
0.581	1.059	0.608	1.186	0.564	0.986	0.616	1.226	0.524	0.841	0.607	1.178	0.523	0.838
0.208	1.016	0.248	1.278	0.236	1.194	0.278	1.492	0.163	0.752	0.343	2.025	0.117	0.515
0.159	0.949	0.176	1.067	0.137	0.795	0.225	1.457	0.153	0.909	0.138	0.805	0.178	1.086
0.259	1.040	0.253	1.007	0.220	0.840	0.216	0.820	0.242	0.951	0.191	0.705	0.281	1.163
0.165	0.967	0.119	0.661	0.158	0.918	0.156	0.902	0.186	1.118	0.133	0.751	0.175	1.038
0.104	1.026	0.097	0.953	0.119	1.198	0.076	0.731	0.118	1.179	0.116	1.158	0.127	1.288
0.064	0.900	0.066	0.939	0.099	1.461	0.032	0.432	0.091	1.318	0.052	0.733	0.082	1.185
0.041	1.176	0.041	1.168	0.030	0.858	0.017	0.469	0.047	1.363	0.025	0.713	0.039	1.110

Friendly	Friendly_odds	Unfriendly	Unfriendly_odds	Healed	Healed_odds	Stimulated	Stimulated_odds	Open	Open_odds	Exclusive	Exclusive_odds	Want to reside	Want to reside_odds
0.210	0.974	0.222	1.044	0.210	0.973	0.222	1.046	0.212	0.983	0.222	1.045	0.216	1.007
0.163	0.922	0.178	1.026	0.171	0.977	0.175	1.010	0.160	0.904	0.183	1.062	0.165	0.940
0.097	0.936	0.104	1.019	0.102	0.997	0.105	1.023	0.096	0.924	0.106	1.036	0.097	0.945
0.373	0.910	0.411	1.067	0.383	0.950	0.401	1.021	0.366	0.880	0.414	1.081	0.377	0.924
0.088	0.988	0.096	1.086	0.083	0.936	0.093	1.057	0.088	0.993	0.092	1.037	0.090	1.017
0.350	1.048	0.331	0.963	0.347	1.035	0.335	0.981	0.352	1.058	0.329	0.956	0.347	1.032
0.290	0.989	0.298	1.031	0.290	0.993	0.296	1.022	0.280	0.946	0.298	1.028	0.289	0.984
0.267	1.067	0.243	0.937	0.264	1.050	0.250	0.973	0.271	1.089	0.244	0.946	0.264	1.051
0.361	0.921	0.406	1.113	0.362	0.925	0.397	1.071	0.352	0.885	0.400	1.084	0.368	0.948
0.183	1.057	0.168	0.950	0.182	1.044	0.170	0.964	0.183	1.053	0.168	0.949	0.179	1.027
0.480	0.964	0.506	1.067	0.478	0.953	0.500	1.044	0.476	0.949	0.499	1.040	0.484	0.980
0.119	0.960	0.127	1.028	0.120	0.969	0.125	1.012	0.120	0.964	0.128	1.039	0.122	0.982
0.563	1.008	0.562	1.003	0.562	1.001	0.560	0.994	0.561	0.998	0.562	1.001	0.562	1.002
0.382	1.052	0.364	0.973	0.378	1.034	0.370	0.998	0.383	1.057	0.360	0.960	0.379	1.038
0.233	1.011	0.235	1.022	0.230	0.991	0.237	1.034	0.232	1.004	0.230	0.995	0.234	1.015
0.273	1.077	0.239	0.899	0.274	1.083	0.250	0.955	0.278	1.106	0.246	0.933	0.270	1.061
0.416	0.938	0.451	1.080	0.418	0.946	0.445	1.057	0.413	0.925	0.447	1.065	0.423	0.963
0.257	1.107	0.226	0.933	0.251	1.071	0.236	0.985	0.257	1.104	0.225	0.926	0.252	1.077
0.416	0.912	0.457	1.081	0.424	0.945	0.448	1.041	0.410	0.891	0.456	1.073	0.421	0.931
1	–	0	0.000	0.462	1.082	0.429	0.945	0.472	1.124	0.420	0.909	0.459	1.065
0	0.000	1	–	0.222	0.923	0.252	1.092	0.218	0.904	0.251	1.086	0.230	0.968
0.297	1.062	0.268	0.918	1	–	0	0.000	0.300	1.074	0.272	0.938	0.292	1.033
0.174	0.962	0.192	1.085	0	0.000	1	–	0.172	0.949	0.189	1.060	0.181	1.008
0.273	1.091	0.237	0.902	0.270	1.071	0.245	0.943	1	–	0	0.000	0.268	1.062
0.372	0.916	0.418	1.110	0.375	0.927	0.412	1.083	0	0.000	1	–	0.384	0.962
0.250	1.049	0.235	0.968	0.247	1.032	0.242	1.007	0.252	1.061	0.235	0.969	1	–
0.386	0.966	0.407	1.054	0.383	0.954	0.404	1.041	0.387	0.966	0.405	1.042	0	0.000
0.418	1.088	0.378	0.922	0.413	1.064	0.388	0.960	0.422	1.106	0.380	0.928	0.412	1.062
0.241	0.942	0.265	1.073	0.243	0.956	0.262	1.056	0.236	0.918	0.265	1.069	0.245	0.965
0.238	1.087	0.208	0.915	0.234	1.064	0.214	0.950	0.243	1.116	0.210	0.925	0.233	1.059
0.411	0.952	0.438	1.062	0.412	0.956	0.432	1.039	0.406	0.934	0.435	1.052	0.415	0.969
0.234	1.098	0.196	0.875	0.231	1.081	0.201	0.902	0.241	1.142	0.201	0.904	0.228	1.061
0.306	0.972	0.323	1.049	0.306	0.970	0.325	1.061	0.307	0.978	0.320	1.037	0.313	1.006
0.190	1.057	0.170	0.926	0.190	1.060	0.175	0.959	0.192	1.074	0.172	0.938	0.186	1.034
0.507	0.950	0.539	1.080	0.507	0.949	0.539	1.079	0.505	0.944	0.535	1.064	0.517	0.989
0.097	0.998	0.095	0.984	0.097	1.006	0.094	0.973	0.095	0.984	0.098	1.010	0.096	0.991
0.621	0.965	0.642	1.058	0.618	0.955	0.637	1.033	0.618	0.955	0.638	1.039	0.624	0.980
0.413	0.923	0.421	0.953	0.438	1.020	0.427	0.975	0.426	0.971	0.427	0.977	0.405	0.892
0.587	1.083	0.579	1.049	0.562	0.981	0.573	1.026	0.574	1.029	0.573	1.024	0.595	1.121
0.295	1.624	0.135	0.603	0.263	1.382	0.175	0.824	0.310	1.744	0.131	0.584	0.269	1.422
0.158	0.941	0.141	0.822	0.195	1.212	0.188	1.162	0.184	1.130	0.166	0.998	0.180	1.102
0.245	0.968	0.234	0.911	0.247	0.978	0.170	0.608	0.241	0.947	0.221	0.844	0.203	0.758
0.135	0.763	0.178	1.060	0.141	0.803	0.156	0.900	0.137	0.774	0.214	1.327	0.153	0.881
0.091	0.880	0.135	1.382	0.098	0.960	0.140	1.443	0.048	0.441	0.126	1.280	0.092	0.890
0.049	0.682	0.116	1.732	0.036	0.492	0.115	1.721	0.058	0.811	0.083	1.202	0.068	0.963
0.026	0.746	0.061	1.779	0.020	0.558	0.056	1.621	0.022	0.621	0.059	1.713	0.036	1.028

Do not want to reside	Do not want to reside_odds	Warm	Warm_odds	Aloof	Aloof_odds	Fascinating	Fascinating_odds	Not fascinating	Not fascinating_odds	Want to play	Want to play_odds	Want to examine deliberately	Want to examine deliberately_odds
0.216	1.009	0.212	0.982	0.216	1.006	0.214	0.996	0.214	0.999	0.213	0.988	0.220	1.034
0.174	1.002	0.164	0.934	0.183	1.062	0.160	0.904	0.179	1.035	0.162	0.915	0.174	1.002
0.101	0.986	0.096	0.924	0.109	1.072	0.096	0.925	0.105	1.025	0.093	0.903	0.102	0.995
0.400	1.018	0.373	0.908	0.417	1.092	0.367	0.885	0.408	1.051	0.362	0.866	0.396	1.002
0.091	1.030	0.089	1.000	0.088	0.989	0.090	1.011	0.089	1.003	0.089	1.002	0.092	1.046
0.334	0.974	0.349	1.045	0.328	0.952	0.353	1.061	0.333	0.970	0.356	1.075	0.337	0.990
0.292	1.001	0.288	0.980	0.300	1.042	0.284	0.961	0.296	1.021	0.278	0.935	0.290	0.991
0.252	0.985	0.266	1.063	0.245	0.950	0.270	1.082	0.248	0.967	0.271	1.090	0.253	0.989
0.390	1.042	0.364	0.931	0.398	1.075	0.353	0.889	0.394	1.057	0.345	0.859	0.387	1.029
0.172	0.976	0.182	1.046	0.170	0.961	0.183	1.054	0.172	0.976	0.184	1.062	0.171	0.974
0.497	1.030	0.482	0.969	0.497	1.032	0.476	0.948	0.497	1.028	0.470	0.927	0.495	1.021
0.125	1.012	0.122	0.981	0.125	1.009	0.120	0.966	0.125	1.012	0.123	0.995	0.126	1.020
0.560	0.994	0.562	1.002	0.561	0.997	0.564	1.009	0.561	0.997	0.563	1.006	0.560	0.994
0.364	0.975	0.380	1.045	0.361	0.961	0.384	1.063	0.363	0.971	0.385	1.065	0.369	0.994
0.234	1.015	0.234	1.013	0.231	1.001	0.231	0.999	0.232	1.007	0.227	0.976	0.233	1.011
0.250	0.956	0.275	1.085	0.244	0.925	0.278	1.102	0.249	0.949	0.287	1.154	0.255	0.983
0.441	1.037	0.415	0.935	0.448	1.070	0.413	0.926	0.441	1.040	0.402	0.884	0.437	1.024
0.234	0.975	0.256	1.097	0.226	0.935	0.257	1.104	0.231	0.960	0.256	1.097	0.235	0.981
0.443	1.018	0.415	0.910	0.457	1.080	0.411	0.893	0.449	1.046	0.403	0.866	0.441	1.013
0.433	0.962	0.465	1.095	0.423	0.923	0.471	1.122	0.430	0.950	0.476	1.141	0.434	0.966
0.244	1.042	0.225	0.937	0.249	1.070	0.221	0.915	0.244	1.045	0.213	0.873	0.244	1.043
0.277	0.961	0.295	1.051	0.275	0.950	0.299	1.069	0.278	0.964	0.301	1.083	0.279	0.970
0.184	1.029	0.176	0.972	0.188	1.054	0.173	0.956	0.184	1.027	0.167	0.913	0.187	1.051
0.251	0.972	0.272	1.083	0.240	0.918	0.279	1.121	0.246	0.948	0.284	1.152	0.253	0.980
0.403	1.042	0.375	0.927	0.412	1.086	0.370	0.907	0.404	1.049	0.362	0.879	0.403	1.042
0	0.000	0.250	1.051	0.235	0.968	0.252	1.062	0.237	0.977	0.253	1.068	0.242	1.004
1	–	0.388	0.974	0.403	1.036	0.386	0.964	0.401	1.026	0.381	0.945	0.401	1.026
0.391	0.972	1	–	0	0.000	0.421	1.099	0.387	0.957	0.430	1.141	0.394	0.984
0.257	1.027	0	0.000	1	–	0.238	0.927	0.259	1.039	0.229	0.881	0.255	1.017
0.218	0.971	0.237	1.078	0.212	0.935	1	–	0	0.000	0.248	1.146	0.219	0.978
0.430	1.027	0.411	0.953	0.435	1.048	0	0.000	1	–	0.400	0.909	0.427	1.016
0.210	0.956	0.235	1.105	0.199	0.893	0.240	1.135	0.207	0.937	1	–	0	0.000
0.317	1.023	0.309	0.984	0.315	1.015	0.307	0.976	0.315	1.012	0	0.000	1	–
0.176	0.966	0.189	1.053	0.173	0.947	0.191	1.068	0.176	0.965	0.195	1.093	0.178	0.978
0.528	1.035	0.510	0.963	0.531	1.047	0.506	0.947	0.527	1.030	0.500	0.923	0.530	1.043
0.096	0.996	0.097	0.999	0.097	1.007	0.096	0.990	0.097	1.004	0.097	1.002	0.095	0.984
0.636	1.032	0.622	0.972	0.636	1.031	0.618	0.954	0.635	1.027	0.615	0.941	0.634	1.020
0.449	1.068	0.383	0.814	0.490	1.257	0.408	0.902	0.451	1.076	0.359	0.734	0.417	0.936
0.551	0.937	0.617	1.228	0.510	0.796	0.592	1.109	0.549	0.929	0.641	1.363	0.583	1.069
0.191	0.912	0.283	1.529	0.149	0.680	0.305	1.699	0.169	0.785	0.304	1.691	0.186	0.885
0.145	0.848	0.168	1.012	0.156	0.929	0.178	1.083	0.150	0.882	0.189	1.167	0.183	1.121
0.228	0.878	0.229	0.886	0.234	0.908	0.243	0.955	0.247	0.976	0.268	1.088	0.210	0.791
0.199	1.215	0.155	0.896	0.189	1.134	0.134	0.758	0.190	1.143	0.162	0.942	0.179	1.064
0.098	0.959	0.088	0.849	0.137	1.405	0.060	0.562	0.121	1.215	0.033	0.305	0.101	0.987
0.096	1.402	0.058	0.821	0.078	1.121	0.046	0.635	0.084	1.212	0.031	0.417	0.098	1.441
0.044	1.266	0.019	0.518	0.057	1.661	0.035	0.985	0.040	1.151	0.014	0.386	0.044	1.255

Lively	Lively_odds	Calm	Calm_odds	Atmosphere of urban	Atmosphere of urban_odds	Atmosphere of rural area	Atmosphere of rural area_odds	Gender				Age	
								Male	Male_odds	Female	Female_odds	10th	10th_odds
0.211	0.978	0.219	1.025	0.211	0.978	0.215	1.001	0.181	0.807	0.240	1.159	0.180	0.802
0.169	0.965	0.176	1.017	0.179	1.038	0.175	1.005	0.195	1.150	0.158	0.890	0.070	0.357
0.101	0.982	0.103	1.010	0.103	1.003	0.102	0.994	0.132	1.328	0.080	0.764	0.044	0.402
0.379	0.933	0.401	1.024	0.404	1.034	0.399	1.016	0.449	1.247	0.355	0.839	0.214	0.416
0.085	0.957	0.091	1.033	0.084	0.945	0.090	1.018	0.058	0.637	0.112	1.294	0.085	0.954
0.349	1.044	0.335	0.982	0.335	0.980	0.336	0.986	0.306	0.857	0.365	1.120	0.403	1.314
0.288	0.979	0.293	1.004	0.298	1.030	0.293	1.006	0.300	1.038	0.286	0.972	0.278	0.932
0.265	1.053	0.250	0.977	0.254	0.998	0.252	0.985	0.250	0.976	0.258	1.019	0.363	1.664
0.361	0.920	0.390	1.043	0.382	1.006	0.388	1.032	0.388	1.033	0.375	0.975	0.253	0.552
0.182	1.044	0.171	0.972	0.176	1.006	0.173	0.987	0.169	0.954	0.180	1.035	0.233	1.431
0.478	0.954	0.496	1.026	0.487	0.991	0.495	1.020	0.488	0.992	0.491	1.006	0.441	0.821
0.121	0.975	0.126	1.018	0.124	1.003	0.125	1.008	0.109	0.864	0.135	1.107	0.085	0.657
0.561	1.000	0.560	0.995	0.563	1.005	0.561	0.998	0.543	0.930	0.575	1.058	0.569	1.030
0.380	1.042	0.367	0.985	0.364	0.973	0.367	0.986	0.335	0.857	0.397	1.121	0.447	1.379
0.230	0.994	0.233	1.009	0.228	0.984	0.233	1.009	0.233	1.011	0.230	0.992	0.266	1.202
0.275	1.090	0.252	0.966	0.260	1.006	0.253	0.971	0.229	0.853	0.281	1.121	0.350	1.547
0.416	0.937	0.440	1.034	0.431	0.998	0.437	1.020	0.474	1.188	0.399	0.875	0.342	0.685
0.251	1.072	0.233	0.969	0.239	1.001	0.235	0.984	0.217	0.883	0.255	1.094	0.399	2.120
0.422	0.936	0.446	1.030	0.439	1.002	0.442	1.016	0.483	1.196	0.404	0.870	0.251	0.429
0.464	1.087	0.432	0.956	0.442	0.997	0.437	0.976	0.423	0.922	0.458	1.064	0.637	2.212
0.222	0.921	0.245	1.049	0.233	0.982	0.241	1.027	0.230	0.965	0.241	1.027	0.155	0.593
0.299	1.069	0.278	0.965	0.287	1.008	0.280	0.976	0.288	1.016	0.283	0.988	0.365	1.443
0.174	0.960	0.186	1.045	0.175	0.970	0.182	1.015	0.177	0.982	0.182	1.013	0.154	0.828
0.272	1.082	0.249	0.963	0.253	0.980	0.252	0.977	0.252	0.978	0.260	1.017	0.388	1.838
0.373	0.919	0.404	1.050	0.396	1.015	0.398	1.023	0.387	0.978	0.397	1.017	0.251	0.517
0.248	1.038	0.240	0.992	0.239	0.988	0.239	0.990	0.226	0.917	0.253	1.066	0.315	1.451
0.383	0.954	0.401	1.028	0.393	0.995	0.399	1.019	0.409	1.063	0.383	0.954	0.367	0.888
0.415	1.075	0.390	0.969	0.397	0.997	0.394	0.983	0.352	0.823	0.433	1.154	0.549	1.840
0.241	0.941	0.257	1.029	0.254	1.011	0.255	1.015	0.285	1.183	0.227	0.871	0.183	0.666
0.236	1.073	0.217	0.965	0.221	0.989	0.219	0.977	0.210	0.926	0.233	1.058	0.332	1.727
0.411	0.950	0.429	1.025	0.425	1.008	0.427	1.017	0.441	1.075	0.410	0.946	0.348	0.727
0.234	1.097	0.209	0.950	0.218	1.004	0.213	0.971	0.180	0.792	0.246	1.173	0.322	1.710
0.307	0.973	0.319	1.030	0.308	0.979	0.315	1.011	0.301	0.946	0.321	1.042	0.283	0.869
1	–	0	0.000	0.181	0.997	0.178	0.979	0.175	0.961	0.186	1.030	0.234	1.385
0	0.000	1	–	0.515	0.983	0.524	1.018	0.516	0.985	0.522	1.011	0.444	0.737
0.096	0.997	0.096	0.991	1	–	0	0.000	0.098	1.015	0.096	0.988	0.094	0.973
0.618	0.956	0.634	1.024	0	0.000	1	–	0.629	1.001	0.629	0.999	0.585	0.831
0.419	0.944	0.430	0.987	0.439	1.025	0.433	1.001	1	–	0	0.000	0.433	1.000
0.581	1.059	0.570	1.013	0.561	0.976	0.567	0.999	0	0.000	1	–	0.567	1.000
0.266	1.401	0.175	0.822	0.200	0.969	0.191	0.914	0.205	1.000	0.205	1.000	1	–
0.197	1.232	0.171	1.037	0.147	0.865	0.150	0.882	0.166	1.000	0.166	1.000	0	0.000
0.252	1.003	0.224	0.859	0.251	1.000	0.248	0.981	0.251	1.000	0.251	1.000	0	0.000
0.135	0.763	0.182	1.085	0.219	1.365	0.184	1.097	0.170	1.000	0.170	1.000	0	0.000
0.088	0.855	0.110	1.087	0.117	1.173	0.106	1.050	0.102	1.000	0.102	1.000	0	0.000
0.045	0.626	0.094	1.371	0.034	0.471	0.085	1.234	0.070	1.000	0.070	1.000	0	0.000
0.017	0.465	0.044	1.275	0.031	0.885	0.037	1.045	0.035	1.000	0.035	1.000	0	0.000

20th	20st_odds	30th	30st_odds	40th	40st_odds	50th	50st_odds	60th	60st_odds	More than70	More than70_odds
0.262	1.301	0.196	0.891	0.212	0.983	0.170	0.751	0.240	1.156	0.419	2.640
0.229	1.411	0.182	1.057	0.230	1.417	0.240	1.502	0.127	0.688	0.095	0.496
0.158	1.642	0.117	1.155	0.084	0.799	0.148	1.516	0.077	0.728	0.095	0.915
0.402	1.025	0.437	1.183	0.473	1.372	0.531	1.729	0.371	0.900	0.419	1.101
0.066	0.726	0.092	1.041	0.075	0.827	0.050	0.545	0.168	2.068	0.216	2.833
0.362	1.102	0.354	1.069	0.259	0.681	0.297	0.824	0.305	0.856	0.333	0.973
0.238	0.760	0.279	0.937	0.298	1.032	0.460	2.065	0.233	0.736	0.323	1.158
0.258	1.016	0.219	0.818	0.238	0.914	0.197	0.719	0.204	0.748	0.220	0.825
0.305	0.714	0.374	0.972	0.443	1.294	0.546	1.954	0.556	2.041	0.399	1.079
0.156	0.872	0.180	1.033	0.144	0.792	0.186	1.074	0.120	0.642	0.124	0.664
0.419	0.753	0.482	0.971	0.516	1.110	0.552	1.282	0.651	1.944	0.533	1.188
0.141	1.158	0.125	1.009	0.154	1.293	0.109	0.861	0.142	1.170	0.124	0.999
0.537	0.906	0.578	1.070	0.546	0.940	0.574	1.054	0.509	0.810	0.656	1.492
0.390	1.090	0.372	1.008	0.260	0.597	0.354	0.934	0.349	0.913	0.430	1.282
0.190	0.782	0.202	0.843	0.215	0.912	0.272	1.240	0.327	1.617	0.199	0.828
0.350	1.545	0.222	0.818	0.237	0.892	0.194	0.691	0.116	0.378	0.124	0.405
0.398	0.871	0.416	0.936	0.473	1.182	0.500	1.317	0.556	1.651	0.581	1.824
0.198	0.790	0.181	0.708	0.187	0.734	0.272	1.191	0.178	0.693	0.172	0.663
0.469	1.132	0.490	1.230	0.452	1.058	0.549	1.558	0.513	1.349	0.485	1.205
0.421	0.915	0.432	0.957	0.352	0.684	0.394	0.820	0.309	0.563	0.333	0.629
0.200	0.809	0.220	0.913	0.248	1.065	0.314	1.482	0.389	2.060	0.409	2.238
0.334	1.257	0.280	0.977	0.237	0.778	0.275	0.950	0.145	0.427	0.162	0.483
0.203	1.165	0.121	0.630	0.165	0.899	0.248	1.506	0.295	1.905	0.285	1.821
0.284	1.149	0.246	0.946	0.207	0.755	0.120	0.395	0.211	0.775	0.162	0.558
0.392	0.997	0.345	0.814	0.494	1.508	0.489	1.477	0.465	1.346	0.656	2.954
0.261	1.113	0.195	0.760	0.217	0.871	0.217	0.873	0.233	0.955	0.247	1.035
0.343	0.802	0.357	0.853	0.463	1.320	0.380	0.940	0.538	1.787	0.495	1.503
0.402	1.017	0.363	0.862	0.363	0.862	0.343	0.790	0.331	0.749	0.210	0.401
0.237	0.921	0.234	0.908	0.279	1.151	0.340	1.530	0.280	1.155	0.409	2.055
0.238	1.090	0.216	0.956	0.176	0.745	0.131	0.526	0.145	0.592	0.220	0.981
0.381	0.838	0.416	0.969	0.472	1.220	0.503	1.380	0.505	1.394	0.485	1.282
0.247	1.180	0.232	1.084	0.207	0.939	0.071	0.276	0.095	0.376	0.086	0.338
0.343	1.151	0.261	0.776	0.329	1.078	0.309	0.984	0.436	1.705	0.388	1.398
0.215	1.237	0.181	1.002	0.144	0.761	0.157	0.843	0.116	0.595	0.086	0.425
0.535	1.065	0.463	0.796	0.556	1.157	0.560	1.176	0.695	2.102	0.656	1.766
0.086	0.874	0.097	1.000	0.124	1.326	0.112	1.172	0.047	0.463	0.086	0.878
0.566	0.769	0.620	0.963	0.679	1.247	0.657	1.130	0.764	1.906	0.656	1.127
0.433	1.000	0.433	1.000	0.433	1.000	0.433	1.000	0.433	1.000	0.433	1.000
0.567	1.000	0.567	1.000	0.567	1.000	0.567	1.000	0.567	1.000	0.567	1.000
0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
1	–	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
0	0.000	1	–	0	0.000	0	0.000	0	0.000	0	0.000
0	0.000	0	0.000	1	–	0	0.000	0	0.000	0	0.000
0	0.000	0	0.000	0	0.000	1	–	0	0.000	0	0.000
0	0.000	0	0.000	0	0.000	0	0.000	1	–	0	0.000
0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	1	–