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# Linguistical approach with Automatic MBTI Identification Model based on Measuring Bioelectricity Patterns

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***Abstract***

*Until now, it is popular to use question-and-answer-based for human personality. The current inspection of representative personality types includes Myers-Briggs Type Indicator (MBTI) and job suitability evaluations. The problem of these inspection methods is influenced by the user's environment and psychological status during MBTI inspection. To solve this problem, we proposed MBTI Identification Model based on measuring bioelectricity patterns. We adapt traditional Korean medicine, the Eight Constitution, to this model. We develop an automatic MBTI identification algorithm that maps the Eight Constitution via biological current patterns to identify MBTI personality types. By utilizing the algorithm proposed in this research, it is anticipated that users will be able to measure MBTI more easily and accurately.*

***Keywords:*** *Sasang Constitution, Eight Constitution, Bioelectricity Current Pattern*

## 1. Introduction

A popular survey-based method determines human personality types. The MBTI is among the most prominent personality type inspection. There is a tendency for certain personality types to be preferred in the job. However, the person's surroundings and psychological conditions can affect the MBTI inspection, and the results can change. Moreover, individuals may discern the intentions of the inspection questions and deliberately obtain results that align with their preferred personality types. To solve this problem, previous

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research has proposed a method of identifying MBTI by adopting a traditional Korean medicine: Eight Constitution human property.

The theory of the Eight Constitution medicine means that normal persons can be classified into eight distinct types, each with its unique biological patterns and personality traits. Previous research focused on how to identify one of the Eight Constitution types based on mapping bio-currents with a unique individual's biological pattern[1]. In this paper, additionally, we develop an algorithm to map the keywords associated with the Eight Constitution to the MBTI personality types and provide more objective results compared to survey-based MBTI inspection. By utilizing bio-currents as an objective metric, this approach will aim to reduce the influence of environmental variables on MBTI results. As a result, we will offer a more objective and standardized way of determining an individual's personality type, compared to traditional survey-based MBTI methods.

In this study, to achieve it, we improve and expand the existing personality keyword mapping algorithm from an engineering perspective. We develop a web page and an Android application to allow users to easily access and utilize the mapping algorithm. This allows users to conveniently measure their bio-currents and identify their corresponding personality keywords according to the algorithm.

## 2. Related Works

### 2.1. Myers–Briggs Type Indicator (MBTI )Test

The MBTI is a self-report personality type indicator based on a questionnaire[2]. The MBTI inspection was created by Myers and Briggs, inspired by Carl Gustav Jung's psychological type theory. This inspection aims to classify individuals based on the theory of psychological types.

**TABLE 1. Type of MBTI**

| | | | |
|---|---|---|---|
| **ESTJ** Executive | **ESFJ** Consul | **ENFJ** Protagonist | **ENTJ** Commander |
| **ESTP** Entrepreneur | **ESFP** Entertainer | **ENFP** Campaigner | **ENTP** Debater |
| **ISTP** Virtuoso | **ISFP** Adventurer | **INFP** Mediator | **INTP** Logician |
| **ISTJ** Logistician | **ISFJ** Defender | **INFJ** Advocate | **INTJ** Architect |

MBTI classifies human types into 16 types of personality types, as shown in Table 1, through four preference indicators [3]. Extraversion and Introversion represent differences in focus on oneself and others, Sensing and iNtuition represent differences in perception, either through direct experience or imagination, Thinking and Feeling represent differences in decision-making criteria, whether based on objective standards or personal values, and Judging and Perceiving represent distinctions in lifestyle patterns[4].

### 2.2. Questionnaire for Sasang Constitution Classification II (QSCCII)

Many studies have explored the relationship between Western psychological-based personality inspections and traditional Korean medicine's constitution typology. Most of these studies utilized the QSCCII inspection. The QSCCII is a questionnaire used in traditional Korean medicine to identify the Sasang Constitution type, consisting of 121 items covering physical, personality, and pathological aspects[5].

**TABLE 2. Part of the QSCCII Inspection paper**

| Number | Question | Answer |
|---|---|---|
| **19** | I am active and strong. | True / False |
| **21** | I tend to accomplish what I start to do until the end. | True / False |
| **57** | I work according to my mood or feelings. | True / False |

Table 2 is a partial excerpt of the QSCCII questionnaire [6]. Using only QSCCII is insufficient for precise constitutional determination. However, it can be effectively used for a rough classification of constitution types[4]. The average accuracy of this inspection is 70.08%, and a study on its reproducibility over two years showed a matching rate of 56.88%[7]. Since the QSCCII relies on a questionnaire-based inspection, its reliability is low. Consequently, we need to supplement the questionnaire and reference other factors for more reliable results[8].

In this study, we aim to enhance reliability by using a more detailed classification of the Eight Constitution instead of the traditional Sasang Constitution and incorporating objective data such as bio-current data.

### 2.3. Eight Constitution

The traditional Korea Eight Constitution is a more detailed form of the constitution than the traditional Sasang Constitution[8]. Each constitution exhibits variations in both a physical constitution and temperament[8-10].

**Table 3. Activation Chart of Body Organs according to Eight-Constitution**

| **Organ Functioning** | **Pulmotonia**<br>Soyangsung Taeyangin | **Colonotonia**<br>Soeumsung Taeyangin | **Renotonia**<br>Taeyangsung Soeumin | **Vesicotonia**<br>Taeeumsung Soeumin |
|---|---|---|---|---|
| Strong | Lung | Large Intestine | Kidney | Bladder |
| Weak | Liver | Gallbladder | Spleen | Stomach |
| **Organ Functioning** | **Hepatonia**<br>Soyangsung Taeeumin | **Cholecystonia**<br>Soeumsung Taeeumin | **Pancreotonia**<br>Taeyangsung Soyangin | **Gastrotonia**<br>Taeeumsung Soyangin |
| Strong | Liver | Gallbladder | Spleen | Stomach |
| Weak | Lung | Large Intestine | Kidney | Bladder |

The classification of each constitution is based on the degree of activation of organs and tissues, as shown

in Table 3. We develop and utilize a rule-based algorithm using the relative strengths of organ activation levels among the Eight Constitution.

### 2.4. Bio-Current

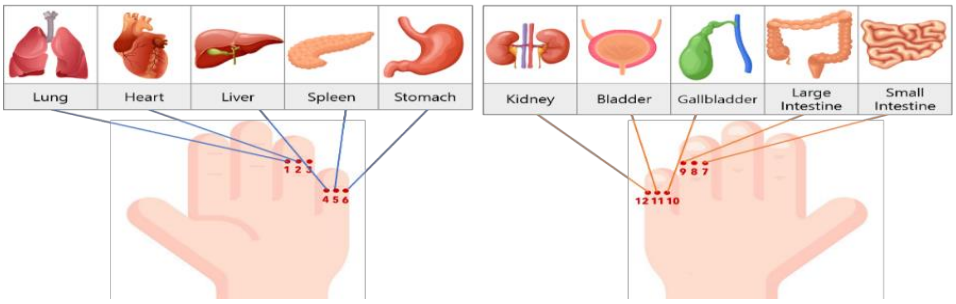


**Figure 1. Bio-Current Measurement Points Map by Human Organ**

In this study, we use bio-currents to identify physiological patterns. We also measure the bio-currents at 12 points on the left hand and 12 points on the right hand, as indicated in Figure 1[11]. We find that metallic objects or moisture cause affect measurement inaccuracy when measuring bio-currents. Therefore, metal objects are excluded during bio-current measurements and also keeping dry conditions.

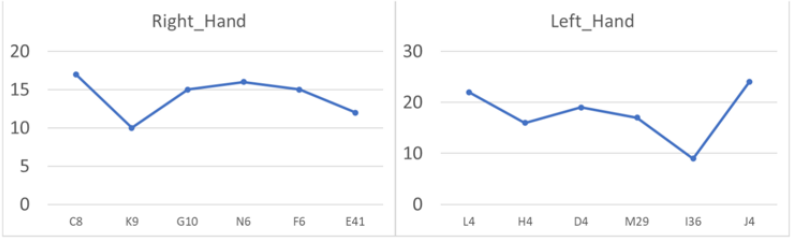


**Figure 2. Bio-Current measurement graph**

Figure 2 represents the graph obtained from measuring the bio-current. Each point in Figure 2 is connected to the corresponding point shown in Figure 1[12]. Due to the electrical properties of the meridians, higher bio-current values indicate a higher activation level in the corresponding organs, whereas lower bio-current values suggest lower activation levels[13]. In Figure 2, the highest point is connected to the kidney, and the lowest point is associated with the bladder. Thus, analyzing the graph in Figure 2 indicates a higher kidney activation level and a lower bladder activation level.

This study analyzes such graphs to determine the constitutional type and identify MBTI personality types. Various personality traits associated with the Eight Constitution are unified into a set of common keywords. These 24 standardized keywords are then classified according to the MBTI preference indicators.

**TABLE 4. MBTI and Eight -Constitution Keyword Mapping Results Char**

| Eight Constitution | Pulmotonia | Colonotonia | Hepatonia | Cholecystonia |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| **MBTI** | INTJ | ENTJ | ISTP | ENFJ |
| | INTP | ENTP | ISTJ | ESFJ |
| | INFJ | ENFJ | ESTP | |
| | INFP | ENFP | ESTJ | |
| **Eight Constitution** | **Renotonia** | **Vesicotonia** | **Pancreotonia** | **Gastrotonia** |
| **MBTI** | INTJ | ISTJ | ENFP | |
| | ENTJ | ISFJ | ESFP | |
| | ISTJ | | | |
| | ESTJ | | | |

In previous studies, keyword mapping was conducted for all Eight Constitution, excluding the Gastrotonia Constitution. Table 4 shows the results of the keyword mapping.

## 3. The MBTI Identification Model

### 3.1. Our System Design

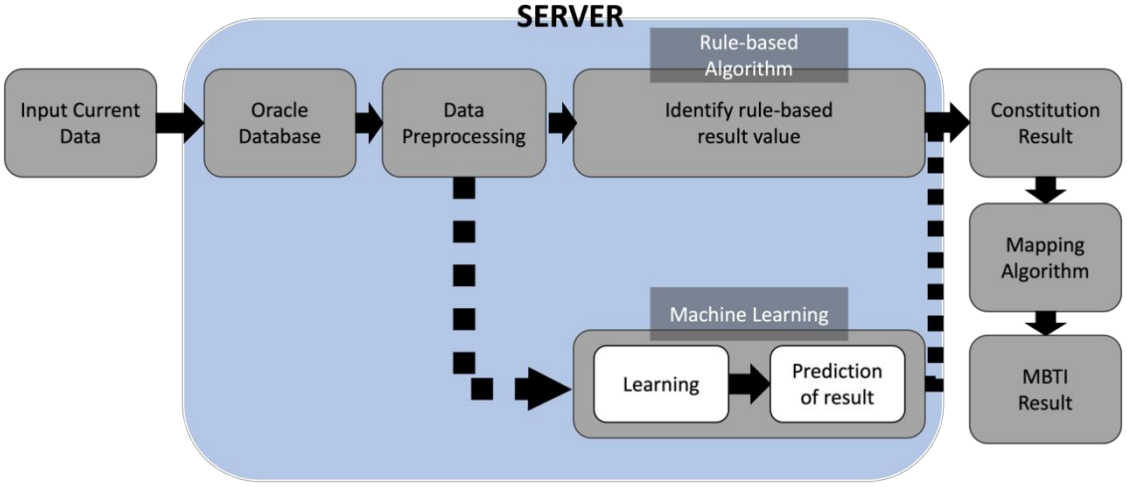


**Figure 3. The process of the MBTI Identification Model**

The entire process is illustrated in Figure 3. Bio-current values inputted through an app or website are stored in a database. The constitution determination algorithm then provides one of the Eight Constitution based on the data. Next, the personality keyword mapping algorithm offers an objective MBTI result corresponding to the constitution. In the near future, we will clearly compare results obtained from both rule-based and machine-learning algorithms, with the final output provided only when they align. This approach ensures more accurate results compared to the traditional methods. However, in cases where the two results do not match, the output will be based on the rule-based algorithm. As a result, we will have the accuracy of the determinations to the normal person.

### 3.2. DB Design of the MBTI Identification Model

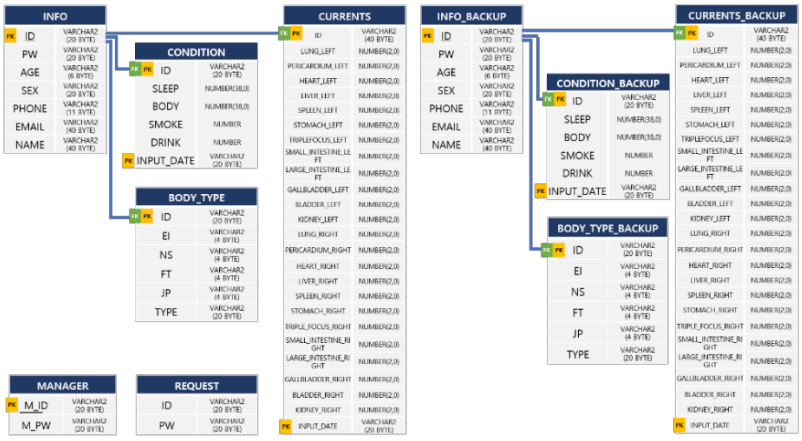


**Figure 4. Normalized Data Schema of Human Database**

The E-R diagram of the database used in this study is shown in Figure 4. The database is designed to satisfy the third normal form. We design the INFO table containing member information and make connections with other tables through one-to-many relationships. Additionally, foreign keys are set in the tables that store bio-current and condition data to eliminate transitive functional dependencies. A separate table is created for the withdrawal member recovery system.

## 4. The Eight Constitution's Identification Algorithm

In the eight constitution identification algorithm, the highest weight is given to the score if the parts with the strongest organ activity match. After comparing all small and medium-sized relationships, the result of summing all scores is determined as the result.

In the Eight Constitution, there is a specific biological pattern for each constitution.

**Table 5. The strong and weak arrangement of organs in the Eight Constitution**

| Eight-constitution | The large and small, strong and weak arrangement of organs | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Pulmotonia** | Soyangsung Taeyangin | Lung | > | Spleen | > | Heart | > | Kidney | > | Liver |
| **Colonotonia** | Soeumsung Taeyangin | Large intestine | > | Bladder | > | Stomach | > | Small intestine | > | Gallbladder |
| **Hepatonia** | Soyangsung Taeeumin | Liver | > | Kidney | > | Heart | > | Spleen | > | Lung |
| **Cholecystonia** | Soeumsung Taeeumin | Gallbladder | > | Small intestine | > | Stomach | > | Bladder | > | Large intestine |
| **Renotonia** | Taeyangsung Soeumin | Kidney | > | Lung | > | Liver | > | Heart | > | Spleen |
| **Vesicotonia** | Taeeumsung Soeumin | Bladder | > | Gallbladder | > | Small intestine | > | Large intestine | > | Stomach |
| **Pancreotonia** | Taeyangsung Soyangin | Spleen | > | Heart | > | Liver | > | Lung | > | Kidney |
| **Gastrotonia** | Taeeumsung Soyangin | Stomach | > | Large intestine | > | Small intestine | > | Gallbladder | > | Bladder |

Table 5 shows the arrangement of large and small strengths and weaknesses of organs, which are biological patterns according to each constitution.

This study first classifies which of the four preferred indicators and identifies which of the two types of preference indicators. The method of classifying the MBTI-type determination process into two procedures is expected to be more accurate than the method of determining it at once.

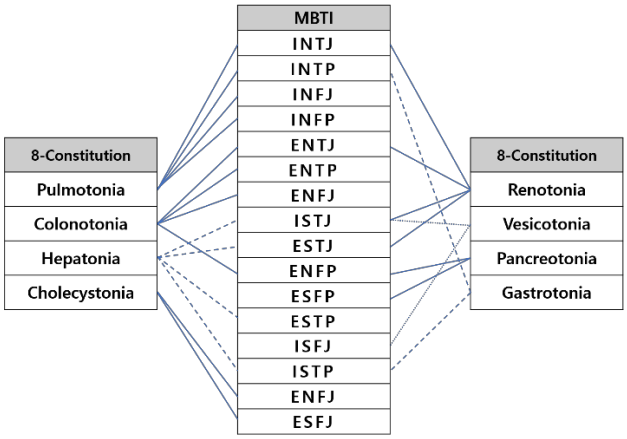


**Figure 5. MBTI to Eight Constitution Mapping Results**

Figure 5 shows the results of mapping Eight Constitution and MBTI. We use Fillmore's case grammar approach to analyze cases of characteristics of eight constitution attributes to identify between MBTI and Eight constitution. Through this, it can be seen that the Gastrotonia constitution is added.

## 5. Best Practices for Automatic MBTI Identification Model

### 5.1. Android version

To enhance user convenience, we develop an Android application for each user to input and then display their measured bio-currents. Furthermore, using the inputted bio-current data, the application provides a predicted MBTI result.

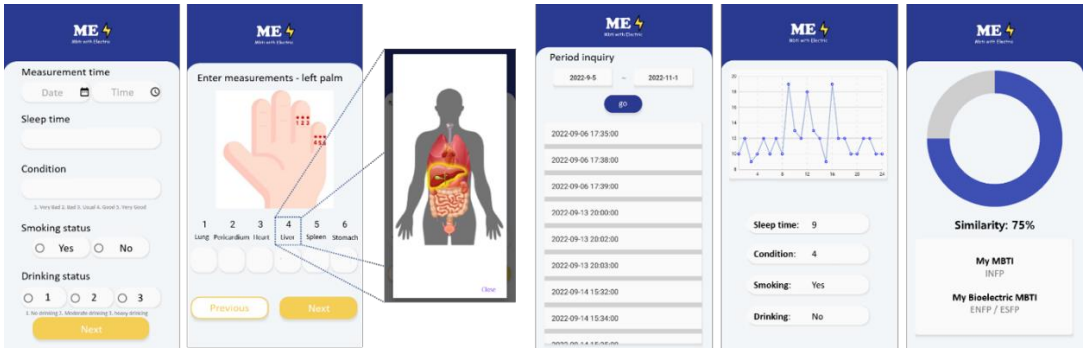


**Figure 6. Input Function and Result Output Function for Bio-current Measurement APP**

Figure 6 shows the Android app screen where users can input their sleep duration, body condition, smoking and drinking status, and measured bio-currents. To enhance the user's understanding of the measurement points,

tapping on the text of the input points displays the corresponding body organs.

As shown in Figure 6, users can view their bio-current data in graph format for the desired date and period. They can observe their bio-current trends over time by selecting a specific date. Additionally, the app displays the predicted MBTI result generated by the research algorithm and shows the matching percentage with the results from the traditional MBTI inspection.

### 5.2. Web version

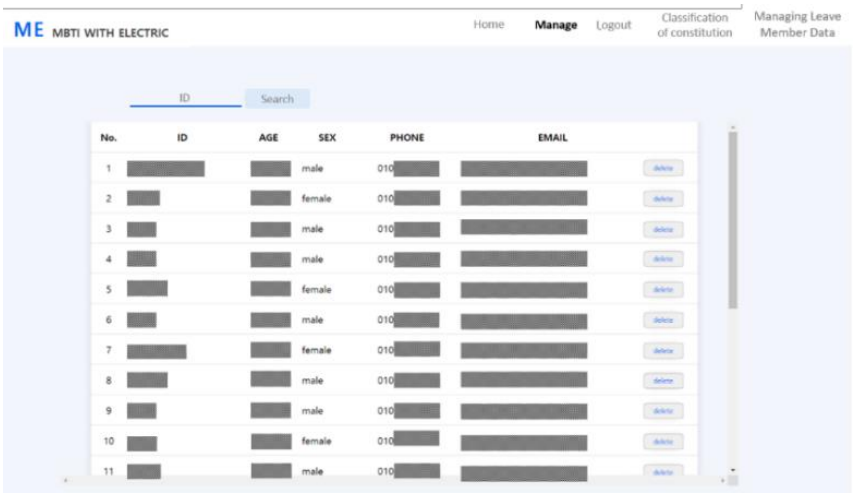


**Figure 7. Inquiry of member information on the manager's web**

As depicted in Figure 7, the administrator account has access to view user IDs and can perform operations such as searching, modifying, and deleting data for specific users. Additionally, the administrator can restore data for users who have withdrawn from the service within a certain period. If a withdrawn user does not apply for data restoration within the designated period, their data will be automatically permanently deleted. The administrator page automatically identifies the user's constitution through the constitution classification page and determines the user's MBTI based on the identified constitution.

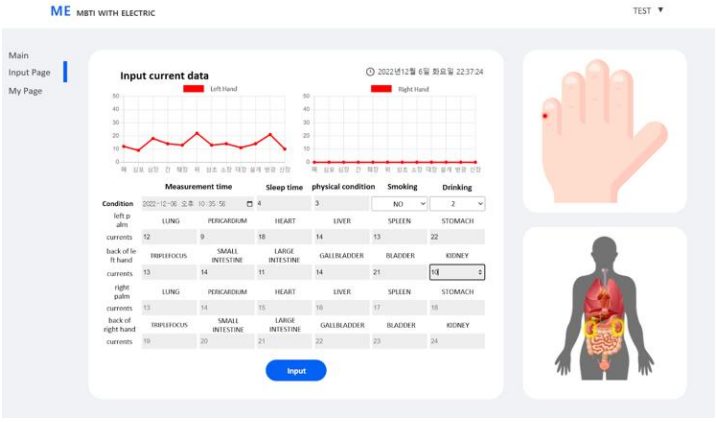


**Figure 8. Bio-current measurement input function - WEB**

Figure 8 is a page where users can input their body condition and bio-current data. Similar to the Android app, clicking on the text box for bio-current data displays the connected body organs on the right side to

enhance the user's understanding. When the bio-current data is entered, the web shows the real-time input values in graph format at the top of the page.

### 5.3. case study

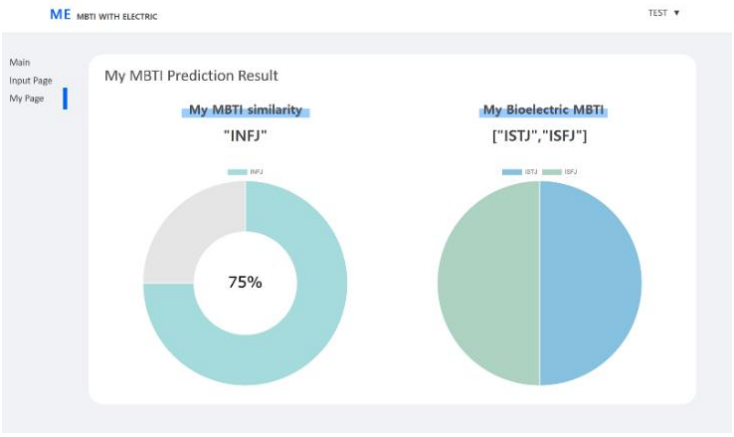


**Figure 9. Bio-current measurement input function - WEB**

In Figure 9, users can compare their existing MBTI with the predicted MBTI result generated by the research algorithm. They can also check the matching percentage between the two results. Additionally, the web presents the average values of bio-current data measured for the left and right hands over 1 month, 3 months, and 6 months in graph format. Users have the option to modify or delete the inputted bio-current data and body condition

.

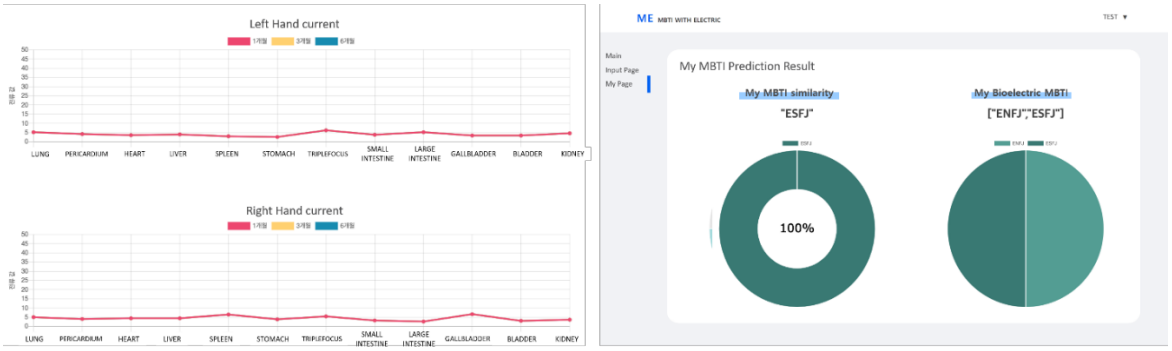


**Figure 10. Result Graph of Subject**

Figure 10 is the result screen of one of the participants who underwent testing using our constitutional identification model. In Figure 10, the graph obtained from measuring the bio-current patterns of the participant is shown. Analyzing the graph in Figure 10 shows that the organ with the highest level of activation is the pancreas ( gallbladder ), while the organ with the lowest level of activation is the large intestine. Thus, the participant's constitution is identified as the Cholecystonia constitution. The MBTI types mapped to the Cholecystonia constitution include ENFJ and ESFJ. We can observe that the result obtained through the objective administration of the traditional MBTI inspection aligns with the identified constitution and the mapped MBTI types.

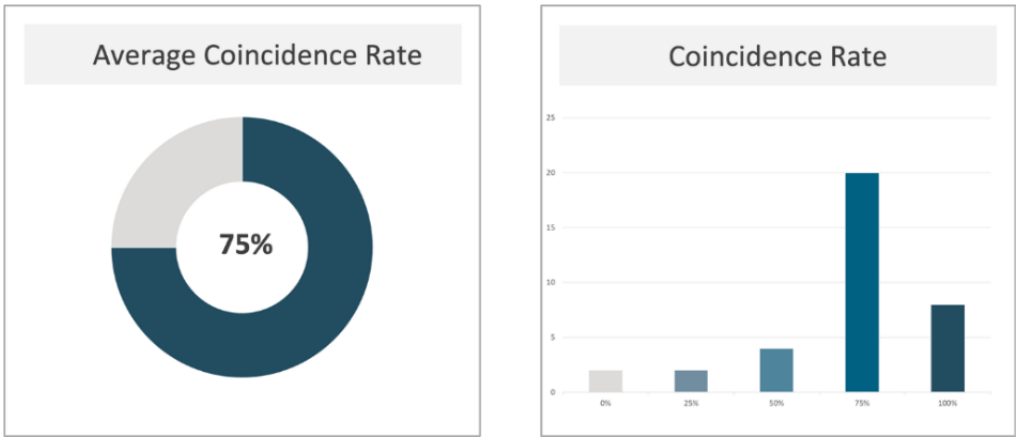


**Figure 11. Average Match Rate Graph & Match Rate Distribution Graph**

The graph in Figure 11 shows the average matching rate and the distribution of matching rates for 36 participants. The average matching rate was found to be 75%, and the distribution of matching rates is biased towards higher matching rates. As a result, it is expected that by further improving the constitutional identification model, we can achieve higher accuracy compared to the initial model.

## 6. Conclusions

We propose a novel personality type inspection method that combines traditional Korean medicine's Eight Constitution and Western medicine's MBTI. We identify the Eight Constitution through bio-currents and present normal person with original MBTI results. We map the relationship between Eight Constitution and MBTI characteristics of human body by using linguistic approach. Furthermore, we develop both Android and web platforms to improve accessibility and usability for users. By using objective indicators, this approach offers more reliable results compared to conventional questionnaire-based personality inspections.

By utilizing the proposed model in this study, we can address the reliability issues of the traditional MBTI inspection. Therefore, we anticipate that the inspection results could serve as a point of reference across various domains, including job selection and academic pursuits.

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