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A Case Study on Social Welfare Services Using Emotion-Based Artificial Intelligence in Metropolitan City of Seoul

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Abstract

Interest in social welfare services and education using emotion-based artificial intelligence in various fields of social welfare service in Seoul is increasing. Social welfare services and education using emotion-based artificial intelligence is a relatively new field, so more active research and discussions are needed among practitioners to develop from various perspectives.

Key words: *artificial intelligence, sentiment analysis, social welfare service, case study*

1. Introduction

In order to effectively develop social welfare service activities, Seoul Metropolitan Government must strengthen the ability to effectively collect data on consumers of social welfare services and select the proper information necessary for decision-making. The existing social welfare service work is now old-fashioned and inefficient because it is mainly focused on collecting and analyzing response data based on case studies during the era of emotion-based artificial intelligence combined with exponential data accumulation. When emotion-based artificial intelligence is applied, it results in a more complex and effective outcome compared to the existing social welfare service. Social welfare services using emotion-based artificial intelligence are seeking new perspectives on social welfare service data to replace the changes in strategic perspectives on data and characteristics of data.

1.1 First, a new perspective is required in terms of changes in strategic perspectives on data:

Existing social welfare service work is based on an ad-hoc problem-solving survey that collects data to recognize problems and solve the problems. However, the recent social welfare services using emotion-based artificial intelligence require prospective thinking about the strategic value of data from social welfare institutions. In other words, it demands the view that the data itself becomes an opportunity and core competitiveness for social welfare services. Due to the recent phenomenon, social welfare institutions with data dominance provide greater value to customers and are more competitive.

1.2 Second, a new perspective is required in terms of the necessity of the characteristics of the data.

The data obtained from the traditional case study-based social welfare service work approach are oral preferred data, which is significantly

different from the actual behavior of customers. In addition, as pointed out in several studies, the understanding of data sources that overcome the limitations of social welfare service work data is increasing rapidly as well as the demand for the use of the improved data collection. In the field of social welfare services using emotion-based artificial intelligence, various types of customer actual behavioral data are accumulated in the database of social welfare institutions as part of daily transaction activities, which yields in a more extensive and complex amount of social welfare service data. Different databases are generated in various forms in various industries. In order to select and utilize techniques appropriate for a given variety of situations, it is necessary to understand the nature of the social welfare service decision-making problem and also to acquire the ability to replace it with data-related tasks. In educating these competencies, convergent education beyond the education of the technique itself is necessary to successfully implement the technologies and systems. This competency is a competency that is different from previous emotion-based artificial intelligence technology. This study is crucial for improvement and it helps understand the concept of institution's social welfare service strategies. Also the uses of emotion-based artificial intelligence analysis and data mining techniques are developing very quickly. This study encompasses both the conceptual aspect of social welfare services and the technical aspect of the use of emotion-based artificial intelligence. Research on social welfare services using emotion-based artificial intelligence will record and track the characteristics of different consumers' actual behavioral data while generating extensive database on a daily basis. This updated system holds more analytical approach and is more efficient and beneficial towards service consumers.

2. Previous Research

2.1 Emotion-based artificial intelligence concept

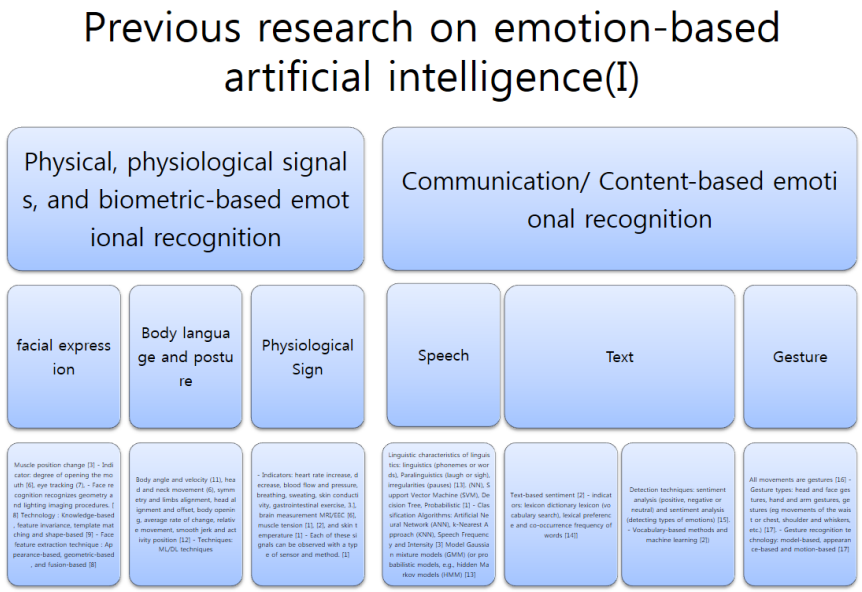
Emotional-based artificial intelligence refers to a psychological state or process that performs the function of maintaining the balance of goals

related to the brain's information process. “Emotion” can be defined as a series of discrete states with mutually exclusive meanings, while emotion can be characterized by a combination of numerical dimensions related to the grade of intensity. The dimension model of emotion can be found in two-dimensional or multidimensional space, and one of the earliest examples is Russell's circle-x model, which consists of two variable classifications for emotion and arousal [2]. Since emotional awakening is composed of emotional awareness, physical activation and elements are described as the value of pleasure or pleasure. “Emotional analysis” is an evolved scientific field to identify and analyze human emotions and individuality [3] This is also called emotional perception because it is done through emotional computing related to the identification of emotional states.

2.2 Case of social welfare services using emotion-based artificial intelligence

In the era of emotion-based artificial intelligence, the ability to scientifically formulate and perform social welfare service activities based on data is emerging as an indispensable factor for the survival and growth of social welfare institutions. Recently, in developed global countries, demand for manpower that can scientifically optimize social welfare service activities, which are the core of social welfare institution activities, using emotion-based artificial intelligence, is exploding. According to the Mc Kinsey report published in 2020, demand for artificial intelligence personnel in the United States will range from 140,000 to 190,000 in 2018, exceeding 50% to 60% of the estimated supply. The recent opening or expansion of master's courses specializing in data artificial intelligence at leading graduate schools in the United States, such as MIT and Carnegie Mellon, can be seen as supporting the validity of their reports.

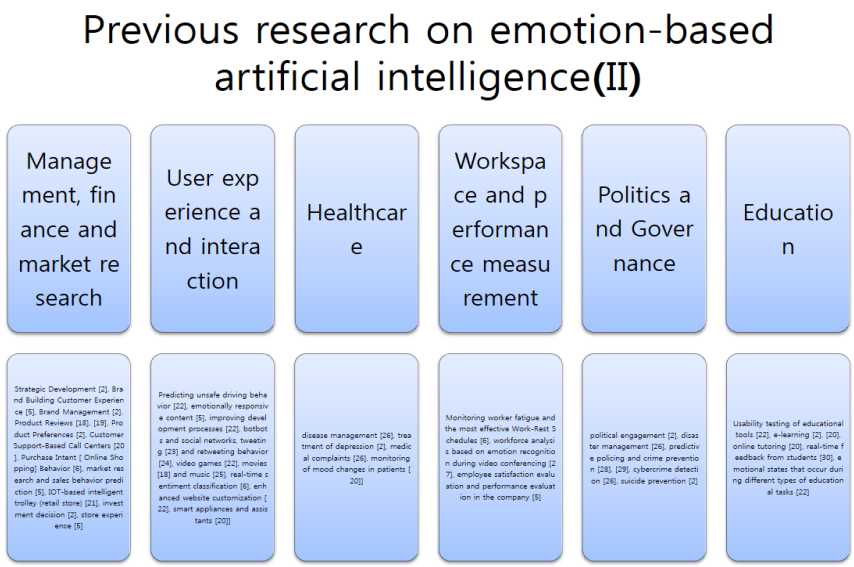
<Figure 1> Previous research on emotion-based artificial intelligence (technical field)



In Korea, the demand for professional artificial intelligence-related social welfare service personnel is exploding, but the supply of artificial intelligence personnel is very insufficient. Most of the current social welfare service education is conducted mainly on the concept of establishing basic social welfare service strategies and case studies, and in-depth social welfare service education, only education in specific fields related to psychology-based consumer behavior is very active. In terms of supplying competent human resources, the supply of professional education programs for high-quality artificial intelligence personnel in the field of social welfare services is quite weak, and in particular, education on quantitative social welfare services is relatively inactive. Due to the nature of social welfare services using emotion-based artificial intelligence, a considerable level of knowledge on quantitative fraudulent techniques such as data mining is essential, but education on this is insufficient. In Korea, such quantitative social welfare service education has not yet been widely conducted except for the level of Ph.D. programs at several universities. Social welfare service education using emotion-based artificial intelligence for practical experts,

not for academic research at the doctoral level, is quite weak. In conclusion, compared to the continuous establishment and expansion of master's courses specializing in artificial intelligence in social welfare services at leading graduate schools in the United States, domestic social welfare service artificial intelligence education is relatively lagging. In addition, competing with soft manpower resources in the current trend referred to as the 4th Industrial Revolution is a more advantageous trend for Korean social welfare institutions that lack natural resources, but it is very worrisome that preparations for this area are delayed in Korea. Under the recognition of these problems, education to develop the ability to use emotion-based artificial intelligence in various fields needs to be further activated, and this study aims to help revitalize data-based artificial intelligence education in terms of social welfare institutions' use of social welfare services. Social welfare services using emotion-based artificial intelligence are a study that combines the conceptual and quantitative analysis techniques of social welfare services, and are expected to contribute to expanding the base of social welfare service education using emotion-based artificial intelligence in Korea.

<Figure 2> Previous research on emotion-based artificial intelligence (Application area)



3. Emotion-based artificial intelligence social welfare service work type

3.1 Types of work that are expected to be effective when applying emotion-based artificial intelligence in Metropolitan City of Seoul

①Work that is simple and repetitive, so it's a good job for someone to replace and support

- Preparation of standard press releases (issuance or release of fine dust warnings based on figures, etc.)
- Frequent civil service counseling and Q&A (FAQ), etc

②Work that requires reasonable decision-making support through accumulated data or information

- Judgment of the feasibility of implementing policies according to citizens' requests for administrative services, prediction of service demand, etc
- Owl bus (by analyzing cell phone calls during late night hours, late night bus routes are confirmed)

③Work that can help make decisions by reducing the scope due to the large amount of data

- Detection of unauthorized buildings using aerial photographs, crackdown on illegal parking and stopping, etc
- AI interviews (reduce the scope of review compared to data of excellent employees who have previously learned a large number of interviewees)

④Work that is effective to find useful information in vast documents, photos, and voices

- Collecting only similar patents, collecting and analyzing precedents, and currentizing department phone numbers through public documents, etc.
- Unauthorized dumping of illegal waste using CCTV (in case of unauthorized dumping, photo shoot and warning message)

⑤Work that requires expertise to refer to experience, technology, and existing cases

- Diagnosis of a disease only with the sound of a stethoscope, judging a specific situation in a picture, and reading a medical image, etc
- AI-based joint zone safety management (automatic detection of abnormal symptoms through periodic monitoring)

⑥Work that requires customized services for each administrative service target

- Welfare services that the elderly living alone in their 70s can receive, lifelong education programs, and job recommendations, etc

⑦Work that needs to be resolved due to frequent identical or similar complaints

- In the event of a 120 consultation waiting call, some complaints are resolved using Chabot's.

3.2Emotion-based artificial intelligence technology and application services in Metropolitan City of Seoul

①(Inference) Reasonable judgment through data and reasoning, decision-making support, etc

- AI investigator (illegal loan, multi-level related keywords are learned and related posts are detected on SNS)
- AI Taxi (Based on taxi operation information, it predicts the demand for taxis and provides information to drivers)
- Owl bus (by analyzing cell phone calls during late night hours, late night bus routes are confirmed)
- AI-based joint zone safety management
- Recommend a judgment based on precedent data

②(Language intelligence) Understanding the context of a person's words or writings, real-time translation, interpretation, etc

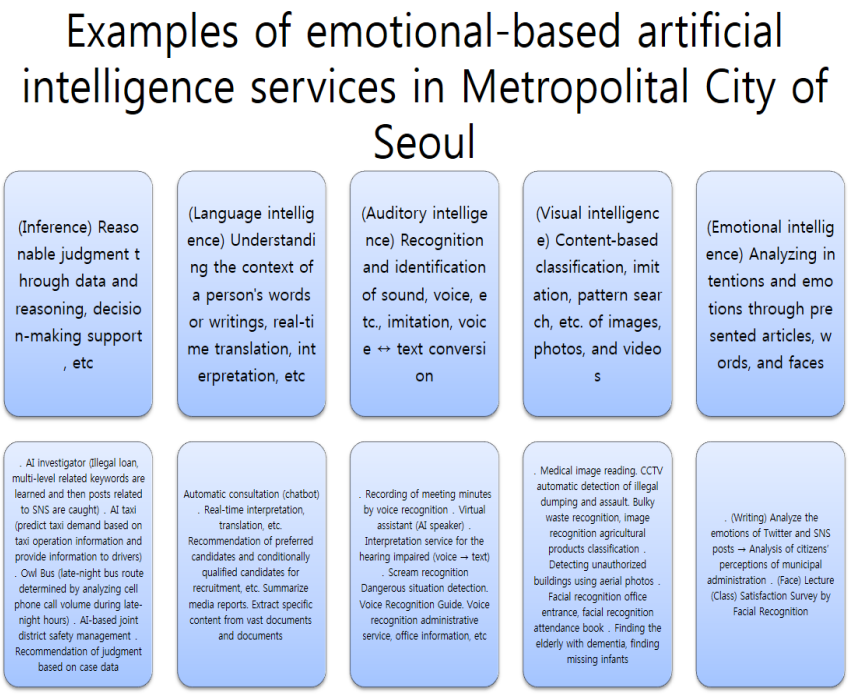
- Automatic counseling (Chatbot)
- Real-time interpretation, translation, etc
- Recommendation of preferred candidates, conditionally qualified candidates, etc
- Summarizing media reports
- Extract specific contents from vast documents and documents

③(Auditory intelligence) Recognition and identification of sound, voice, etc., imitation, voice ↔ text conversion
- Writing minutes for voice recognition
- Virtual secretary (AI speaker)
- Interpretation service for the hearing impaired (voice → text)
- Scream recognition and danger situation detection
- Voice recognition guide
- Voice recognition administrative services, government building guidance, etc

④(Visual intelligence) Content-based classification, imitation, pattern search, etc. of images, photos, and videos
- Medical image screening
- Automatic detection of unauthorized CCTV speculation and assault
- Large waste recognition, video recognition, and agricultural products classification
- Detection of unauthorized buildings using aerial photographs
- Facial Recognition Office Access, Face Recognition Attendance Book
- Finding the elderly with dementia or missing infants

⑤(Emotional intelligence) Analyzing intentions and emotions through presented articles, words, and faces
- (Writing) Analyze the emotions of Twitter and SNS posts → Analysis of citizens' perceptions of municipal administration
- (Face) Lecture (Class) Satisfaction Survey by Facial Recognition

<Figure3> Examples of emotional-based artificial intelligence services in Metropolitan City of Seoul



4. Emotion-based artificial intelligence social welfare service work process

4.1 Understanding social welfare case issues using emotion-based artificial intelligence in Metropolitan City of Seoul

In order to create business value through big data, an understanding of business issues must be preceded. Through practice, we present business

problems to practitioners and draw ideas on what insights will be needed to solve problems. Through this, practitioners are encouraged to understand business problems.

4.2 Understanding social welfare case data using emotion-based artificial intelligence

Big data is a material for deriving insights, the basis for business value. In order to analyze the data and create value from the results, it is first necessary to understand the characteristics of the data held. Understanding the characteristics of the data is the process of identifying which tables are included in the data, what variables are in each table, and what those variables mean. Through the process of understanding data, you can get an idea of what information is related to the purpose of analysis among the given data and how to derive insights by linking various information. The goal is to allow practitioners to understand data from the perspective of creating business value and gain clues to deriving insights.

4.3 Perform a formulation

Formulation is the process of deriving an analysis frame, a learning algorithm, and an input and output variables from business problems and data. The practitioners practice converting the presented business problem into a data mining problem through three following steps. Analysis framework settings include classification prediction, association rules, predictive analysis, data reduction, data search, and data visualization. We learn about these frameworks and perform an analysis to select a framework suitable for solving a given business problem. The learning algorithm setting allows you to select an appropriate algorithm for each framework of data mining. For example, algorithms such as logistic regression, decision tree, and SVM may be used in the classification framework. The practice of selecting an appropriate algorithm is performed by considering the analysis goal

(accurate prediction is the goal, data interpretation is the goal, etc.) and the characteristics of the data (type of data such as resin type, category type, number of data and number of variables). Input and output variable setting is the process of setting input and output variables suitable for the selected analysis framework and learning algorithm, and analyzes to determine appropriate input and output variables from given data.

4.4 Pre-processing of social welfare case data

Data preprocessing is a preceding step for performing various analyses including data modeling. Pre-processing is an important process in practice, accounting for more than 80% of the time required for actual data analysis, but in many data analysis programs, preprocessing is overlooked. By performing the process of integrating and purifying data, it recognizes the importance of data preprocessing to practitioners and suggests ways to solve data consistency problems and data quality problems (missing values, presence of variables with little information, etc.).

4.5 Data modeling of social welfare case data

Data modeling is a step of constructing a model and deriving an analysis result using the learning algorithm, input variable, and output variable presented in the formulation. Working-level officials use Python's Sikit Learn or R's various libraries (gim, tree doom) to learn the model from the previously preprocessed data, interpret and visualize the results.

4.6 Insight Derivation

Insight derivation is the process of deriving useful information by interpreting the analysis results obtained through data modeling. For

example, for the types of accidents obtained through data modeling, by visualizing the degree to which human damage is serious as follows, it is possible to determine which types of accidents should be focused first from the standpoint of social welfare institutions. As another example, the visualization method can be used to derive insights that the degree of damage varies according to gender for each type of accident.

4.7 Deriving a business action

Business action derivation is the process of making decisions to actually utilize insights obtained through data analysis.

6. Conclusion

If this study is successful, it is expected to increase interest in social welfare services and education using emotion-based artificial intelligence in various fields of social welfare services in Seoul. In terms of education supply, the field of social welfare services using emotion-based artificial intelligence is a relatively new field, so more active research and discussions need to be conducted among practitioners from various perspectives, which will provide a clue to spreading such research and discussion. Macroscopically, the expansion and deepening of social welfare service work in various aspects of Seoul's administration is not just expected to develop social welfare service work, but to provide an environment in which social welfare service personnel using emotion-based artificial intelligence with analytical capabilities can be supplied to the market in earnest.

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