

Study on an Integrated System using an ER Diagram for Chungcheong Rural Communities

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Abstract: While urban regeneration projects are currently under active execution in several old cities in Korea, there are few projects to improve the quality of life of rural communities. Considering the decline of the SOC system, deterioration of housing, and degeneration of economic feasibility, the purpose of this study is to provide solutions to realize an improved economic and social environment of rural communities through an integrated management system for traffic safety and water management systems. Therefore, this research used an Entity-Relationship Diagram to construct an integrated system for traffic safety and water management systems for Chungcheong rural communities. The ERD is prepared by depicting 7 relationships for 13 entities, including traffic accidents and agricultural products, and 26 attributes, including soil moisture and underflow storage. Consequently, it will be possible to set up a decision-making support system that can analyze and evaluate the regeneration index, technology, and management of the systems for Chungcheong rural communities, based on supplier and user perspectives

Keywords: Integrated System, Entity-Relationship Diagram, Traffic Safety System, Water Management System

I. INTRODUCTION

Urban regeneration projects are recently under active execution in several old cities in Korea. However, only few urban regeneration projects executed for the rural communities, resulting in poor SOC system, aging houses and deteriorated economic conditions in rural communities.

According to recent data from the Korea Statistics, more than 200,000 traffic accidents occur annually, and the number of traffic accidents in rural areas has increased from 401 cases in 2010 to 463 cases in 2013. In addition to this, rural communities are exposed to economic loss due to drought and flood and decreased efficiency due to old SOC systems. This suggests that the related authorities should shed new lights on the aging rural communities. This research focuses on the application of the systems for the traffic safety systems and water management system of Chungcheong Provinces. It also presents a decision-making support system that can analyze index, technology and management for the regeneration of Chungcheong Provinces.

II. INTEGRATED SYSTEM DESIGN BASED ON ER DIAGRAM

ERD(Entity-Relationship Diagram) is an estimated top tier data program which is often used for the strategic planning or top-down planning. In other words, it is a modelling method, composed of related groups between the individuals based on the meaning of the actual organizations and interaction.

To establish an integrated system, this research utilized the ERD. To create an ER model, elements that are required in the traffic safety system and water management technology system requirements are retrieved. Based on the requirements, the following Table 1 is prepared by distributing the items to Entity, Relationship and Attribute.

TABLE I
 ER DIAGRAM ELEMENTS ANALYSIS THROUGH REQUIREMENTS

Item	Elements
Entity	Traffic accident, agricultural products, sensor monitoring
Relationship	Establishment and storage of DB, decision-making system for system installation, agricultural products information, water storage and sensor monitoring
Attribute	Number of and increase of traffic accidents, watering time and required water for each agricultural products, soil moisture, rain water storage, water supply, temperature and humidity

III. STRUCTURE OF INTEGRATED SYSTEM

As in the Figure 1, the integrated ERD for traffic safety system and water management system is constructed through input, measurement, analysis and UI design based on the DB.

At the Input, traffic accidents, types of agricultural products and damage from flood that are analyzed in the requirements, can be inputted. At the Measurement, information about soil moisture, water storage, water supply, temperature and humidity, can be collected through the sensor that is related to the sensor monitoring. At the Analysis, the system provides information through analysis of poor traffic systems, frequent traffic accident sites, level of accidents according to area, increase of traffic accidents, data according to period and status diagnosis. At UI Design, information are provided through search for types of agricultural products, damage from flood and condition of cultivation.

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IV. CONCLUSION

The purpose of this research is to establish an integrated management system to minimize traffic accidents and economic loss from the natural disaster. For the integrated system modelling, the ERD is prepared by composing seven relations for 13 entities, including traffic accidents and agricultural products, and 26 attributes, including soil moisture and underflow storage. As a result, a decision-making support system, which can analyze and diagnose regeneration index, technology and management of the systems in rural communities based on the supplier and user perspectives, can be realized.

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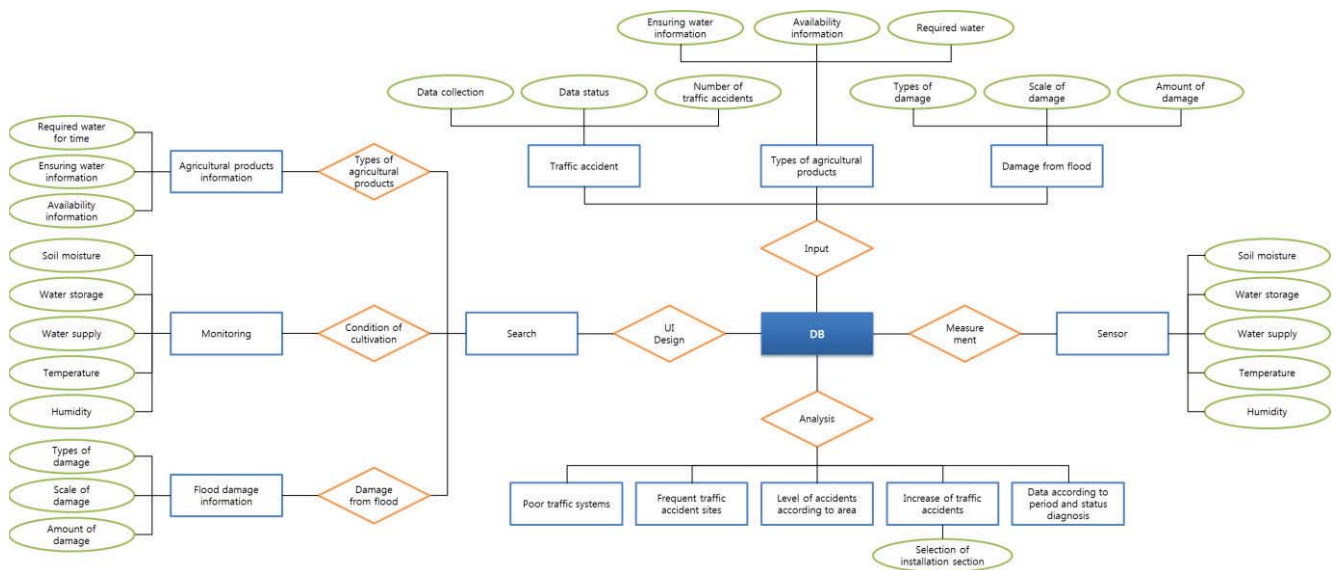


FIGURE 1 INTEGRATED SYSTEM ER DIAGRAM