Information System for Efficient Management and Distribution of Production Information of Agricultural Products in Korea

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Abstract

A electronic record sheet utilizing optical character reader (OCR) technology and an information system for efficient control of rice production were developed for this study. The electronic record sheets based on OCR allows easy control of production-related information, makes the information available to consumers and retailers and enables elderly farmers to participate in the traceability system. In addition, a system was developed for scanning multiple electronic record sheets and transferring them to the traceability system. The systems developed in this study are expected to easily provide production information from producers to distributors and consumers via the Internet and mobile network.

Keywords: Electronic Record Sheet, OCR, Traceability System, Rice

Introduction

Producers, distributors and retailers participating in the agricultural product traceability system must record production history as paper or electronic data to enable to trace. Consumers are especially interested in production history, and it is therefore very important to accurately maintain the information and make it available to the consumers and distributors. In reality, however, creating and maintaining precise production history recording is very burdensome for elderly farmers. Accordingly, it is necessary to develop an information system that facilitates creating and maintaining production-related history record at the production stage and expedites the delivery of the information to consumers. This study discusses the development and utilization of a production-related record system that uses OCR technology to implement efficient acquisition and provision of cultivation history.

Development Methodology and Description

In order to survey how agricultural production record was managed on the field, we visited rice processing centers (RPC) and agricultural product processing centers (APC) at Nonsan, Cheolwon and Hongcheon. Based on the survey, the record sheet adapted, OCR technology was developed to facilitate the process of creating and maintaining cultivation history records for rice farmers.

In addition, the system development for storage production information recorded into the traceability system and to make the information available to consumers and distributors was conducted.
Development of Electronic Record Sheet using OCR Technology

Based on the survey of the existing paper record book, a new electronic record sheet using OCR technology was developed. The electronic record sheet can record farm tasks including soil management, nursery management for raising of seedling, rice paddy field control, weed control, disease and insect pest control, fertilization control, harvest management and agricultural materials purchase, etc (Fig. 1).

The electronic record sheet was simplified to maintain only the information required for traceability system. Furthermore, for improvement of operation efficiency of information control, bar codes and farm household codes were implemented to enable single scanning of multiple record sheets. Empirical tests of the developed electronic record sheet were conducted for 50 rice farmers. In order to test the scanner recognition rate of the electronic record sheets created by rice farmers, record sheets of two farmers (8 pages) were used, and 858 out of 1,022 characters were recognized properly, displaying a recognition rate of 83.95%. One of the tasks to be achieved in near future is improving the rate to 95%.

Fig. 1. Electronic Record Sheets for Rice Farmers

Fig. 2. Electronic Record Sheet Recognized by OCR Reader
In order to improve the recognition rate of electronic record sheets, the system allows the recognition program to compile incorrect characters for human verification, and users can also manually detect errors to make prompt corrections.

**Development of Distribution System of Production Information**

After electronic record sheets created by farmers are collected, image files of record sheets are created by the OCR reader, corrections on error are made and the production information is sent to the traceability system (www.cypap.net) as meta data to make the information available to the consumers and distributors.

A data transmission algorithm was developed for sending the production information amended by the OCR recognition program to the traceability system database. Transmitted and untransmitted records are grouped according to task date, RPC code, cultivation area code and variety code so that untransmitted records can be sorted out for revision and transmission.

Furthermore, amounts of agricultural materials usage exceeding those of purchase were filtered by error detection service to enable accurate control of production information.
Conclusion

Producers participating in the agricultural product traceability system must maintain production history and shipping information as paper or electronic data so that the information can be traced when necessary.

An electronic record sheet of cultivation history based on OCR technology and its handling information system for rice were developed for this study. The record sheets involved creating records based on farm tasks including soil management, nursery management for raising of seedling, rice paddy field control, weed control, disease and insect pest control, fertilization control, harvest and agricultural materials purchase, etc. By providing simple means to control cultivation history records and to provide the information to the consumers and retailers, elderly farmers can also participate in the traceability system. Furthermore, this study implement bar codes and farm household codes to improve information control efficiency and can transmit the data of multiple record sheets to the traceability system by a single scanning. Then the systems can provide easily production information to distributors and consumers via the Internet and mobile network.

References

Korean Ministry of Agriculture and Forestry · Agriculture, Forestry and Fishery Information Center, “Guideline for 100% Usage of Traceability Management System”, May 2007.
Lee, Choong Geun · Kim, Jae Cheol · Cheon, Ah Reum · Song, Jin · Kim, Gi Jong · Sohn, Jong Rok, “Establishing Essential Record Information for Successful Introduction of the Rice Production Traceability System”, 『Crop Science Research Paper Collection』, Vol. 6, 2005.