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A Hyperlink based Graphical User Interface of Knowledge Management System for Broiler Production

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Abstract

The level of consumption of animal protein in Indonesia has been increasing. Unfortunately, this increase has not been balanced by the adequate rise stock production. The use of closed house system for broiler production is very potential to contribute the increase of protein source. The purpose of this research is to build a knowledge management system broiler production management closed house system. Web-based system developed using PHP programming language, and Protégé as processing knowledge representation. This research has developed the concept of knowledge management system with ontology model of semantic network, among the results of this research is a conceptual model, knowledge maps, and prototype production management knowledge management website broiler closed house system. Knowledge management system is equipped with recording system applications. This application is useful to be able to see results in the production of a period of production. The prototype knowledge management website provides links consultancy services for farmers who want to ask about production management. The concept of knowledge management systems can be used as a basis for building a semantic website that can model the process and rules management broiler production closed house system.

Keywords*: Knowledge Management System (KMS), broiler management, broiler production management, closed house system, semantic website, Protégé*

1. Introduction

According Mulyantini, the condition of the Indonesian population is accompanied by an increase in income and education, lifestyle changes, and nutritional awareness increased that demand for poultry commodities as a provider of animal protein also increased [1]. According to Wijayanto, animal protein consumption rate of poultry in Indonesian society is still classified as low [2] [3]. That's because the supply of animal protein from poultry is still not able to match the level of Indonesian population. The cause of the lack of supply of broiler chickens is due to inadequate management and application of technology for Broiler production.

Efforts to increase the production of broiler farms continue to be done by the Indonesian government. Indonesia began implementing modern cage system with a closed cage system model or broiler closed house system. Some neighboring countries in southeast Asia that has developed broiler closed house system like Thailand ninety-eight percent have implemented a closed cage system, whereas in Indonesia is still less than five percent are implementing a closed cage system, and even then concentrated in Java, especially in West Java and East Java [4] [5].

In building a closed cage system follows the main principles that provide a healthy environment for breeding chickens [6]. Chicken optimum productivity can be achieved on condition thermo-neutral zone, the temperature is a comfortable environment, thirty-two to thirty-three degrees Celsius for the pups, and about twenty-one to twenty-three degrees centigrade for ages above twenty two days [7]. Good enclosure management can control the amount of

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livestock production, death and environmental pollution, with the efforts of the transmission of the virus from birds to humans can be prevented. In an organization that knowledge usually only owned by those involved in the organization, so that the person is no mutation, leave, or die, or wherever so that he is missing, then how can this knowledge be maintained by the organization. The process is called knowledge management maintains the knowledge. The purpose of knowledge management is how we get the most out of the knowledge management [8], [9]. The type of knowledge can be tacit and implicit [10]. Tacit knowledge is a knowledge or an experience that resides inside the head of person. The knowledge that has been documented or embedded in an application software (e.g. an expert system, an intelligent system, or a decision support system (DSS) is a type of implicit knowledge.

Knowledge management is divided into four classes. The first is knowledge discovery, knowledge acquisition second is how we acquire knowledge, knowledge sharing is the next one, and the fourth is the knowledge of how we apply user application knowledge [11], [9].

2. Related work

Maseleno et al (2012) developed an early warning system (Early Warning System) web-based to detect the disease in poultry, the Dempster-Shafer approach Theory and Web Mapping. The five indicators used are the symptoms of depression (depression), combs, wattle (wattle), bluish face region (around the face bluish), swollen face region (facial area swelling), narrowness of eyes (slanted eye shape), and balance disorders (disorders balance). Mapping web (web mapping) is used to display the map on the screen to visualize the result of the identification process. The results revealed that the Poultry Disease Warning System has successfully identified a disease of poultry and maps can be displayed in the form of visualization mapping [12].

Arowolo et al (2012) develop an expert system for the diagnosis of poultry diseases, by using Visual Prolog 7.3. The system was tested using a Design Criterion and Knowledge Base Expert System for Stratified Root. The results show the value of 8.37, with the results of the analysis in the application of expert system can be trusted as an alternative solution to the problem of poultry diseases, the value included in the category of 8:00 to 10:00. Exactly and Succesful Good Degree [13].

Alimudin et al (2011) developed a model of the temperature and humidity distribution in closed broiler house using Computational Fluid Dynamics (CFD) software to simulate pattern and dynamic distribution of temperature and temperature inside a broiler house. The simulation result is used to apply an intelligent control system for monitoring and controlling the optimal micro-climate for broilers inside a broiler closed-house system [14] [15].

This study aims to build a knowledge management system for broiler production management in a closed house system. The benefit of this research is the solution for broiler breeders and farmers, especially agribusiness, to be able to acquire, share and store the knowledge needed to develop livestock production broiler. The scope of this study covers all the knowledge for the management and optimization of broiler production in broiler closed house system.

3. Research Method

The basis stages of the research follow the Knowledge Management System Life Cycle (KMSLC) discussed in (Ahwad and Ghaziri 2010) to focus KMS blue print development, as shown in Figure 1.

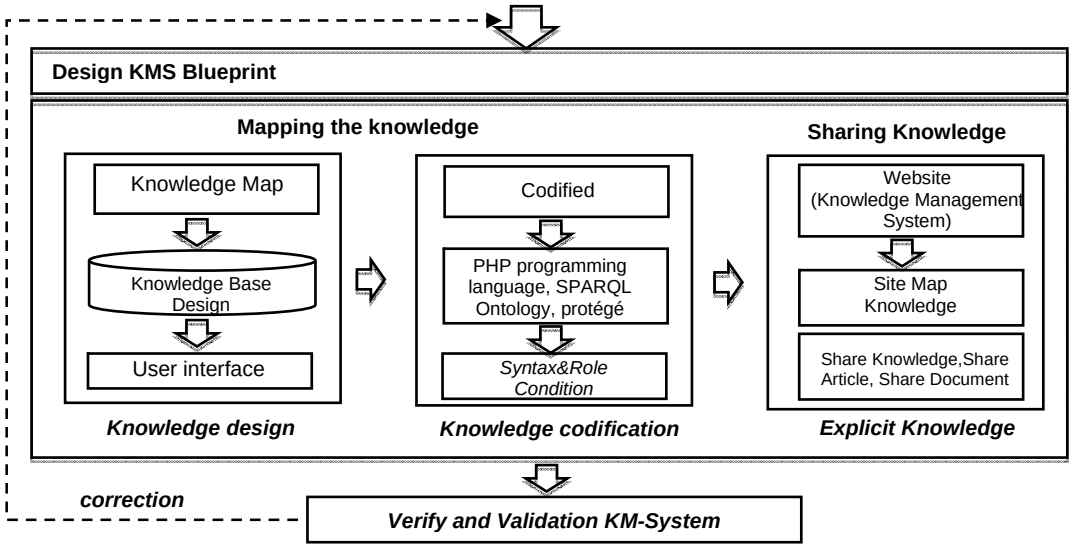

Figure 1. Concept Design KM System Blueprint

4. Results and Analysis

The scope of broiler chicken production management according to Indonesian Agriculture Ministerial Decree 424 2001 includes poultry selection, feed management, physical management of the cage, health management, system maintenance, and harvesting.

From the description of the scope of broiler production management we developed a conceptual model based on the concept of semantic-net and ontologies, which then coded to an ontology *editor* and knowledge acquisition system software called, Protégé version 4.3, as shown in Figures 2.

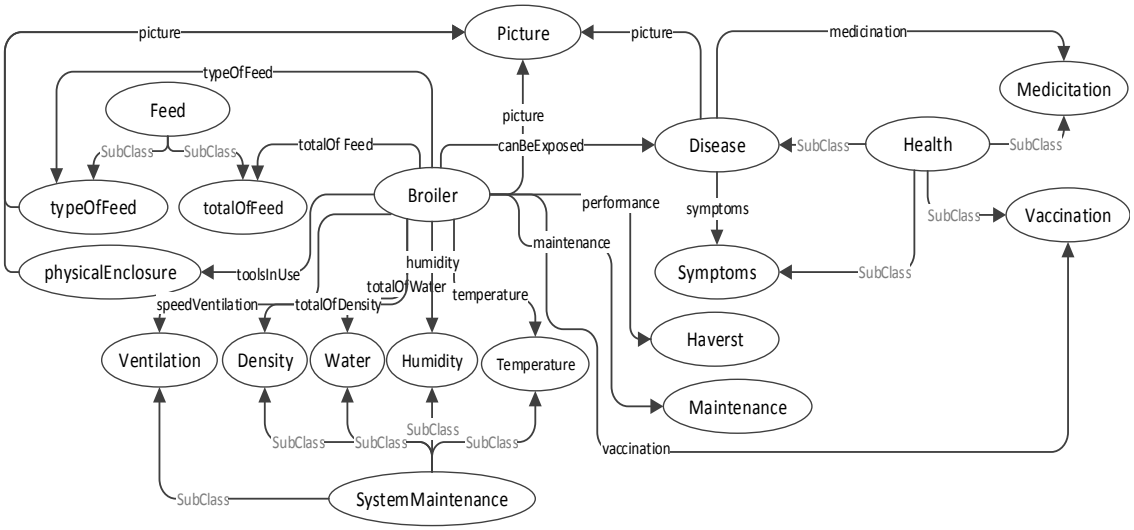

Figure 2. Conceptual model of knowledge production management

Having designed the conceptual model is then define each class in Protégé sofware. This step is the creation of knowledge-based ontology hierarchy. Here's a picture with protégé class definition in Figure 3.

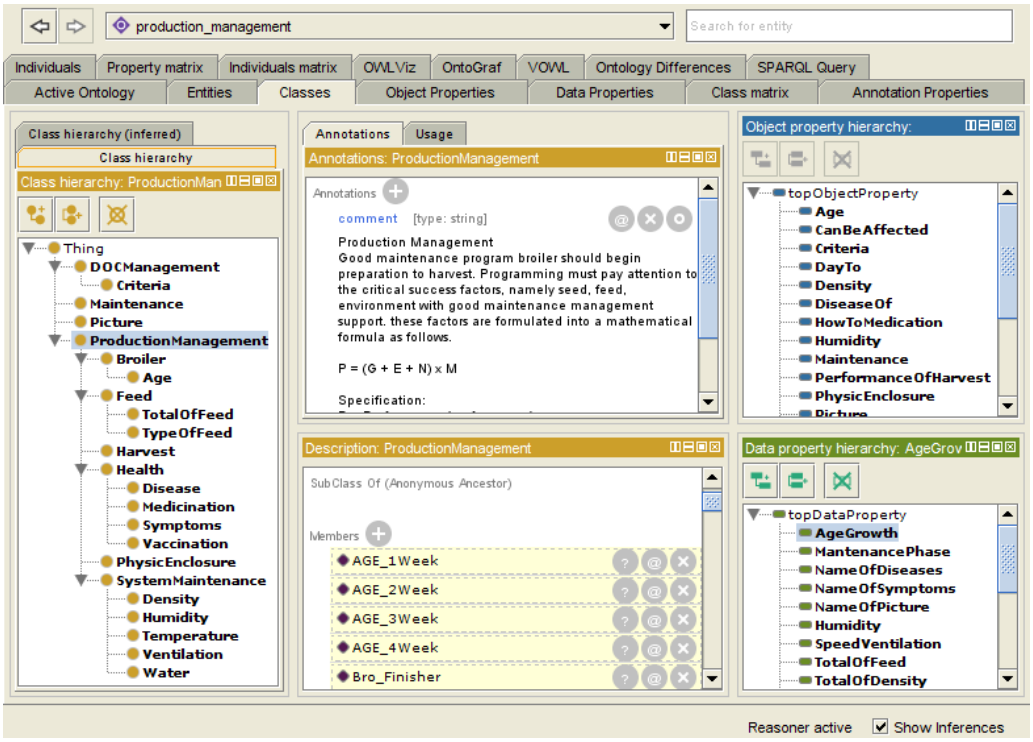

Figure 3. Class definitions with the protégé

Some rules of the conceptual model can be written in the triple model. The triple model is relationship of one object to the other object. The structure of the triple model consist of subject, predicate, and object. Object property is describes how access to the property, the following examples of the use of the name property on defining the relationship of disease and symptoms are illustrated in Figure 4.

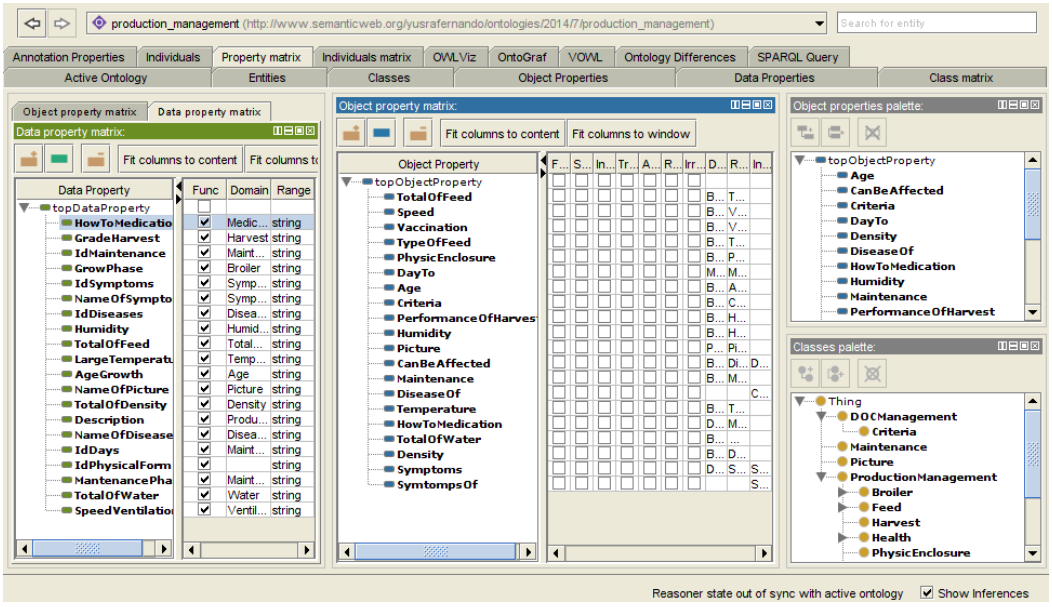

Figure 4. Defining Object Properties

The next step is checked logical consistency. The consistency can be checked through the reasoner. Protege supports many reasoners. this paper uses hernit as its reasoner [16]. Reasoner can be used to check the consistency of each part that has been defined. Results from Reasoner provide information consistency of logical and the relationship between class, subclass and properties in the form of a notice consistent or not, if the color black, blue indicates still consistent when red means has not been consistent. After checking the consistency of the entire inter-class logic chart of the obtained results broiler production management ontology closed system in Figure 5.

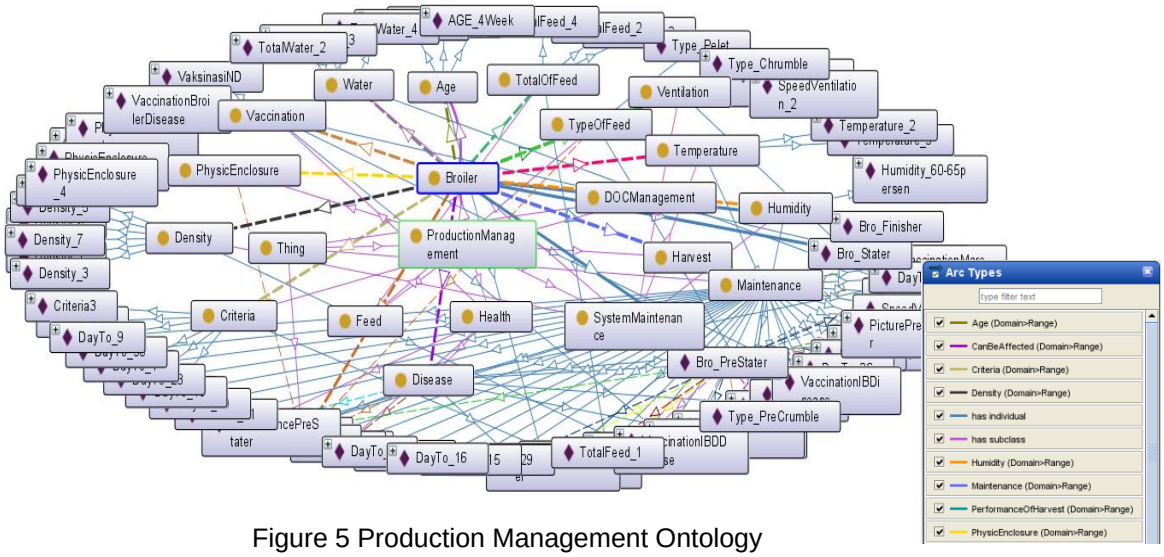

Figure 5 Production Management Ontology

To access the knowledge management database management broiler production closed house system of Protégé applications can use SPARQL query language. An example of SPARQL to retrieve the information about the diseases of broiler can be seen in script of SPARQL (1).

```
1 PREFIX mp: <http://www.semanticweb.org/yusrafernando/                    (1)
  ontologies / 2014/7 / manajemen_produksi #>
2 SELECT? Broiler? IdDiseases? Diseases? NameOfDisease
3 WHERE {
4    ?Diseases rdf: type mp: Diseases.
5    ?Diseases mp: IdDiseases ?IdDiseases.
6    ?Diseases mp: NameOfDisease ? NameOfDisease.
7    ?Broiler rdf: type mp: Broiler.
8    ?Broiler mp: GrowthPhase \"".$Broiler."\" ^^xsd:string.
9    ?Broiler mp: CanBeAffected? Diseases.
10 }
```

The next step is Verify and validate KM-System. Results Verification and Validation KM-System for testing the system with two of them, namely: First, logical test includes testing the syntax of the program KM-system and the Codification of tacit and explicit knowledge. Second, user acceptance testing is testing the application of KM-System is a black box [17] that can be performed by a team consisting of KM Selection of good seed DOC, Management feeds, enclosure Management, Health Management, System Maintenance, Harvest.

The next step is implementing The KM-System with designing user interfaces, writing code, and testing of a system that was developed. The testing performed on each module. The testing to ensure that systems are developed in accordance with the modeling results. Tests have been done with the installation of the application on the server side, and then on-line system. Display results from a prototype implementation of the system of semantic knowledge management website management broiler production closed house system is illustrated in Figure 6.

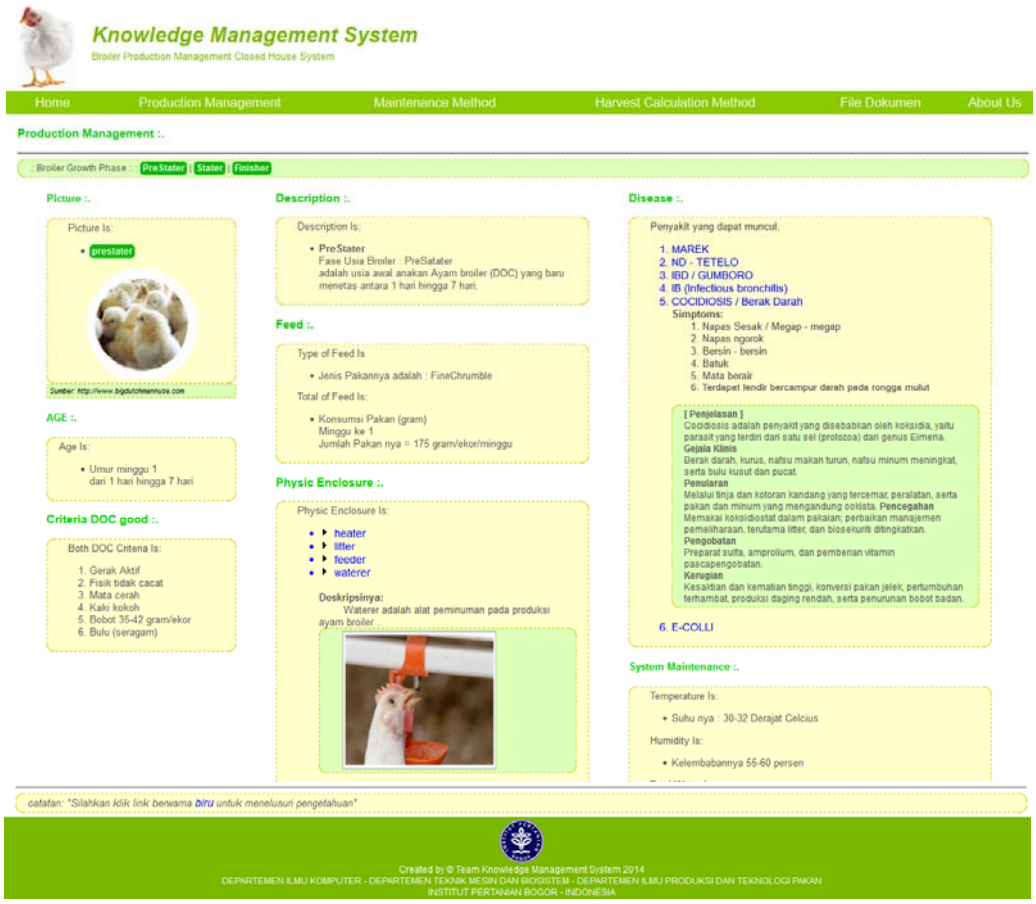

Figure 6. User Interface KM-System

5. Conclusion

The use of semantic net and ontologies has been demonstrated and implemented to develop a hyperlink-based graphical user interface for knowledge management system of broiler production in a closed house system. KM-System is built using multiple applications that PHP Version 5 programming language and database SPARQL, and use tools protégé version 4.3 editor. KM-System generates a website with conceptual hyperlink capability that allows users to search for knowledge broiler production with a closed cage system.

Knowledge management system development management closed broiler production house only covers the production process has not been discussed about business analysis, feasibility analysis, post-harvest marketing management. Development of a knowledge management system can be developed with JAVA-based programming language (JENA) so that the application will be more interactive and adaptive.

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