

INFORMATION AND COMMUNICATION TECHNOLOGIES

FEATURES AND LIKENESSES OF INFORMATION MODELS OF ANIMALS REGISTRATION

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Abstract

The process of creation of the informative systems based on the account of such animals as horses, sheep and goats is analyzed in the work. Three structural models are created and their comparative analysis is conducted. As a result of analysis the general elements of structures, characteristic to each model were found. The Meta modelling approach to facilitate the system was used. The system has a more abstract structure and allows dynamically to add not only the animal specimens but also new types of attributes in fly during runtime. Recompilation of the system is not required there is no necessity of the analytical restructuring of the model, the absence of type explosions is guaranteed in a database because not a new table-type, but a new record in one or two tables is added.

Keywords: Selection, object model, Meta modelling.

Introduction

Selection is the main task of animal breeding. To carry out this works animals should be compared. But in order to compare the animals their descriptions and measurements should be used. We made an effort to find out whether it is possible to define general criteria for comparison of different animals; thus it would allow to systematize work of secessionists.

The method of registration of sheep, horses and goats was studied. Based on these materials, the structure and procedure of estimation of each animal was made. Then these procedures and structures were compared, and using the qualimetric system of indexes of quality the invariant elements of the systems were found. As a result, there was a possibility of using a compatible Meta modelling approach to realization of tasks of the systems of different animal accounting.

Materials and Methods

To create the models of animal estimation, normative documents on selection were studied, specialists in this area were involved, the practical methods of domestic animal registration and selection were studied (Ministry of Agriculture, 2002).

When the materials of domestic animal estimation had been collected, there was a necessity to analyze them. The object - oriented approach to create and analyze the models was used. The objective models of account of sheep,

horses and goats which obviously demonstrate the system of animal estimation accepted in Latvia were created (Microsoft, 2007). The qualimetric approach to the analysis of the created models predetermined the possible variants of universal parameters of comparison and domestic animal account (Rulko, 2003).

Qualimetric is a study of quantitative and quality estimations of quality. All the results were made into the whole model and the Meta modelling methodology for the general system realization of animal account was used.

Results and Discussion

On the first stage, three models of classes using the normative documents of Latvian Republic on registration of domestic animals were made (Ministry of Agriculture, 2002). Figures 1, 2 and 3 represent the formal objective models of account of horses, goats and sheep.

Similarly, the information on the estimation of goats was structured.

The objective estimation model of sheep qualities was made, too.

Basic entities in each model are a horse, goat and sheep. These are animals whose parents should be registered. It represented recurring associations, outgoing and ingoing into one entity, on the class model. An owner and animal passport are registered for each animal. In contradistinction to the animal passport the attribute 'the animal owner' can be changed during the life cycle of the object of a horse, goat

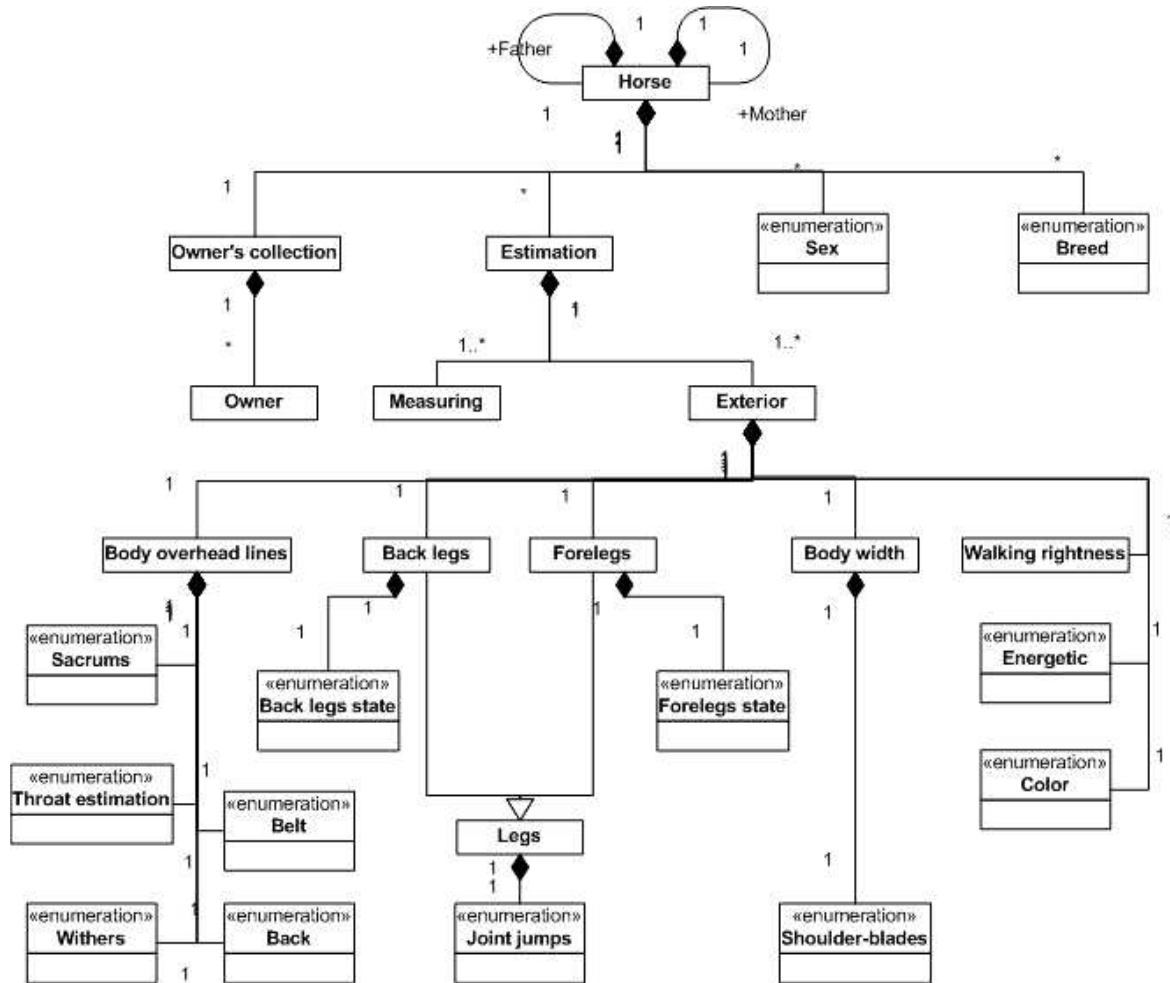


Figure 1. Object model of horse estimation.

and sheep type (Ministry of Agriculture, 2002). It is one of features of models of all animals which should be taken into account during realization of the systems of animal account. It is represented schematically not as a static owner, but as a dynamic structure of data type 'collection'. A great number of quality and quantitative indexes of animals influence an increase of the model. In the mentioned models quality indexes are modelled by the stereotype 'enumeration' and quantitative indexes are represented by numerical types. The main difficulty of comprehension of account models is a great number of quantitative and quality animal attributes. The other difficulty lies in the problem that these models are static, that at first the system is filled by the models of animal attributes, and then it is realized as the information system. Additions of a new attribute change the model structure and make recompile the whole system (Petraq and Panos, 2006).

In figure 4 there are general attributes of animals, characterizing horses, sheep and goats.

However, these model elements are insufficient for a complete account of each animal type. That is why the qualimetric approach which divides all quality indexes into two large categories was used (Rulko, 2003).

All animal characteristics were divided into two groups: quality (what) and quantitative (how many). Because of this division, it is not necessary to register a definite list of animal attributes, but instead of it, it is suggested that one provides a possibility of the generalized index registration in the system. It means that the registration record of each animal consists of two parts - quality and quantitative indexes (it refers to each animal). It is necessary to specify a definite list of qualities for registration of definite type. So this is a two-level modelling system. First, comes the so-called Meta level where there is information about

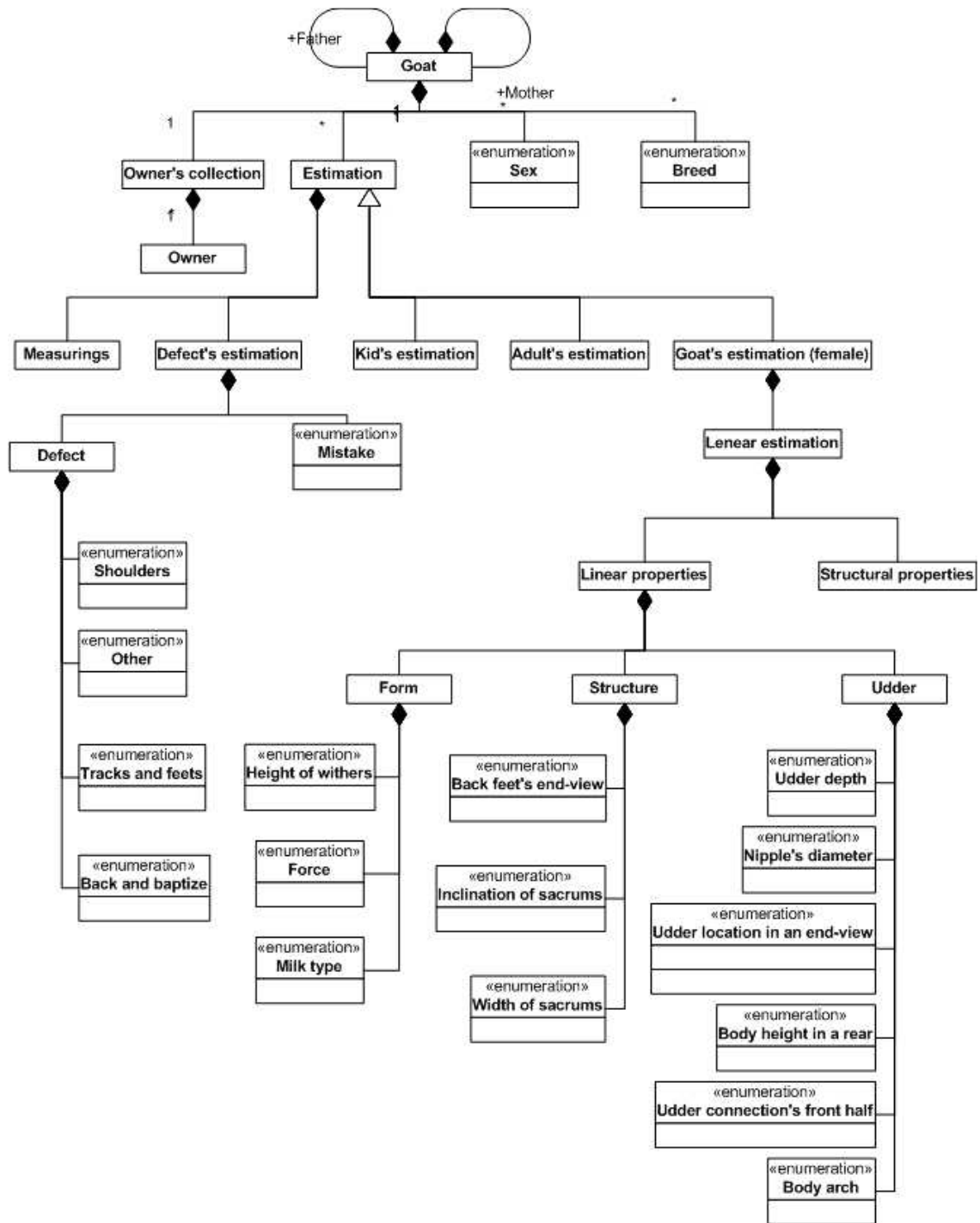


Figure 2. Object model of goat estimation.

the lists of quality and quantitative argument-types of parameters (information on the type of animal), the second level- implementation level where there is information on the definite meaning of attributes of definite animal specimens.

In figure 5 there is a generalized two-level

chart of Meta modelling. It allows to disengage oneself from a definite animal during creation of the system, and definite information on an animal is given during its exploitation.

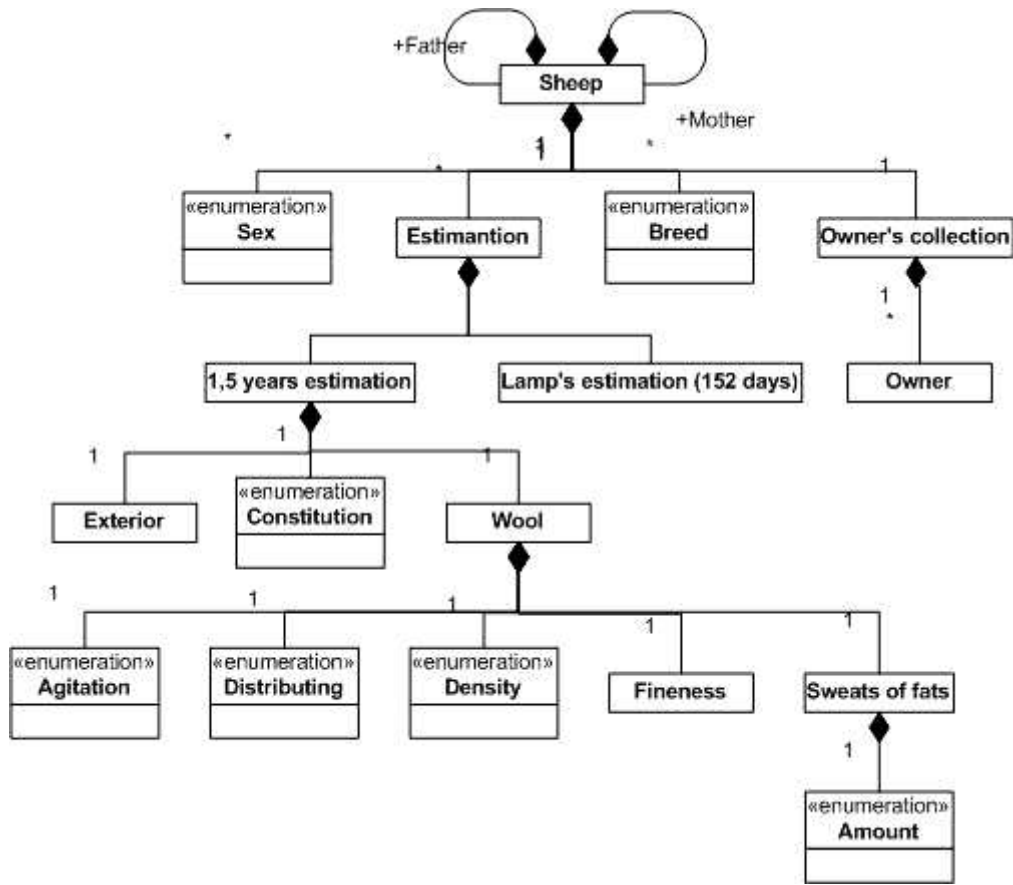


Figure 3. Object model of sheep estimation.

Conclusions

The two-level chart of Meta modelling was created as a result.

The prototype of information system of

registration of any type animals was created founded dividing into quality and quantitative properties.

Usage of Meta types makes a model more abstract and facilitates it; thus, construction of

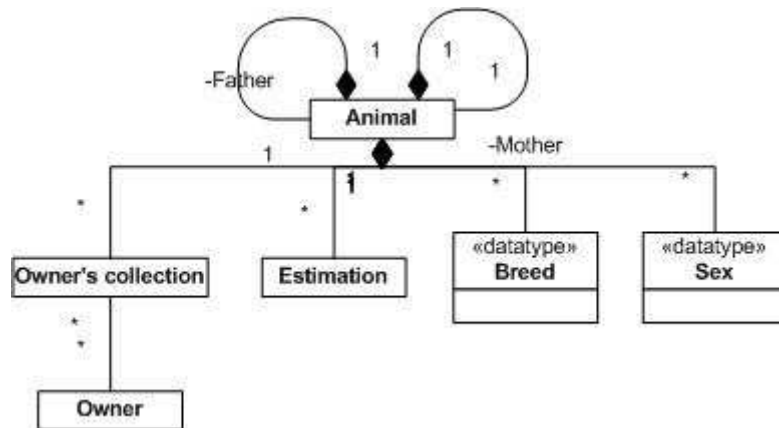


Figure 4. In the horse, sheep and goat models.

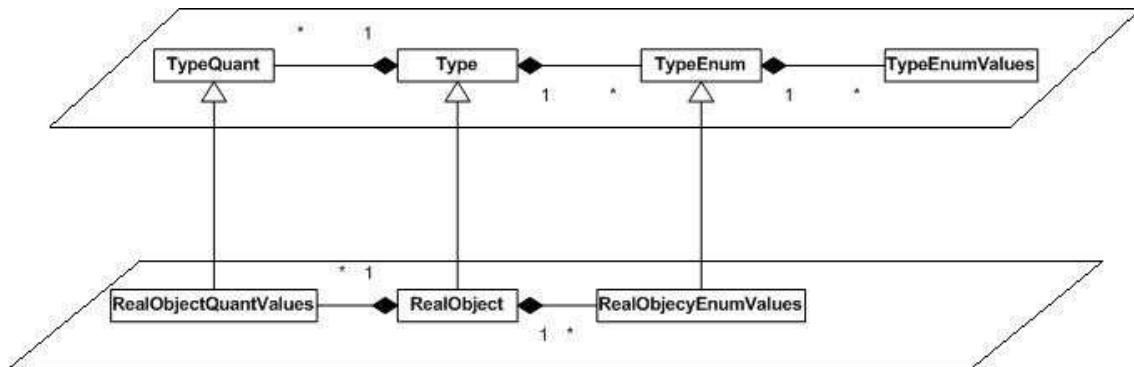


Figure 5. Dividing into quality and quantitative properties.

the program system consists of three stages: at the first stage such abstract essences as quality and quantitative types of information, abstract animal entities, its parents and the owner are determined. At the second stage an abstract model is specified by filling it with its definite list of quality and quantitative indexes.

Made as the class diagram of object model of

animal account, it helps to analyze, structure and generalize system information.

Usage of qualimetric approach allows to create a compatible model of the animal account.

Usage of two-level model allows to decide the problem of different type animal account by determining not types and animals and their properties, but types of types.

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