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Realization of Animal Recognition Knowledge System under Language Education

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Abstract: Nowadays, the concept of human and nature is deeply rooted in people's hearts, and the chances of contact between animals and humans are greatly increased. Therefore, the identification of animals has become a difficult problem. Research on animal recognition knowledge system is an important method to solve this problem. With the help of computer language, the animal recognition knowledge system can be implemented in many fields to solve many animal-related problems. Therefore, it is very necessary to actively carry out the realization of knowledge system based on animal recognition under language education. The purpose of this article is to discuss the realization of animal recognition knowledge system under language education, establish animal recognition knowledge system under C language education, perform texture comparison, feature capture, and accuracy analysis to evaluate the effectiveness of animal recognition knowledge system. The results of the study show that there are 431 pictures in the bird dataset and 404 pictures successfully recognized by the system, with a recognition rate of 94.61%; 277 pictures in the dog dataset, and 251 pictures successfully recognized by the system. The rate reached 90.6%, 189 cattle dataset images, 147 pictures successfully recognized by the system, and the recognition rate reached 79.03%; 187 tiger dataset images, 178 pictures successfully recognized by the system, the recognition rate reached 97.6%. It can be seen that the recognition system proposed in this paper is feasible, and the realization of animal recognition knowledge system under language education is of great significance.

1. Introduction

Artificial intelligence was formally proposed in 1956 and is a multidisciplinary emerging science. The first concept is to design and develop various computer programs to simulate human thinking

structure, reasoning process and problem-solving behavior. After more than half a century of development and practice, a more systematic discipline has been formed. Research in this area includes robotics, language recognition, image recognition, natural language processing, expert systems, etc., and is widely used in various fields.

There are many types of animals in nature, and it is difficult to understand each animal [1]. The continuous development of advanced technology makes the research of animal cognitive knowledge system a hot spot. Generally speaking, a knowledge system is an intelligent computer program system that has domain knowledge and experience, and can use human expertise and problem-solving methods to solve problems in the field. In short, the knowledge system is a programming system with a lot of professional knowledge and experience [2]. It uses artificial intelligence and computer technology to make inferences and decisions based on the knowledge and experience provided by one or more experts in the field. Simulate the decision-making process of human experts to solve the complex problems that human experts need to solve [3].

Manohar began to use computers to identify the types of animals, and discussed the principles and methods of mathematical morphology in more detail, especially the application of the mathematical morphology of animal taxonomy [4]. Khoramshahi systematically evaluated several general morphological features through experiments, and accumulated experience in the collection and recognition of animal images [5]. Mansourian extracts the mathematical morphological features of animals, and studies the feasibility and reliability of the classification features in the general subject of dimensions, illustrating the research progress of animal morphology dynamic determination and automatic species identification [6]. Su expressed the morphological characteristics of the animal objects collected from the database, used fuzzy decision algorithms to classify the animals, studied the image segmentation algorithm based on the mathematical form of the color image, and sealed the color digital image. We proposed a formal template to perform code processing [7]. ChenChau uses a classifier and uses the mathematical statistical functions, shape and texture functions of the image as input to the classifier to classify and identify animal species, and achieved good results [8]. Park uses the global threshold method to segment the animal's image, and uses one-time gray value statistics, gray value execution matrix, area, perimeter, and aspect ratio to classify animals [9].

Compared with the previous literature, the innovative content of this article is roughly divided into the following points: The first point is to establish an animal recognition knowledge system under C language education, which can identify the animal species in the sample library when building the model. Tests show that the system is stable and reliable. The second point is to study the multi-feature extraction technology and feature selection technology of animal images. The local features of animal images have the characteristics of rotation, translation and scale invariance, are not sensitive to changes in illumination and do not depend on background segmentation, and are suitable for extracting natural light. And the eigenvalues of images obtained under complex background.

2. Principles of Artificial Intelligence

As one of the three major scientific technologies of this century, artificial intelligence technology has shown its strong practical value in the fields of national defense, industry, agriculture, education, health and high technology. Animal identification system is a specific comprehensive application of artificial intelligence technology.

The main direction of basic research on artificial intelligence involves three major technical issues: (1) Artificial intelligence based on information processing. It not only needs to deeply study the external input and internal output of related information, but also research and explore the

internal storage of related information and the internal signal processing technology methods of related information. By analyzing and comparing the processing of specific information by robots and other machines, this is a main research method widely adopted by artificial intelligence [10]. It can systematically describe and analyze the method and calculation process of a person's brain information processing, imagine the development of a mechanical artificial intelligence calculation model, that is, assume that a person's brain is an intelligent machine or a computer. Then how to do this must comprehensively analyze the main content of the network information processing and the way to complete the task. (2) Artificial intelligence based on symbol information processing. In some computer applications, the relationship between knowledge and other information can be expressed in a symbolic form. The emphasis of symbolic abstract processing is the important leading role of abstract symbols in the process of text information processing. Computer symbols have multiple capabilities for measuring input, output, storage, copying, and comparing symbols. A basic theoretical hypothesis of artificial intelligence is that we have to transform the above-mentioned various symbolic and manipulation characteristics into a machine that can directly display the different performances of human and human machine artificial intelligence. (3) This problem is artificial intelligence processed after solving. One of the main methods of artificial intelligence is to enable it to automatically develop and design large-scale computer applications that can accurately simulate and automatically demonstrate the behavior of "intelligent" problems when they need to solve complex problems, and they do not require the use of other algorithms or any step-by-step solution can solve the calculation process of the problem. The biggest problem we face in the Institute of artificial Intelligence may be that some robots can complete many tasks every day and some robots cannot perform normally. In order to overcome this technical problem, people are constantly actively exploring, and constantly put forward some new implementation methods and solutions. Specifically shown in Figure 1.

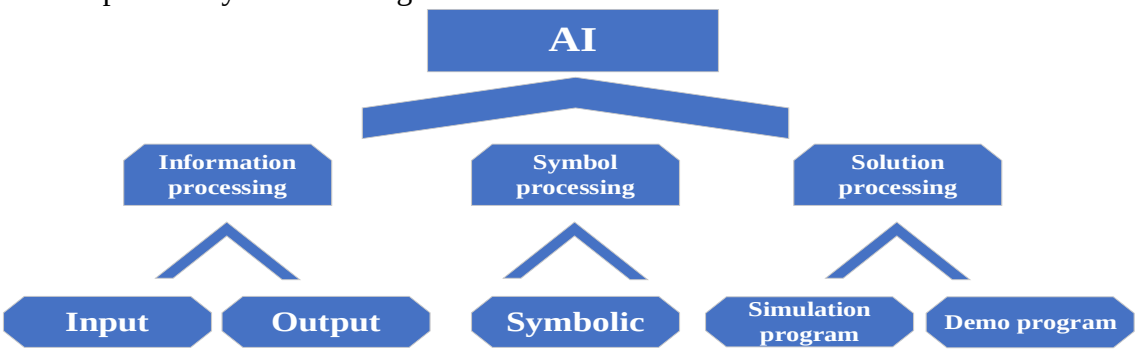

Figure 1. AI technical issues

Artificial intelligence research involves the following research areas. (1) Mainly study conversational readable and unspeakable human computer applications, which is also commonly referred to as the field of natural language processing. (2) Explore the development of sensitive human machines and create a kind of human vision through automatic design Human robots programmed with various auditory functions can accurately recognize the changing surrounding environment at a certain activity time. (3) Mainly develop applications that use various symbolic language recognition technologies to automatically simulate the learning behavior of various human social experts Programs, that is, expert systems. Mainly study how to make human computers that can make human computers have a robot-like automatic learning and computing ability. (4) Automatic proof theorem natural proof is to study how to achieve. The various methods and strategies that human computers can perform natural reasoning and automatic proof are currently an important research focus area where artificial intelligence first conducts in-depth research on humans and successfully promotes their application. (5) Automatic verification program system

design to study how to succeed realize automatic program programming (also called program synthesis) and automatic verification of program correctness. (6) Intelligent robot engineering that is regarded as the main testing ground for studying artificial intelligence research theories, methods, and technologies. (7) Game, research Based on competitive artificial intelligence mental activities such as human chess, card games, and wars. (8) Extend the application of artificial intelligence and related science and technology research to the field of decision support system research to form an artificial intelligence decision support system. (9) Mainly study artificial neural networks that can simulate the structure and physiological functions of the brain's nervous system; but According to the technical nature of research, artificial intelligence research can be divided into intelligent theoretical technology research and applied engineering technology research. The main direction of theoretical and technical research is to conduct academic research and theoretical exploration on the related theoretical issues of robot and intelligent machine artificial intelligence technology through related technology development and research, and the main direction of applied engineering technology research is to study based on artificial through design and research and development. Intelligent technical tools and application of technical products like expert systems. Foreign professionals engaged in domestic engineering theoretical scientific research generally use the term artificial intelligence researchers, while domestic professionals engaged in mechanical engineering scientific research generally collectively refer to the term as "knowledge engineer".

3. Knowledge System Architecture

The organizational structure of the knowledge system is often referred to as the construction method and basic organizational structure of each component of the knowledge management system [11]. The appropriate choice of system structure is closely related to the practical applicability of the professional knowledge system and the effectiveness of the system. Although there are many different types and names of Chinese intellectual property system diagrams, their basic principles are consistent with the frame diagram as shown in Figure 2.

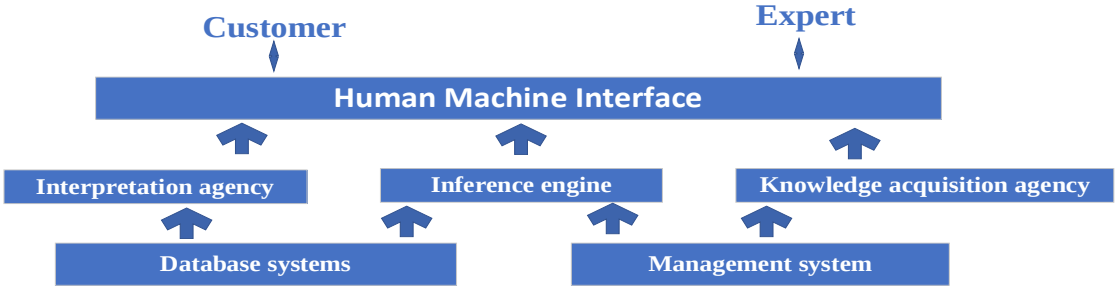

Figure 2. Knowledge system framework

The two core parts of the knowledge system are the existing knowledge base and inference engine. The basic information processing process is: the knowledge system analyzes and infers according to the relevant knowledge in the existing knowledge base system and the relevant fact information provided according to the user's needs. Some preliminary conclusions have been drawn from the premise of this knowledge [12]. And these preliminary results are stored in the new database as intermediate results, and then the results are used as new data to carry out new theoretical reasoning together with knowledge and facts, and gradually approach the goal of each solver. In this operation process, system personnel can continuously communicate with other users through human-computer interface, send questions to other users, or make correct explanations for some questions that may be raised by some users. Knowledge base storage is a kind of knowledge information storage based on knowledge system, which is used to store knowledge related to

solving practical problems (including factual problem knowledge and heuristic problem knowledge). The common representation of mathematical knowledge types are: first-order generalized predicate and logical knowledge representation, production and rule knowledge representation, semantics and network knowledge representation, framework knowledge representation, script knowledge representation, process knowledge representation, state diagram knowledge representation, object-oriented knowledge representation and some common tables that are not conducive to the determination of mathematical knowledge Indication and method, etc. Reasoning robot is a kind of application program used to help scientific reasoning in scientific knowledge management system. One of its main application functions is to help simulate the complex thinking process of experts in the field of mathematics, control and help to execute the correct solution of complex problems. It may also be based on relevant facts known to the public at present. By using all the knowledge in the existing knowledge base data, we can carry out comprehensive reasoning according to certain comprehensive reasoning methods and logic control strategies until we get a corresponding reasoning conclusion and answer. It mainly includes two parts: automatic reasoning method and automatic control strategy. Generally, reasoning methods can be divided into precise logic reasoning or imprecise logic reasoning. The control strategy is divided into two parts: data reasoning control strategy and data search control strategy. The strategy in search is usually the key, which can be divided into incomplete heuristic information search and complete heuristic search. Now the main engine is heuristic engine search. Database can also be referred to as "blackboard" or "comprehensive database". It is mainly used to record and store the initial processing facts, specific description of the problem, the possible intermediate processing results and the final processing results and other related information in the process of reasoning and solving. The explanation and processing mechanism is composed of a group of application languages, which can automatically track and record the user's reasoning and query process in real time. When the end user needs to give a reasonable explanation to the reasoning and query questions put forward by the end user, it will make a reasonable and corresponding explanation and processing according to its processing requirements. At last, the information form agreed by the users who ask for answers is output and fed back to the end users through the human-machine interface. At present, most enterprise knowledge management systems begin to use the interactive knowledge interpretation and analysis method of man-machine dialogue. The acquisition research organization of knowledge points is mainly responsible for the realization of machine deep learning. The human-computer interface system is an application interface that can interact between experts in the technical field, intellectual property engineers and general human-computer users. It is composed of a group of application programs and corresponding hardware devices of human-computer, which is used to complete and transmit the output processing of human-computer in real time.

The essence of animal recognition system is the logical process of transforming human thinking process into computer language. What is important is the expression of knowledge and information, the creation and management of the basic knowledge base of intelligent inferences or solutions, and the expression based on specific knowledge and information. The system's knowledge performance uses production performance. The formal system is composed of three parts: rule base, comprehensive database and control system. Among them, the rule-based and integrated database correspond to the database pointer and the pointer based on explanation of the system respectively. The database list contains the facts entered by the user. Each node of the main chain of the knowledgebase pointer chain is the conclusion. Under each node, there is a pointer cause chain indicating the reason for such a conclusion. There are n nodes. The main chain and cause chain of each node end in NULL. Through the FREEDB(), FREEKB(), CREATKB(), and IN-PUTDB() functions, the rule basis is released, the narration basis is released, the narration basis is made, and the narration basis is added to realize the rule base for management.

The system mainly completes the wireless data transmission function of the GPRS wireless terminal. The software mainly includes: GPRS module dial-up Internet program, data communication program, control script program. The GPRS module provides an external RS 2232 interface. This can be directly connected to the ARM development board. The GPRS module diamond program mainly uses MC55 as a modem. The corresponding AT command is sent by the microcontroller. The control module completes the diamond operation and establishes a PPP connection with the mobile service provider. By cross-compiling PPP, PPPD and chat session programs are generated. Among them, the PPPD program is responsible for completing the interactive content of the PPP protocol, and the chat session program completes the AT command and controls the MC55. Through the built-in Linux description of the corresponding PPP dial shell script, the GPRS module will automatically connect to the GPRS network after startup. The collected data is sent to the corresponding data server host through TCP/IP protocol to realize the wireless transmission of the collected data.

4. Animal Identification System Architecture

4.1. Experiment Preparation

(1) Establishment of animal identification system

The animal recognition knowledge system is an analysis system for identifying animals. Basically, this system is used for analysis and classification. In a knowledge system, the knowledge in the knowledge base uses deterministic knowledge and is represented by production rules. As shown in Table 1, the system recognizes animals based on the following principles.

Table 1. System principle

	IF	Then
R01	Hairy	Mammal
R02	Eat meat	Carnivores
R03	Eating grass	Herbivores

R01: IF the animal has hair, THEN the animal is a mammal; R02: IF the animal eats meat, the animal is a carnivore; R03: IF the animal eats grass, then is an herbivore.

(2) System hardware composition

The system uses a handheld reader with an operating frequency of 13412kHz, a data storage capacity of 256KB, a maximum reading distance of 55cm, an RS2232 data interface, and an operating temperature range of -40℃ to 50℃. Read radio frequency tags that comply with the ISO11784/1785 standard and display the tag number at the same time. Stable performance and simple operation. Suitable for animal identification and management. The embedded microprocessor chooses the S3C 2410 processor based on ARM9. This is a 32-bit microcontroller using a 0118μm manufacturing process, with 5 levels of pipeline, the highest operating frequency may reach 202MHz. S3C 2410 includes independent 16KB command cache and data cache, MMU, LCD controller TFT, NAND flash memory controller, 3 UART, PWM 4 timers, rich I/O interface, 8 10-bit. The ADC and touch screen buttons have I2C interface, 2USB host interface, 1USB device interface and other rich peripheral devices. Using this microprocessor to develop application systems can reduce development costs and shorten development cycles.

4.2. Experimental Content

(1) C language implementation of animal recognition system

In order to realize this knowledge system in the C language environment, after analysis, we can

draw a conclusion, the premise and conclusion of the rule can be expressed as a dual (variable, variable value), and variables can be used in any case. For example, if the variable HAS is defined to mean "I", the premise of rule RII takes three values: long neck, long legs, and dark spots. This is not allowed in the C language. To solve this problem, we use a structure that stores the assumptions and conclusions of the rules. Therefore, V~ABLE is used to store variable names. value is used to store the value of the variable. There are multiple variables in the hypothesis or conclusion. next is used to point to the next variable, if there is only one variable, it is empty, and the facts of the premise and conclusion are expressed in the form of a linked list.

(2) Enumeration definition

Here the type of the variable is int. It is easy to understand through enumeration definition. Variable enumerations are defined as follows: enumeration {AS, animal type, canned, color, eyes, eating, and, cannot}; possession, animal type, canned, energy (meeting), color, eyes, eating, animal name, cannot (No) representative. Variable value enumerations are defined as follows: Enumerations {MAO, FEI, YUMAO, XIADAN, NAI}; they represent hair, flies, feathers, eggs, milk, etc., respectively. For example, the front part of rule R11 can be expressed as (ANIMALTYPE), (HAS, CLLANGB0ZI), (HAS, CHANGTUI), (HAS, ANBAN)}.

(3) Preservation of rules

The rules are also saved in the form of a linked list. The structure for storing rules is defined as: UCLRULE, the structure of such definition rules {IPUBLIC: INTRULENUM; GONTYPE*CONDITION*RESOLUTION; RULE * NEXTRULE}; here RLLL~LML is the rule code. Cond and Res show the prerequisites and conclusions of the rule. If it is the last rule, next rule points to the next rule. Then its value is "0". There are two main reasons for using a linked list to save a rule base. (1) The link list storage method is more flexible. In theory, you can store any number of rules without wasting a lot of storage space. (2) The rules can be easily extended, some new rules can be generated during the inference process, and the new rules can be easily added to the link list.

5. Effect of Animal Identification System

5.1. Analysis of the Operation Effect of Animal Identification System

The animal recognition system counts the number of simultaneous occurrences of two pixels with specific gray levels in a given direction and a given distance in an image, and provides comprehensive information about changes in image direction, spacing, and amplitude. To get the gray value converted into a texture signal. The texture characteristics of some animals are shown in Table 2.

Table 2. Animal texture features

Group	U_{ENER}	U_{CON}	σ_{ener}	σ_{con}
Insect	0.678	0.062	0.009	0.012
Mammal	2.543	2.654	1.675	1.789
Birds	1.356	0.986	1.234	1.018

As shown in Table 2, the average energy of insects is 0.678, the standard deviation of energy is 0.062, the average entropy is 0.009, and the standard deviation of entropy is 0.012. When calculating the color gray worm body symbiotic texture matrix, the color gray texture image it uses is the gray component based on the color worm body model calculation, and it is only used to calculate the gray worms obtained by the gray image gray segmentation method. The gray-scale texture structure of the body part. In the calculation of the grayscale features of the image texture derived from the calculation of the texture grayscale feature co-occurrence matrix, the feature

calculation and measurement size of the grayscale co-occurrence matrix of each image is determined by the texture grayscale co-occurrence level of each image and each image. The relationship between the gray scales is determined, so the calculation generally requires that the gray scale of each image should not be less than. In the actual operation to obtain these texture image features, it is necessary to reduce the gray level of these original pavilion images to achieve a smaller gray scale range in special cases where it is impossible to affect the accuracy of describing these texture image features.

The animal recognition system extracts 30 features such as color, geometry, invariant moments and texture from each image as the basis for identifying animals. The 30 features represent low visual features including the color, shape, moments and texture features of the pest, that is, the average of each dimension of the extracted feature vector of each image or the maximum value is fused into a single vector. Since the importance of each image is different, the feature vector of each image must be weighted before the weighted average. Therefore, the input is the feature vector of the image and the output is the corresponding weight value. Higher weights correspond to more important and useful images. This decision process is independent for each frame. Using this strategy, the recognition system will prefer positive and clear animal images and weight them.

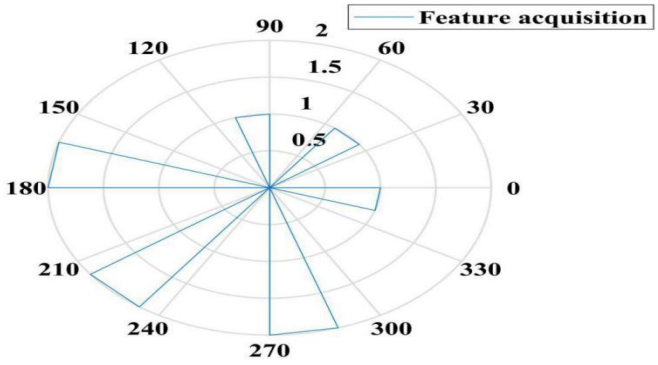

Figure 3. The number of feature acquisition of animal recognition system

As shown in Figure 3, the feature recognition number of animal recognition system fluctuates in the range of 25-30, and there is a large frequency of 30, which shows that the animal recognition system has a good feature capture effect, from multiple features to determine the animal type. This aspect reflects the optimization of the function design and the weight analysis of multiple indicators, which makes the weight calculation of the animal identification system more balanced.

After a series of preparations and deployment frameworks, we will use our own data set for testing, and create a web crawler program as a test set, so that a large number of animal pictures can be taken from China Animal Picture Network, and one of them is randomly selected images for testing. In order to simplify the manual workload, manual verification is performed by testing and verifying sub-data sets divided into four data sets (bird, dog, cow, and tiger) to reduce the false positive rate of the model.

As shown in Figure 4, there are 431 pictures in the bird dataset, and the number of pictures successfully recognized by the system is 404, with a recognition rate of 94.61%; 277 pictures in the dog dataset, and 251 pictures successfully recognized by the system. The recognition rate reached 90.6%; 189 pictures of the cattle dataset, the number of pictures successfully recognized by the system was 147, and the recognition rate reached 79.03%; 187 pictures of the tiger dataset, the number of pictures successfully recognized by the system were 178 photos, and the recognition rate reached 97.6%. Through the above tests, we can see that the test accuracy rate of the bird and dog data set reaches 90% or higher, while the test accuracy rate of the cattle data set is only 80%. Cow

data set testing shows that humans can identify cows with brown backgrounds based on human visual experience, but it is difficult for machines to correctly identify target objects without distinguishing background colors. If judged, the accuracy will be reduced. Compared with the other two validation datasets, many cattle jewelry datasets and cattle datasets, for example, photos of incomplete legs due to muddy water in muddy backgrounds have relatively high levels in the target recognition area of such images false detection rate and missed detection rate, and errors are likely to occur when monitoring the entire system.

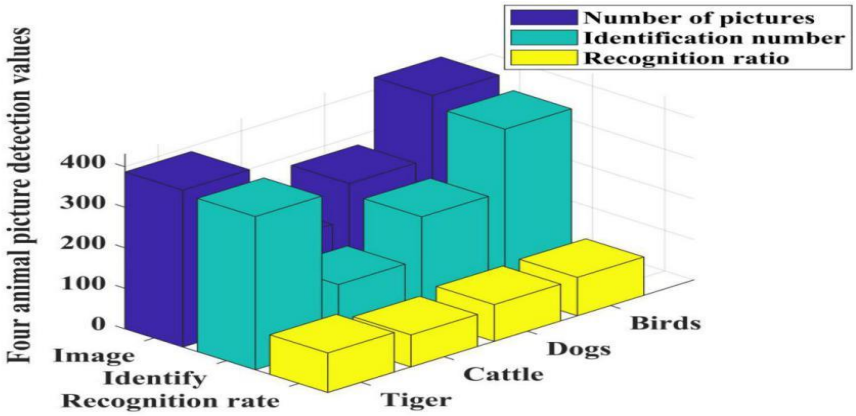

Figure 4. Test cases of different data sets

5.2. Analysis of the Advantages of Animal Recognition System under Language Education

The purpose of this article is to discuss the realization of animal recognition knowledge system under language education, and establish the animal recognition knowledge system under C language education. In the knowledge system, the knowledge in the knowledge base uses deterministic knowledge, and the production rules indicates that the premise and conclusion of the rule can be expressed as a dual (variable, variable value), and in any case, the variable can be used for texture comparison, feature capture, and accuracy analysis to evaluate the effectiveness of the animal recognition knowledge system.

The realization of animal recognition system in language teaching is suitable for large sample animal recognition. Previously, more samples were needed because the training samples of the recognition system were too few, and the deep learning algorithm did not have enough dimensions to extract multi-dimensional features. Because the number of sample models is too small to represent the entire data sample, its generalization ability is insufficient, and the possibility of inaccurate prediction of images with different heights is also limited. Therefore, according to the comparison of the correct rate of the sample, set up several intervals of 1-200, 200-400, 400-600, 600 to evaluate.

As the number of test samples increases, the accuracy of animal identification also fluctuates. As shown in Figure 5, in the 1-200 intervals, the accuracy rate of the traditional recognition system is around 98.5%. As the number of samples increases, the accuracy rate continues to decrease, and eventually decreases to 97.5% in the interval of more than 600; and under language education the overall animal identification system has less fluctuation, and the accuracy rate has been maintained at about 98%. This also reflects that the animal identification system under language education is more suitable for large sample animal identification, and maintains a high accuracy rate.

Animal identification system. You can infer the first facts provided and infer which animals these facts are. Since this is a solution process, the reasoning method uses forward reasoning. Solving these first facts can indicate which animal it is. The initial content of the database is the

initial facts given. Starting from the first fact (R01), the known facts in the database and the rule-based knowledge are matched one by one. When inference begins, the working process of the inference mechanism is as follows. First, get the first rule from the rule base R01 and check whether its prerequisites successfully match the known facts in the database. The match was successful because the test showed that the database contained "hair". At this point, R01 will be executed and its conclusion will be added to the database as a new known fact. Therefore, with the support of language teaching, the animal recognition system saves a lot of time.

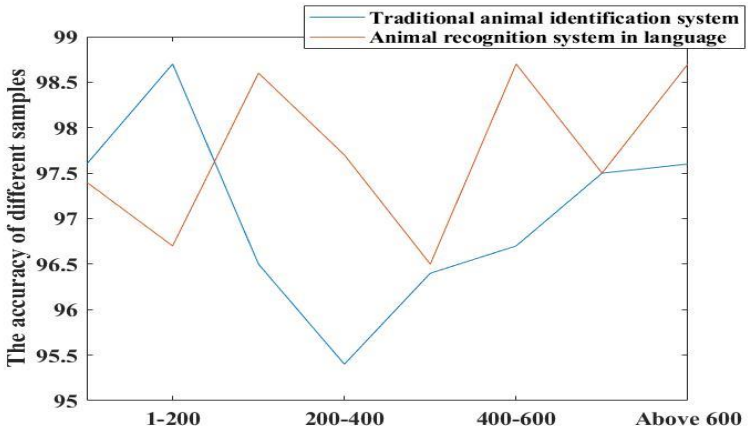

Figure 5. Changes in animal recognition accuracy

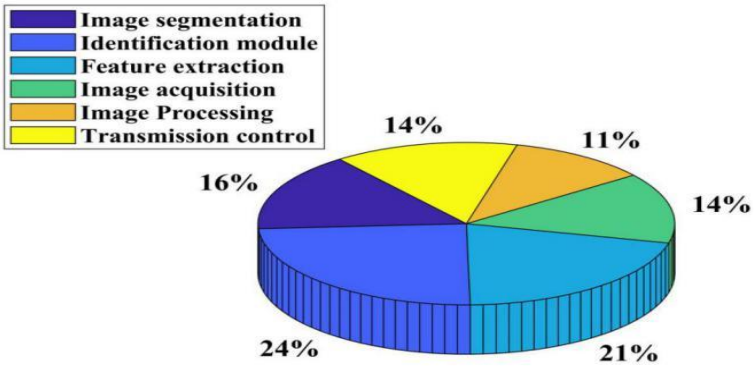

Figure 6. System saves time

As shown in Figure 6, 24% of the time saved by the animal recognition system comes from the recognition module, indicating that the system recognizes faster, and 21% is the feature capture module, which also shows that the system has a large number of features, which is preferred for low visual features, the best subset of classification features that are most beneficial to animal image classification is determined as the input to the classifier. This also fully shows that the animal recognition system implemented in the context of language education has been greatly improved in the recognition system, and the time has been greatly reduced, which undoubtedly improves its performance.

6. Conclusion

(1) The research background of this article is that the concept of people and nature is deeply rooted in people's hearts, and the chances of contact between animals and humans are greatly

increased. Therefore, the identification of animals has become a difficult problem. Research on animal recognition knowledge system is an important method to solve this problem. With the help of computer language, the animal recognition knowledge system can be implemented in many fields to solve many animal-related problems. Therefore, it is very necessary to actively carry out the realization of knowledge system based on animal recognition under language education.

(2) The purpose of this article is to discuss the realization of animal recognition knowledge system under language education, and establish the animal recognition knowledge system under C language education. In the knowledge system, the knowledge in the knowledge base uses deterministic knowledge, and the production rules indicates that the premise and conclusion of the rule can be expressed as a dual (variable, variable value), and in any case, the variable can be used for texture comparison, feature capture, and accuracy analysis to evaluate the effectiveness of the animal recognition knowledge system.

(3) Experimental data shows that for 431 pictures of bird datasets, the number of pictures successfully recognized by the system is 404, and the recognition rate has reached 94.61%; 277 pictures of dog datasets, the number of pictures successfully recognized by the system is 251 pictures, the recognition rate reached 90.6%; 189 pictures of the cattle dataset, the number of pictures successfully recognized by the system was 147, and the recognition rate reached 79.03%; 187 pictures of the tiger dataset, the pictures successfully recognized by the system. There are 178 sheets, and the recognition rate has reached 97.6%. Through the above tests, we can see that the test accuracy rate of the bird and dog data set reaches 90% or higher, while the test accuracy rate of the cattle data set is only 80%.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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