Design and Implementation of Interactive Appointment System Based on Portrait Matching

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Keywords: Portrait matching, Interactive appointment, WeChat applet.

Abstract. Based on WeChat applet, using portrait matching technology to help children find their suitable pet partners. Enhance the matching fit, design and implement the interactive appointment system. The applet mainly includes functions such as portrait matching, interactive reservation, foster care reservation and cloud development.

Introduction

Raising pets scientifically will have a positive impact on children's physical, social, emotional and other aspects, making children's childhood happier and warmer. However, the closure of families in many cities in China makes children lack the opportunity to get along with pets. Based on this, we propose an interactive appointment system for children and pets based on portrait matching. We introduced the new concept of "one-to-one pairing of child and pet", and designed the reservation service of pet center. We combine the educational pain points of Chinese children with pet foster care, and match the children and pets one by one. Starting from the essence of helping children grow better, we let children have good contact with pets, and learn a valuable lesson that can't be learned in school or in remedial classes. In addition, we have also designed a family pet service, that is, family foster care for pets. Help pets find a suitable foster home and make their foster life as comfortable and happy as at home.

Considering that mobile platform has become the mainstream platform for users to access the Internet, users are gradually accustomed to using mobile app client to realize various applications. And WeChat applets can be used without downloading. This installation-free implementation realizes the dream of "within easy reach" of the application, which is simple, light and takes up less memory. Therefore, by designing the portrait matching appointment system of WeChat applet, children and pets can interact more conveniently.

Construction of User Portrait

Construction of User Quantitative Portrait and Qualitative Portrait

In the process of quantitative user portrait modeling, we need to focus on the granularity of user portrait, that is to say, to what extent the user portrait should be refined. In this step, we can know the user's usage scene, appointment object, etc. through the method of questionnaire survey. On this basis, we can design the user's portrait, which has certain reference significance for grasping the granularity of the user's portrait. When the granularity of the user portrait is determined, the user behavior can be captured through a form or by technical means, user data can be stored and analyzed, and quantitative user portrait can be obtained.

Building Domain Glossary and Determine the Structure between Classes

The domain glossary identifies and collects all useful domain concepts, attributes, instances, and so on, which correspond to various labels in user profiles. The establishment of domain vocabularies is helpful for ontology conceptual analysis, ensuring the integrity of the knowledge involved, removing redundancy, and laying a foundation for the hierarchical relationships between classes.
and attributes. Table 1 shows part of the vocabulary of user portrait domain classes involved in the applet:

Table 1. Glossary of User Portrait Domain Classes (Part).

<table>
<thead>
<tr>
<th>Entry Name</th>
<th>Type</th>
<th>Semantic Description</th>
<th>Category of Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>people</td>
<td>Class</td>
<td>The parent class of all the people in the ontology</td>
<td>Super class: Object</td>
</tr>
<tr>
<td>child</td>
<td>Class</td>
<td>Interactive sites are for users, the subclass of people.</td>
<td>People</td>
</tr>
<tr>
<td>dog</td>
<td>Class</td>
<td>Pets are the object-oriented, the subclass of pets.</td>
<td>Pet</td>
</tr>
</tbody>
</table>

In the classification structure, "people" and "pet" are regarded as super class, and the subcategories "applied family", "foster family", "child" and "cat" and "dog" are extended respectively, finally forming a tree structure.

![Figure 1. Classification Structure of User Portrait Ontology (Part).](image)

**Defining Attributes and Instance**

Attributes include object attributes and data attributes. Table 2 shows some attributes of objects in the user portrait ontology:

Table 2. Glossary of Ontology Attributes (Part).

<table>
<thead>
<tr>
<th>Entry name</th>
<th>Type</th>
<th>Domain of definition</th>
<th>Range</th>
<th>Semantic description</th>
<th>Category of ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>housing type</td>
<td>Attribute</td>
<td>foster family</td>
<td>Type</td>
<td>House type of foster family (several rooms and halls)</td>
<td>Object attribute</td>
</tr>
<tr>
<td>weight of pets</td>
<td>Attribute</td>
<td>Dog, cat</td>
<td>Float</td>
<td>Weight of pet applying for foster care</td>
<td>Data attribute</td>
</tr>
</tbody>
</table>

The instance of a class usually includes information such as instance name, category, and instance description. Table 3 shows the results of related instances in ontology:

Table 3. Examples in Ontology (Part).

<table>
<thead>
<tr>
<th>Instance name</th>
<th>Category of ownership</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labrador</td>
<td>Dog</td>
<td>One of the dog breeds</td>
</tr>
<tr>
<td>small high-rise building</td>
<td>Residential type</td>
<td>Residential types of foster families</td>
</tr>
<tr>
<td>Garfield</td>
<td>Cat</td>
<td>One of the cat breeds</td>
</tr>
<tr>
<td>Three rooms two halls</td>
<td>Hosing type</td>
<td>Housing type of foster family</td>
</tr>
</tbody>
</table>

**Storage and Reasoning of Qualitative Portrait Knowledge**

**Construction of User Quantitative Portrait**

The ontology created by protege is usually stored in RDF, owl or XML format. However, most of the data in the recommendation system is stored in relational database, which makes the ontology
data not directly used in the recommendation system. In order to solve this problem, we use Eclipse as a development tool to implement ontology access operation based on MySQL database through Jena API.

Building Ontology Model: Using Jena to process ontology requires the establishment of an ontology model.

Database Links: After loading the link driver, the database link code is as follows:
1. IDBConnection conn=null;
2. Class.forName("com.mysql.jdbc.Driver").newInstance();
3. Conn=new DBConnection(DB_URL,DB_USER,DB_PASS,DB_TYPE);

Reading and Saving: Then read and save the model with the following code:
   tempModel=maker.openModel("testDBModel",true);

**Reasoning of Qualitative Portrait Knowledge**

To make inference in Jena, one must first obtain an inference interface. After the inference interface is obtained, the inference ontology needs to be obtained. With the inference interface and ontology model as the parameters of the method, the createInfModel method of ModelFactory can be called to extend the normal model to support any related reasoning ability. The main statements are as follows:

ModelFactory.createInfModel(getReasoner(rulePath),getOntModel(ontPath));

According to the above query code, we can use SparQL to construct queryString. For example, the following query string can be defined to query the preference of the applicant family for a certain breed of pet:


**Architecture and Design of Interactive Appointment Applet for Children and Pets**

**Overview of Development Technology**

The Minor Program Framework (MINA) system is divided into two parts: the logic layer (App Service) and the View layer (View). The applet provides its own view layer description languages WXXML and WXSS, as well as a JavaScript-based logical layer framework, equivalent to HTML+CSS+JS for web page programming.

**Overall Function**

The main functions of the applet are divided into two parts: family pet service and pet center reservation service:

![Figure 2. Overall Function of Online Pet Foster Care Appointment Applet.](image)
**Portrait Matching Process**

Pet family foster matching is based on the matching of pet information database and family information database. After the matching, according to the existing portraits, the automatic matching between databases is realized, and the fast and reasonable matching between pet owners and foster families is realized.

![Diagram](image)

Figure 3. Schematic Diagram of Matching Portrait of Pet Family Foster Care.

**Design and Implementation of Applet**

**The Cloud Development**

Cloud development provides developers with complete native cloud support and WeChat service support, weakens the concept of back-end and operation and maintenance, does not need to build servers, uses the API provided by the platform for core business development, and can achieve rapid online and iterative, at the same time, this ability is compatible with and not mutually exclusive to the cloud services that developers have used.

Cloud Development Initialization:

```javascript
wx.cloud.init(); // Cloud development initialization
const db = wx.cloud.database(); // Obtaining a cloud development database
const pet = db.collection('pet'); // Obtain the required data table from the database
```

Database Update Record:

Get the original default image from the cloud development server repository and preview it in the form. After the data and image of the form are modified, click Modify to update the form, save the new image uploaded by the user to the cloud development server repository and update the records in the cloud database. The code is as follows:

```javascript
db.collection('pet').update({data: {...}})
```

**Interactive Appointment Applet for Children and Pets**

![Applet](image)

Figure 4. Details Interface1 (Part).  Figure 5. Details Interface2 (Part).
The applet is divided into two parts: "Child Information" and "Park Pet Information". "Child Information" includes the information of children who sign up for interaction, and "Park Pet Information" includes the information of pets who participate in the interaction.

**Conclusion**

Based on the portrait matching technology, the interactive appointment system of children and pets realizes the automatic matching between databases based on the existing image on the platform of WeChat applet, which makes children and pets realize the effective matching and improves the matching degree. In addition, using the technology to develop a applet of family pet foster appointment, which can help pets find a suitable foster family and improve the matching fit. However, how to achieve more detailed portrait matching remains to be studied.

**Acknowledgement**

This work is supported in part by the National Nature Science Foundation of China (No. LGF19G020002)

**References**


