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SHANGHAI JIAO TONG UNIVERSITY

Project Documentation

Project Workshop of Database Systems (CS356)
Project my-meal.com

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1 Examples

1.1 Example Section

1.1.1 Example Subsection

1.1.1.1 Example Subsubsection

1.2 Listings

In listing 1.1 you can see the usage of an image.

1.3 Graphics

In figure 1.2 you can see the usage of an image.

1.4 Lists

This is a basic list

- First item
- Second item
- Third item

```
1 <?php
2     $hello = "Hello {$_GET[ 'name ' ]}";
3     echo $hello;
4 ?>
```

Figure 1.1: This is the caption for the example listing. (Extract from `hello.php`)



Figure 1.2: This is the caption for the example image

2 Project Description

Our project is an implementation of a food delivery system called MyMeal accessible as a web page. It offers important features like searching for restaurants and for food available for ordering, or an ordering process for customers. We have three kinds of user in our system: visitor, customer and restaurant. A visitor is a person visiting our web page having no session id. A customer is already a registered user with the possibility to order food. A restaurant is also a registered user, who represents the restaurant with its menu.

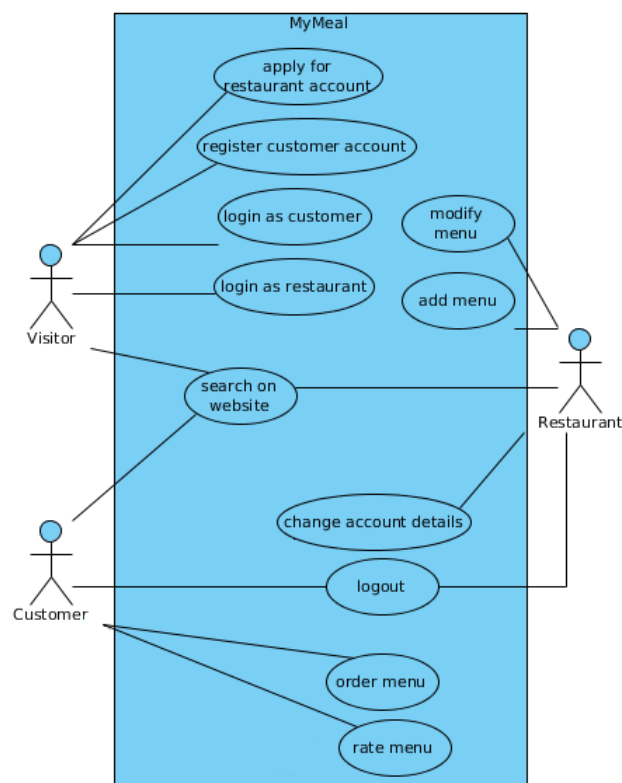


Figure 2.1: Use case diagram of our system.

The possibilities of the users of our system are shown in figure 2.1. A visitor of our website can search on it, log in as a customer or as a restaurant, register an customer account and also apply for a restaurant account. For now the application of a restaurant account will be processed by our system similar to the registration of a customer account. That means every restaurant will be accepted. The application process is an optional goal.

An user logged in as a customer has the following possibilities: search for restaurants or menus, rate a menu after it was delivered, modify his/her rating his rating, modifying account details and order a menu.

An user logged in as a restaurant will be able to add and modify his/her menus as well as the restaurant's account details and will also be able to search for restaurants or menus.

Optional goals: An application process for the restaurants, with approvement of an additional kind of user with administrative rights. The option for a restaurant to accept or cancel an order. The option for a customer to cancel a yet non accepted offer. In addition we would like to offer an recommendation system for the customers based on the customer's previous orders and ratings using machine learning techniques like neural networks and gradient boosting.

3 State of the Art

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4 System Overview

In this chapter we give an overview to our system. The system is splitted in-independent parts, the frontend and backend. The frontend is the whole webinterface for the user designed with HTML, Javascript and CSS. The backend consists out of the commucation interface between frontend and backend for which we used REST API and the database server by itself.

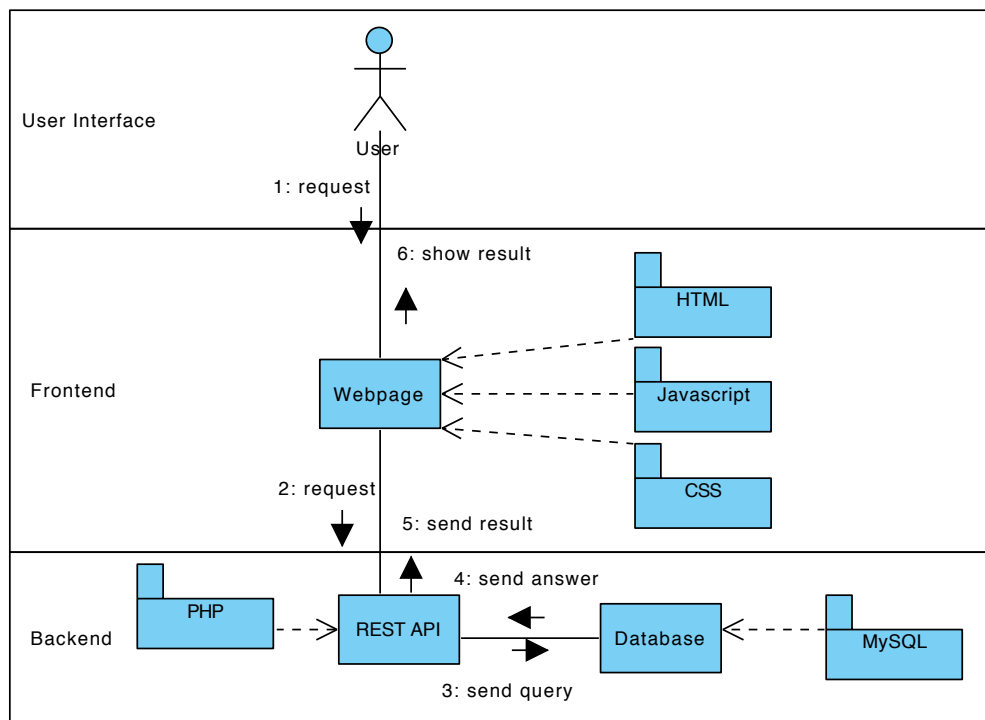


Figure 4.1: An overview of how requests are handled.

A normal procedure in our system would be that an user of our system uses a functionality of the webinterface to send an command to our REST API. The REST API will now check the validity of the command and if it is confirmed it will forward an request to the MySQL server. The MySQL server sends the result of the request back the REST API where an answer gets wrapped with the important information and sends it back to the user.

5 Database

In this chapter we introduce the different methods we considered for a database representation and give reasons for final choice we made. Then we give a detailed description for our ER model.

5.1 Selection of the Database System

For our database we considered NoSQL and SQL methods. We looked at different NoSQL solutions like MongoDB. Since nobody who was responsible for the database had experience with NoSQL we chose to stick with the SQL approach. We wanted to build a slim system. Therefore we first started to use SQLite. At this time we still used Python in the backend. Later in our project Python became no possibility for us anymore so moved to PHP. This also meant that we would change our SQLite system to MySQL, because one of our group members already had experience with this combination. After considering different possibilities we finally arrived back at the standard solution for a database. The advantages are that it is fast, well documented, the community is big and exists already for a long time so a lot of problems have been already discussed. On the other hand MySQL has so many functionalities that often it offers more complex solutions for less complicated problems. For example there is no support for constraints for values in tables in MySQL so that we had to use triggers which are handled way more complicated because they have way more functionalities.

5.2 ER-Model

The figure 5.1 is the current state of our database visualized with an ER model. An full description of the table will follow but first we explain the naming convention as well as the meaning of the colors in the ER model.

attribute: (**attribute name**) The attribute name is always written in lower case. **item[primary key:** (**attribute name**)_pk] The attribute name concated with a '_pk' at the end.

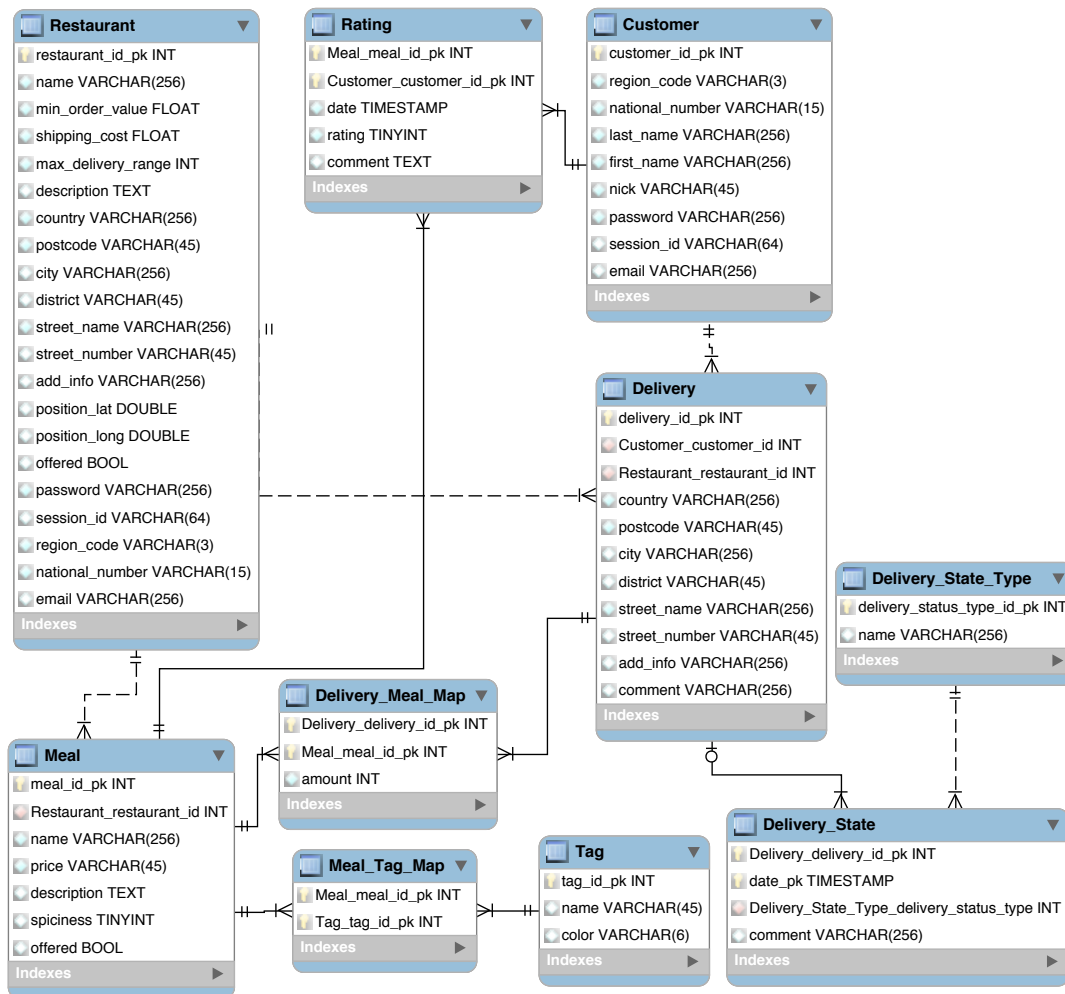


Figure 5.1: ER model of our database.

foreign key: (table name)_(attribute name) The table name is references the name of the table. Every first letter of every word in the table name is written in uppercase.

foreign key: (table name)_(attribute name)_pk The foreign key name concatenated with a '_pk' at the end.

I The description for the colors of in the ER model.

yellow The attribute is a primary key.

red The attribute is a foreign key which may not be NULL. The referenced primary key it identified by the name.

lightblue The attribute may not be NULL.

We will continue with a complete description of the database.

5.2.1 Customer

The Customer table saves the information of a customer.

customer_id_pk: **int(11)** The surrogate key of the customer by which the customer is identified.

region_code: **varchar(3)** The region code of the telephone number given by the customer.

national_number: **varchar(15)** The national number of the telephone number given by the customer.

last_name: **varchar(256)** The last name of the customer given by the customer

first_name: **varchar(256)** The first name of the customer given by the customer.

nick: **varchar(45)** The nick name of the customer given by the customer. The nick name is unique.

password: **varchar(256)** The password of the customer given by the customer.

session_id: **varchar(64)** The session id generated for the customer for each session.

email: **varchar(256)** The email of the customer given by the customer.

5.2.2 Delivery

The Delivery table saves the information of a delivery

delivery_id_pk: **int(11)** The surrogate key of the delivery by which the delivery is identified

Customer_customer_id: **int(11)** The surrogate key of the customer who made delivery.

Restaurant_restaurant_id: **int(11)** The surrogate key of the restaurant at which the delivery was made.

country: **varchar(256)** The country of the address the delivery should be delivered to.

postcode: **varchar(45)** The postcode of the address the delivery should be delivered to.

city: **varchar(256)** The city of the address the delivery should be delivered to.

district: **varchar(45)** The district of the address the delivery should be delivered to.

street_name: varchar(256) The street name of the address the delivery should be delivered to.

street_number: varchar(45) The street number of the address the delivery should be delivered to.

add_info: varchar(256) Additional information of the address the delivery should be delivered to.

comment: varchar(256) A comment for the restaurant which is added to the delivery by the user.

5.2.3 Delivery_Meal_Map

The Delivery_Meal_Map table maps the delivery with the meal its included.

Delivery_delivery_id_pk: int(11) The surrogate key of the delivery by which the delivery is identified.

Meal_meal_id_pk: int(11) The surrogate key of the meal by which the meal is identified wich is included in the delivery with the Delivery_delivery_id ID.

amount: int(11) The number of the meals of the meal with the Meal_meal_id_pk ID inclcd in the delivery with the Delivery_delivery_id ID. The amount may not be negative.

5.2.4 Delivery_State

The Delviery_State table maps a delivey to a delivery type.

Delivery_delivery_id_pk: int(11) The surrogate key of the delivery by which the delivery is identified.

date_pk: timestamp The timestamp when the delivery status was applied.

Delivery_State_Type_delivery_status_type: int(11) The ID corresponding to

comment: varchar(256) A comment to this delivery status. Can be given by the restaurant or automatic by the system.

5.2.5 Delivery_State_Type

The Delivery_State_Type is a static table which maps an ID to a delivery status type.

delivery_status_type_id_pk: int(11) The surrogate key which is used to save the delivery status type in the dynamic tables.

name: varchar(256) The name of the delivery status type.

5.2.6 Meal

The meal table represents a meal offered by an restaurant for customers.

meal_id_pk: int(11) The surrogate key of the meal by which the meal is identified.

Restaurant_restaurant_id: int(11) The surrogate key of the restaurant which owns the meal.

name: varchar(256) The name of the meal.

price: varchar(45) The price of the meal. The price may not be negative.

Meal_Category_meal_category_id: int(11) The surrogate key of the category of the meal.

description: text The description of the meal.

spiciness: tinyint(3) The value of spiciness. It reaches from 0 to 3.

offered: tinyint(1) A boolean value if the meal is still offered by the restaurant.

5.2.7 Meal_Category

The Meal_Category table is a static table which maps an ID to a category. Every dish can be categorized to one category. The categories are disjoint.

meal_category_id_pk: int(11) The surrogate key which is used to save the meal category in the dynamic tables.

name: varchar(45) The name of the meal category.

5.2.8 Meal_Tag_Map

The Meal_Tag_Map table maps a number one tag to one Meal.

Meal_meal_id_pk: int(11) The surrogate key of the meal the tag is mapped to.

Tag_tag_id_pk: int(11) The surrogate key of the tag the meal is mapped to.

5.2.9 Rating

The Rating table represents a rating of a meal from a customer.

Meal_meal_id_pk: int(11) The surrogate key of the meal by which the meal is identified.

Customer_customer_id_pk: int(11) The surrogate key of the customer which rated the meal.

date: timestamp The date the rating was made.

rating: tinyint(4) The rating of a dish. A rating reaches from 0 to 5.

comment: text A comment added by the customer.

An additional constraint is that a customer cannot rate a meal before he ordered and received it.

5.2.10 Restaurant

restaurant_id_pk: int(11) The surrogate key of the restaurant by which restaurant is identified.

name: varchar(256) The name of the restaurant.

min_order_value: float The minimum value a delivery from the restaurant has to be worth so it can be made. The value may not be zero.

shipping_cost: float The shipping cost of a delivery. The value may not be zero.

max_delivery_range: int(11) The maximum range the customer can be away from the restaurant to make a delivery given in meters. The value may not be zero.

description: text A description of the restaurant.

country: varchar(256) The country of the address of the restaurant given by the restaurant.

postcode: varchar(45) The country of the address of the restaurant given by the restaurant.

city: varchar(256) The country of the address of the restaurant given by the restaurant.

district: varchar(45) The district of the address of the restaurant given by the restaurant.

street_name: varchar(256) The street name of the address of the restaurant given by the restaurant.

street_number: varchar(45) The street number of the address of the restaurant given by the restaurant.

add_info: varchar(256) Additional information from the address given by the restaurant.

position_lat: double The latitude coordinate of the location of the address calculated by the system. The value may not be zero.

position_long: double The longitude coordinate of the location of the address calculated by the system. The value may not be zero.

offered: tinyint(1) A boolean value if the restaurant is still offering service.

password: varchar(256) The password of the restaurant given by the restaurant.

session_id: varchar(64) The session id generated for the restaurant for each session.

email: varchar(256) The email of the restaurant given by the restaurant.

region_code: varchar(3) The region code of the telephone number given by the restaurant.

national_number: varchar(15) The national number of the telephone number given by the restaurant.

5.2.11 Tag

The Tag table is a static table which maps an ID to a category. Every dish can be tagged with several tags by the restaurant. A tag describes a feature of a dish.

tag_id_pk: int(11) The ID which is used to save the tag in the dynamic tables.

name: varchar(45) The name of the tag.

color: varchar(6) The color code of the color used to represent the tag in the frontend.

5.3 Static tables

In this section we present the tables which are not used for inserts. Instead saving a string repeatedly in intensively used tables we just save an ID and use a static table for mapping this ID to a string. We present the values of the static tables. The Tag table:

tag_id_pk	meaning	color code	color
1	Vegetarian	#22c13e	light green
2	Vegan	#195805	dark green
3	Pork	#f97990	pink
4	Cold	#73b9c1	light blue
5	Kosha	#6c1547	purple

The Delivery_State_Type table:

delivery_status_type_id_pk	name	meaning
1	PENDING	The delivery was ordered by a customer but the restaurant has not seen the delivery yet.
2	PROCESSING	The restaurant has seen and accepted the delivery and will proceed with it.
3	INDELIVERY	The restaurant sended the delivery out.
4	DONE	The delivery has been delivered.

5.4 Views

This is a list of Views we use. We basically just use them to avoid the inner joins with the static tables in every request.

Delivery_State_View Joins the Delivery_State with Delivery_State_Type together.

Delivery_View Joins the Delivery with Delivery_State together

5.5 Approach to our Solution

Our first approach was to use SQLite for the database. For the communication between the database and the frontend we wanted to use the REST API framework eve[Eve]. While trying to build up a server with eve we figured out that the framework is not in a state where it is usable for our project. That is the reason we went for PHP for the interface between frontend and backend. Since it is more convenient to use PHP with MySQL we also changed the database system to MySQL.

5.6 Implementation

We implemented for each communication between the frontend and backend an own php file. In there we grab the content of the JSON file the frontend sends, check if the needed parameter are given and escape them. Further we prepare the needed SQL queries and inserts for the MySQL server, prepare and execute them. The needed results are wrapped in an answer array and sended back to the frontend.

5.7 Security

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6 The RESTful Interface

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7 Frontend

7.1 Overview

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7.2 mplementation

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7.3 Communication with the RESTful Interface

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