Simple OCR Project System Desgin

Author: Bo Wen

Date: March 17, 2020

Contents

List of Tables

List of Figures

1 Revisions

Date	Revision#	Authors	Comments
March.16 2020	Revision 0	Bo Wen	Initial draft of system design
March.17 2020	Revision 1	Bo Wen	Minor changes

Table 1: Simple OCR Project Table of Revision

2 Purpose

2.1 Project Overview

Optical character recognition or optical character reader (OCR) is the electronic or mechanical conversion of images of typed, handwritten or printed text into machine-encoded text, whether from a scanned document, a photo of a document, a scene-photo (for example the text on signs and billboards in a landscape photo) or from subtitle text superimposed on an image (for example from a television broadcast).

Widely used as a form of data entry from printed paper data records – whether passport documents, invoices, bank statements, computerized receipts, business cards, mail, printouts of static-data, or any suitable documentation – it is a common method of digitizing printed texts so that they can be electronically edited, searched, stored more compactly, displayed online, and used in machine processes such as cognitive computing, machine translation, (extracted) text-to-speech, key data and text mining. OCR is a field of research in pattern recognition, artificial intelligence and computer vision.

2.2 The Purpose of The Project

The main purpose of Simple OCR is to return the words contained in image to the user. Besides, the result should be stored in database for future use.

2.3 Naming Conventions and Terminology

Term	Description
SimpleOCR	SimpleOCR is the project web program

Table 2: Terminologies and corresponding descriptions

3 Project Scope

3.1 Overview

The system design document contains information about the breakdown of the components of the system. The document will include a diagram that shows the detail of the interactions between python files.

3.2 Constraints

3.2.1 Development Constraints

The project uses Django framework, pytesseract and pillow library for OCR, MySQL as the database.

3.2.2 Schedule Constraints

The project should be finished in a week.

3.2.3 Personnel Constraints

The project must be done individually.

4 Behaviour Overview

The behavior of SimpleOCR consists of four major steps: taking inputs, submitting inputs, returning result and saving result.
For the first step, the user needs to input the name and image to get the program variables prepared. After that, the user submits the inputs to the server. Then, the server returns the desired result to the client. Finally, the result is saved in database.

5 Function diagram

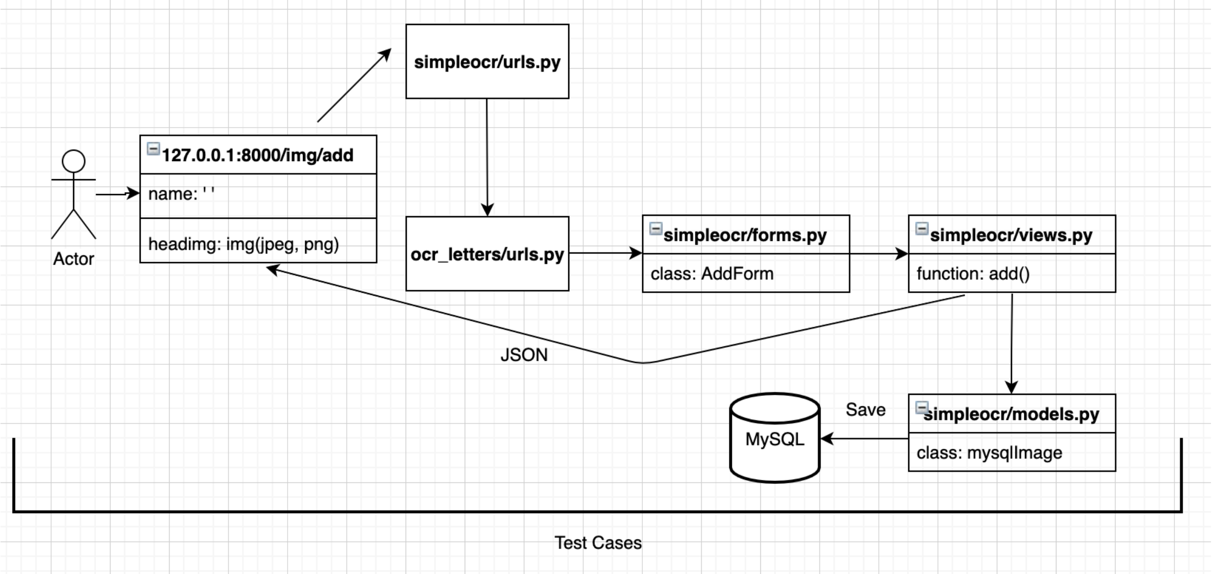

Figure 1: Function Diagram

This diagram gives an overview how each part of this program interacts. The user can access the address http://127.0.0.1:8000/img/add in browser to view the web page. There are tow inputs in total which are name and image. The image should be in jpeg or png format. After the access, the web servive starts to involve. It takes the form and uses the OCR library to process the image, finally returns the letters in JSON format. The recognized lettes are stored in database, in this case, MySQL.

6 API Design

6.1 Overview

A Web API is a unique type of interface where the communication takes place using the Internet and Web-specific protocols. Much like remote APIs make remote resources appear as local, Web APIs do the same thing for resources available on the Web. In fact, Web APIs started to become popular with the advent of internet services that let users store content online. In general, you serve Web APIs through an HTTP interface. The API itself defines a set of endpoints, request messages and response structures. It is a standard approach also to identify the supported response media types. XML and JSON are two favorite examples of response media types that can be easily interpreted by API consumers. While initially Web APIs were also called Web services, nowadays the use of the latter form signals that the API is RESTful, as opposed to following the SOAP standard.

6.2 API

This project uses single API since it only does one specific job. The web API is set as http://127.0.0.1:8000/img/add/

7 Database Design

7.1 Overview

A database is an organized collection of data, generally stored and accessed electronically from a computer system. Where databases are more complex they are often developed using formal design and modeling techniques.

7.2 Database Table

The database is designed in following format. mid is the ID for this table, name is the user name which user inputs, letters is the result after OCR, isdelete represents the row is deleted or not, 1 represents deleted, 0 represents not deleted, addtime is the time the row has been added.

Primary Key	Column Name	Data Type	Length	Null	Constraint
Yes	mid	INT	11	Not Allowed	
	name	VARCHAR	20	Not Allowed	
	letters	VARCHAR	100	Not Allowed	
	isdelete	INT	11	Not Allowed	
	addtime	DATETIME	20	Not Allowed	

Table 3: Simple OCR Project Table of Databse

8 Unit Test

8.1 Overview

Unit testing is a level of software testing where individual units/ components of a software are tested. The purpose is to validate that each unit of the software performs as designed. A unit is the smallest testable part of any software. It usually has one or a few inputs and usually a single output. In procedural programming, a unit may be an individual program, function, procedure, etc. In object-oriented programming, the smallest unit is a method, which may belong to a base/ super class, abstract class or derived/ child class. (Some treat a module of an application as a unit. This is to be discouraged as there will probably be many individual units within that module.) Unit testing frameworks, drivers, stubs, and mock/ fake objects are used to assist in unit testing.

8.2 Unit Test Cases

8.2.1 Form Test

Test Function	Pass Or Fail
test_AddForm_valid_data_png	Pass
test_AddForm_valid_data_jpg	Pass
test_AddForm_invalid_data_no_name	Pass
test_AddForm_invalid_data_no_image	Pass
test_AddForm_invalid_data_no_name_and_no_image	Pass

Table 4: Simple OCR Project Table of Testing Form

8.2.2 Model Test

Test Function	Pass Or Fail
test_mysqlimage_name	Pass
test_mysqlimage_letters	Pass

Table 5: Simple OCR Project Table of Testing Model

8.2.3 Url Test

:

Test Function	Pass Or Fail
test_add_url_is_resolved	Pass

Table 6: Simple OCR Project Table of Testing Url

8.2.4 View Test

:

Test Function	Pass Or Fail
test_add_POST_png	Pass
test_add_POST_jpg	Pass
test_add_POST_txt_invalid	Pass
test_add_POST_txt_invalid_no_name	Pass
test_add_POST_no_name_submit	Pass
test_add_POST_no_image_submit	Pass
test_add_POST_no_image_and_no_name_submit	Pass

Table 7: Simple OCR Project Table of Testing Model