F.C. Team Possible

Project: World Cup 2014 Website

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Problem

Around the world association football, or soccer, has millions of ardent fans and admirers. Despite the need, these millions (even billions) of soccer lovers don't have a single website where all the latest information is gathered and easily accessible. There is a lack of rich media content including video, twitter, stats, and events of the current world cup all collected in one place, especially in english speaking countries such as the United States. At the moment, the average soccer fan has to bounce around many different sites to get the latest information they want, such as match highlights, their favorite player's tweets, and player's statuses. Even though some sites attempt to address this need, there is a lack of design consideration; The currently existing websites lack natural and intuitive interfaces to make all available media content easy to access.

Use Cases

The site's interface allows navigation from a particular point of interest such as a favorite player to a certain match, from one country to another, all the while enjoying the content they desire, because each web component is interlinked with another. In fact, any twitter feed, stat, or video connected to the object of interest is on the site, at most, four clicks away. This eliminates the need of scouring Youtube for the game or player highlights or needing to search twitter to see what players are tweeting. Because of its design innovation, this website will bring together all of the most desired media content of today's World Cup Soccer fans and provide them access to

any article of interest quickly at the same time saturating them with other interesting content, facilitating hours of soccer bliss.

Abstract

This report describes the initial stages of building a responsive and attractive website using Django, Bootstrap, CSS, and javascript. This iteration will contain the how-to of setting up the basic framework for the site's layout, developing the API, and working models. The result will yield a static "demo" version of the website with which to share, modify, and experiment with before committing to building the fully dynamic website.

Required technologies

Django

Django is an open source, Python based web-framework. At later iterations, Django delivers the dynamically driven content of the site. In this iteration, however, Django only serves up static pages that mock up the intended final design. Even though they are not yet put into use, the models for the database being delivered are both generated and tested.

1. Setting up Django

Installing Django

The framework of the website utilizes version 1.6.5 of Django because it is the most stable iteration released thus far. Using pip3, Django can be installed in bash with the command:

sudo pip3.4 install django==1.6.5

(Other options can be found at https://docs.djangoproject.com/en/1.6/intro/install/#install-django).

Starting a New Project

A new project can be started using the command:

django-admin.py startproject project_name

After this command a new folder with *project_name* should be in the current working directory. Contained within that directory should be another folder with the name *project_name* and a file named *manage.py*. The *manage.py* file runs commands for Django and should not be edited. Inside the second project_name folder there should be four files: *__init__.py, settings.py, urls.py,* and *wsgi.py.* The *__init__.py* file is there just to let Python know that this a Python folder. The *settings.py* and *urls.py* files will be edited during the set up of the static site. The *wsgi.py* file will be used in the configuration of hosting the site on PythonAnywhere.[2]

At this point it will be possible to run a private server at *http://127.0.0.1:8000* using the command:

python3 manage.py runserver

Installing Additional Packages

Next, some additional packages should be installed to help in later production phases using the command:

pip3.4 install south django-registration stripe

Then, create a new app using the command:

python3 manage.py startapp app_name

This should create a new folder named *app_name* with files *__init__.py, admin.py, models.py, tests.py*, and *views.py.* Add the string *'signups'* to the the tuple labeled *INSTALLED_APPS* in the *settings.py* in the first folder named *project_name.*[2]

2. Setting Up the Django Database for the Models

Setup MySQL Environment and Installation Guide

The operating system used is Ubuntu 14.04 and the command to install the MySQL connector from Oracle is:

> *sudo pip3.4 install --user https://dev.mysql.com/get/Downloads/Connector-Python/mysql-connector-python-1.1.6.tar.gz*

Following this, MySQL 5.5 server has to be installed. The MySQL website details the instruction specific to the three different major operating systems. Next, the *settings.py* file has to be updated to use the oracle Django backend. This changes the default Django database engine from sqlite to MySQL so that the model can interact with a server backed by a MySQL database.[7]

Create Database Scheme from MySQL through terminal

In order to access MySQL as the root user, the command:

> *mysql -u root -p*

has to be run through command prompt terminal. If there are permission problems with running the previous commands with password, the root user privilege of the MySQL has to be flushed.[7]

Grant user access to the database

A new user has to be created for the specific database and the user has to be granted access. This is done by the following commands which are entered in the MySQL interactive command prompt.[7]

```
CREATE USER ‘user’@’localhost’ IDENTIFIED BY ‘mypass’;
CREATE DATABASE any_name;
GRANT ALL ON any_name.* TO ‘user’@’localhost’;
```

Configure the database settings in Settings File

With the newly created user, the Django *settings.py* file has to be modified to recognize the changes made to MySQL i.e. set the location of which database is to be refered to and the data will be stored on that newly created database. This allows the Django model to interact with MySQL when the user is trying to perform data insertion, deletion or modification. The following is an example of the *settings.py* format:

```
DATABASES = {
    'default': {
        'ENGINE': 'mysql.connector.django',
        'NAME': 'schema_name'),
        'USER': 'username',
        'PASSWORD': 'user_password',
        'HOST': 'localhost', #On pythonanywhere, change to “mysql.server”
        'PORT': '3360',
        }
}
```

Create the designed model from *model.py*

Following these steps, the hypothetical model becomes realized and all the tables are created from model design.

```
python3  manage.py syncdb
```

Load required data with Python scripts

Instead of inserting player, county, and match information by hand, an automated script was created and fed data encoded as a dictionary.

Obtain the data in the JSON format first and then process the data i.e. take all necessary bits of information and reformat it in a dictionary format. This reformatted data is also stored in a .json format with a .txt file extension.

This is an example command of how to feed in Python script in order to insert country information into the tables.

python3 manage.py shell < country_insert.py

The above step is repeated with this command.

data: the "country_insert.py", "player_insert_script.py", "match_insert_script.py"

All the data and information inserted can be inspected through the administrative panel.

localhost:8000/admin

3. Building tests for the models using Django unit tests

The required imports:

Add these imports to the *test.py* file:

```
import json
from django.test import TestCase
from name_of_app.models import *
```

`import json` #is needed to read the json files that is fed for testing. `from django.test import TestCase` #is needed so that the unit tests are able to run properly lastly `from name_of_app.models import *` #are needed to import the models for testing.

Make a class for the model tests

An example of a class created in *test.py* :

```
class ModelTestCase(TestCase):
        def test_country_model(self):
                #Dictionary Key: Country Name
```

```
        #Dictionary Value: [Country_code, country_rank]
        country_test_dict = {"Brazil": ["BRA", 5]}
        Country.objects.create(country_name="Brazil",
        country_code=country_test_dict1["Brazil"][0],
        rank = country_test_dict1["Brazil"][1]facacd
        Country_Brazil = Country.objects.get(country_name="Brazil")
        self.assertEqual(Country_Brazil.country_name, "Brazil")
        self.assertEqual(Country_Brazil.country_code, "BRA")
        self.assertEqual(Country_Brazil.rank, 5)
```

The test class above creates a new country object using the model by the following code:

```
Country.objects.create(country_name="Brazil",
country_code=country_test_dict1["Brazil"][0],rank = country_test_dict1["Brazil"][1]).
```

The parameters taken in by the country model is the country name, country code and rank. The `Country.objects.get(country_name="Brazil")` code is used to retrieve the country object. Asserts are used to test whether the data inputted to the database are correctly returning the data that is expected. All the nine tests included in the *test_model.py* almost follow the exact pattern of testing. Instead of taking input data from a hard coded dictionary, three of the tests take in data from a file.

The tests that are checking foreign keys must make a foreign object first and then pass it in as a parameter for the model that is using the foreign key otherwise the test will fail since the model is expecting a the foreign key object. For example:

```
    def test_player_model1(self):
            #Dictionary Key: Player full name
            #Dictionary Value: [sur_name, country,Clubname,Position,Birthdate]
            player_test_dict1 = {"Andrea Barzagli": ["Barzagli", "Italy", "Juventus FC",
            "Defender", "1981-05-08"]}

            Country.objects.create(country_name = player_test_dict1["Andrea
            Barzagli"][1])
            c1 = Country.objects.create(country_name = player_test_dict1["Andrea
            Barzagli"][1])

            Player.objects.create(country=c1, sur_name= player_test_dict1["Andrea
            Barzagli"][0],full_name = "Andrea Barzagli" ,clubname =
            player_test_dict1["Andrea Barzagli"][2], position = player_test_dict1["Andrea
            Barzagli"][3], birth_date =player_test_dict1["Andrea Barzagli"][4])

            player_get = Player.objects.get(full_name = "Andrea Barzagli")
            self.assertEqual(player_get.country.__str__(),
            player_test_dict1["Andrea Barzagli"][1])
            self.assertEqual(player_get.sur_name, player_test_dict1["Andrea Barzagli"][0])
            self.assertEqual(player_get.full_name, "Andrea Barzagli")
            self.assertEqual(player_get.clubname, player_test_dict1["Andrea Barzagli"][2])
            self.assertEqual(player_get.position, player_test_dict1["Andrea Barzagli"][3])
            self.assertEqual(player_get.birth_date.__str__(), player_test_dict1["Andrea
            Barzagli"][4])
```

The country object is being created first then passed in as a parameter for the player model. One thing to note is the usage of the `.__str__()` in the context of the country foreign key. This is used so that the name of the country is returned as a string instead of the country object being returned. The `.__str__()` function in the context `get.birth_date` is used because the format in which the date is saved is different then the string of the birth date.

Running the tests

Since the database is backed by MySQL, in order to run the unit tests, one has to setup the model mentioned above. The unit test is located at the path: *world_cup/wc_app/test_Model.py*
The following is the command to run the test:

python3 manage.py test

4. Using TastyPie to Build API

How to install TastyPie

Use this command to install tastypie:

pip3.4 install --user django-tastypie

Install using the *pip3.4* command on PythonAnywhere in order to link to the correct version. Add *tastypie* to the list of installed apps in *settings.py*. Create a new file named *api.py.* The file with one resource added looks like:

```
from tastypie.authorization import Authorization
from tastypie import fields
from tastypie.resources import ModelResource
from wc_app.models import *
from wc_app.prettyPrint import *
from tastypie.constants import *
from django.conf.urls import *


class CountryResource(ModelResource):
```

```
        class Meta:
            queryset = Country.objects.all()
            resource_name = 'countries'
            authorization = Authorization()
            serializer = PrettyJSONSerializer()
            filtering = {
                "country_name" : ALL,
                "country_code" : ALL
            }
            detail_uri_name = 'country_name'


        def prepend_urls(self):
            return [
                url(r"^(?P<resource_name>%s)/(?P<country_name>[\w\d_.-]+)/$" %
self._meta.resource_name, self.wrap_view('dispatch_detail'), name="api_dispatch_detail"),
            ]


        def determine_format(self, request):
            return "application/json"
```

In order to hook up the resource, add new urls to the *urls.py* file. The file with one resource added to the url patterns like:

```
from django.conf.urls import patterns, include, url
from django.conf import settings
from wc_app import views
from django.contrib import admin
from wc_app.api import *


urlpatterns = patterns('',
...
 #RESTful API
url(r'^api/', include(CountryResource().urls)),
…)
```

After restarting the django server, the API is ready to server up default content. [3]

Using TastiePie to Show All Elements in a Resource

By default, the entire resource is available after adding it correctly. The resource can be retrieved through adding *?offset={offset}&limit={limit}* onto the url. For example the url

../api/countries/?offset=0&limit=32

would return all of the elements in the country resource.

Using TastiePie to Show Specific Elements in a Resource

The filtering dictionary contained within the resource *api.py* allows the API to return specific elements based on a key value contained in the listed fields. In the case of the country resource a specific country element can be returned by appending the search to the url, such as

../api/countries/USA

will return the USA element. Also, to increase the flexibility of using the created API, for instance, one could obtain country information of a specific country through attributes of filter that allowed on the correspond resource class

../api/countries/?country_code=argentina.

../api/countries/?country_code=arg

Building Unit Tests for TastyPie API

```
class APItests(unittest.TestCase) :
    url = "http://127.0.0.1:8000/"

    #Countries
    def test_get_all_countries(self) :
        request = Request(self.url+"api/countries/")
        response = urlopen(request)
        response_body = response.read().decode("utf-8")
        self.assertEqual(response.getcode(), 200)
        response_data = loads(response_body)
        response_objects = response_data["objects"]
        expected_response = [{Answer Dictionary}]

        for obj in response_objects:
            for key in obj:
                if type(obj[key]) == list:
                    obj[key] = sorted(obj[key])
```

```
        for obj in expected_response:
            for key in obj:
                if type(obj[key]) == list:
                    obj[key] = sorted(obj[key])

        for obj in response_objects:
            self.assertTrue(obj in expected_response)
```

Currently, API tests are written inside *tests.py* under the *wc_app* folder. In order to test API, the above is an example of testing countries API with local server. So, since the API test relies on the response from the predefined url which is “localhost” in this context. After loading the correct data into database, the test will run along with the commands below:

```
# will run all the py file starts with test
# require to import unittest from django
python manage.py test

# run server so that tests of API can access information from db
python manage.py runserver
```

Repeat the above for matches and players APIs. Same things go to specific country, specific player and specific match designed API.

5. Adding 404 error

A error page titled “404 error” is presented when some an illegal url is accessed through our web host. In order to achieve this edits were made to *urls.py.*

```
#Error 404
url(r'./$', views.handler404, name='handler404')
```

In addition these line were added to *views.py*:

```
#Error 404 page
def handler404(request):
    return render(request, '404.html')
```

Most of views will call handler404 function if the requested data is not exist. Anything other than the defined paths will return the customize 404 page to user.

Bootstrap

Bootstrap is a open source front-end framework that provides responsive web-design with little to no effort while offering customizable elements and templates.

1. Setting up Bootstrap

In order to make a sleek, intuitive, and powerful mobile first front-end framework for faster and easier web development, the up-to-date Twitter bootstrap css v3.2.0 was included. Go to http://getbootstrap.com/ and download the code available on the site and include it in the project folder. Then set a path in the base HTML file so that it enables the use of bootstrap.

jQuery library for bootstrap dropdown

```
<script src="http://ajax.googleapis.com/ajax/libs/jquery/2.1.0/jquery.min.js"></script>
```

Twitter bootstrap css in minified form

```
<link rel="stylesheet" href="//maxcdn.bootstrapcdn.com/bootstrap/3.2.0/css/bootstrap.min.css">
```

Twitter bootstrap default javascript

```
<script src="//maxcdn.bootstrapcdn.com/bootstrap/3.2.0/js/bootstrap.min.js"></script>
<script src="/static/js/bootstrap.min.js"></script>
```

2. Getting Templates

Templates are designs used in designing web pages. To find a template search on Google and choose a template. There are many templates available as open source on the web for bootstrap.

3. Customizing templates using CSS

Include a *custom.css* file to override current css attributes. When using a web browser like Firefox there is an inspect element option which allows the CSS to be viewed and edited within

the browser. By selecting the appropriate code, editing it, and placing it in the *custom.css* file the default format can be overridden.

Apiary

Apiary provides a convenient way to mock up a RESTful API. Using the in-site API Blueprint Editor, a mock up can be generated, documented, and shared with team members.

1. Setting up Apiary

Go to www.*apiary.io* and sign in with the project's git hub account.

2. Creating a mock up

Use the Apiary site's embedded editor to create and modify the API mock up.

3. Resulting API

GET /api/countries/?offset={offset}&limit={limit}

List first {limit} Matches starting from {offset}. Queries are bounded by the number of matches which is 64.

GET /api/countries/{id}

Displays all the details of a specific Country object.

GET /api/players/?offset={offset}&limit={limit}

List first {limit} Players starting from {offset}. Queries are bounded by the number of Players which is 736.

GET /api/players/{id}

Displays all the details of a specific player object.

GET /api/matches/?offset={offset}&limit={limit}

List first {limit} Matches starting from {offset}. Queries are bounded by the number of Matches which is 64.

GET /api/matches/{id}

Displays all the details of a specific match object.

PythonAnywhere

PythonAnywhere is a web hosting service as well as an online IDE based on the Python programming language. This acts as a server to host the site. PythonAnywhere has the resources and the environment to setup Django application as well as CSS bootstrap.

1. Setting up PythonAnywhere

Create a new PythonAnywhere account. To clone the github repository on PythonAnywhere go to the bash console. Then at the root directory use the git clone command and drag and drop the clone link on the console to clone.

2. Hosting the site

To allow the site for public access, go to dashboard and under the web tab, make a new web application. Then, there will be a configuration popup, choose manual configuration and choose the corresponding Python version. In this project, the project is setup to environment with Python 3.4.1 support. Next, change the settings on *wsgi.py* as they came with default flask settings which is not related to the project.[8]

```
import os
import sys
if path not in sys.path:
        sys.path.append(path) os.environ['DJANGO_SETTINGS_MODULE'] = 'world_cup.settings'
import django.core.handlers.wsgi application = django.core.handlers.wsgi.WSGIHandler()
```

The above is an example of how to link to the project repository that has just been cloned in PythonAnywhere so that the hosting site can recognize where the project is located at. One should change *world_cup.settings* to his or her Django application path respectively. The reason to use manual configuration instead of opting for Django configuration on PythonAnywhere is because the default Python, bundled with the Django settings, might require more modification

to the project repository as compared to manual configuration of Python that does not serve with the Django module. The reason to do it this way is to publish the Django application from PythonAnywhere as it was like running the project on localhost without having the need to touch the source files.[8]

Setting up Python Anywhere on MySQL[9]

1. Create the database with '*username$db_schema_name*'
2. Clone the github directory and setup wsgi to the path of cloned folder
3. Change settings.py db_name to '*username$db_schema_name*'
4. Install django, mysql-connector, tastypie module through pip as described before in the documentation. In our case, for example

    pip3.4 install --user django-tastypie

5. Run syncdb to generate tables from model
6. Run 3 scripts to automate the process of inserting data
7. Reload the web application and everything should be good to go

Design Choices

Current Web Design

The website has a navigation bar that links to the homepage, the "about us" page and dropdowns for countries, players and matches. The homepage has three links that link to a page containing the countries, a page containing all of the players, and to a page that contains all of the matches.

The countries page currently contains a view of four countries at a time, sorted alphabetically, showing their country flag and ranking. On each country page there is an embedded Google

Map with the country location and the list of players for that nation. Inside an individual country's page, all the players will be linked to their details.

The players page contains a view of 11 or 12 players at a time, sorted alphabetically by country then shirt number, showing their country and shirt number. On each player page there are two tabs, one containing their player details, biography, and photo and the other having their country flag and club-team name.

The matches page contains a list of all 64 matches, showing both teams emblems, the match score, match winner, and the location of where the match took place. On each match page the score is shown along with both countries' flags, an embedded highlight video of the match, and an embedded Google map showing the location of the match.

Django Model Design

The Django models represent the three main subjects of the site:the country model, the player model, and the match model. The country model consists of the country name, a country code and the rank of that country. The player model consists of a foreign key that comes from the country model that links the player to that specific country. The remaining fields contain the player surname, full name, the club he/she plays for, the position he plays and his birthdate. The matches model uses two foreign keys from the country model. This is done to link the two countries playing against each other. The other fields consist of the match number, the winner of the match, the scores of the match, the location where it was held and when it was held.

The Django model generates default primary keys by assigning them to the created id field as integers. The following model view shows the foreign keys on the match table as country_A_id and country_B_id respectively. It makes sense to design the model to have the country as the

foreign key in the match table because every single match will have a home team and an away team. By doing the object can be used to access all the attributes from the country class. For example, Brazil is playing against Germany and a user wants to know about the ranking of Brazil in FIFA ranking, he or she can get the rank easily as the rank variable can be accessed through the match model. Same thing goes for player table; every player is associated with a country.

Updated:

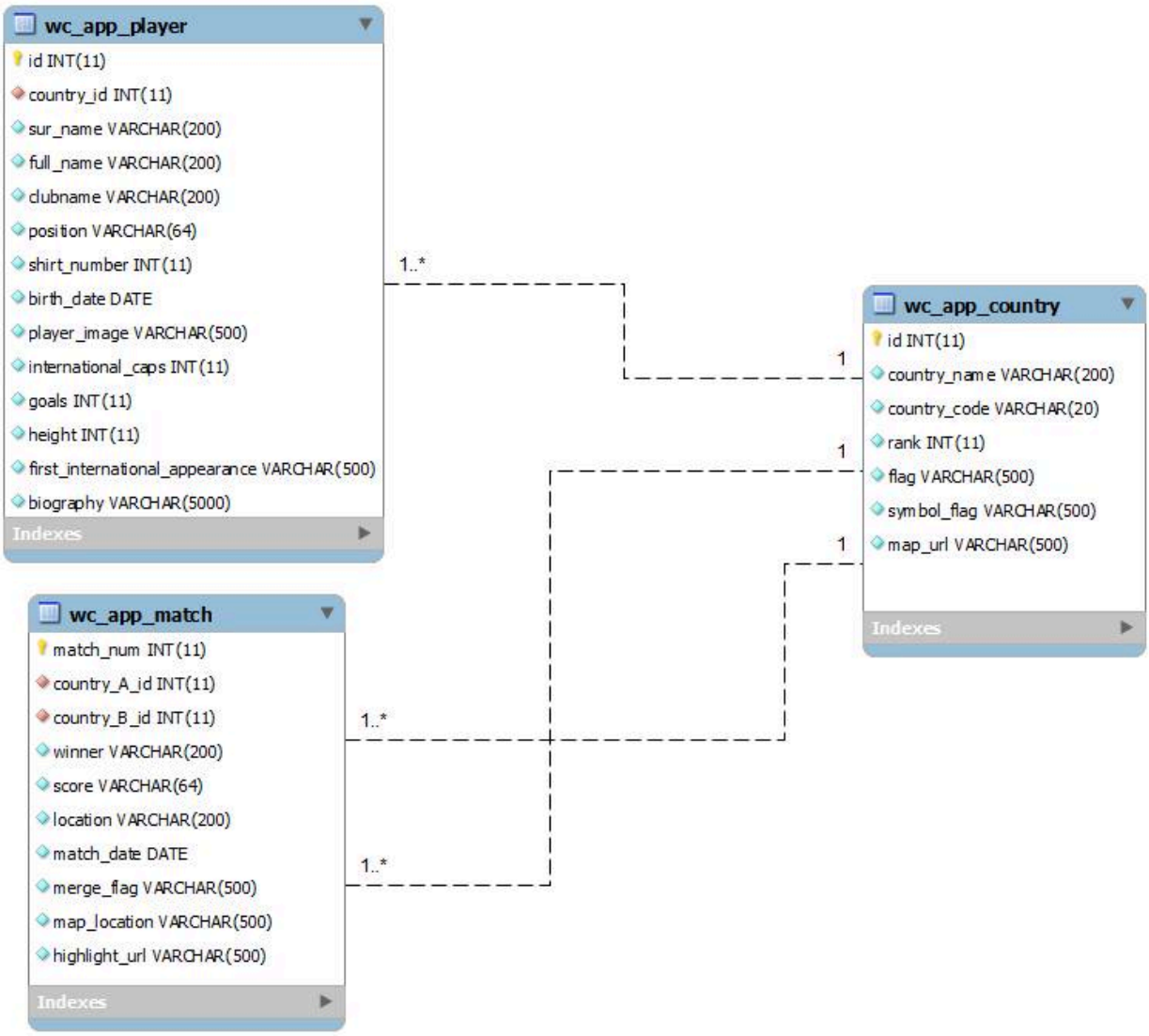
Player and Matches have been changed since the beginning of second iteration. Below are extra fields added to improve the comprehensiveness of data to be represent on our web site:

In Player Class of wc_app.model:

```
#add
international_caps = models.IntegerField(default=0)
goals = models.IntegerField(default=0)
height = models.IntegerField(default=0)
first_international_appearance = models.CharField(max_length=500)
biography = models.CharField(max_length=5000)
```

In Match Class of wc_app.model:

```
map_location = models.CharField(max_length=500)
highlight_url = models.CharField(max_length=500)
```



How to Insert Text Dynamically

In order to insert dynamically generated text, inline python scripts can be inserted into the html.

For example, to insert a player name code would look like:

*<li class="p-name">{{full_name}}
<li class="p-team">*

The python code is contained *{{here}}* and pulls data from the database.

How to Insert Images Dynamically

The images are loaded dynamically by inserting the link text as per the method explained above and loaded in via the link.

How to Insert Videos Dynamically

The videos are loaded dynamically by inserting the link text as per the method explained above and loaded in via the link.

How to Insert Google Maps Dynamically

The Google Maps are loaded dynamically by inserting the link text as per the method explained above and loaded in via the link.

Conclusion

While the implementation for this project is specifically about designing a website that provides information for the current FIFA World Cup, the principles and design could be directly applied to almost any current event of public interest, and more generally to any website that could benefit from scalable and dynamically generated content.

References

1. For apiary RESTful API.

   http://apiary.io/,

2. Tutorial steps for Django.

   https://docs.djangoproject.com/en/1.6/intro/tutorial01/

3. Documentation for tastypie.

   http://django-tastypie.readthedocs.org/en/latest/

4. For videos

   http://www.espnfc.us/video/highlights/114/index

5. For biographies, pictures, player data.

   http://www.fifa.com/worldcup/index.html

6. For twitter bootstrap

   http://getbootstrap.com/

7. Documentation for mysql.

   http://dev.mysql.com/doc/

8. For PythonAnywhere questions.

   https://www.pythonanywhere.com/wiki/

9. For setting up PythonAnywhere on MySQL.

   https://www.pythonanywhere.com/wiki/UsingMySQL

10. Where we found match data.

    http://worldcup.sfg.io/