1. INTRODUCTION

1.1 Overview

The aim of our project is to gather data about various events on in Dublin and display on an android app so users can find out what events are on upcoming nights. The users can choose how the events are categorized and displayed. The users may also browse the venues they wish and see any events linked to their chosen venue. They can favourite pubs or events so the details can be easier tracked. The data is stored in a MySql database on a cloud server hosted by DigitalOcean. The location of this server is in London. The data we use is collected using scrapers on different event websites.

The websites we will be using for this will be eventbrite.ie, entertainment.ie and facebook.com. The eventbrite scraper takes information from the first few pages of different event categories. The entertainment scraper takes information from the first few pages that are displayed under the event listings. Both of these scrapers are made using the requests and BeautifulSoup libraries. The facebook scraper works using the Facebook python API. This scraper is given a list of venue names gathered from Google and checks if there are any events on in any of the listed venues. The scrapers are run on the server once a day to update the events. The old events are removed from the database once a day also. PHP is used to create a REST API so the app can retrieve information.

1.2 Glossary

- Event
  Any event on in a venue

- Venue
  Any pub, music venue or location where there may be some event

- MySql
  Database management system

- DigitalOcean
  Website where cloud servers can be rented

- Scraper
  A program or script that gets information from a webpage

- Eventbrite.ie
  A website for buying tickets to events

- Entertainment.ie
  An Irish website that has information about upcoming Dublin events

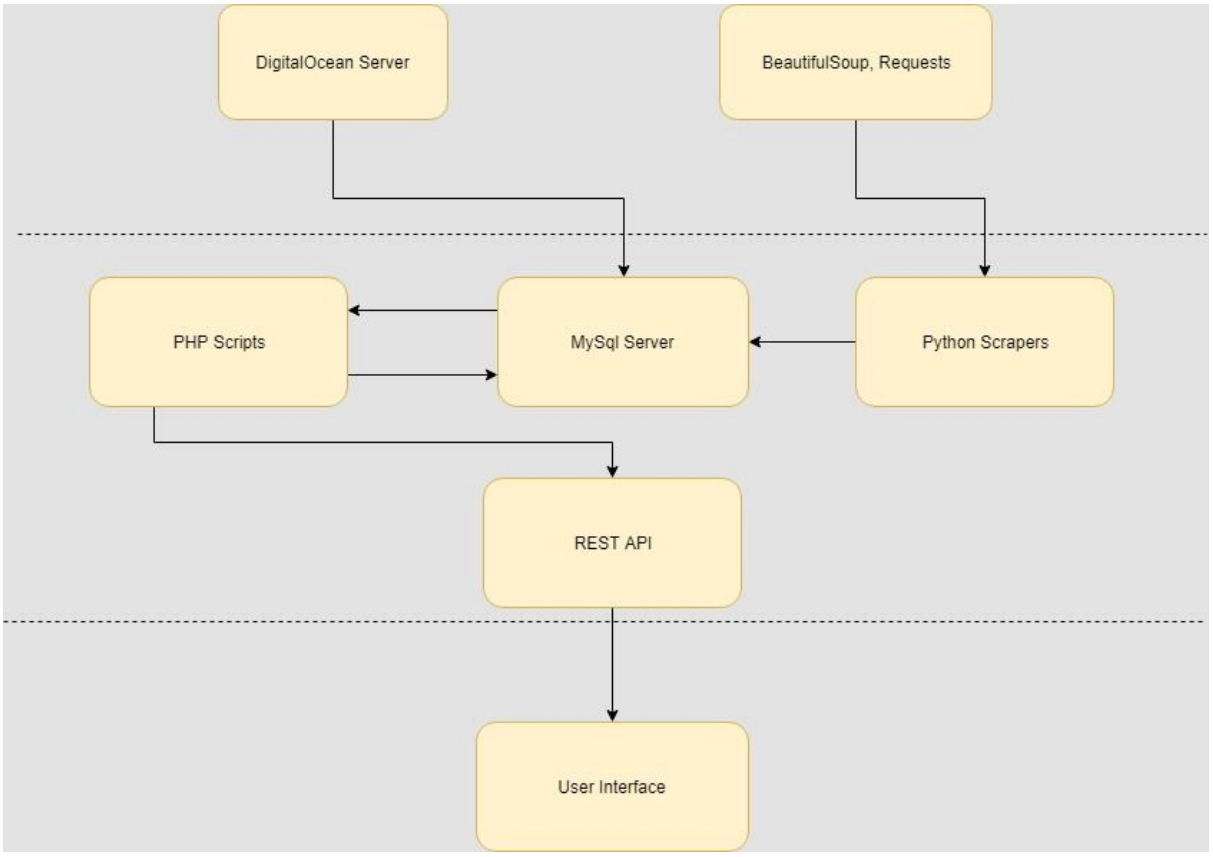
- Facebook.com
  A social networking site that venues sometimes use to advertise their events

- Requests
  A python package that fetches html from a given url

- BeautifulSoup
  A python package used for parsing html

2. SYSTEM ARCHITECTURE

Diagram



Digital ocean is used to host our server. We use BeautifulSoup and Requests to build the scrapers. The scrapers put the information into the MySql database. The database is queried by the php scripts and creates a json REST api. The app, user interface, uses this rest api to get the information to display.

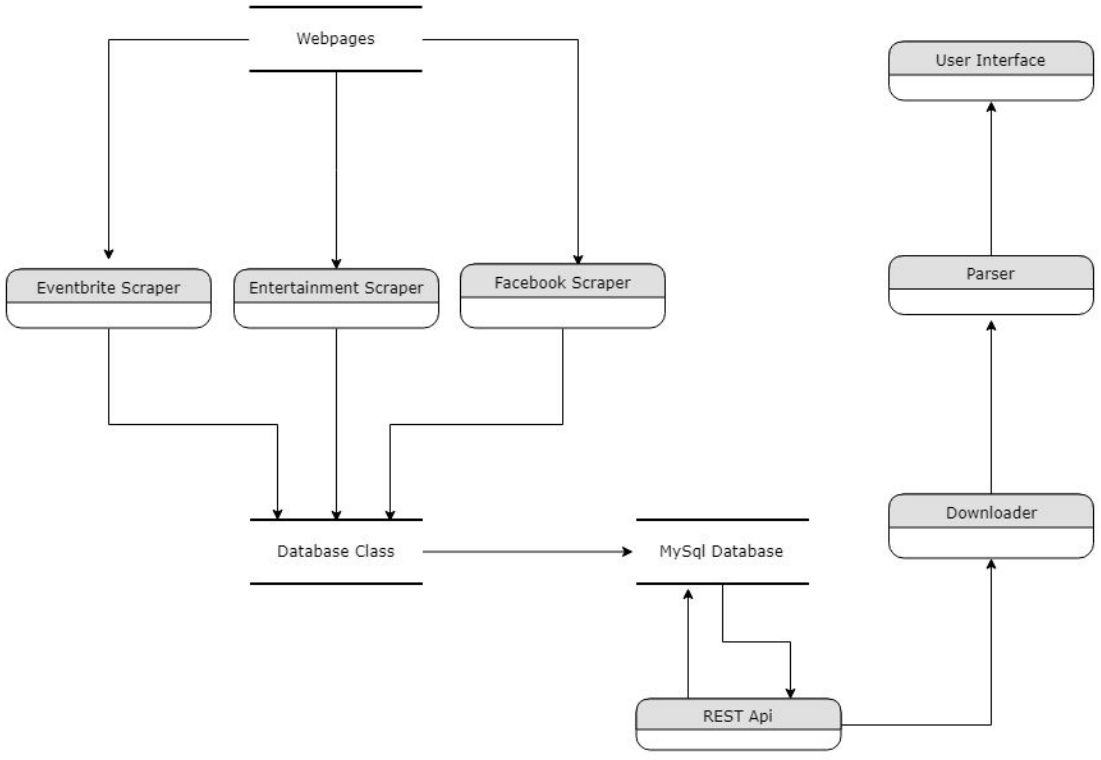
3. HIGH LEVEL DESIGN

Back end

Our database contains two tables, events and venues. The composite key for venues is the name and the address, and the composite key for event is the name, location and date/time. The events has a foreign key on the location column that points to the name of a venue in the venue table.

Our server has a python class that wraps around our database and is specifically made for handling events in the form of tuples. It takes an event and checks the location first to see if it exists in the venues table if it does not it will google the location to see if it can find more info on it and if it finds a sufficient amount of info it adds it to the venues table before going back to checking the rest of the event. It will then check if the event exists in the events table if it does then it will just print an integrity error saying that it is a duplicate otherwise it will add it. There is also a function that takes a generator that outputs event tuples and continues until the generator stops.

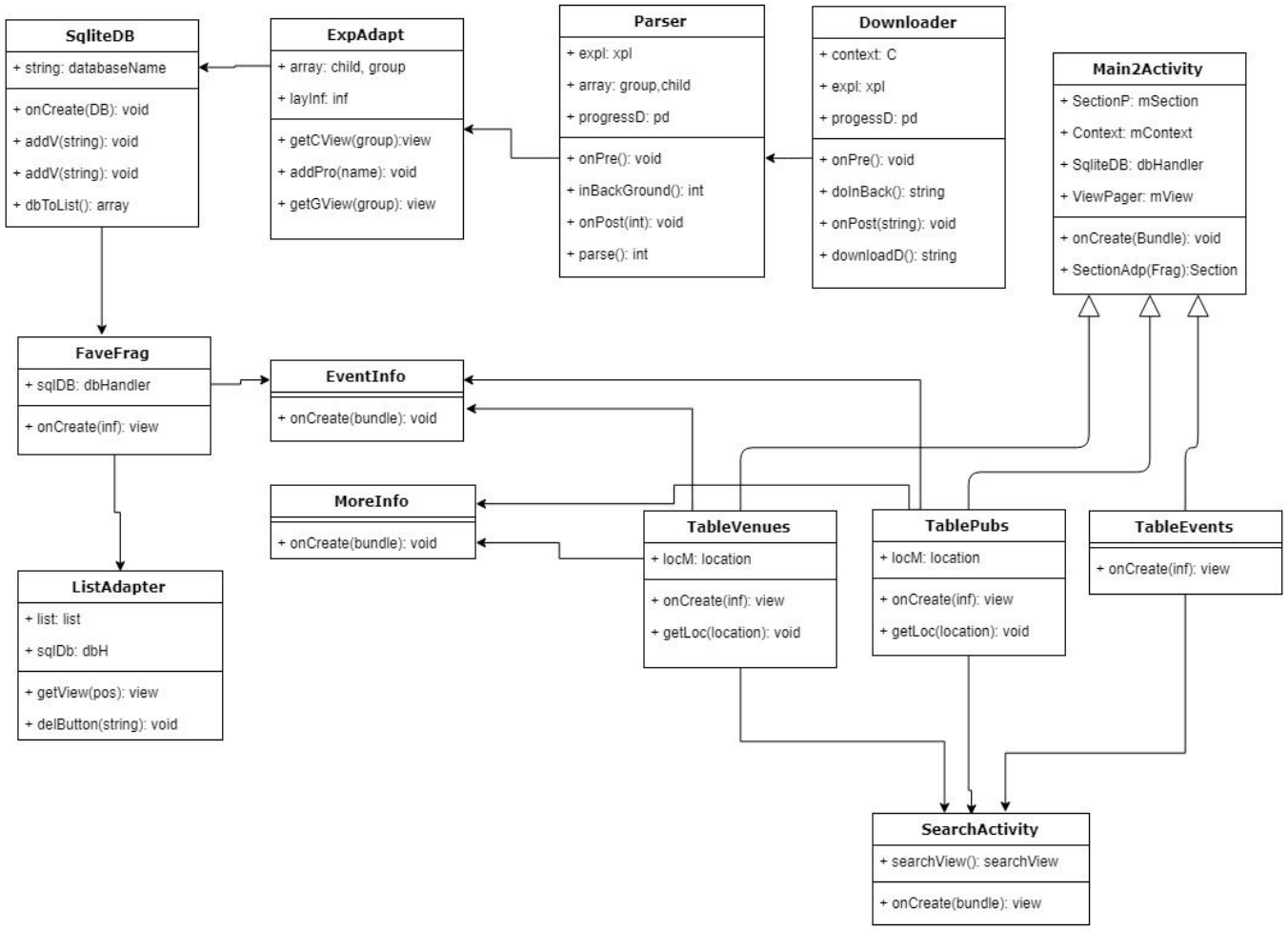
The scrapers are written as multiple functions called as one generator function. This lets us easily write new scrapers to interact with our database. Every scraper will write its output into an log. These logs will contain information on what errors occurred and what events and venues were added to the tables by that scraper.



Front end

The application front end runs on the android operating system. It is designed to work for phones using API 15 and up. We have a base main activity class that is created when the user opens the app. It automatically creates a view of the events database so that a user can start browsing events instantaneously. Data is downloaded from the cloud server database by creating a sql query in php that is then downloaded by the downloader class and the information is then parsed and set in the parser class. Most unique queries required a unique php script.

A user can favourite events or pubs and it is then added to the sqlite database on their device, this allows users to quickly add and remove events or pubs from their favourites if they wish to do so.



4. PROBLEMS AND RESOLUTIONS

Geopy GoogleV3 Limit

Problem

The GoogleV3 class that comes with the geopy package is used to turn addresses into coordinates and when we were using it at the beginning we did not have an api

key this meant we were very limited to how many requests we could make per minute.

Resolution
We fixed this by getting an api key.

Duplicates

Problem
When the database tables were first used we were getting a few duplicates. We realised this was because we had not set our primary keys properly.

Resolution
We fixed this by creating composite keys for the tables.

Entertainment scraper

Problem
The entertainment.ie scraper continually would not retrieve a certain p tag which contained a description about the event.

Resolution
We could not fix this for a while until we decided to change the BeautifulSoup parser from python's built in library to "html5lib". This fixed the problem.

Unicode errors

Problem
Some venue names contained fadas and accents on some websites but didn't on others so this was annoyingly inconsistent and was causing duplicates and/or created unicode errors.

Resolution
We used the Unidecode python package to change the names back to normal letters from the fadas and accents.

Server Problem

Problem

We originally planned to set up our own ssh server and mySql database on a machine we had spare but we realised that the connection wasn't consistent enough and we spent too much time trying to fix it to no avail.

Resolution

We overcame this by switching to a DigitalOcean server instead.

Search Button

Problem

The search button wouldn't appear on the first tab on the android app but would appear on the others. If you swiped off the tab and back it would appear. If you pressed the search icon after it appeared it would give you the results back on a different tab.

Resolution

We overcame it by getting rid of the search icon completely and instead having a search option in the drop down menu which started a new activity to allow a user to search.

Sqlite

Problem

We could not initialize context from a fragment view, this was causing a null pointer exception. Events were being added but weren't actually be stored. Table was not getting created at the launch of the app.

Resolution

We fixed these problems by creating a specific getContext method from the main activity class. This allowed us to get the context initialized before we created the database. After thorough testing we found that the route cause of the problem occured in the addProduct method. We narrowed it down to 2 lines of code that were switched around. This caused no error to be raised by the compiler so it was very hard to track down the problem.

Android mySql Connection

Problem

We could not get the jdbc library to connect to our database.

Resolution

We created a REST api with PHP to retrieve information from the database.

Facebook API

Problem

When searching for pubs we would run out of api calls because we had many to go through and because we had a public api which expired every 24 hours.

Resolution

We were able to get an extended API key by registering our app with the Facebook api.

Entertainment next page

Problem

When collecting the pages to scraped for entertainment.ie there was an error where the link to the next page was not working because it just brought you back to the same page.

Resolution

After lots of debugging and messing with browsers we learned that if the link started with “www” it would not work so removed the “www” and it worked fine.

5. INSTALLATION GUIDE

The required python packages for the server-side of this project are contained in the requirements.txt file. You can install these by running ‘pip install -r requirements.txt’ from your server console. You can download the android app from the Google Play Store.