# BizzTrend: Business Trend Analysis

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## ABSTRACT

Performance of any business is ratings and review driven. The objective of this project is to analyze and identify the relationship between customer satisfaction and businesses performance. BizzTrend website analyses the data to provide an insight into the latest trends of the businesses; compare the performance of the business over the years and the standards violated. It is useful for customers as well as business owners alike. Customers can view it to make decisions as to which one to select and business owners to improve their business strategies by avoiding violations.

## 1. INTRODUCTION

"The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency."
-Bill Gates.
It is very essential to invent correct financial and tactical strategies to enhance business. Data analysis is important in business to understand problems facing an organization, and to explore data in meaningful ways. Data in itself is merely facts and figures. BizzTrend website analyses to provide an insight into the latest trends of the businesses; compare the performance of the business over the years and the standards violated. Forecasting and budgeting could be gauged by the businesses. Strategic planning and anticipating is essential to become a high-flying company and remain one after that status is achieved.

Dataset information is as follows:

The dataset was downloaded form

https://catalog.data.gov/dataset/yelp-data

The dataset has 3 csv files:

- businesses file contains information about names of the various businesses, business id, address of the business, city of the business, state of the business, postal code of the business, latitude, longitude as well as phone number of the business.
- inspections file contains ID of the business, score of the business, date of inspection, description on inspection and type of the inspection.
- violations file contains Id of the business, data, code and description of the violation.

Based on the score provided during inspections, we use graph to visualize the trends in the business. Data is stored in database. BizzTrend website provides user a user interface to view the various trends. BizzTrend internally connects to PostgreSQL database to fetch the business information and uses tableau to show the trends and to analyze the growth or fall of businesses over the years from 2010 to 2018.

BizzTrend website pages:

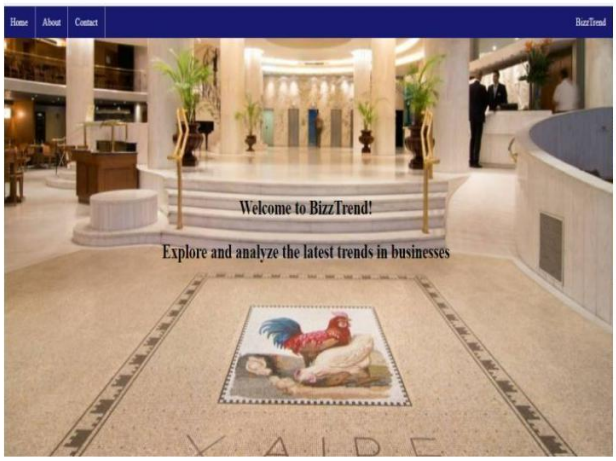


Figure 1: Welcome page


Figure 2 : BizzTrend page

## 2. Architecture

BizzTrend is a website to analyse and display the various trends, patterns in the business industry. It uses data stored in database to provide information to the user. Architecture diagram is as follows:

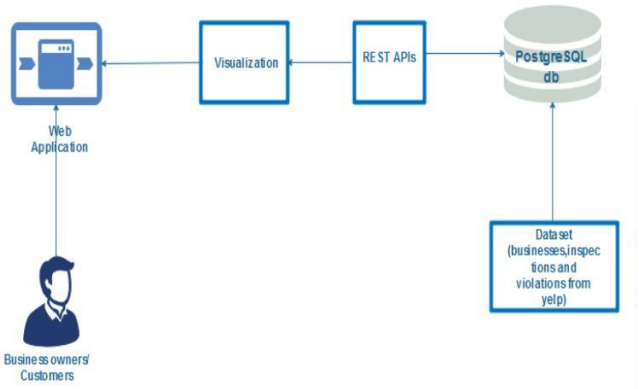


Figure 3: Architecture diagram

Business owners or customers can access BizzTrend application, the application provides a user interface wherein user can select from various options to analyze or explore data regarding various businesses. It provides:

i] Trending businesses

Scores of the businesses are visible on the graph, which is indicative of the businesses that are at the top of their game. Latest businesses can be studied there.

ii] Violations

Analysis of the various violations by the businesses is shown in violations section. Each red circle represents a violation made by the business in that particular year. We can even specify the name of the business which needs to be analyzed and even comparisons could be made amongst different businesses to understand the reason why the business is underperforming.

iii] Analysis of businesses

Interactive graph is available which is capable of dynamically analyzing any number of businesses based on user selection

iv] Business Information

Information about the business regarding their contact details, address is also made available to the users, by fetching the business information from PostgreSQL database, businesses table. Tableau is integrated with the web application to provide graphical visualizations for Trending businesses, Violations and Analysis of businesses. To get business information, user enters the name of the business, that name is passed via html to jQuery. jQuery uses ajax call to call the REST API as follows:

```
$("#submit").click(function(){
        var businessName= $("#BusinessName").val();
        var showData = $("#show-data");

            jQuery.ajax({
                type: "GET",
                url:
'/TableauSQLProject/provide/getbusinessinfo?businessNam
e='+businessName,
                dataType : "json",
                contentType: "application/text",
                data: result.qs ,
                timeout: 200000 ,

            success: function(data)
```

```
$("#submit").click(function(){
        var businessName= $("#BusinessName").val();
        var showData = $("#show-data");

       jQuery.ajax({
           type: "GET",
           url: '/TableauSQLProject/provide/getbusinessinfo?businessName='+businessName,
           dataType : "json",
           contentType: "application/text",
           data: result.qs ,
           timeout: 200000 ,
           success: function(data) {
               if(data){
                   var len = Object.keys(data).length;;
                   var txt = "";
                   if(len > 0){
                       txt += "<tr><td>"+data.hotelName+"</tr><tr></tr><tr></tr><td>"+"A

                       if(txt != ""){
                           $("#show-data").append(txt).removeClass("hidden");
                           $("#show-data").show();
                       }
```

Figure 4: Code

REST API is defined as well:

```
@GET
@Path("/getbusinessinfo")
```

```
@GET
@Path("/getbusinessinfo")
public Response getBusinessDetails(@Context final HttpServletRequest request)
```

Figure 5: REST API code

/getbusinessinfo is the path which invokes REST API. Java code connects to the PostgreSQL businessdb database, to get information about businesses from businesses table.

Entity Relationship diagram is as follows:

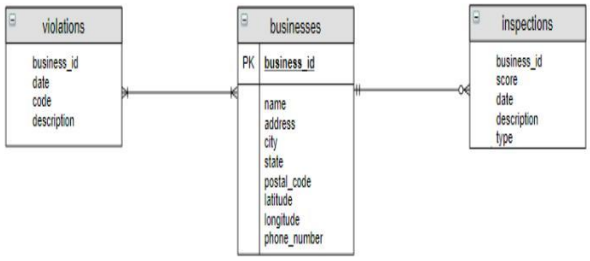


Figure 6: Entity relationship diagram

Once the data is fetched, BusinessProfileBean java object is populated with the details of the business and then it is converted to json and sent back to jQuery, which then displays the data to users by using css styles.

## 3. Implementation

BizzTrend website uses the following technologies to provide a user friendly site

i] REST Service APIs
ii] Java
iii] JavaScript
iv] JQuery
v]Tableau
vi] PostgreSQL
vii] IBM Websphere Liberty server

BizzTrend website provides various tabs which when clicked by the user, uses jQuery to pass the user entered or requested data to the REST Service API. A RESTful API breaks down a transaction to create a series of small modules. Each module addresses a particular underlying part of the transaction. A RESTful API is an application program interface. A RESTful API explicitly takes advantage of HTTP methodologies defined by the RFC 2616 protocol. Rest Service API based on the request connects to PostgreSQL database and fetches the business information and displays to the user. PostgreSQL database has three tables businesses, inspections and violation. CSV file was imported into PostgreSQL; since violations file size was large it was broken down into 5 files and imported into PostgreSQL.

Database Information:

PostgreSQL was used to create database

Command used:

i] business table

```
CREATE TABLE businesses (
        business_id         INT,
        name                VARCHAR(50),
        address    VARCHAR(55),
        city                VARCHAR(20),
        state       VARCHAR(2),
        postal_code         VARCHAR(10),
        latitude    double precision,
        longitude double precision,
        phone_number VARCHAR(14),
        PRIMARY KEY (business_id)
);
```

ii] inspections table

```
CREATE TABLE inspections (
        business_id         INT,
        score INT,
        date Date,
        description VARCHAR(20),
        type VARCHAR(10)

);
```

iii] violations table

```
CREATE TABLE violations (
        business_id         INT,
        date Date,
        code VARCHAR(10),
        description VARCHAR(500)
);
```

| | Table | Owner | Tablespace | Estimated row count |
|---|---|---|---|---|
| ☐ | businesses | jvarghe | | 2429 |
| ☐ | inspections | jvarghe | | 33107 |
| ☐ | violations | jvarghe | | 68848 |

Figure 7: PostgreSQL tables

To display the various trends and to analyze the data, tableau is invoked which displays the interactive graphs, which could be filtered to observe and study the latest trends.

Visualizations are as follows:

### 3.1 Analysis of businesses

An interactive graph has been created which is capable of dynamically analyzing any number of businesses based on user selection. By default all are selected as shown below, which shows the score of businesses spread across years.

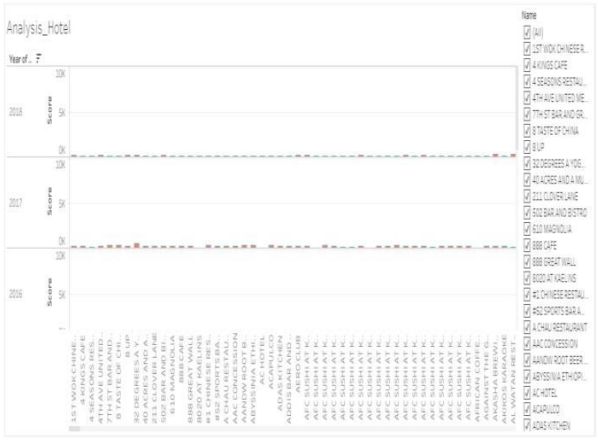


Figure 8: Analysis of business graph 1

Score of each business can be analyzed over the years to study about the progress made or about the reasons of the fall in the score. Based on the requirement, we can select few of them as shown below:

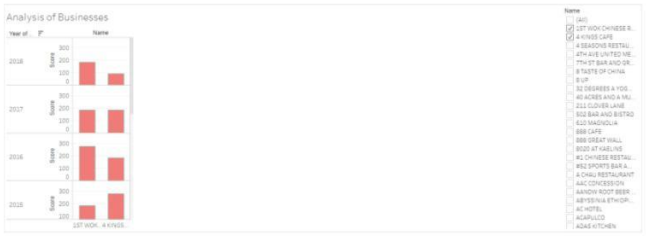


Figure 9: Analysis of business graph 2

Reason for the decline in the score is available in the Analysis of violations graph.

## 3.2 Violations

Analysis of the various violations by the businesses is shown below. Each red circle represents a violation made by the business in that particular year. We can even specify the name of the business which needs to be analyzed and even comparisons could be made amongst different businesses to understand the reason why the business is underperforming. It even helps customers to make decision inorder to select a better business.


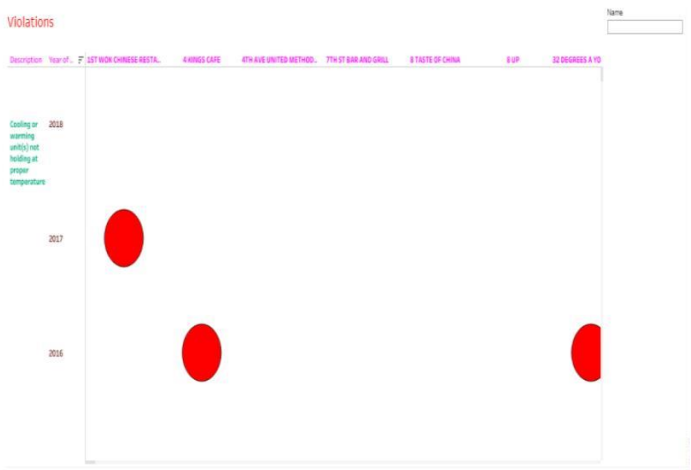


Figure 10: Violation Analysis graph

## 3.3 Trending businesses

It could be used by Business owners to know about their competitor and customers to select from the various businesses. Scores of the businesses are visible on the graph, which is indicative of the businesses that are at the top of their game. Latest businesses can be studied here.

Latest trend is shown as follows:


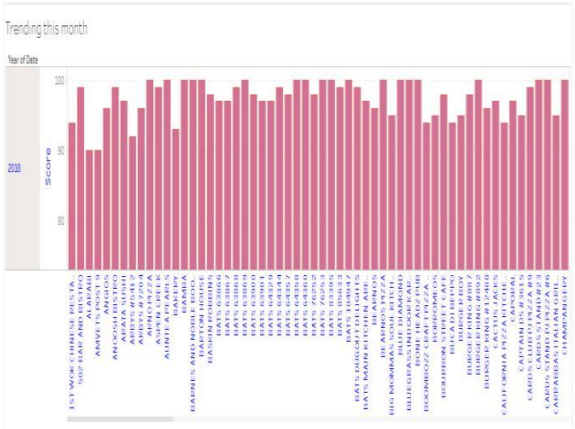


Figure 11: Trending businesses graph

## 3.4 Business Information

Information about the business regarding their contact details, address is also made available to the users, by fetching the business information from PostgreSQL database, businesses table.

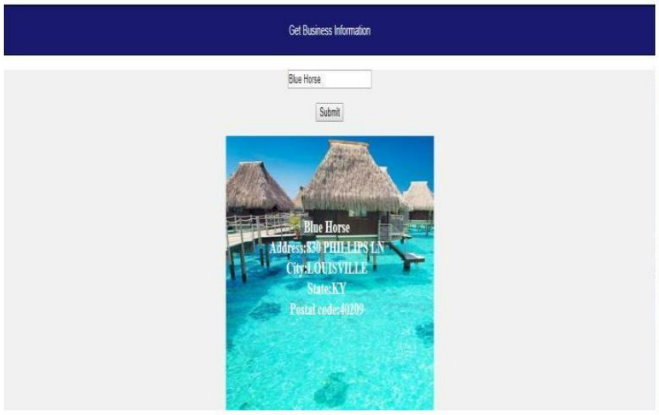


Figure 12: Business Information

## 4. Evaluation

This project uses the dataset provided by yelp to analyze the data to provide an insight into the latest trends of the businesses, compare the performance of the business over the years and the standards violated. Top-level businesses and their information are made available just at the click of a button via BizzTrend. User friendly application as well as graphical representations eases the analysis process.

## 5. Conclusion

This report helps to analyze various trends, patterns in the business. It provides a platform for business users as well as customers to make decisions by providing graphical representations, access to dynamic graphs which could be modified according to the user's requirements. Violations made by businesses are analyzed and businesses can gain perspective as well as enhance profit based on the actions required for making future decisions. Many businesses scored high in routine inspection itself, like MAYAN STREET FOOD, PINOTS PALETTE while CHEDDARS SCRATCH KITCHEN #2142 and several others in followup inspection. PINOTS PALETTE scored a 100 in all the inspections performed till date starting from 2015.

## 6. REFERENCES


[1] Margaret Rouse, "RestFul API," Web Page, Dec. 2016. [Online].Available:https://searchmicroservices.techtarget.com/definition/RESTful-API.

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