Food Violations Report

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Abstract

During this report, we investigate the trends of Food Violations committed by Businesses within California, in addition to analyzing the areas and businesses within California which contribute the most / least amount of Food Violations.

Within our results, we determined that the area with the highest number of Food Violations within California was committing an average of 500-1000% more Violations per month then the state average. Furthermore - from the 906,014 total Food Violations found during the 30-month period we analyzed, we found that just 21 of the 116 different types of Food Violations were responsible for a staggering 90.2% of all Violations that were committed.

We then go on to compare the Food Violations of McDonalds to Burger King, where in addition to both companies committing a high number of Food Violations - we find McDonalds are committing an average of 50% more per month than its biggest competitor.

Introduction

The purpose of assignment 2 was to utilize the python programming language and its NumPy / matplotlib libraries to analyze a collection of raw data provided within 2 excel spreadsheets, before providing various reports / graphs summarizing the data. The raw data contains a large volume of Food Health and Safety Inspections that were performed on various businesses, alongside the Food Violations found within these inspections and their associated details.

MySQL was used to store all the relevant data found within a database, which is then utilized within our analysis to help summarize the data and to identify trends / anomalies found within the Inspections and Violations.

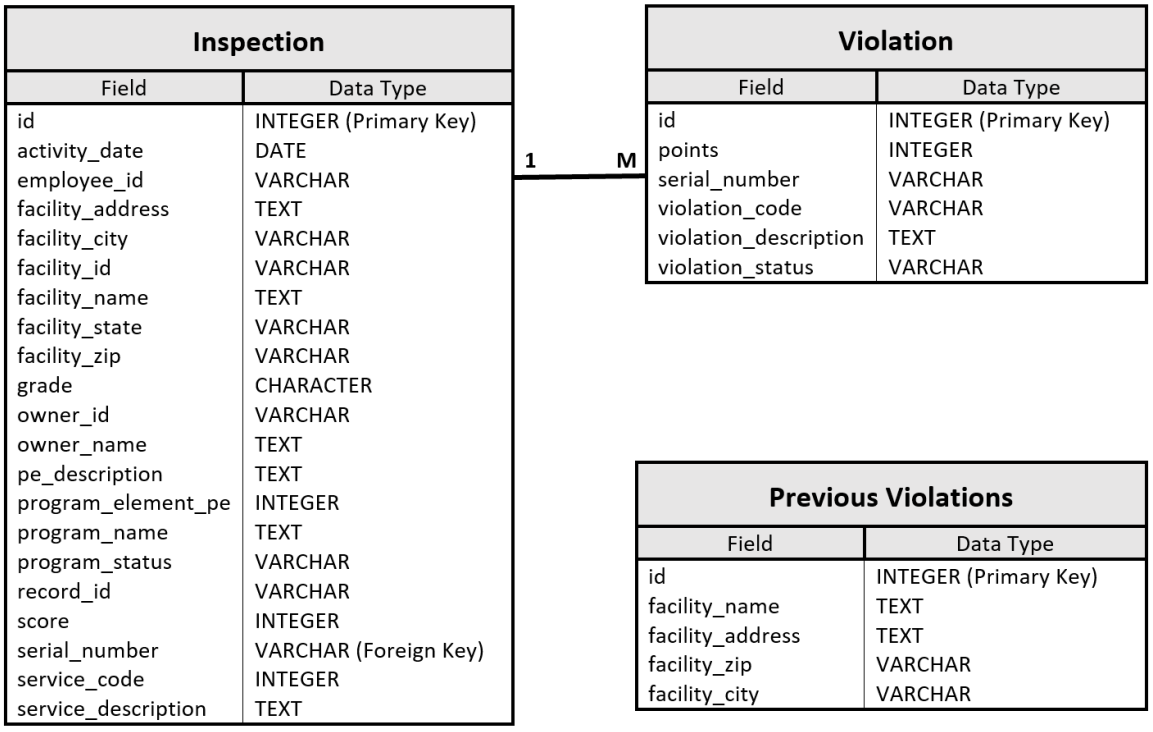
During our analysis – we investigated the Food Violations of each Business, the Food Violations of various areas, and the types of Food Violations found throughout all the Inspections. Subsets of the information are also compared throughout our graphs to highlight any discrepancies found within the data.

Throughout this report, we will be presenting the results of our analysis and discussing any interesting findings that were discovered within our reports summarizing the data.

Database Structure

The raw data gathered from the excel spreadsheets were stored in a MySQL database consisting of 3 tables – Violation, Inspection and Previous Violations. Field names for the tables were kept consistent with the names used throughout the excel spreadsheets.

An ER Diagram for the database is provided below:



Violation counts

During our analysis of the various Violations found during the Business Inspections, we discovered that there was a total of 906,014 Violations found – which were distributed among 116 different types of Violations.

There were clear discrepancies among the results – with only 21 different types of Violations accounting for a staggering 90.2% of the reported Violations, averaging a total of 38,900 breaches each.

Although the Inspected Violations differ in terms of their severity and impact on Health and Food Safety - when comparing these results to the 66 types of Violations which all had less than 100 breaches (averaging just 10 breaches each), it is clear that further incentives / processes could be implemented by the responsible Businesses to reduce these numbers to a much higher standard.

Excel Spreadsheet – Violation Types:

Code	Description	Count
CL21	Public Health Permit/License valid	1
F001	# 01a. Demonstration of knowledge	6883
F002	# 02. Communicable disease; reporting, restrictions & exclusions	40
F003	# 03. No discharge from eyes, nose, and mouth	37
F004	# 04. Proper eating, drinking, or tobacco use	3365
F005	# 05. Hands clean and properly washed; gloves used properly	5152
F006	# 06. Adequate handwashing facilities supplied & accessible	33954
F007	# 07. Proper hot and cold holding temperatures	41110
F008	# 08. Time as a public health control; procedures & records	4707
F009	# 09. Proper cooling methods	7994
F010	# 10. Proper cooking time & temperatures	54
F011	# 11. Proper reheating procedures for hot holding	855
F012	# 12. Returned and reservice food	31
F013	# 13. Food in good condition, safe and unadulterated	5012
F014	# 14. Food contact surfaces: clean and sanitized	34447

F015	# 15. Food obtained from approved source	623
F016	# 16. Compliance with shelf stock tags, condition, displayed	1088
F017	# 17. Compliance with Gulf Oyster Regulations	48
F018	# 18. Compliance with variance, specialized process, & HACCP Plan	214
F019	# 19. Consumer advisory provided for raw or undercooked foods	256
F020	# 20. Licensed health care facilities/public & private schools; prohibited foods not offered	2
F021	# 21b. Water available	6791
F022	# 22. Sewage and wastewater properly disposed	1639
F023	# 23. No rodents, insects, birds, or animals	29730
F024	# 24. Person in charge present and performs duties	983
F025	# 25. Personal cleanliness and hair restraints	11878
F026	# 26. Approved thawing methods used, frozen food maintained frozen	7799
F027	# 27. Food separated and protected	17867
F028	# 28. Fruits and vegetables washed as required	207
F029	# 29. Toxic substances properly identified, stored, used	17986
F030	# 30. Food properly stored; food storage containers identified	39855
F031	# 31. Consumer self service facilities properly constructed and maintained	669
F032	# 32. Food properly labeled & honestly presented	6735
F033	# 33. Nonfood-contact surfaces clean and in good repair	100083
F034	# 34. Warewashing facilities: Adequate, maintained, properly use, test strips available	19210
F035	# 35. Equipment/Utensils - approved; installed; clean; good repair, capacity	80020
F036	# 36. Equipment, utensils and linens: storage and use	49744
F037	# 37. Adequate ventilation and lighting; designated areas, use	48046
F038	# 38. Thermometers provided and accurate	11061
F039	# 39. Wiping cloths: properly used and stored	35849
F040	# 40. Plumbing: Plumbing in good repair, proper backflow devices	50870
F041	# 41. Garbage and refuse properly disposed; facilities maintained	4742
F042	# 42. Toilet facilities: properly constructed, supplied, cleaned	16153
F043	# 43. Premises; personal/cleaning items; vermin-proofing	42949
F044	# 44. Floors, walls and ceilings: properly built, maintained in good repair and clean	102012
F045	# 45. Sleeping quarters	437
F046	# 46. Signs posted; last inspection report available	15736
F047	# 48. Plan Review required for new or remodel construction	607
F048	# 47. Permits Available	5515
F049	# 50. Impoundment of unsanitary equipment or food	5928
F050	# 51. Permit Suspension	2955
F051	# 49. Samples Collected	40
F052	# 01b. Food safety certification	18359

F053	# 21a. Hot Water Available	4218
F054	# 52. Multiple Major Critical Violations / Increased Risk to Public Health	1214
F055	# 01a. Demonstration of knowledge	1515
F056	# 10. Proper cooking time & temperatures	12
F057	# 18. Compliance with variance, specialized process, & HACCP Plan	43
F058	# 19. Consumer advisory provided for raw or undercooked foods	185
MF07	# 07. Adequate handwashing facilities supplied & accessible	1
MF42	# 42. Garbage and refuse properly disposed; facilities maintained	1
SF15	No Health Code Violations Observed At The Time Of Inspection	1
SS33	Garbage / rubbish receptacles not maintained clean and sanitary	1
W001	Proper hot and cold holding temperatures	9
W002	Food in good condition, safe and unadultered	1
W003	Food storage separated and protected	6
W004	Food storage space	3
W005	Food elevated	11
W006	Food packaging protected	2
W008	Rodent	6
W009	Cockroaches	42
W011	Storage of materials 18 inches above the floor.	2
W012	Fly Breeding Material	3
W014	Fly Breeding	5
W016	Building rodent proof	3
W017	Hot and cold water available	18
W018	Waste water or sewage properly disposed or not discharged on the ground.	3
W019	Plumbing approved and maintained in good repair.	15
W020	Wall(s) maintained clean	9
W021	Wall(s) maintained in good repair	6
W022	Wall(s) constructed of approved material	1
W023	Floor maintained clean	23
W024	Floor maintained in good repair	6
W025	Ceiling maintained clean	2
W026	Ceiling maintained in good repair	3
W027	Ceiling constructed of smooth, durable, and non-absorbent material	6
W028	Toilet in good repair	4
W029	Toilet maintained clean / sanitary	6
W030	Hand sink in good repair	1
W031	Hand sink maintained clean / sanitary	4
W032	Toilet room floor / walls / ceiling in good repair	3
W033	Toilet room floor / walls / ceiling clean	2
W034	Toilet room with toilet paper / soap / towels / trash receptacle	4
W035	Toilet room well ventilated	2
W036	Toilet room well lighted	2

W037	Toilet available	1
W038	Hand sink available	2
W039	Proper storage or use of hazardous materials	1
W040	Compliance with shellfish tag requirements	2
W041	Premises maintained clean and sanitary	6
W042	Garbage / Rubbish receptacles approved type	8
W043	Garbage / Rubbish receptacles maintained in good repair	3
W044	Garbage / Rubbish receptacles maintained clean and sanitary	4
W045	No unapproved sleeping accomodations	1
W046	Live animals	2
W047	Thermometer: available, maintained in good repair	8
W048	Permits Available	122
W049	Food from an approved source	5
W050	Food properly labeled	15
W051	Walls, Floors, Ceilings: approved, maintained clean and in good repair	32
W052	Equipment, Shelving, Cabinets: approved, maintained clean and in good repair	31
W053	Permit Suspension	35
WP13	# 13. Disease Transmission - Carrier / Lesion / Rash	1
WP15	# 15. Tobacco / Eating / Drinking / Habits / Behaviors	1
WP16	# 16. Hair Restraints / Outer Garments / Nails / Rings	1
WP18	# 18. Personal Hygiene	1
	Total Violations	906014

Violations over time

During our analysis of the Zip Codes with the Least / Most amount of total Violations, we can see within our results that there is a clear discrepancy between the Monthly Violations committed by the Zip Code with the highest number of Violations (Zip Code 91748) compared to the average number of Violations committed within all of California and the Zip Code with the least number of total Violations (Zip Code 90005-2586). We can see clearly within Plot 1 that at no stage during the 30 months covered does the Zip Code 91748 have less monthly Violations then the average within California. Furthermore, the Zip Code 91748 has periods during the graph where their Violations exceed 500 per month– which ranges between a 500-1000% increase on the amount of the average Violations for California during the same time periods, and clearly indicates there are poor Food and Safety / Hygiene standards being practiced by the Businesses within this area.

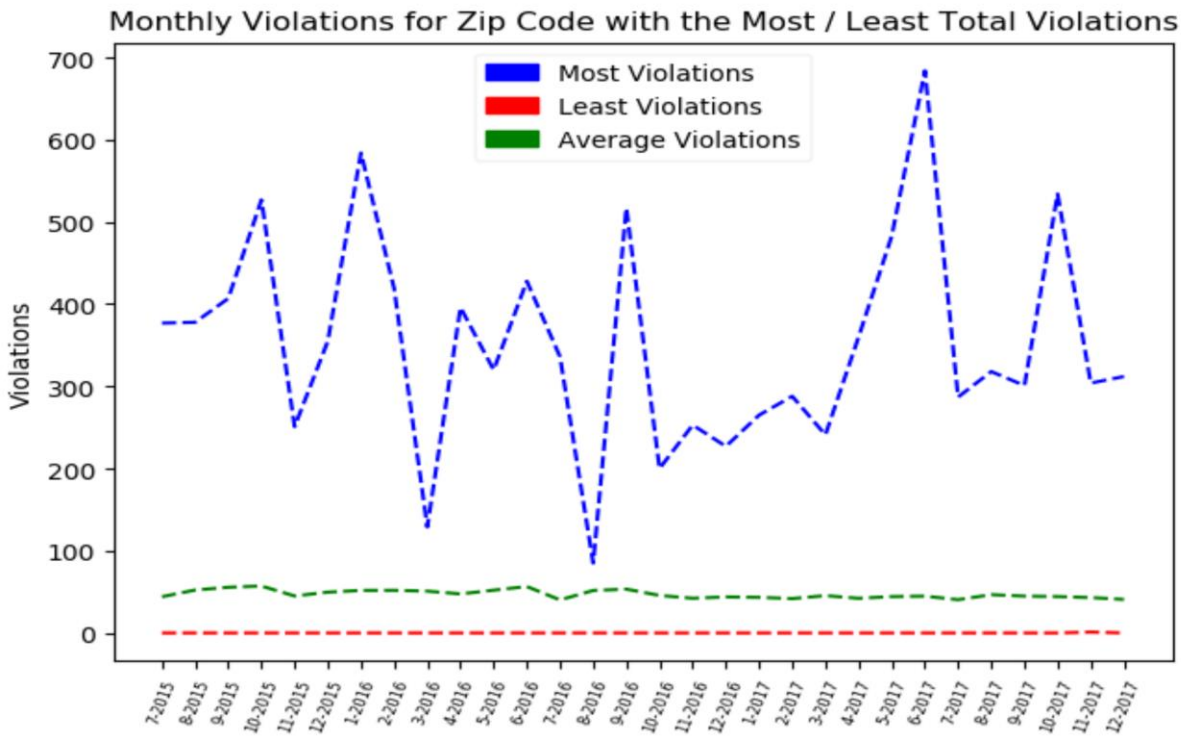
The Zip Code with the least amount of Violations (90005-2586) was found to only have a single violation during the month 11/2017, where only a single Business was inspected. Although the graph may indicate that this area is very hygienic / upholds Food Health and Safety standards to a high level – there was only a single Inspection performed within this area that led to the 1 Violation being found, so further inspections and results for this area will need to be recorded before an accurate analysis / interpretation of this data can be provided. Furthermore – the Zip Code 90005-2586 may be a subsidiary of another Zip Code (such as 90005).

During our analysis of the average monthly Violations committed by all McDonalds / Burger Kings, we found that on average Burger King had far fewer Food Violations than McDonalds – indicating that Burger King tend to follow higher Food Health and Safety / Hygiene Standards. We can see within Plot 2 that on average McDonalds tends to commit 50% more

Food Violations than the average Burger King store, with Burger King only committing more Food Violations during the single month of 11/2017.

The results also indicate that both companies have not made many significant improvements in their Food Health and Safety standards during the 30 month period covered – as the data for both Companies only tends to vary from month to month (or for small periods), but both maintain close to a flat trend / oscillate around the same average values for the time period covered.

Plot 1 – Monthly Violations for Zip Codes with Most / Least Violations:



Plot 2 – Monthly Violations for all McDonalds and all Burger Kings: