BAR DOUGH
HELL'S KITCHEN NYC

BAR DOUGH'S
DATA-DRIVEN INSIGHTS

Sigfús Árnason

TAKEAWAYS FROM INITIAL MEETING

1

HAPPY HOUR MENU ALTERATION ANALYSIS:

- Time-Series Analysis: Examines the influence of happy hour on overall sales.
- Discount Impact Analysis: Evaluates the effectiveness and true value of happy hour promotions.

2

OPERATIONAL HOURS RECONSTRUCTION

- Late Night Sales Analysis: Sales trends during standard dinner hours versus late-night operations.
- Cost-Benefit Analysis: Assesses the profitability of operating the kitchen during late hours.
- Labor Optimization Strategy: Examines workforce allocation to maximize efficiency in relation to sales trends.

MANAGING OUT DATASET: TOAST

WHAT WAS GIVEN

Full access to Toast

THE PROBLEM

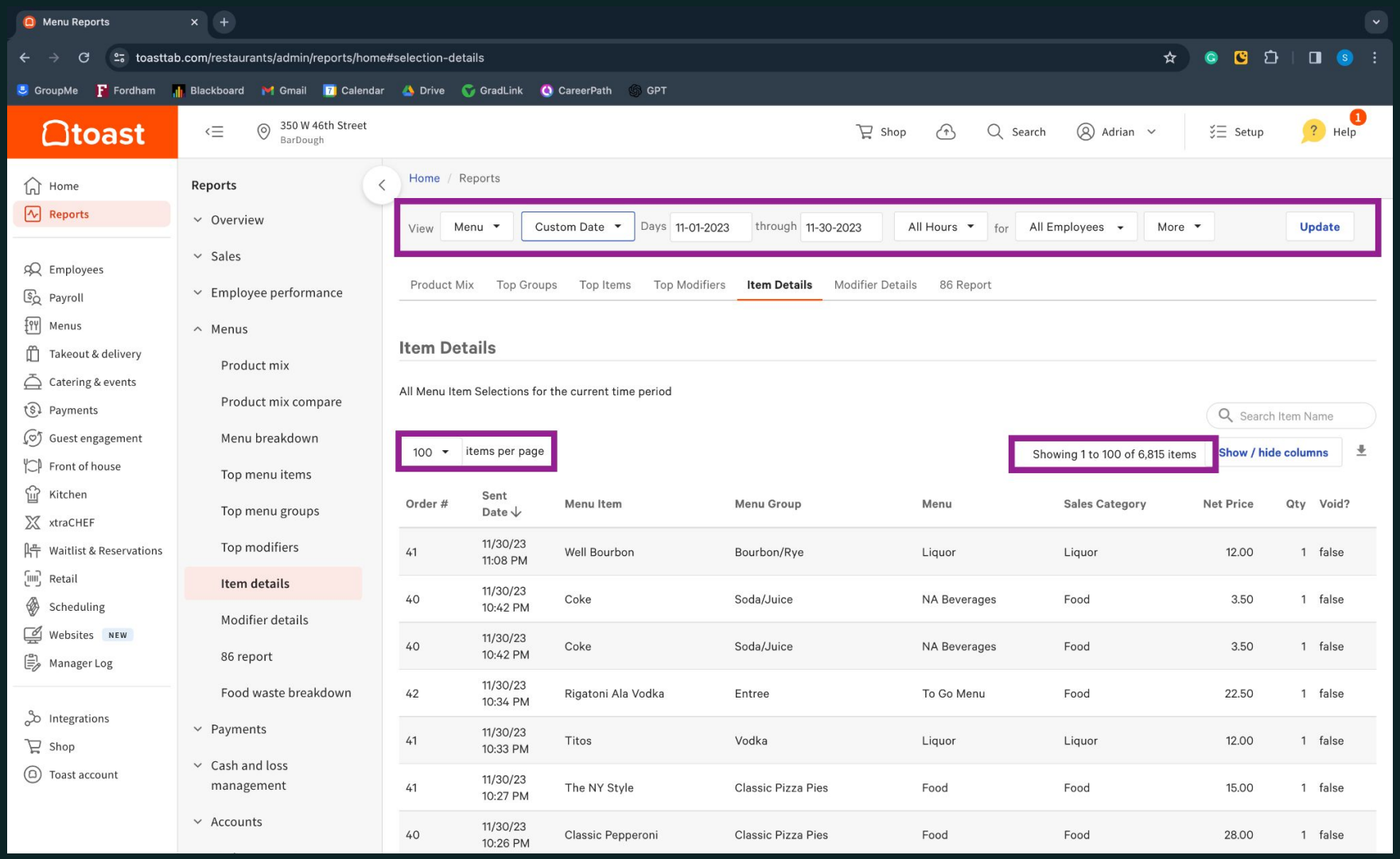
Restriction of Data Extraction

THE SOLUTION

Selenium

OUTPUT

Two Extensive Data Sets
- 68,000 & 2,300 entries



Order #	Sent Date	Menu Item	Menu Group	Menu	Sales Category	Net Price	Qty	Void?
41	11/30/23 11:08 PM	Well Bourbon	Bourbon/Rye	Liquor	Liquor	12.00	1	false
40	11/30/23 10:42 PM	Coke	Soda/Juice	NA Beverages	Food	3.50	1	false
40	11/30/23 10:42 PM	Coke	Soda/Juice	NA Beverages	Food	3.50	1	false
42	11/30/23 10:34 PM	Rigatoni Ala Vodka	Entree	To Go Menu	Food	22.50	1	false
41	11/30/23 10:33 PM	Titos	Vodka	Liquor	Liquor	12.00	1	false
41	11/30/23 10:27 PM	The NY Style	Classic Pizza Pies	Food	Food	15.00	1	false
40	11/30/23 10:26 PM	Classic Pepperoni	Classic Pizza Pies	Food	Food	28.00	1	false

SELENIUM STEP 1: LOGGING INTO ACCOUNT

```
# Open the web page that we want open and log in.
path = "/Users/sigfus/Desktop/Fordham MSBA/Fall 2023/Web Analytics/Project/Selenium/chromedriver"
s = Service(path)
driver = webdriver.Chrome(service = s)
driver.get("https://www.toasttab.com/login")
```

```
# Locate the username input field
username = driver.find_element(By.ID, 'username')
```

```
# Sign in with email first
userid = '[redacted]'
username.send_keys(userid)
```

```
# Click the sign in button to prompt password
sign_in_button = driver.find_element('xpath', '/html/body/div[2]/main/section/div/div/div/div/div/form/div[2]/bu
sign_in_button.click()
```

```
# Locate the password input field
password = driver.find_element(By.ID, 'password')
```

```
# Sign in with password second
key = '[redacted]'
password.send_keys(key)
```

```
# Click the sign in button to enter page
sign_in_button = driver.find_element('xpath', '/html/body/div[2]/main/section/div/div/div/form/div[3]/button')
sign_in_button.click()
```

```
# Get url of Item Detail page (under reports --> menu)
url = 'https://www.toasttab.com/restaurants/admin/reports/home#selection-details'
driver.get(url)
```

SELENIUM STEP 2: RUNNING AUTOMATED CRAWLING FUNCTION MONTH BY MONTH

```python
# Crawl time entry month by month

nov_employee = []
nov_job_title = []
nov_in_date = []
nov_out_date = []
nov_total_hours = []
nov_unpaid_break = []
nov_paid_break = []
nov_payable_hours = []

page = 0
while page < 3:

    # Crawl page
    soup = bs(driver.page_source)

    # Crawl first page
    ## Odd rows
    odd_rows = soup.find_all(class_ = 'odd')
    odd_list = []
    for row in odd_rows:
        # Find all cells in the row and loop through them
        odd_cells = row.find_all('td')
        for cell in odd_cells:
            # Extract text from each cell and convert to int if possible
            odd_text = cell.get_text()
            odd_list.append(odd_text)
    ## Even rows
    even_rows = soup.find_all(class_ = 'even')
    even_list = []
    for row in even_rows:
        # Find all cells in the row and loop through them
        even_cells = row.find_all('td')
        for cell in even_cells:
            # Extract text from each cell and convert to int if possible
            even_text = cell.get_text()
            even_list.append(even_text)
    # Combine lists
    total_list = odd_list + even_list
```

```python
    # Sort and append lists
    employee = total_list[::8]
    nov_employee.append(employee)

    job_title = total_list[1::8]
    nov_job_title.append(job_title)

    in_date = total_list[2::8]
    nov_in_date.append(in_date)

    out_date = total_list[3::8]
    nov_out_date.append(out_date)

    total_hours = total_list[4::8]
    nov_total_hours.append(total_hours)

    unpaid_break = total_list[5::8]
    nov_unpaid_break.append(unpaid_break)

    paid_break = total_list[6::8]
    nov_paid_break.append(paid_break)

    payable_hours = total_list[7::8]
    nov_payable_hours.append(payable_hours)

    # Click to next page
    time.sleep(4)
    #Scroll down to the bottom of the page
    driver.execute_script("window.scrollTo(0, document.body.scrollHeight);")
    #wait for page to be loaded
    time.sleep(4)
    #find and click 'next' button
    #next_page_button = driver.find_element('xpath', '//*[@id="labor-time-entries-table_wrapper"]/div[3]/div/div
    next_page_button = driver.find_element('xpath', '//*[@id="labor-time-entries-table_wrapper"]/div[3]/div/div/
    next_page_button.click()
    time.sleep(4)

    page += 1
```

SELENIUM STEP 3: CHECKING FOR DUPLICATE LISTS (RE-RUN IF DUPLICATE)

```
# Check for duplicate pages (error in crawling/page switching)
# For loop to go through each page's data
for i in range(len(nov_employee)):
    # Nested for loop to go through other pages' data
    for j in range(i+1, len(nov_employee)):
        # Evaluation to see if page i's data is equal to other lists' data
        if nov_employee[i] == nov_employee[j]:
            # Where the duplicates are found
            print("The lists at index {} and {} are equal".format(i, j))
```

SELENIUM STEP 4: EXPANDING PAGE LISTS INTO MONTHLY LIST

```
# Combine page lists into one huge list
comp_nov_employee = [inner_item for outer_item in nov_employee for inner_item in outer_item]
comp_nov_job_title = [inner_item for outer_item in nov_job_title for inner_item in outer_item]
comp_nov_in_date = [inner_item for outer_item in nov_in_date for inner_item in outer_item]
comp_nov_out_date = [inner_item for outer_item in nov_out_date for inner_item in outer_item]
comp_nov_total_hours = [inner_item for outer_item in nov_total_hours for inner_item in outer_item]
comp_nov_unpaid_break = [inner_item for outer_item in nov_unpaid_break for inner_item in outer_item]
comp_nov_paid_break = [inner_item for outer_item in nov_paid_break for inner_item in outer_item]
comp_nov_payable_hours = [inner_item for outer_item in nov_payable_hours for inner_item in outer_item]
```

SELENIUM STEP 5: CREATING MONTHLY AND FULL YEAR DATA FRAMES

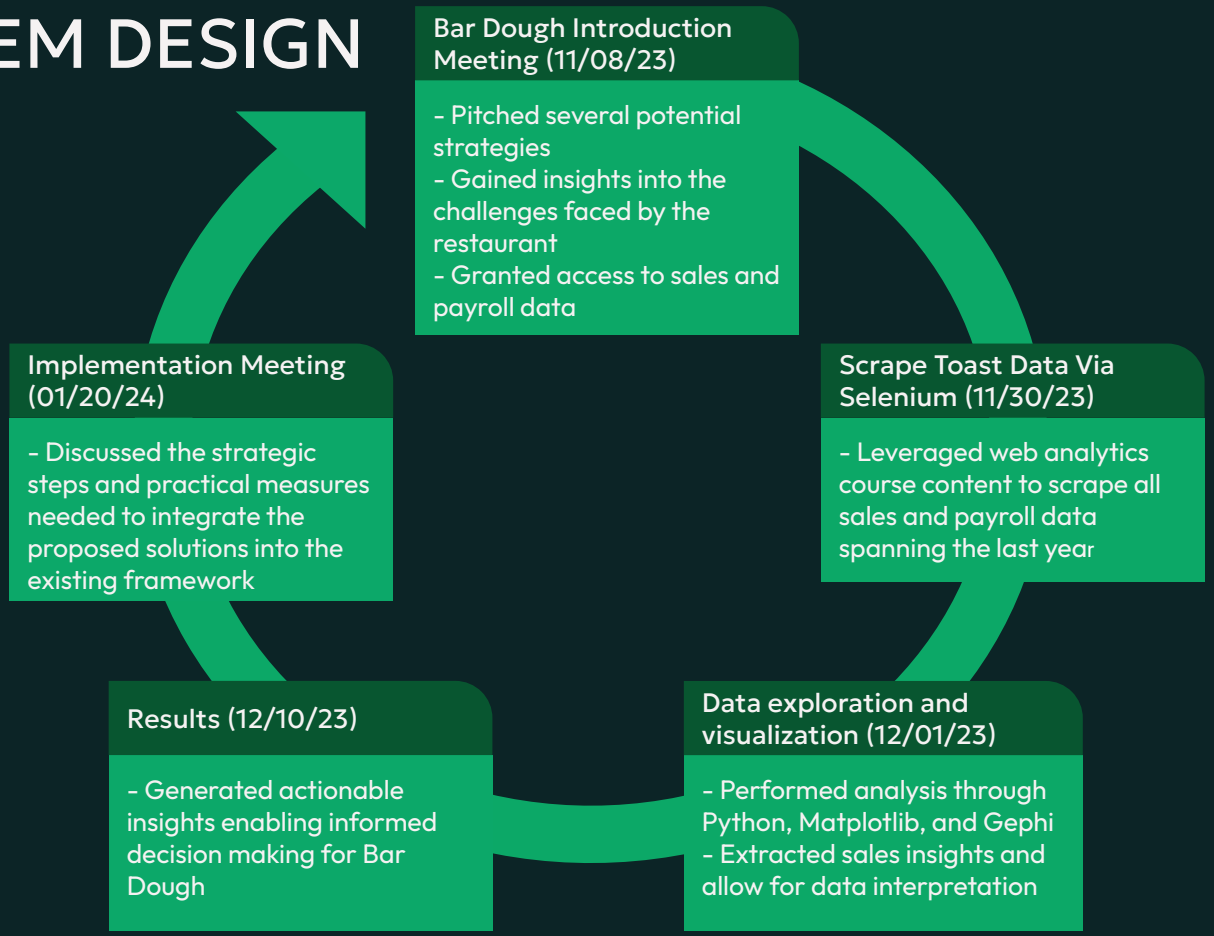
```
# Create data frame
nov_time_entries = {'Employee': comp_nov_employee,
                'Job Title': comp_nov_job_title,
                'In Date': comp_nov_in_date,
                'Out Date': comp_nov_out_date,
                'Total Hours': comp_nov_total_hours,
                'Unpaid Break Time': comp_nov_unpaid_break,
                'Paid Break Time': comp_nov_paid_break,
                'Payable Hours': comp_nov_payable_hours
                }

nov_time_entries = pd.DataFrame(nov_time_entries)
nov_time_entries.sort_values(by = "In Date")
nov_time_entries.shape
```

```
(222, 8)
```

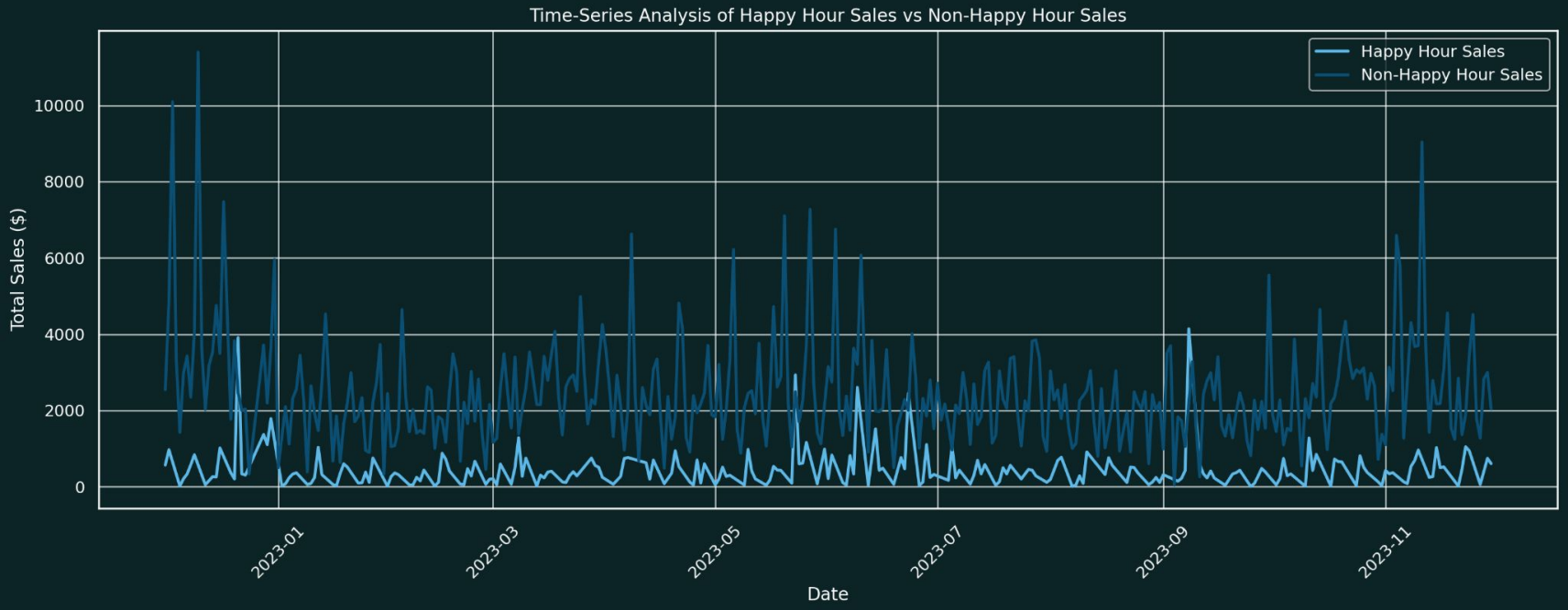
```
# Create a list of the 12 monthly data frames
time_entries_seperate = [dec_22_time_entries, jan_time_entries, feb_time_entries,
                         mar_time_entries, apr_time_entries, may_time_entries,
                         jun_time_entries, jul_time_entries, aug_time_entries,
                         sep_time_entries, oct_time_entries, nov_time_entries]
```

```
# Combine them into one data frame with a new index rather than index from monthly data frames
time_entries_full = pd.concat(time_entries_seperate, ignore_index = True)
time_entries_full.shape
```

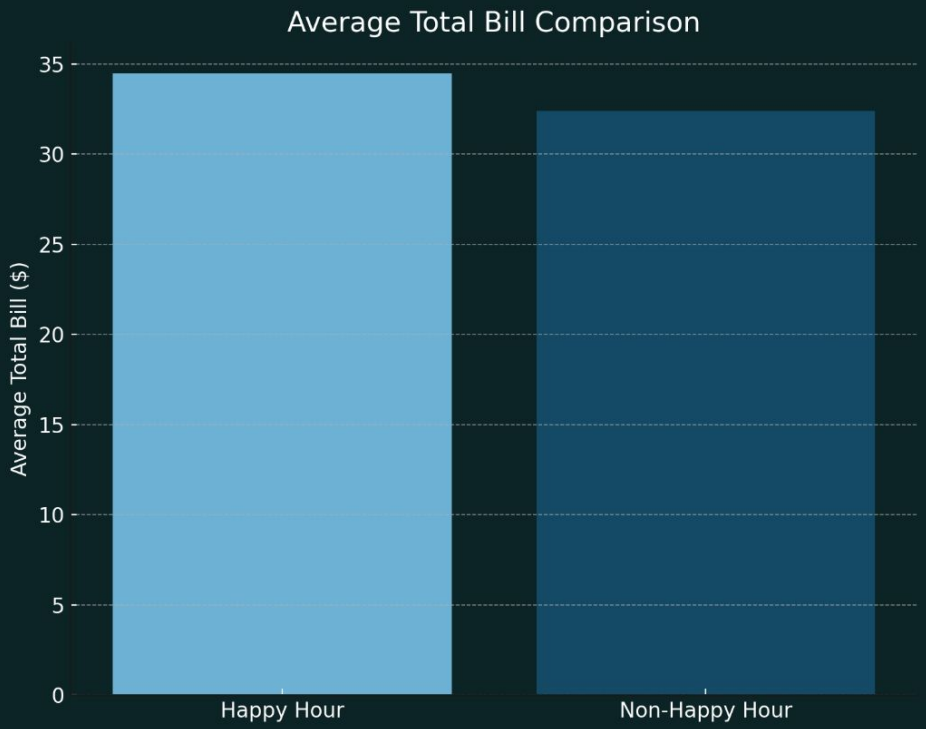
SYSTEM DESIGN



HAPPY HOUR MENU OPTIMIZATION



HAPPY HOUR MENU OPTIMIZATION



HAPPY HOUR MENU OPTIMIZATION

HAPPY HOUR MENU OPTIMIZATION

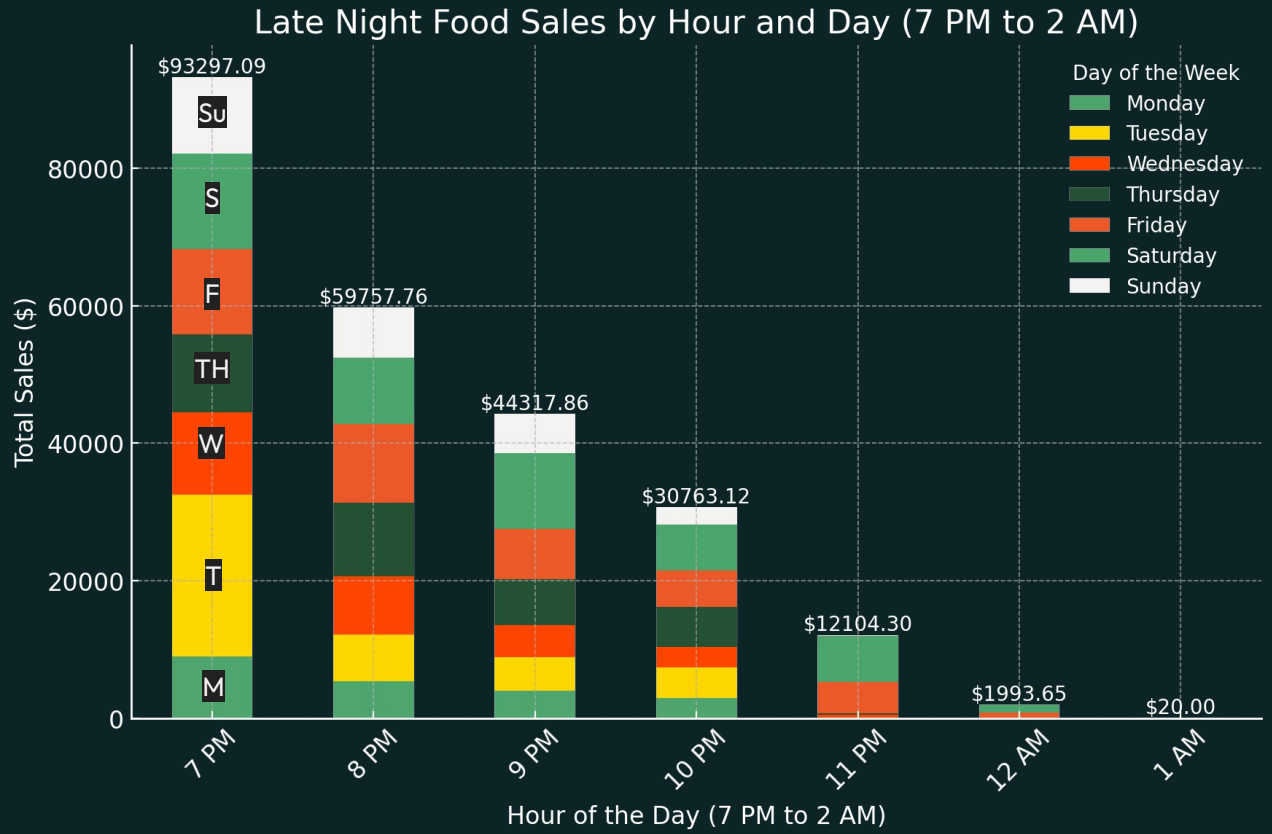
ANALYSIS

- Average Total Bill During Happy Hour: **$34.49**
- Average Total Bill Outside of Happy Hour: **$32.40**
- Average Customer Visits During Happy Hour: **6.90 visits per day**
- Average Customer Visits Outside of Happy Hour: **34.14 visits per day**
- Monday & Tuesday low HH sales.

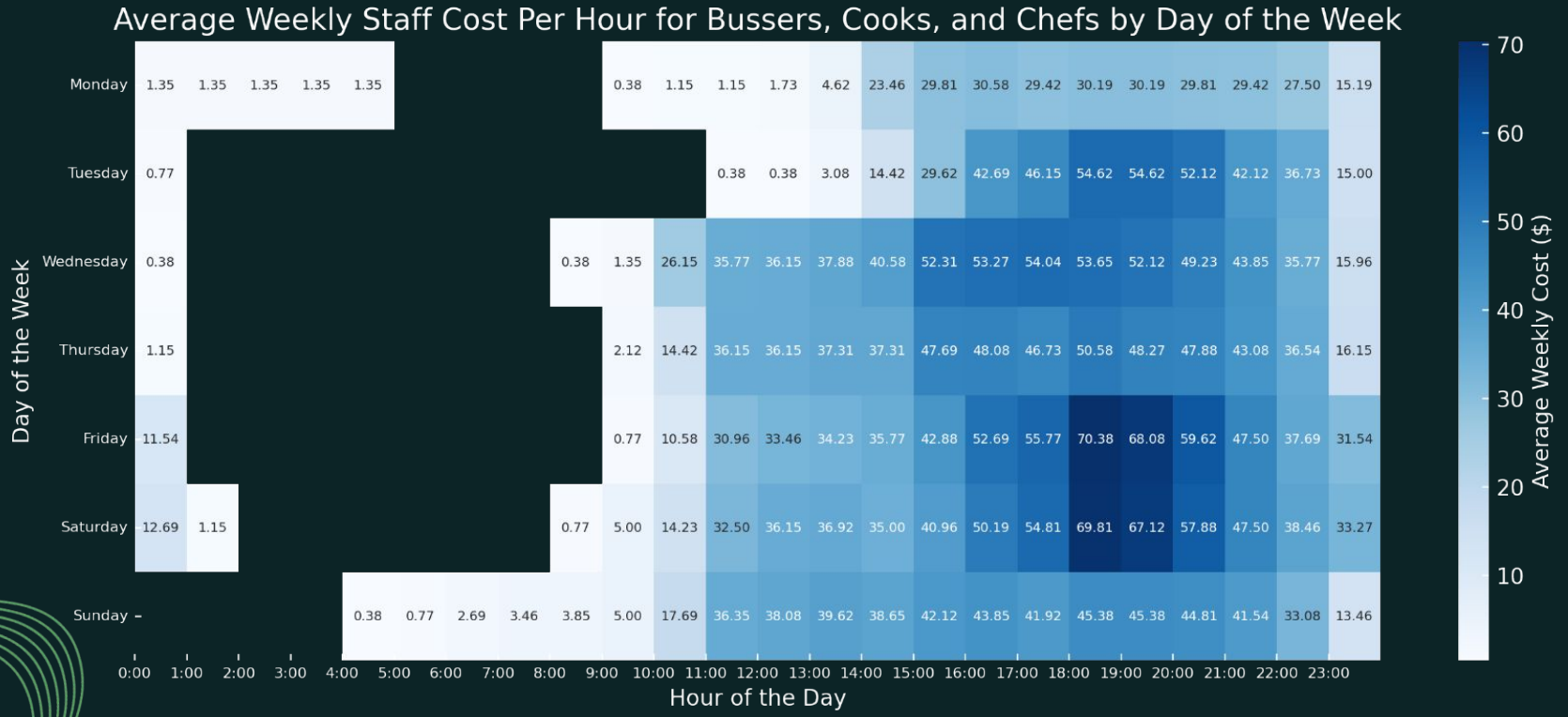
RECOMMENDATIONS

- **Enhance Promotion Visibility:** Increase awareness of Happy Hour promotions.
- **Review Discount Strategy**: Consider altering the discount structure & or HH menu.
- **Special Happy Hour Events:** Create special events or themes during Happy Hour to attract more customers, focused on Monday & Tuesday (4-9pm). Leverage NYC i.e. Sporting events, Broadway shows etc.

OPERATIONAL HOURS RECONSTRUCTION



OPERATIONAL HOURS RECONSTRUCTION



OPERATIONAL HOURS RECONSTRUCTION

ANALYSIS

- **Average First Purchase Time:**
  - Monday: 4:40PM
  - Tuesday: 4:26PM
  - Wednesday: 12:17PM
  - Thursday: 12:40PM
  - Friday: 12:27PM
  - Saturday: 12:08PM
  - Sunday: 12:15PM
- **Average Last Purchase Time:**
  - Monday: 10:39PM
  - Tuesday: 11:03PM
  - Wednesday: 10:59PM
  - Thursday: 11:12PM
  - Friday: 11:44PM
  - Saturday: 11:48PM
  - Sunday: 10:49PM

RECOMMENDATIONS

- **Reconstruct Kitchen Menu Hour:**

Day of the Week	Current Hours	Recommended	Money Saved*
Monday	4:00PM-11:00PM	4:30PM-11:00PM	$15.29
Tuesday	4:00PM-11:00PM	4:30PM-11:00PM	$21.34
Wednesday	11:30AM-11:00PM	12:00PM-11:00PM	$17.88
Thursday	11:30AM-11:00PM	12:30PM-11:00PM	$35.96
Friday	11:30AM-11:30PM	12:30PM-12:00AM	$16.44
Saturday	11:30AM-11:30PM	12:00PM-12:00AM	$0
Sunday	11:30AM-11:00PM	12:00PM-11:00PM	$18.18

*Based on the average pay for the difference in operational hours in the recommended section

- $125.1 saved per week
- $6,504.42 saved per year