Developer Guide

Grocery Spending App

HCI 584X – Summer 2021
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Sarah “Kristi” Morris

Overview

Introduction

Buying groceries can quickly become a costly expense, with consumers constantly searching for ways to save money. Apps are readily available that show grocery spending at a high level, but how might users track and trend their spending habits on actual grocery items?

To solve the problem of being unable to analyze grocery transactions at an item level, the Grocery Spending app was developed and implemented. The goal of this solution is help users find ways to save money on groceries by providing them with an interactive dashboard to analyze grocery item spending and offer personal insights into spending habits.

Implemented Features

- Allow user to input purchased grocery item and assign item to a category.
- Allow user to select month and category to view spending analysis.
- Analyze spending through visualizations:
    - Pie chart: total amounts spent for all categories for a selected month.
    - Pie chart: total amounts spent per item for a selected month and category.
    - Data table: purchased item information for a selected month and category.
    - Bar chart: total amounts spent for a selected category for all months.

Technical Specifications

The app was developed using Python and runs off of a Dash platform. Data is saved to a CSV file and queried using a Pandas dataframe.

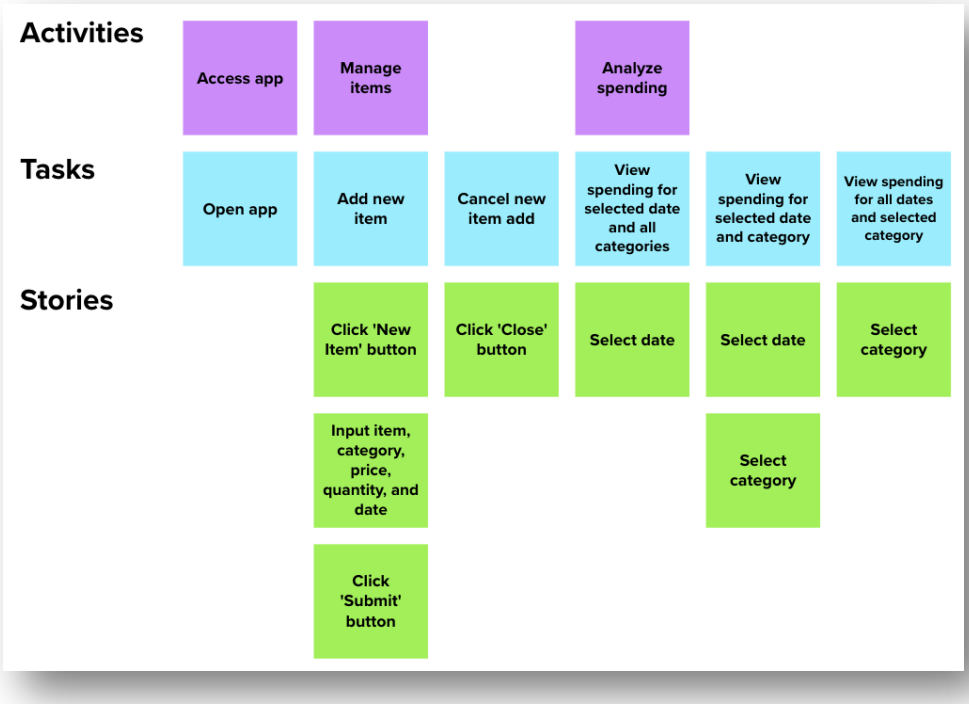
The following packages were imported:

Package	Version
Dash	1.20.0
Dash Bootstrap Components	0.12.2
Dash Core Components	1.16.0
Dash HTML Components	1.1.3
Dash Table	4.11.3
Pandas	1.2.4
Plotly Express	0.4.1
Python	3.8.8

User Activity Flow

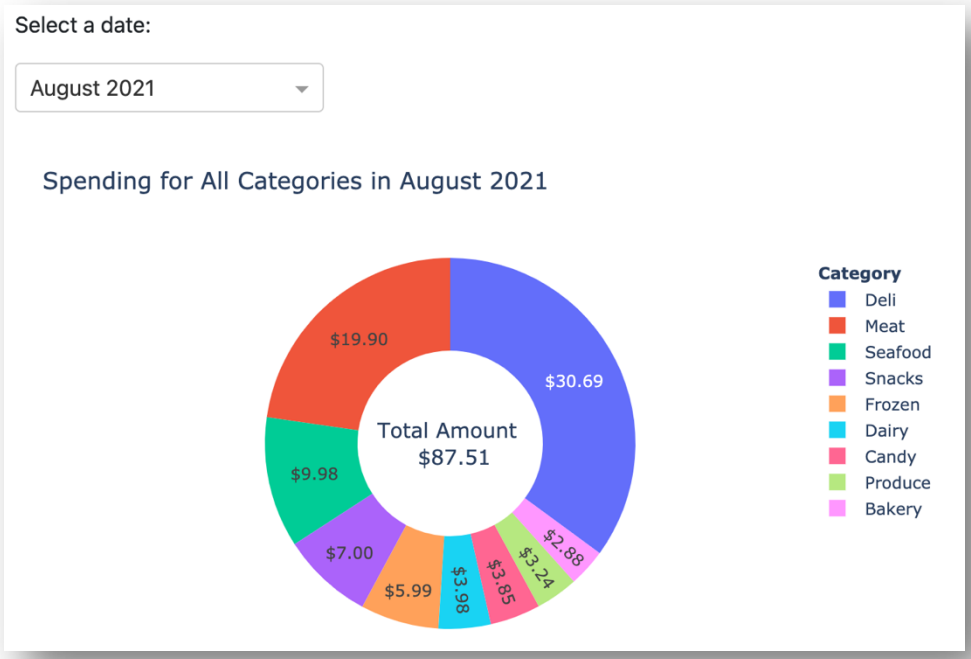
Overview

The user's journey is outlined in the diagram below:

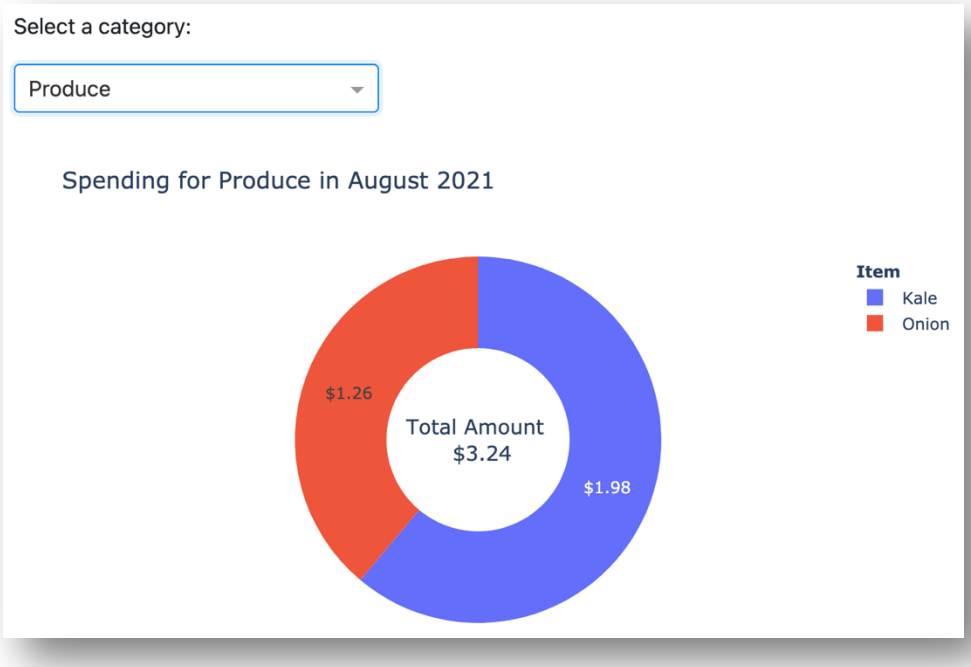


A user accesses the app locally from their web browser. Upon running the app, a one-page dashboard loads with four components that display the user's grocery spending habits for a specific month and/or category.

The first component is a pie chart that is filtered by a month. It displays the total spending amounts for all categories for the selected month. The user selects a month from the dropdown to update the pie chart with the data for the selected month.



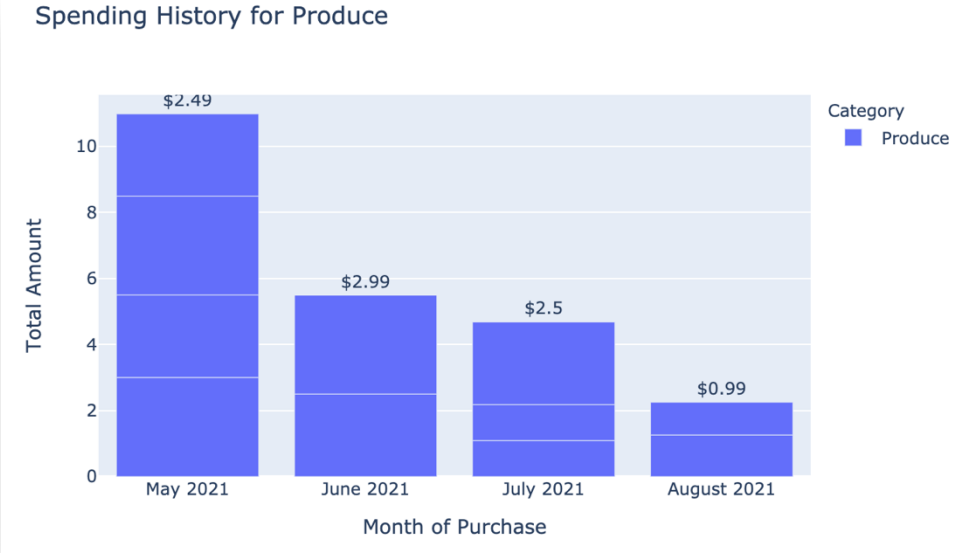
The second component is a pie chart that is filtered by both a month and category. It displays the total spending amounts per item for the selected month and category. The user selects a month and category from the dropdown to update the pie chart with the data for the selected month and category.



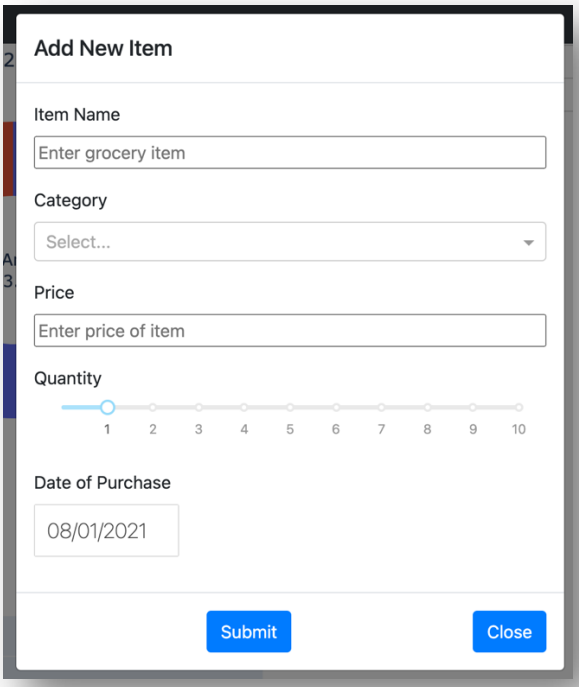
The third component is a data table that is filtered by both a month and a category. It lists the item name, price, quantity and purchase date per item for the selected month and category. The user can sort and page through the table. The user selects a month and category from the dropdown to update the table with the data for the selected month and category.

Name	Price	Quantity	Date
Onion	$1.26	1	2021-08-01
Kale	$0.99	2	2021-08-01

The fourth component is a bar chart that is filtered by a category. It displays the total spending amounts for the selected category for all months. The user selects a category from the dropdown to update the bar chart with the data for the selected category.

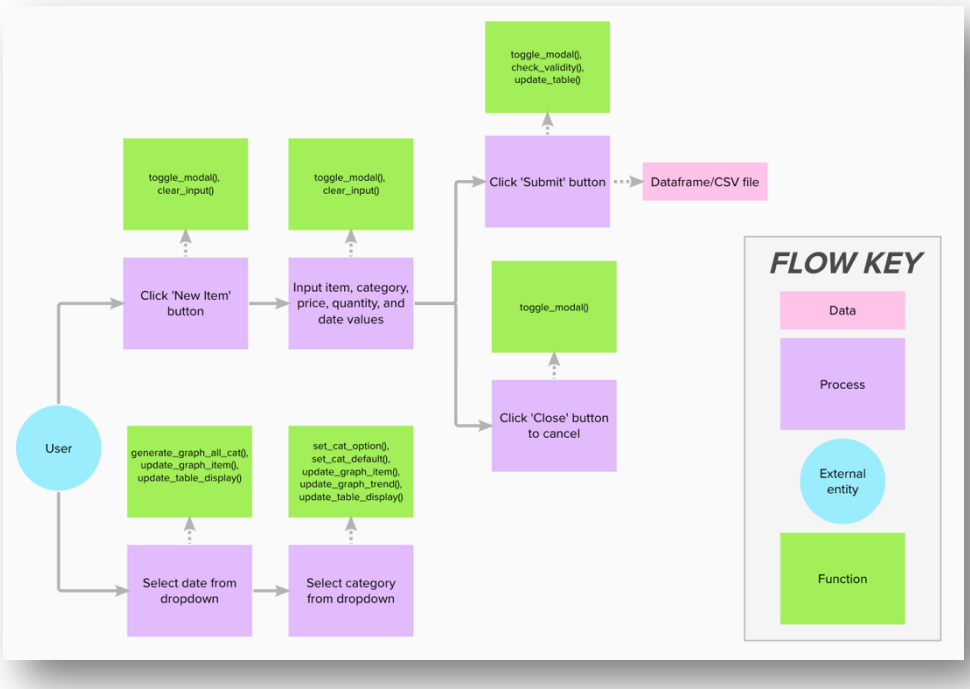


In addition to the dashboard components, the user is able to add new grocery items to the app. To add a new item, the user clicks on the ‘New Item’ button. A modal window opens with a form to input the item. The user types in the item name, selects a category from the dropdown, enters the price of the item, selects the quantity from the slider, and selects the purchase date. The user then clicks ‘Submit’ to add the new item or ‘Close’ to close the modal window and cancel adding the item.



User Flow

The user flow is outlined in the diagram below along with a table detailing the functions used at each stage of the flow:



Function	Description	User Story
Toggle_modal()	Open and closes modal and checks input validation	Click ‘New Item’ button, Input item form values, click ‘Submit’ button, click ‘Close’ button
Clear_input()	Clears input values when modal is opened	Click ‘New Item’ button, input item form values
Set_cat_option()	Sets category dropdown options based on month selected	Select category from dropdown
Set_cat_default()	Sets category dropdown default value	Select category from dropdown
Generate_graph_all_cat()	Generates pie chart displaying spending amounts in all categories for selected month	Select date from dropdown
Update_graph_item()	Generate pie chart displaying spending amounts per item for selected month and category	Select date from dropdown, select category from dropdown
Update_graph_trend()	Generate bar chart displaying spending amounts in all months for selected category	Select category from dropdown
Update_table()	Adds new item to dataframe and writes update to csv file	Click ‘Submit’ button
Update_table_display()	Generates datatable displaying item information for selected month and category	Select date from dropdown, select category from dropdown

Issues

Below are any known or suspected issues:

Issue	Status	Category
The app runs off a CSV file with queries to the Pandas dataframe.	Known	Computational inefficiency
There is no user authentication function.	Known	Computational inefficiency
The app does not allow multiple users.	Known	Computational inefficiency
The slider input for quantity only goes up to 10.	Known	Minor issue
The item name is not capitalized in the CSV file if it is entered in all lowercase characters.	Known	Minor issue
The format of the amount in the pie chart is longer than two decimals.	Known	Minor issue
The amount at the top of the bar chart is cut off at the top.	Known	Minor issue

Future Work

The app was implemented with the following minimum viable product (MVP) features:

- Allow user to input purchased grocery item and assign item to a category.
- Allow user to select month and category to view spending analysis.
- Analyze spending through visualizations:
    - Pie chart: total amounts spent for all categories for a selected month.
    - Pie chart: total amounts spent per item for a selected month and category.
    - Data table: purchased item information for a selected month and category.
    - Bar chart: total amounts spent for a selected category for all months.

Future enhancements to the app include, but are not limited to:

- Use SQL database to run queries and store data in tables.
- Authenticate users with a log on.
- Allow multiple users to access dashboard at one time.
- Provide users with functionality to set custom budgets for items and categories.

- Provide users with functionality to automatically import purchased items:
    - Upload a paper receipt and extract text using optical character recognition (OCR)
    - Import electronic receipt using IMAP protocol and parse text.