

# Personal Financial Managing Web Application Prototype

CSE 6242 Project

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*Rahul Agrawal, Yi Ding, Holly Williams, and Anqi Zou*

# Motivation

- ***Sharing behaviors*** increasingly popular
  - Especially financially, due to impact of social media and e-commerce
  - Bundling & sharing living space are typical
- ***Solution to personal & shared expense***
  - Helps users visualize spending patterns
- ***Users***
  - students, housemates, and even couples, seeking easier tools to track personal and shared expenses

# Problem Definition

## *Personal Financial Management Application Prototype*

- Keep track of expenses, personal and shared
- Auto-categorize expenses to help organize data
- Visualize data across different dimensions such as time and categories, and transactions shared with other users
- See trends and projections for expenses

# Proposed Approaches

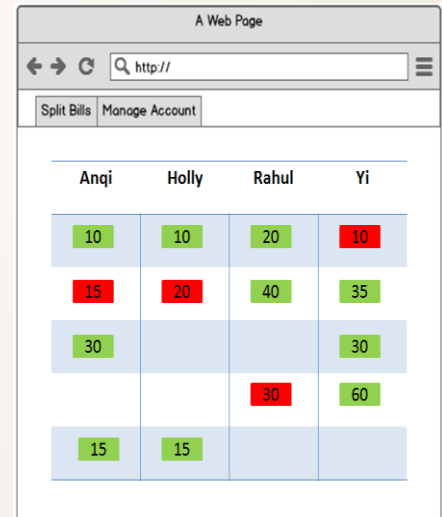
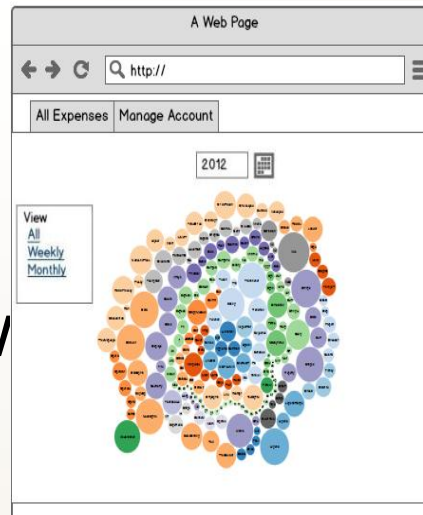
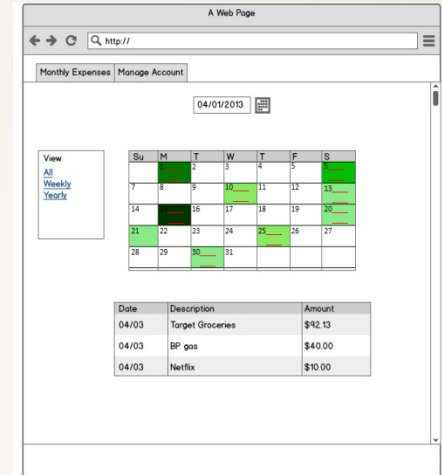
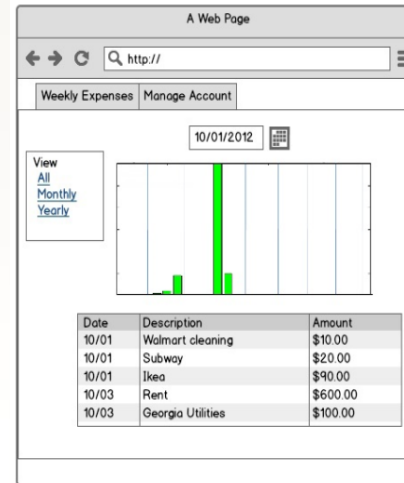
## String Matching Based Transaction Categorization

- Store the lists of top merchandiser names in each of the 7 categories: *Entertainment* (music, movies, games, books), *Food and Dining*, *Utilities*, *Shopping* (clothes, electronics), *Home*, *Transportation*, *Special* (tuition, tax) and *Miscellaneous*.
- Add keywords in each list
- Given the description, compare names along with keywords in the lists to the words in the description, using Edit Distance Difference
- Provide a visualization of the division of a user's expenses

# Proposed Approaches

## Visualization

- Time-based view
- Calendar view
- Category-based view
- Shared expenses view



# Proposed Approaches

## Outlier Prediction

- Three-sigma rule of Normal Distribution:
- About 68.27% of the values lie within 1 standard deviation of the mean. Similarly, about 95.45% of the values lie within 2 standard deviations of the mean. Nearly all (99.73%) of the values lie within 3 standard deviations of the mean.
- Use the 2-sigma rule as alert/fraud detection
- Warn users to pay close attention to expenses out of range

- ***Data Creation - Python***
  - Expenses simulated for several years
  - Users expenses under several categories
  - Directory of stores created for different expense categories
  - Randomly split expenses among a subset of the users

# Implementations

## Visualization & User Interface – JavaScript, HTML

- Shared expense view
  - Red blocks = owed
  - Green blocks = paid

### Split Expenses

#### January 2012

Expense ID	Date	Rahul Agrawal	Yi Ding	Holly Williams	Anqi Zou
1	1/4/2012	23.75	16.63/23.75	23.75	30.87/23.75
877	1/15/2012	7.65/8.5	6.8	7.65	11.9/11.05
5	1/19/2012	16.63	14.25	14.25	49.87
1318	1/24/2012	86.4	-	105.6	-

#### February 2012

Expense ID	Date	Rahul Agrawal	Yi Ding	Holly Williams	Anqi Zou
893	2/1/2012	20.75	20.75	20.75	20.75
1362	2/4/2012	11.25	11.25	11.25	11.25
31	2/6/2012	7.7	8.8	-	16.5
887	2/16/2012	14.7	18.9	21	29.4

### User Expenses

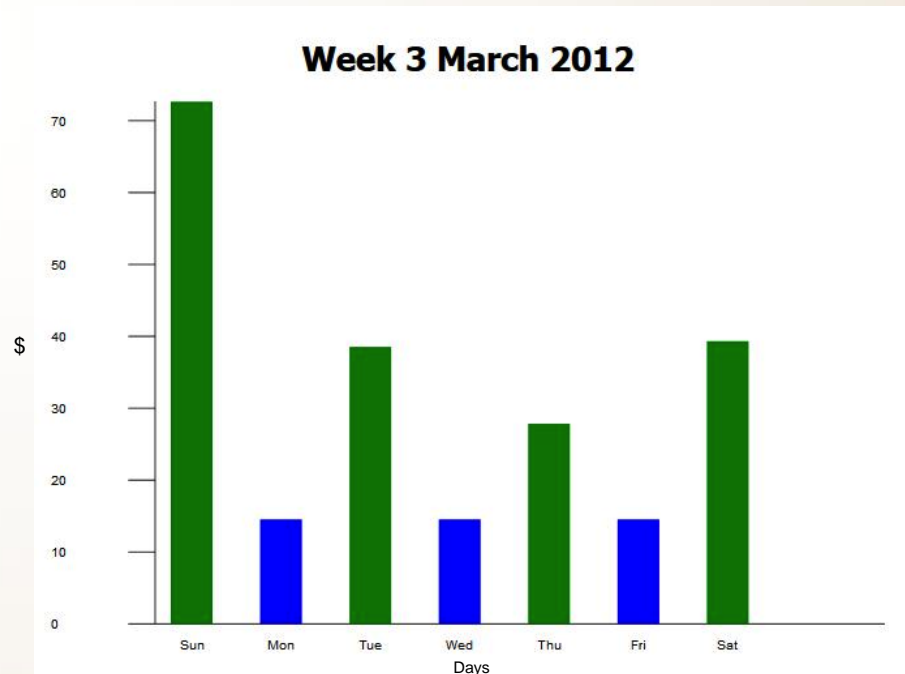
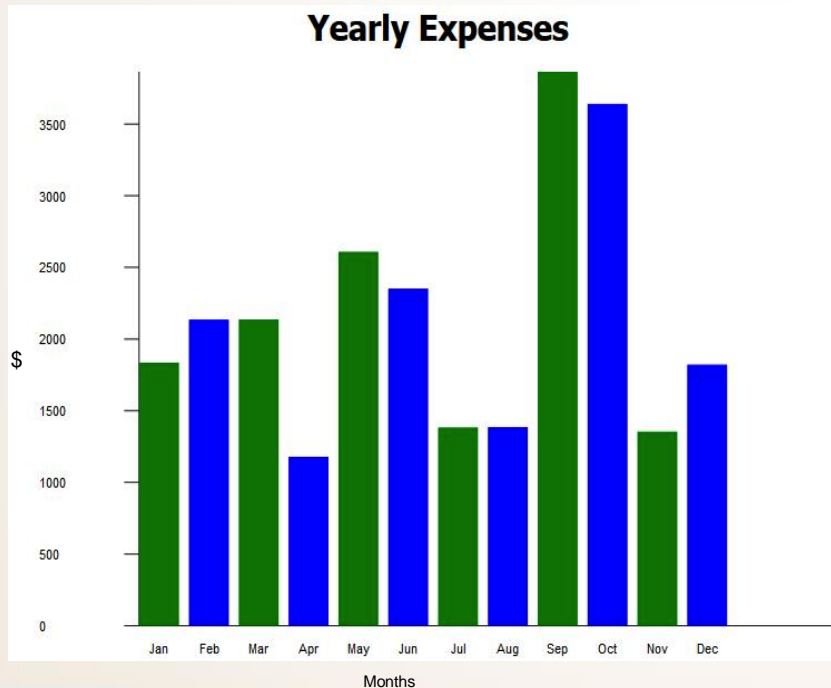
EID	Date	Description	Category	Paid	Total Amount
1	1/3/2012	train	transportation	\$23.75	\$95.00
5	1/4/2012	Citgo	transportation	\$16.63	\$95.00
1319	1/1/2012	Sunoco	transportation	\$29.00	\$29.00
1320	1/0/2012	RaceTrac/Raceway	transportation	\$93.00	\$93.00
1321	1/5/2012	Kroger brand gasoline	transportation	\$79.00	\$79.00
1322	1/0/2012	ARCO	transportation	\$65.00	\$65.00
1323	1/1/2012	Southwest	transportation	\$40.00	\$40.00
1324	1/2/2012	AMC	entertainment	\$27.00	\$27.00
1325	1/3/2012	book off usa	entertainment	\$13.00	\$13.00
1326	1/2/2012	Lord & Taylor	shopping	\$28.00	\$28.00
1327	1/5/2012	Hollister	shopping	\$23.00	\$23.00
1328	1/1/2012	Boscov's	shopping	\$54.00	\$54.00
1329	1/3/2012	The Bon-Ton	shopping	\$172.00	\$172.00
1330	1/4/2012	verizon	utilities	\$298.00	\$298.00
1331	1/0/2012	Arctic Circle Restaurants	restaurants	\$18.00	\$18.00



# Implementations

## Visualization & User Interface – D3

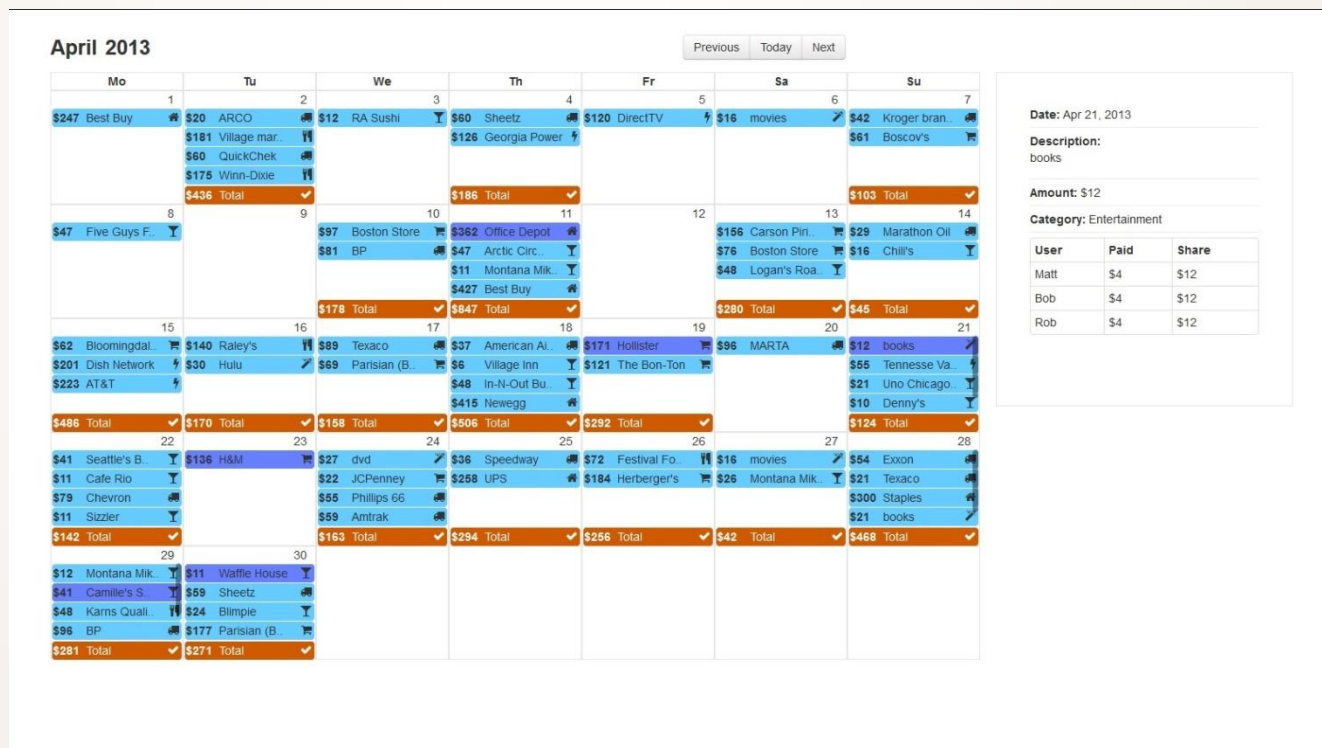
- Time-based views



# Implementations

## Visualization & User Interface

- Calendar view – Twitter Bootstrap, D3, jQuery, jQueryUI
- Based on ahmontero's *bootstrap-calender plug-in*



# Future Work

- ***Collect real data***
- ***Train algorithms with real data***
- ***Integrate all views***
- ***Functionality for slicing-dicing data***
- ***Train algorithms with real data***
- ***Get user feedback***

# Thank You

## Questions & Comments?