Delta Faucet Company is the world’s leading innovator in faucets, flush valves and related accessories. Goal: Identify current and future consumer design/feature preferences for kitchen and bathroom faucets using social media and other websites. Based on the scope of the project, it is divided into three problem spaces —

**Problem Space 1:**
- Scan and summarize latest feature trends
- Identify market and design opportunity using Social Media sites (Twitter)

**Problem Space 2:**
- Use online social and other data to scrape product information
- Analyze the scraped data to prioritize existing or trending features/concepts

**Problem Space 3:**
- Analyze customer satisfaction data to identify areas of opportunities
- Categorize and prioritize the opportunities to improve customer service

### INTRODUCTION

#### Data Analysis:
Sentiment Analysis and engagement analytics to rank tweets based on popularity

#### Identify:
- Zero-shot text classification model
- Basic image classification model

#### Compile Results:
Retrieved topics from the most popular tweets

**Problem Space 2:**

**Web Scrapers:**
- Utilized BeautifulSoup and Selenium
- Scrape product specifications for various retailer's websites e.g. – Amazon, Home Depot etc.
- Analyzed the data for popular trends

**Automation of web scrapers:**
- Scrapers feed system with data continuously
- Back-end connects database to system
- Front-end displays results to Delta Faucet employees

### METHODOLOGY

**Problem Space 1:** Our project is split into the following phases:

![Project Workflow](image1.jpg)

- Data Collection: Used Tweepy API through Python
  - Utilized keywords, date, and location to filter
  - Extracted username, images, number of likes and comments

- Data Cleaning: Removed irrelevant tweets

![Diagram of Automation System](image2.jpg)

- Data Analysis: Sentiment Analysis and engagement analytics to rank tweets based on popularity

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**Problem Space 3:**

- Utilized Python’s BeautifulSoup and Selenium libraries
- Scikit-learn library for supervised classification.
- Built a dataset of scraped reviews.
- Built web app to display the dataset as well as some basic analytics and periodically scrape the web for additional reviews.

### RESULTS

**Problem Space 1:**

**Data Collection:**
- Scraped 60+ tweets, with their text, images, username, location, number of likes, & number of retweets

<table>
<thead>
<tr>
<th>Text</th>
<th>Name</th>
<th>Location</th>
<th>Favorite</th>
<th>Retweet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hey friends that have a good sense for design...</td>
<td>passedthecr/1</td>
<td>Nha</td>
<td>38</td>
<td>1</td>
</tr>
<tr>
<td>@maneer_c @After_e affected i was in one of th...</td>
<td>amberg7</td>
<td>Seattle, WA, USA</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>The organically shaped CA-handled matches the ...</td>
<td>TOSUPA</td>
<td>Nha</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>We’re here to say it and spray it. We’ve been...</td>
<td>deltafaucet</td>
<td>Indianapolis, IN</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Elegance is a contemporary collection with mini...</td>
<td>LucasAlmstrom</td>
<td>Chicago, IL</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

**Figure 1.2: Table of Data Collected**

**Sentiment Analysis:**

![Distribution of Sentiment Score of Text from Tweets (Negative: -1.0 to Positive: 1.0)](image3.jpg)

**Text Classification:**
- Built a "Zero Shot" Classification Model using HuggingFace
  - Used it to filter relevant tweets
  - "Zero Shot" model is a
  - Form of unsupervised learning
  - Categorized tweets based on different topics

**Figure 1.3: Distribution of Sentiment Score of Text from Tweets (Negative: -1.0 to Positive: 1.0)**

**Image Classification:**
- Built an image classification model on a test dataset using Keras and TensorFlow to serve as a building block for next year's students

**Figure 1.4: Tweets Per Topic**

**Figure 1.5: Some Images from Tweets Collected**
Problem Space 1:
- Develop a working computer vision model that can identify faucets and their different features, such as finish
- Gain access to other social media data, such as Pinterest, to get more relevant data.

Problem Space 2:
- Scrape more websites and integrate all the scrapers into the automated feed

Problem Space 3:
- Continue working on our web app and look into hosting it using AWS or some similar webservice.

Automation of web scrapers:
- The front-end, back-end, and scraper integration templates are nearing completion.

RESULTS

Problem Space 2:
Web Scraping:
- Pull out spray wand, advanced spray and secure docking are some of the most popular features
- Pull down type faucets are most popular. However, standard faucets are preferred over pull out ones
- Matte Black is the most popular finish followed by Arctic steel and Champagne Bronze

Automation of web scrapers:
- The front-end, back-end, and scraper integration templates are nearing completion.

Problem Space 3:
- Built dataset of 300 reviews from 3 online review websites
- Trained prediction model in scikit-learn using Delta Faucet CSAT data (Fig 3.1)
- Model scores text from 1-5 (1 denotes high difficulty) (Fig 3.2)
- Model currently runs at 68% accuracy (Fig 3.1)
- Construct a web scraper app using the review dataset to display dataset & new reviews

CONCLUSION

Problem Space 3:
- Built dataset of 300 reviews from 3 online review websites
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FUTURE GOALS

• With the analysis models that we have built, Delta Faucet can look at the top faucet features being talked about and the trending topics in different regions of the US.
• Delta Faucet should focus on –
  o Pull down type faucets
  o Pull out spray wand, advanced spray and secure docking
  o Matte black and stainless steel finishes
• The automation platform will show the current innovations in the market.
• Delta Faucet can predict the difficulty of a customer support case based on customer feedback with reasonable accuracy, and created a web app to scrape and display online reviews.

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