

CS5704 Software Engineering

Semester Project Report

Fall 2021

Stocks and Cryptocurrencies

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App's URL: on Amazon AWS EC2 Virtual Private Server

Date: 12/08/2021
Team Number: 7
Instructor: Prof. Osman Balci

USER ACCOUNTS

Using the deployed software, each team member is required to create an account and generate *meaningful content* in the database for evaluation and testing. **You will be penalized for not having sufficient content.**

In the case of two-factor authentication, your software is required to provide a **Bypass Two-Factor Authentication** option for grading.

List the usernames and passwords below to use for grading the app.

<i>Username</i>	<i>Password</i>
Vgpsean1@gmail.com	Vgpsean1@gmail.com
rmwood323@gmail.com	1q2w3e4R%
sandeshrjain@gmail.com	fbdmkwYkn8Gsywpw@

EXECUTIVE SUMMARY

List of Implemented Cloud Software Features Learned

1. Manages MySQL database using CRUD operations
2. Users can save their favorite stocks and cryptocurrencies to private lists
3. Users can use database searching to find cryptocurrencies
4. User account with personal data storage, editing and retrieval
5. Stock/CryptoCurrency performance sharing via Email
6. Graphical visualization of sentiment analysis of crypto currencies
7. Slideshow of top 6 crypto-currencies and top 6 companies
8. List layout for tables containing crypto-currencies and table containing stocks
9. Detail view of any record in any table
10. Any table can be filter based on user input in text box in specific columns
11. Retrieve information for crypto-currencies, companies, and twitter using API calls

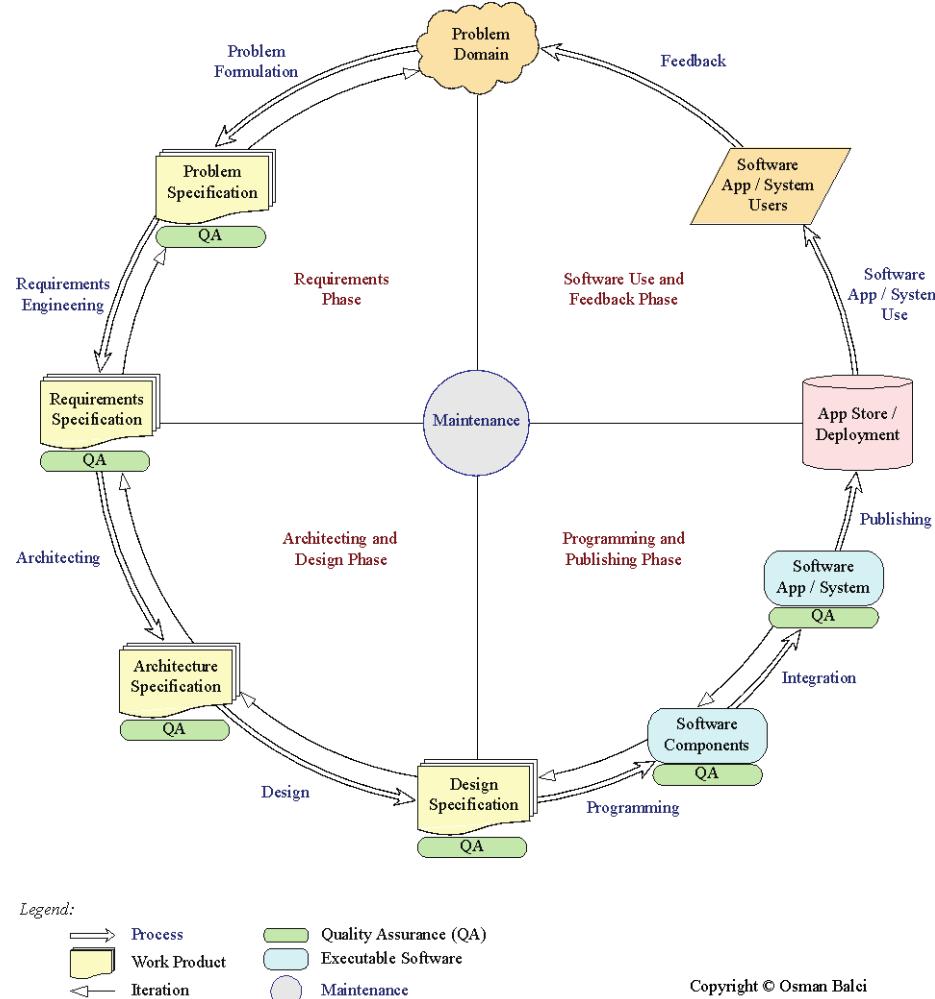
List of Implemented New Cloud Software Features

1. Sentiment analysis of scrapped tweets pertaining to a specific search string
2. 2-factor authentication for logging users in
3. Facial detection on profile pictures

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1. SOFTWARE LIFE CYCLE

A good software engineer develops software by following the software life cycle shown below.



A programmer (hacker or ad-hoc developer) develops software by looking at the problem and directly coding in an IDE. This approach is known as the *Build-and-Fix Approach*, which must never be used!

2. OUR OBJECTIVE

The objective of our team project is to **demonstrate how capable the team members are** in engineering a Jakarta/Java EE cloud software application to solve a complex problem. The cloud software application is created for the purpose of showing how *learned* and *new* complex functionalities and features the team members are capable of developing.

3. PROBLEM SPECIFICATION

3.1 What is the problem?

Today many cryptocurrencies and new stock options are being created very frequently. To one who is unfamiliar with the market it can be very confusing and overwhelming to keep track of all this information. We feel that many current implementations that may have a similar goal become too focused on a specific type of currency or stock. We want to help reduce the barrier of entry to the stock market so that more people can get involved.

3.2 Why is the problem important to solve?

The total market capitalization of stock is more than \$70 Trillion. This figure not only reflects how the commoners' investments behave but also shows how confidence-based trading is a significant part of numerous inexperienced investors. We take the issue of researching stock options, tracking them, and staying up-to-date with the most recent news information and transform it to a visually appealing environment with graphs, charts, targeted query results, automated sentiment analysis of recent tweets, and building an overall profile of the investor. This will act as a better gateway of transition from the world of simple stock ticker symbols and prices to a more sophisticated information processing and visualization.

The field of computer vision has been growing for quite some time now. With the recent open source boom we have libraries like OpenCV to aid us in implementation of various time-tested and standard algorithms like the Haar-cascade facial detection system. By utilizing such a pre-existing resource, we can build an intelligent feature to get the region of interest from the user's webcam and select only a part of the complete image for their profile image. Finally, the aforementioned feature of high-level sentiment analysis for twitter news can keep the user updated about the generic view of the masses. Going with immediate trends might get the user short term benefit and even that would depend on how early they get the information, we can resolve this by using the twitter sentiment analysis API that'll give the user an edge over folks who have to go through all the news themselves regarding all the stock options they have invested on.

3.3 Expected Functionality Description

We want to be able to create a dashboard to display different stocks and cryptocurrencies and allow users to follow along how any of them are doing. Users will be able to search for specific stocks/crypto through a database to filter exactly what they are looking for. They will be able to make accounts to keep track of stocks or crypto that they are interested in. They will be able to look at histories of stocks and read news reports that we pull in and display. Additionally the accounts shall be able to store an editable portfolio of the tracked stocks and cryptos and the user will be able to receive automatic updates on them through text messaging or email. With the news that they can see, headlines, tweets, and other messages will show how people are talking about the stock/crypto and the current general sentiment around it.

The account will be customizable and allow for the user to set a profile picture by taking a photo of themselves. They will be able to also set-up 2 Factor authentication to help protect their account. In their account, a user can manage their tracked stocks and then look at the history of how the stock has done over time in a bar graph or just at the current or past value. Their account will give them access to information about what they have tracked and allow them to edit what they see. They can do this by changing how the data is shown or adding/removing different tracked stocks and cryptocurrencies.

3.4 Learned and new cloud software features to be implemented

Our proposed app shall implement the following *learned* and *new* cloud software features.

Table 1. List of Learned Cloud Software Features to be Implemented

No.	Description of the Learned Cloud Software Feature to be Implemented
1	Manages MySQL database using CRUD operations
2	Users can save their favorite stocks and cryptocurrencies to private lists
3	Users can use database searching to find cryptocurrencies
4	User account with personal data storage, editing and retrieval
5	Stock/CryptoCurrency performance sharing via Email
6	Graphical visualization of sentiment analysis of crypto currencies
7	Slideshow of top 6 crypto-currencies and top 6 companies
8	List layout for tables containing crypto-currencies and table containing stocks
9	Detail view of any record in any table
10	Any table can be filter based on user input in text box in specific columns
11	Retrieve information for crypto-currencies, companies, and twitter using API calls

Table 2. List of New Cloud Software Features to be Implemented

No.	Description of the New Cloud Software Feature to be Implemented
1	Sentiment analysis of scrapped tweets pertaining to a specific search string
2	2-factor authentication for logging users in

3	Facial detection on profile pictures
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4. REQUIREMENTS SPECIFICATION

This section specifies the Functional and Non-Functional Requirements under which our Jakarta/Java EE cloud software application will be developed.

4.1 Functional Requirements

1. The user of the software system shall be authenticated with a username and password.
2. The user shall be able to save stocks and cryptocurrencies of the user's choosing to their account.
3. The system shall provide a sentiment analysis of recent Twitter news headlines about a stock or cryptocurrency that the user requests. The scrapped Twitter information shall be obtained using the Twitter4J API. The results of this analysis shall be obtained using Stanford NLP Core API and the results shall be displayed using a pie chart.
4. The system shall provide facial recognition for the user when the user is taking their profile picture. The system shall use the OpenCV API to accomplish this.
5. The user shall be able to share information on a user selected stock or cryptocurrency through email.
6. The system shall update information about a user selected cryptocurrency upon the user's request. The system shall use the CoinMarketCap API to update information on cryptocurrencies.
7. The user shall be able to create a profile that contains their first name, middle name, last name, email address, home address, and profile picture.
8. The system shall update information about a user selected stock upon the user's request. The system shall use the AlphaVantage API to update information on the selected stock.
9. The system shall provide the user with functionality to populate the CryptoCurrency database with the top 50 cryptocurrencies according to the CoinMarketCap API.
10. The system shall display the stocks and cryptocurrencies in the database to the user via a table that allows the user to perform CRUD operations on the database.
11. The system shall provide hyperlinks to each stock or cryptocurrencies home webpage in the table that shows the database.
12. The system shall allow the user to upload their own profile picture.
13. The user of the software system shall be authenticated with a username and password. Username shall consist of 6 to 32 characters with capital letter, lowercase letter, number, or special character _ . - @. Passwords shall consist of 8 to 32 characters with at least 1: capital letter, lowercase letter, number, and special characters.
14. The system shall allow the user to log out at any time via a logout button provided in a drop down menu of the UI.
15. The system shall make a session inactive after thirty minutes have passed with no user actions.
16. The system UI shall provide a drop down menu to allow the user to navigate through the site.
17. The system shall use the JavaX mail functionality to enable two factor authentication for the users via email.
18. The user shall be able to cancel any CRUD operation.

4.2 Non-Functional Requirements

Each team shall satisfy the following non-functional requirements:

1. The UI template footer shall contain the following statement:

[CS5704 Software Engineering](#) course semester project application developed by studentName1, studentName2, and studentName3.

Course title and each student name above shall be hyperlinked to show the corresponding homepage *in a new window / tab*. Use VT website if you do not have one for yourself.

2. The cloud software application name in IntelliJ IDEA and when deployed on the server shall be a meaningful name without course number or team number. The app name shall reflect what the app does such as MeetingScheduler. Do **not** name it as “group”, “Team4App”, or “CS5704Team4Project”.

Each team's non-functional requirements:

1. The UI template footer shall contain credits to each API that is used in the application.
2. The Sentiment Analysis functionality when provided with ten inputs shall be accomplished in no more than five minutes.
3. The web-based software system shall be usable with Microsoft Edge version 96.0 or higher and Google Chrome version 96.0 or higher.
4. The software system shall be developed using royalty-free software products.
5. The software system shall use the free tier of any API that is used.
6. The software system shall be deployed on an AWS EC2 system using Wildfly.
7. The software system shall use MySQL as the relational database.
8. The software system shall update a selected cryptocurrency or stock in no more than 30 seconds.
9. The UI template header shall display the name of the application and a drop down navigation menu.

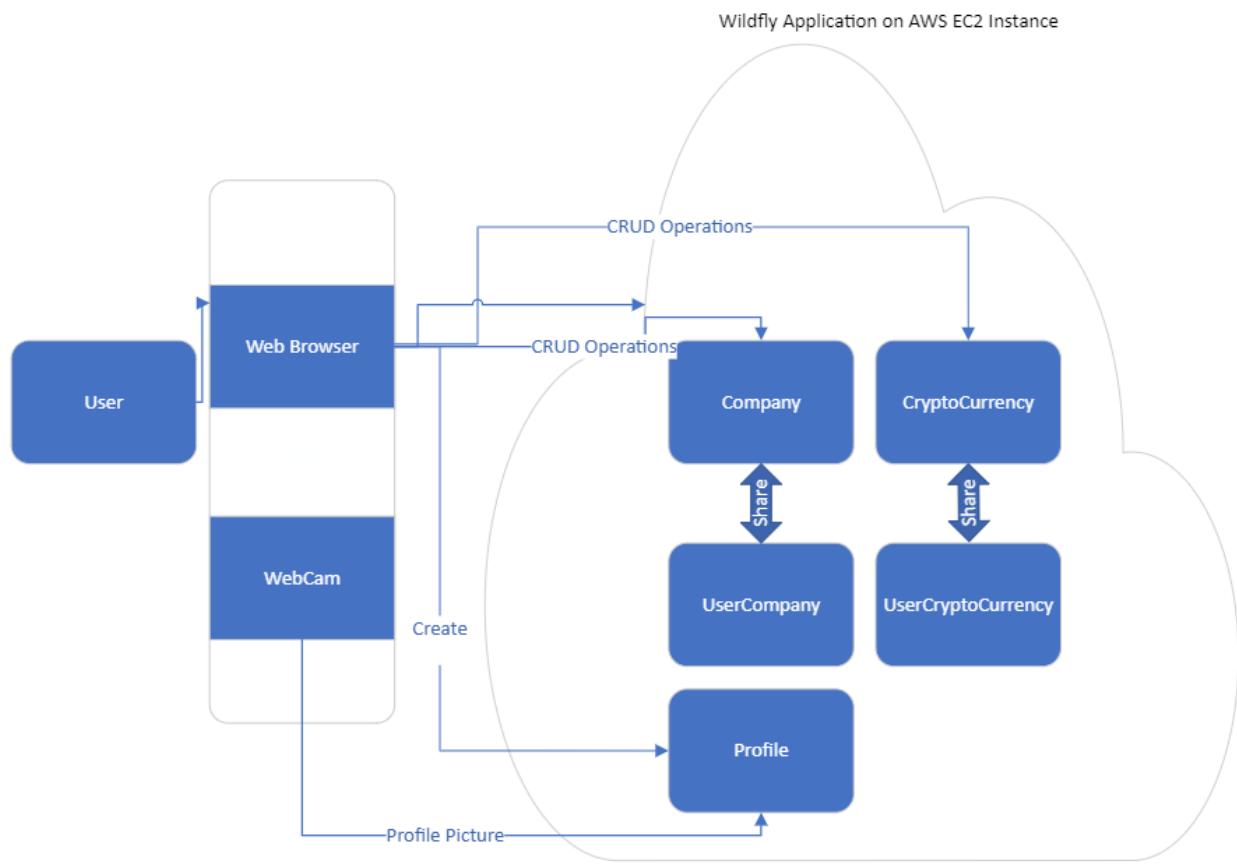
5. ARCHITECTURE SPECIFICATION

Team Member 1 shall create the following 3 DoDAF Models	
	<ol style="list-style-type: none">1. OV-1: High-Level Operational Concept Graphic2. OV-2: Operational Resource Flow Description3. OV-5b: Operational Activity Model
Team Member 2 shall create the following 3 DoDAF Models	
	<ol style="list-style-type: none">1. SV-1: Systems Interface Description2. SV-2: Systems Resource Flow Description3. SV-4: Systems Functionality Description
Team Member 3 shall create the following 3 DoDAF Models	
	<ol style="list-style-type: none">1. SvcV-1: Services Context Description2. SvcV-2: Services Resource Flow Description3. SvcV-4: Services Functionality Description

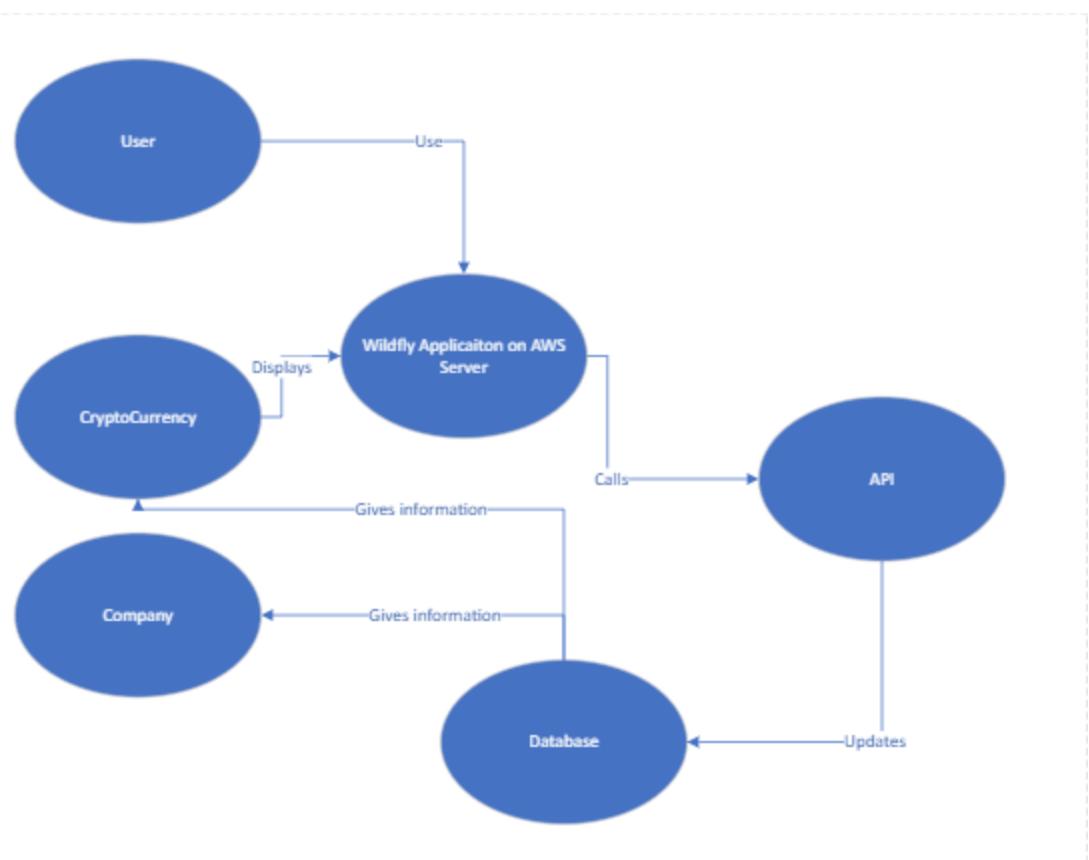
Notes:

- Study [DoDAF Volume 2](#) to learn about each type of DoDAF model (diagram).
- See [Examples of DoDAF models for a Campus Situational Awareness and Emergency Response Management System](#).
- **Microsoft Visio** (recommended) or a tool of your choice can be used to create the DoDAF diagrams.
- Each student is required to create 3 DoDAF models (diagrams) as indicated above. A team of 2 members shall create the models for Team Members 1 and 2 or 1 and 3 or 2 and 3.
- **Extra credit** will be given for additional DoDAF diagrams. Extra credit will be determined with respect to the complexity of each extra diagram.

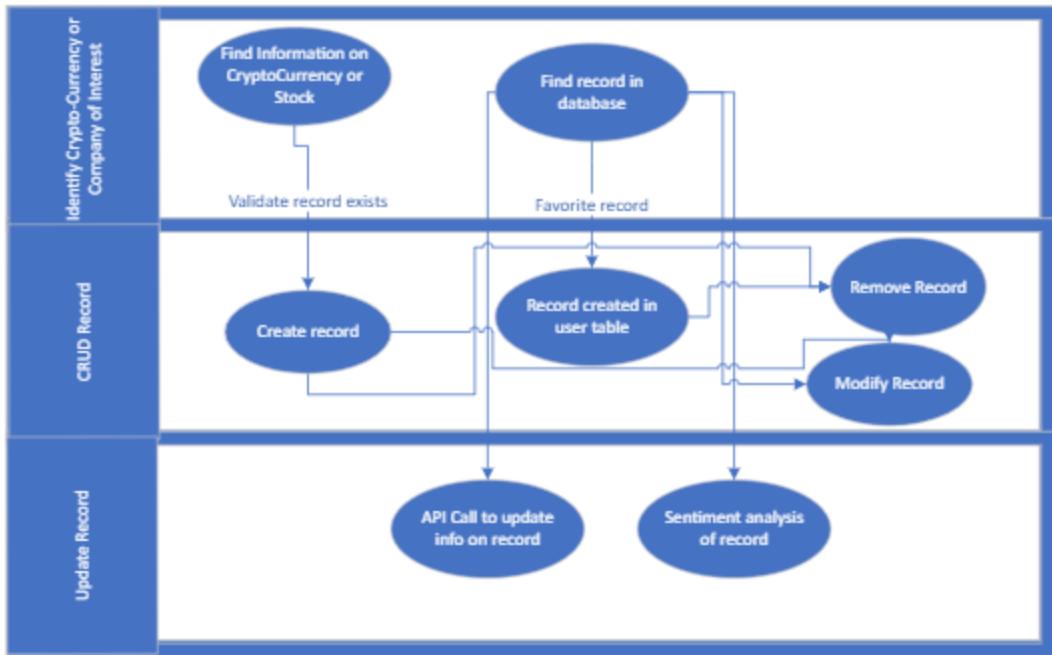
5.1 OV-1: High-Level Operational Concept Graphic



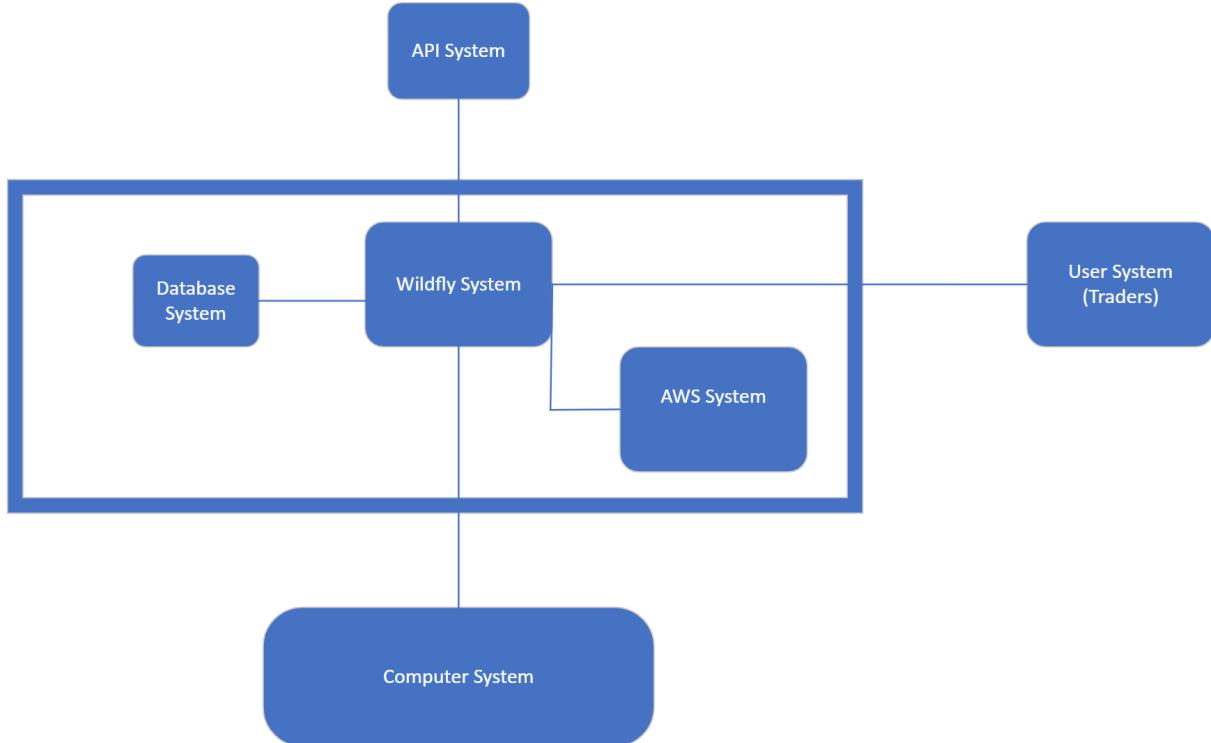
5.2 OV-2: Operational Resource Flow Description



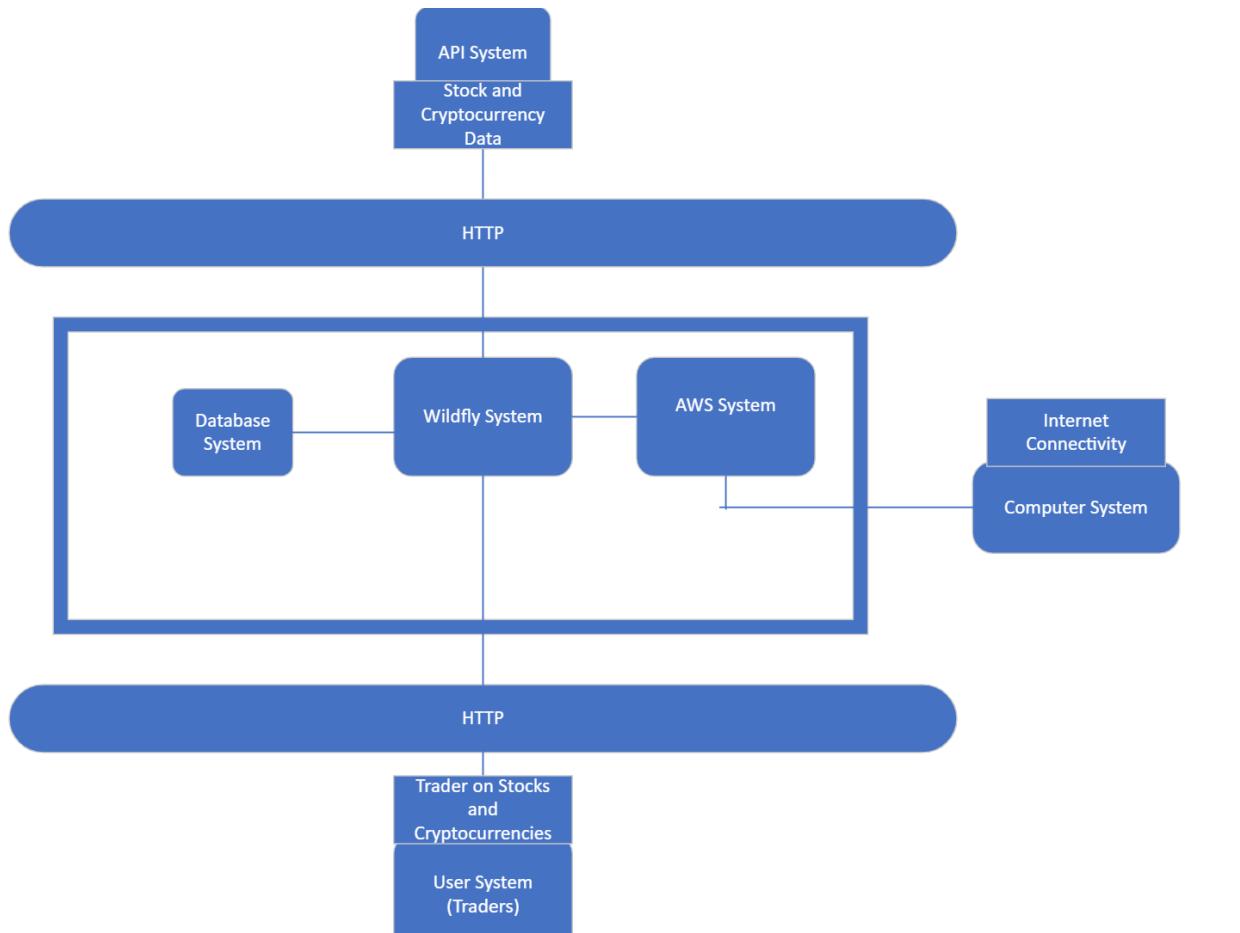
5.3 OV-5b: Operational Activity Model



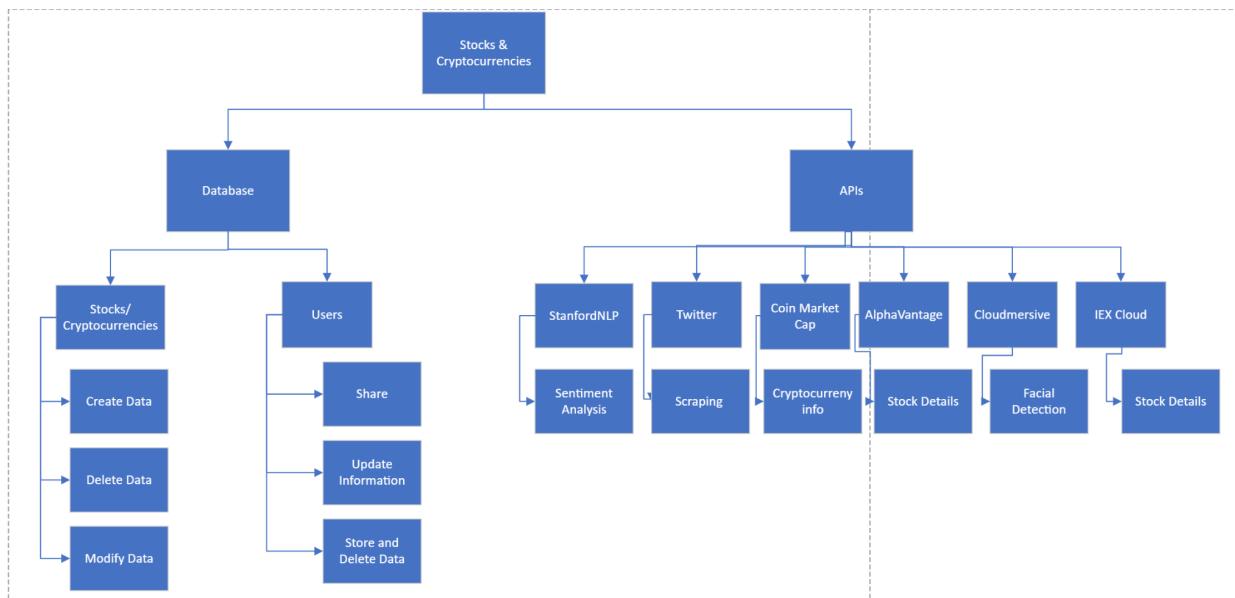
5.4 SV-1: Systems Interface Description



5.5 SV-2: Systems Resource Flow Description

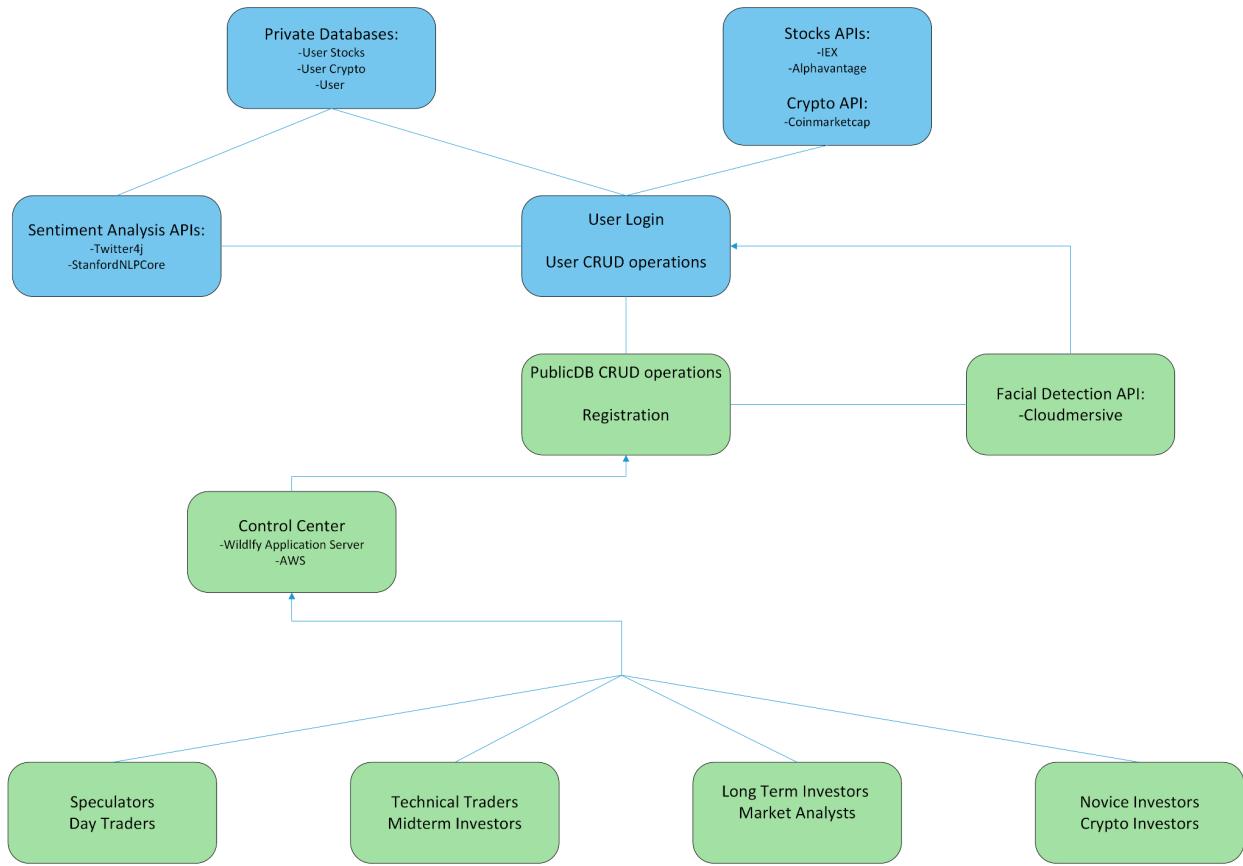


5.6 SV-4: Systems Functionality Description



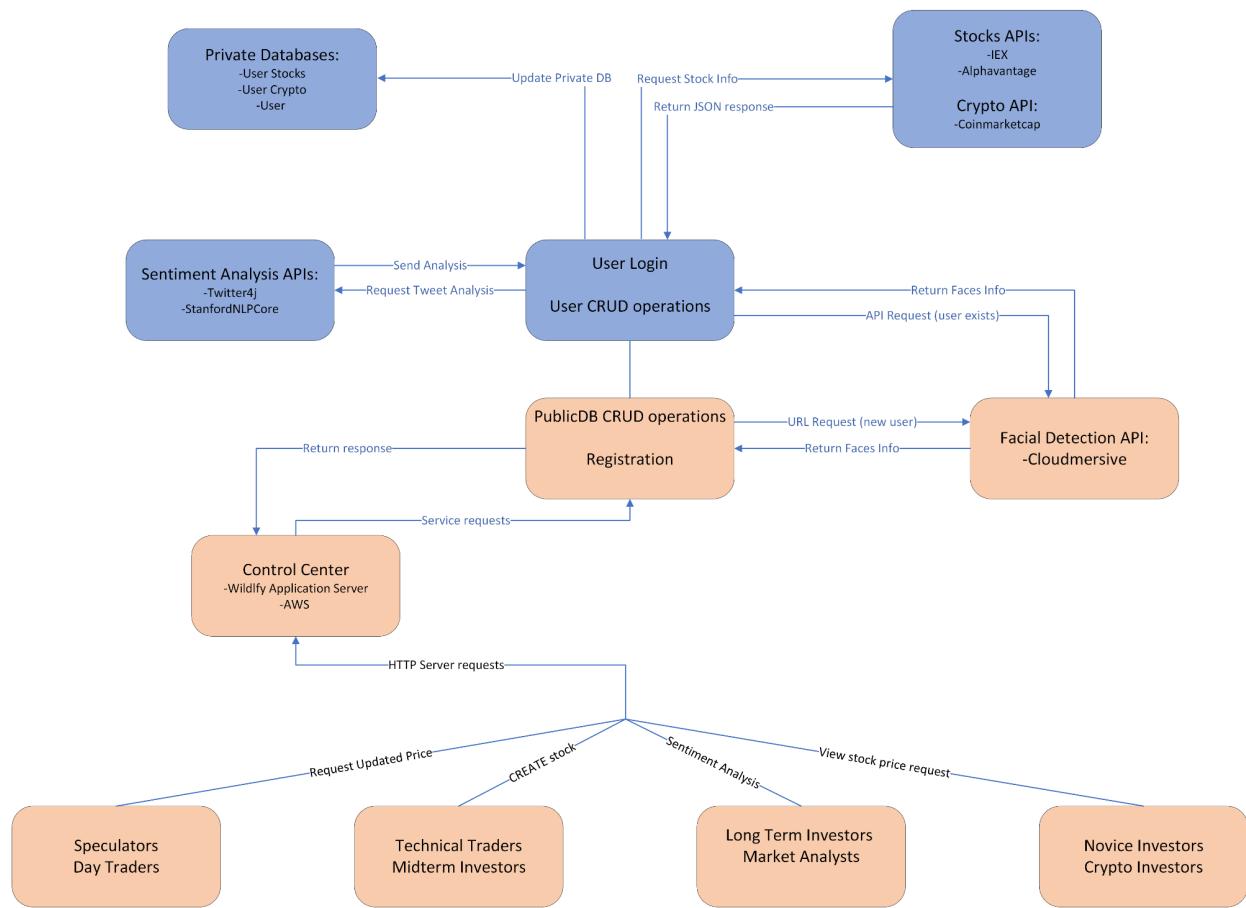
5.7 SvcV-1: Services Context Description

SvcV-1: Services Context Description



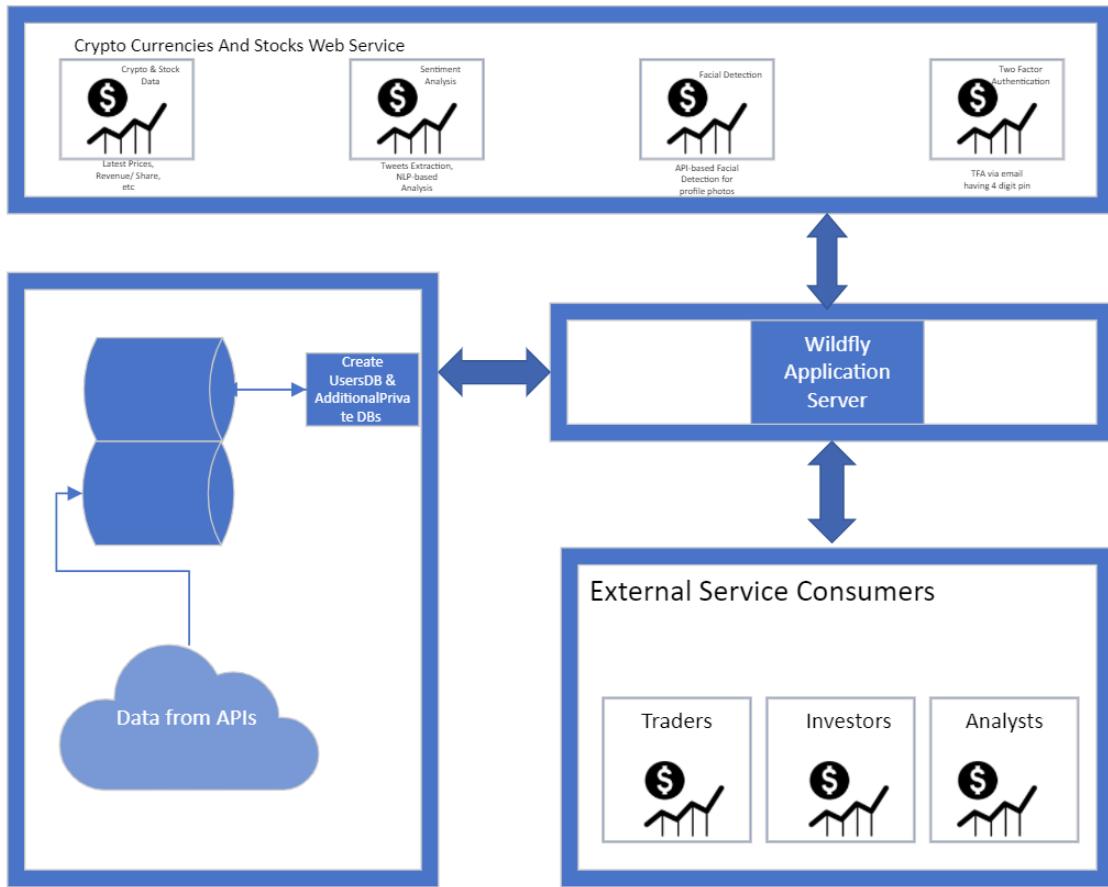
5.8 SvcV-2: Services Resource Flow Description

SvcV-2: Services Resource Flow Description



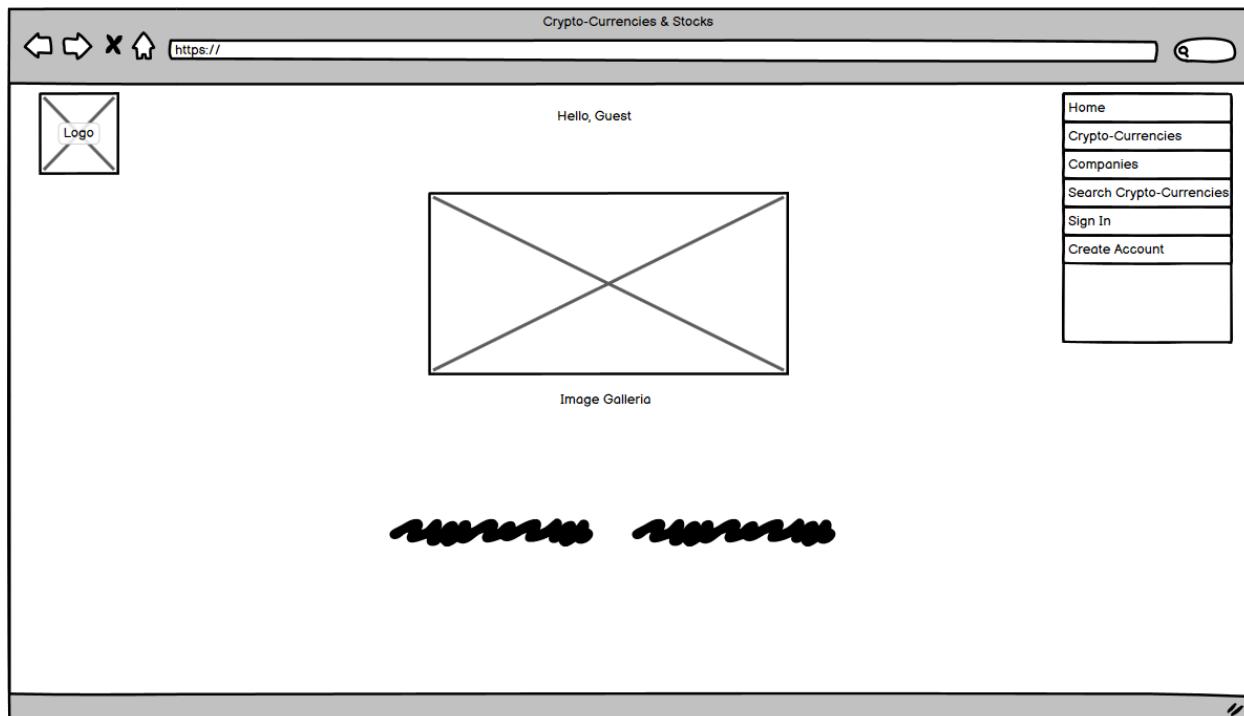
5.9 SvcV-4: Services Functionality Description

SvcV-4: Services Categorization

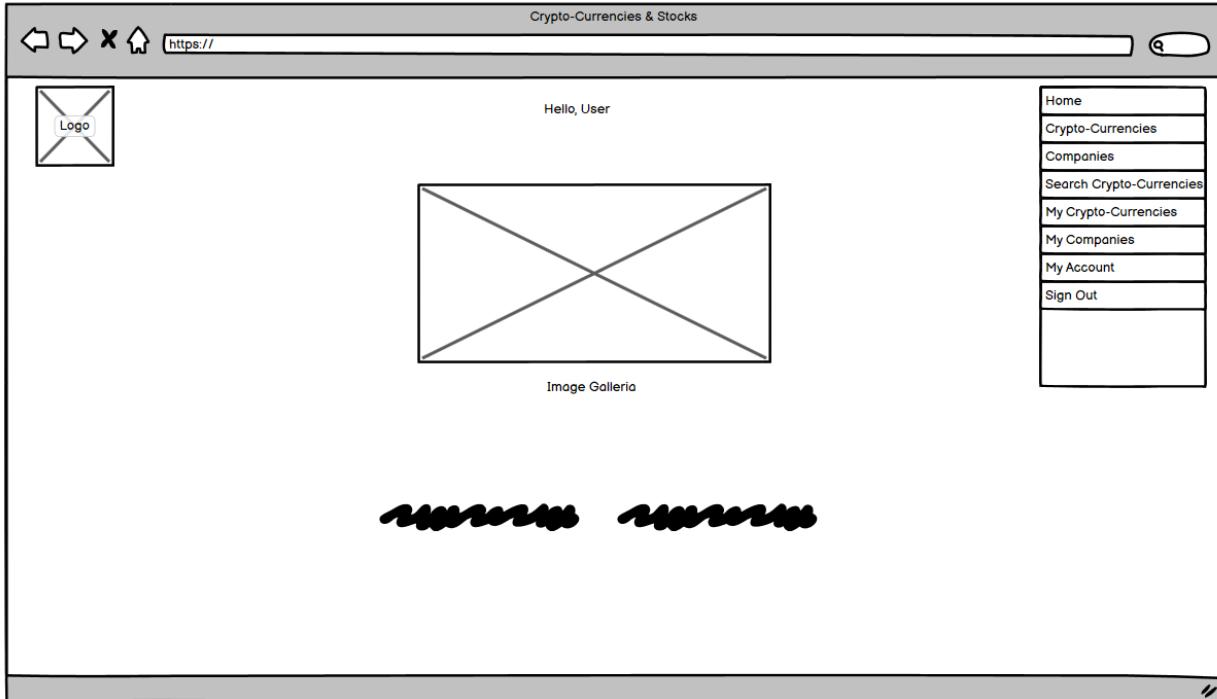


6. DESIGN SPECIFICATION

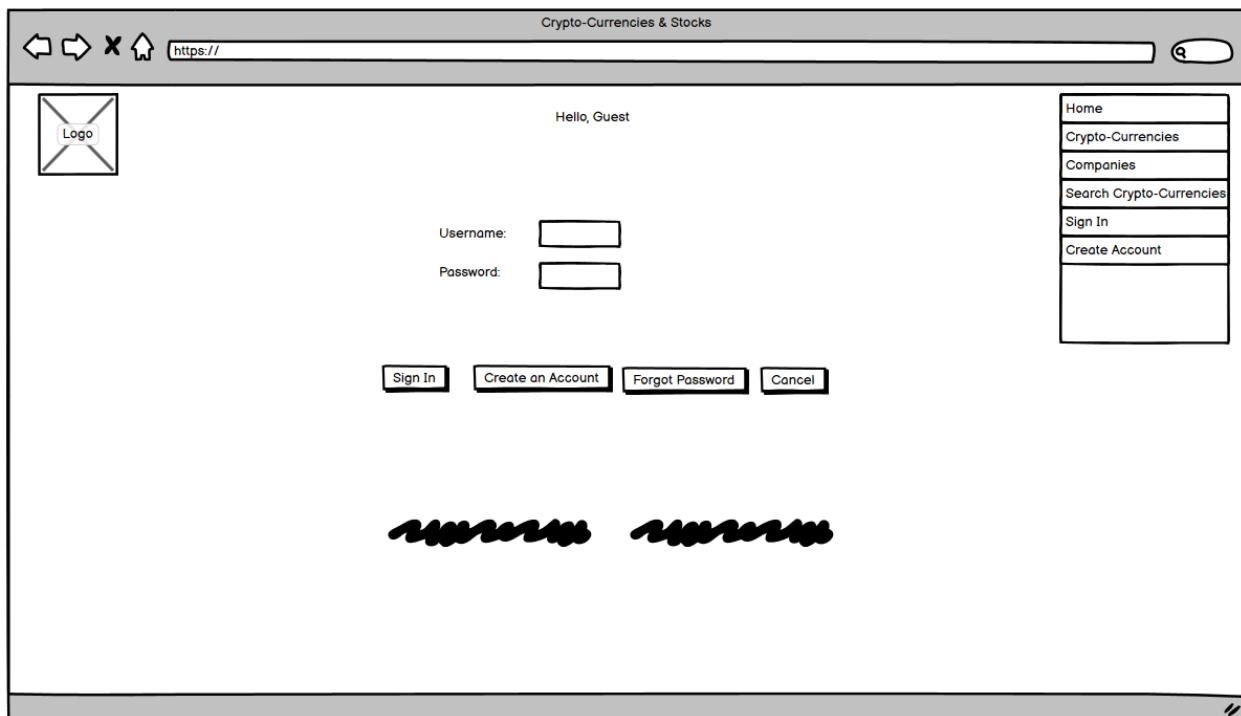
User Interface Prototype Design



Home Page Not Signed In



Home Page Signed In



Log in

Crypto-Currencies & Stocks

https://

Hello, User

Logo

First Name:

Middle Name:

Email

Username

Home

My Crypto-Currencies

My Companies

Edit Profile

Change Photo

Change Password

Delete Account

Sign Out

Home

Crypto-Currencies

Companies

Search Crypto-Currencies

My Crypto-Currencies

My Companies

My Account

Sign Out



Account Details

Crypto-Currencies & Stocks

https://

Hello, Guest

Create an Account

Logo

First Name:

Middle Name:

Username

Password

Submit Cancel

Home

Crypto-Currencies

Companies

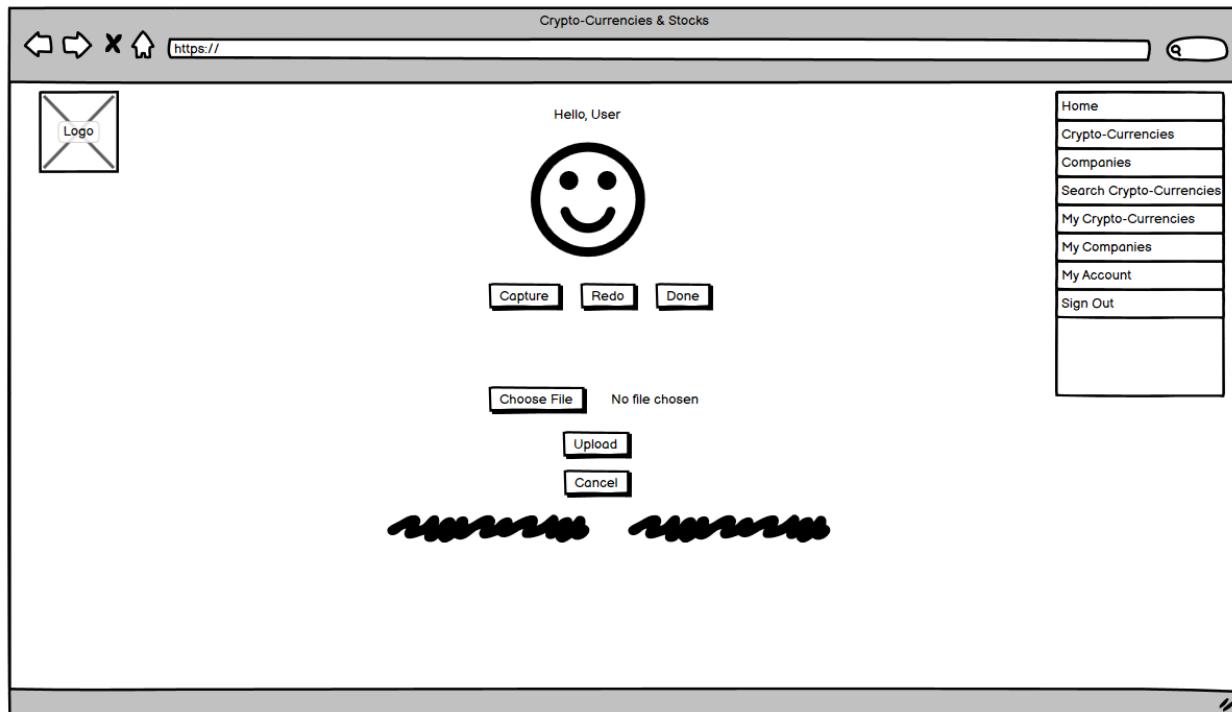
Search Crypto-Currencies

Sign In

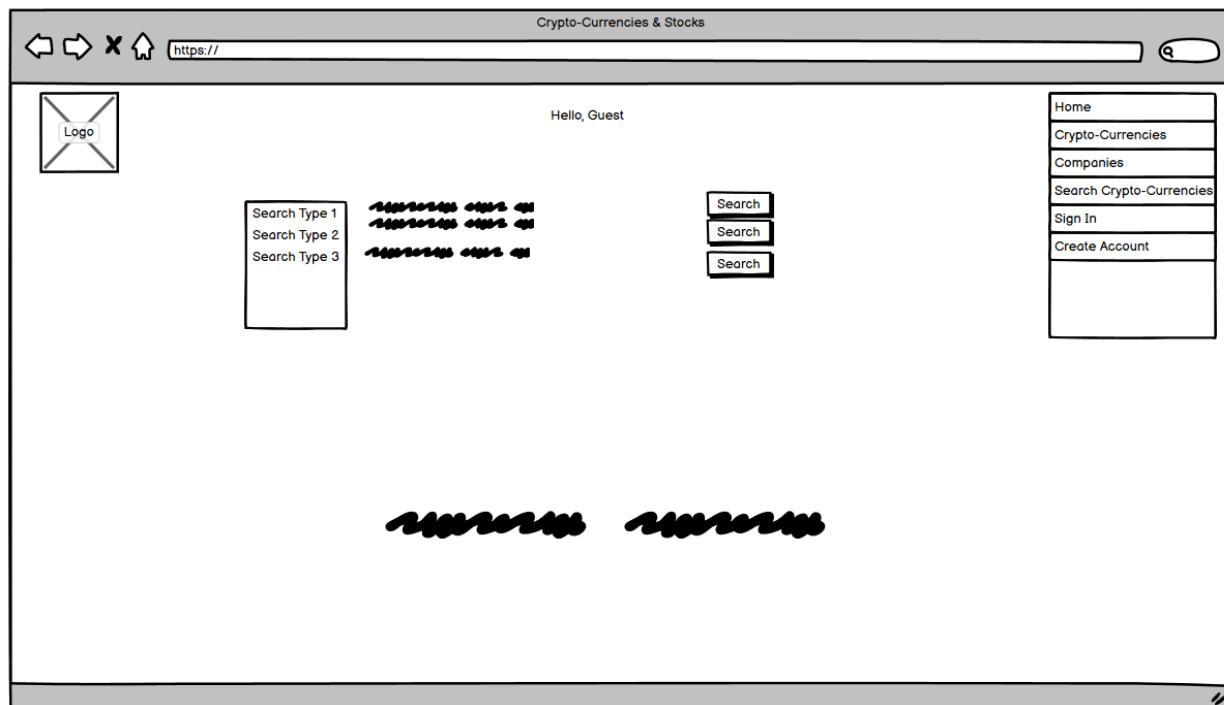
Create Account



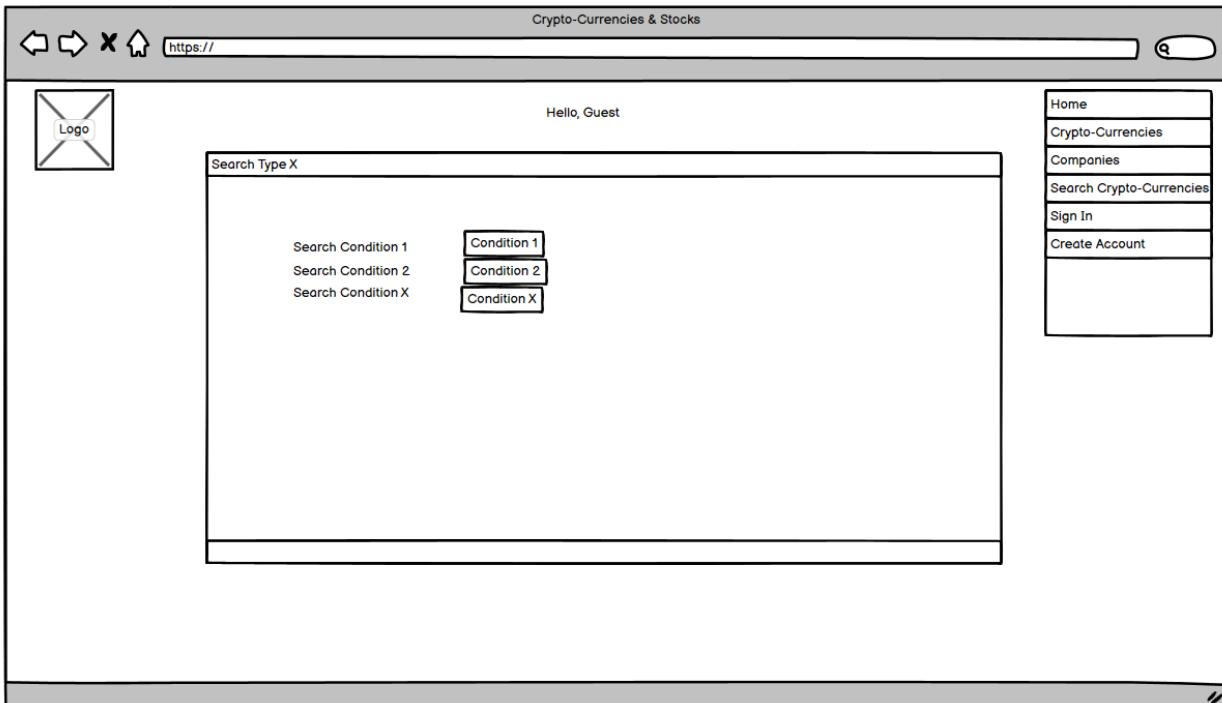
Account Registration



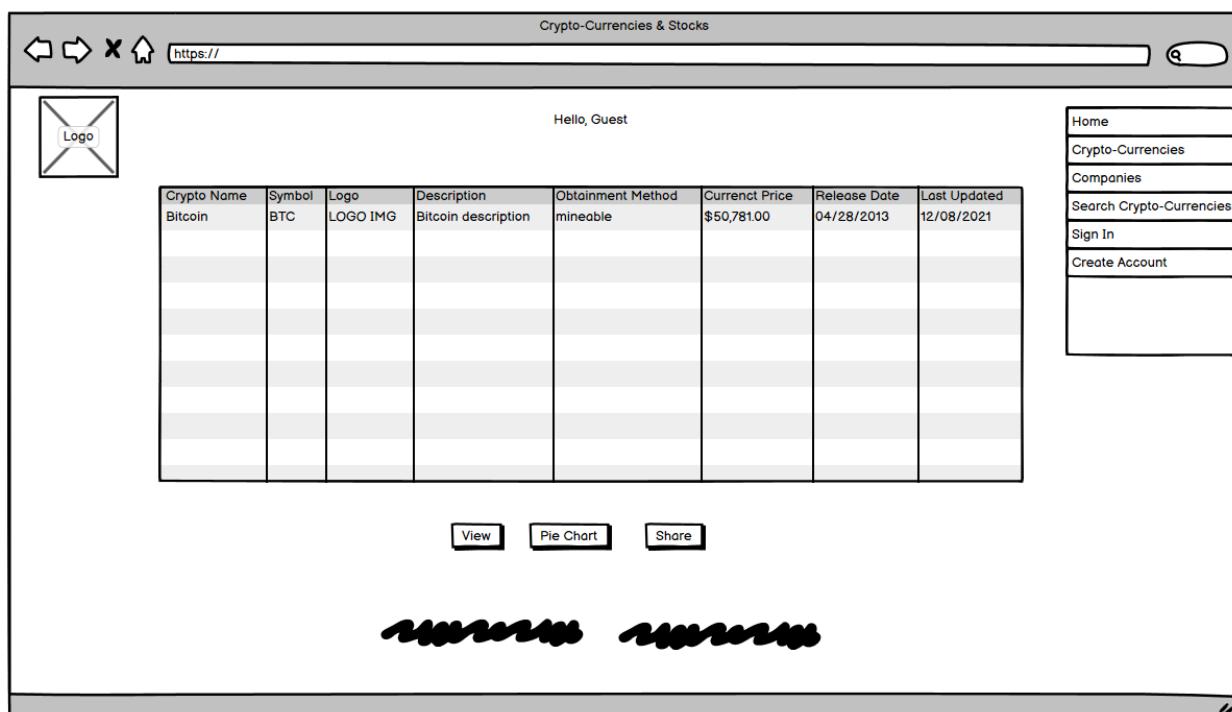
Profile Picture Upload/Capture



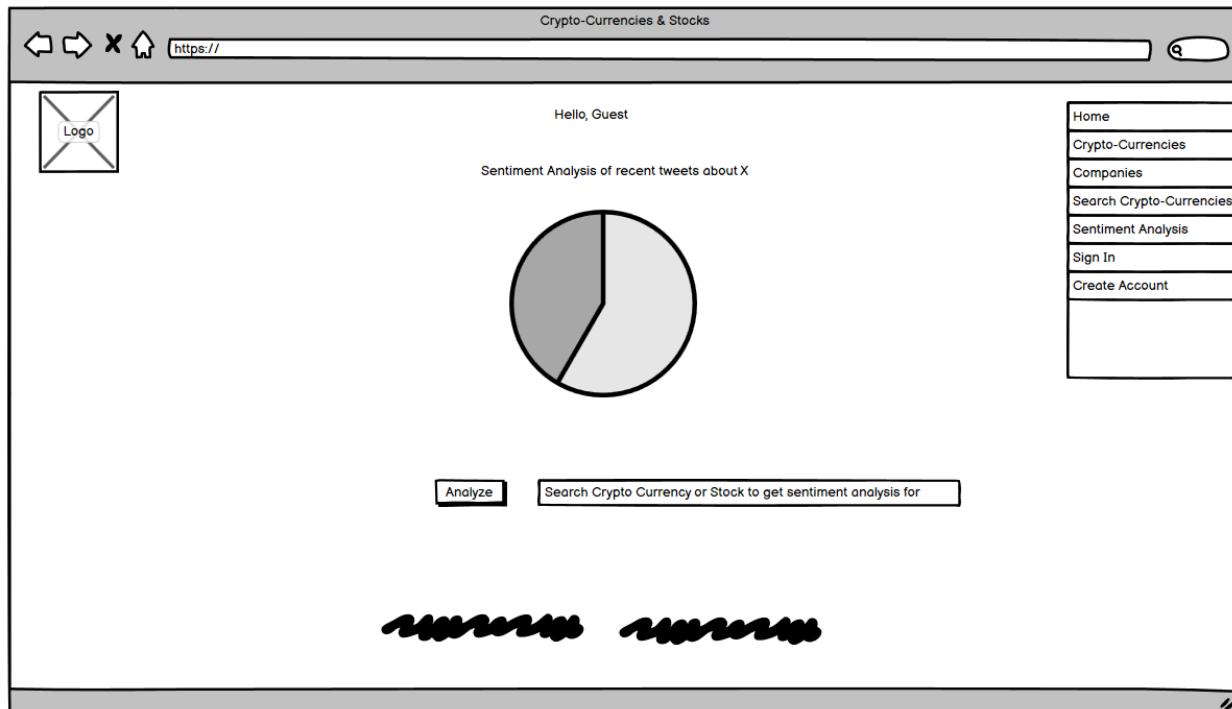
Database Search Type Select



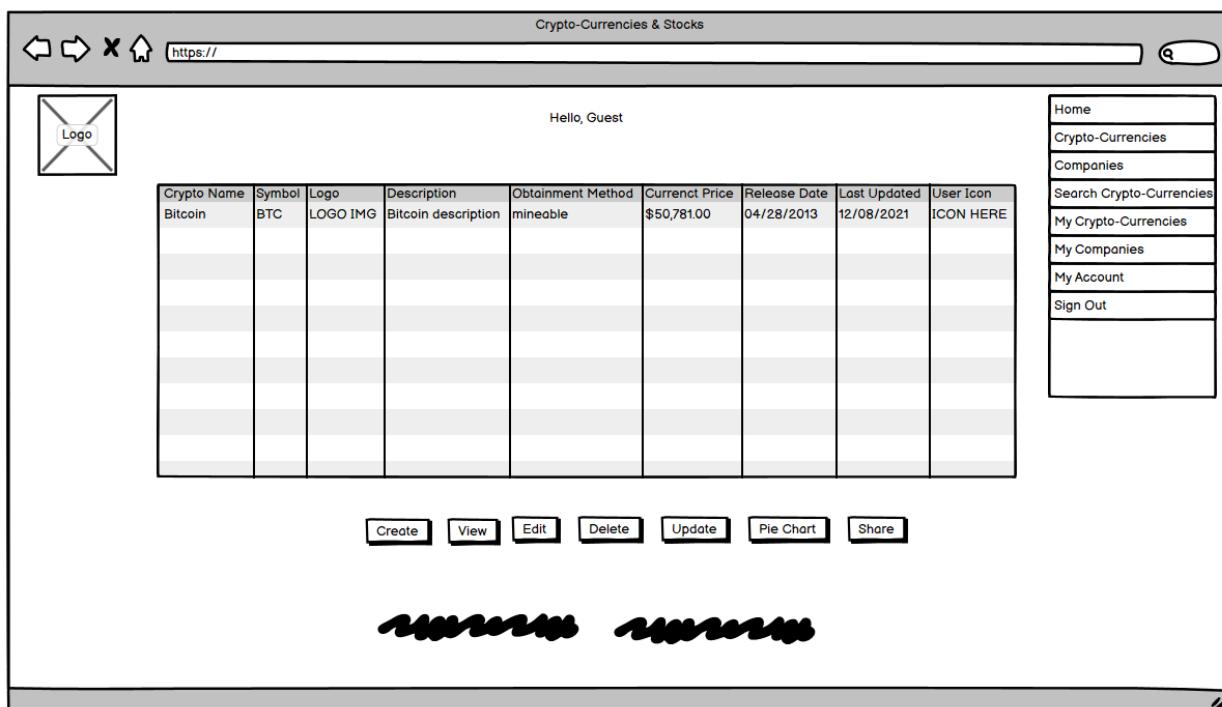
Database Search



Crypto Search Results



Sentiment Analysis Page



User Crypto-Currency Table Display, non user display removes user icon column

Crypto-Currencies & Stocks

Hello, Guest

Create new _____

Field 1
Field 2
Field x

Save Cancel

Create View Edit Delete Update Pie Chart Share

Updated /2021

Create New Record

Crypto-Currencies & Stocks

Hello, Guest

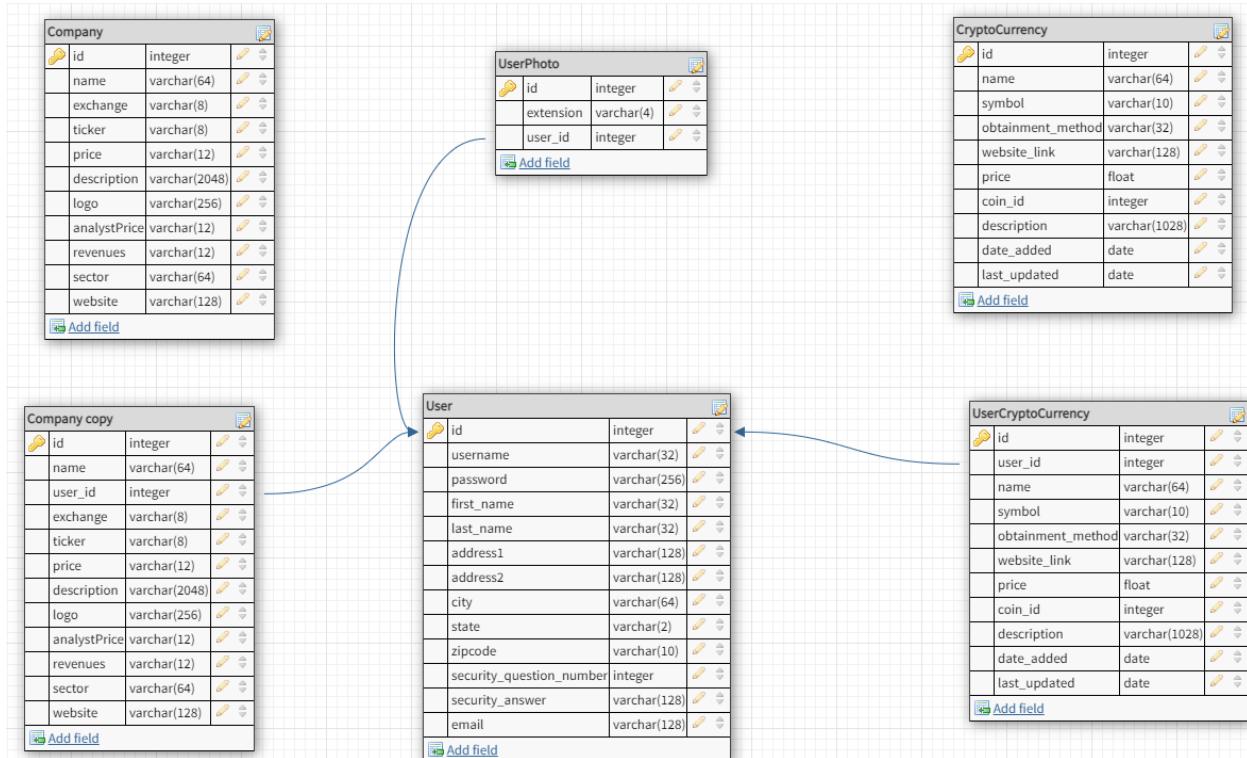
Company Name	Logo	Exchange	Stock Symbol	Revenues in Millions	Employees	Sector
Wal-Mart Stores Inc.	LOGO HERE	NYSE	WMT	\$500,343	Employees 2300000	Retailing

Create View Edit Delete Stock Chart Share

double-click

Company Table, User Company Table has extra column for user icon

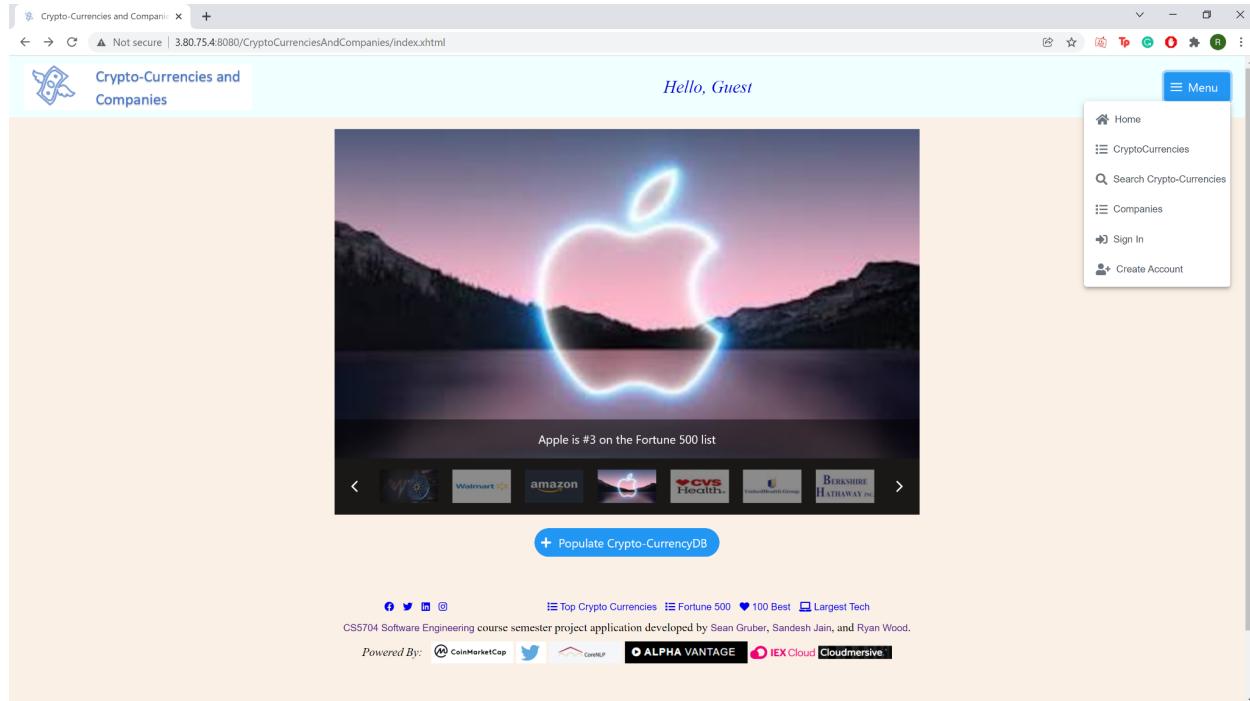
Relational Database Design



7. DELIVERED SOFTWARE FUNCTIONALITY

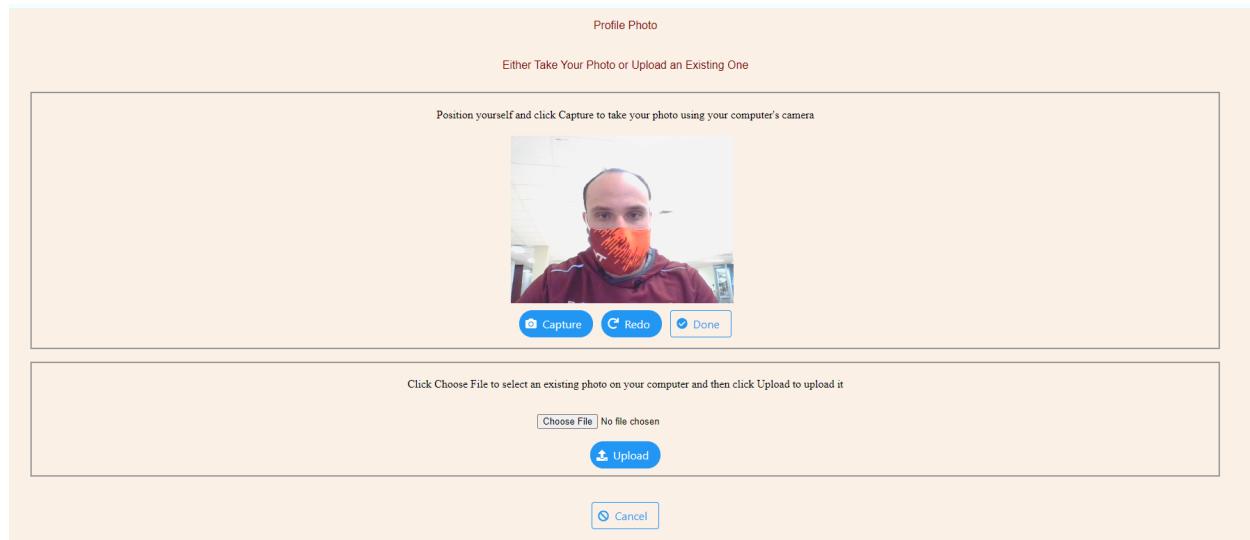
<http://3.85.243.200:8080/CryptoCurrenciesAndCompanies/>

which displays

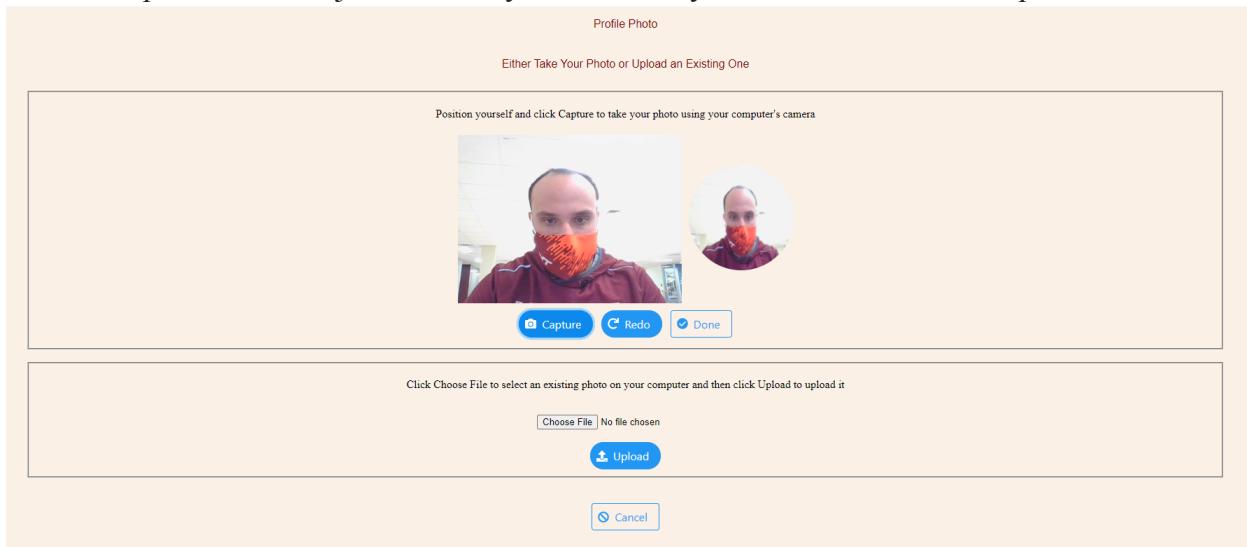


Only press the Populate Crypto-CurrencyDB if the Database is empty! This will duplicate everything as it attempts to fill the database again.

Selecting CryptoCurrencies from the Menu takes you to the table page that shows data from the cryptocurrencies inside the database.



After taking the photo, a smaller thumbnail will appear next to what the camera is displaying. This is the photo that was just taken so you can see if you want to redo it or keep it.



Selecting Done will take you to your profile page with your new photo. The facial detection done by Cloudmersive goes into effect and checks if the picture you took had a distinguishable face. If it finds one, it will crop around it and make it your new avatar.

A screenshot of a user profile page. At the top, there is a large circular thumbnail of the user's profile picture, which is the same image from the previous screenshot. Below the thumbnail is a table with the following data:

First Name:	asdf
Middle Name:	adsf
Last Name:	adsf
Address Line 1:	adsf
Address Line 2:	adsf
City:	adsf
State:	AK
Zip Code	24060
Email:	vgpsean@gmail.com
Username:	Vgpsean1@gmail.com

Shown here is the table that is displayed when the user navigates to the CryptoCurrencies tab. The user can filter and sort by any column except for the logo column.

List of Top CryptoCurrencies							
Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓
Bitcoin	BTC		Bitcoin (BTC) is a cryptocurrency . Users are able to generate BTC through the process of mining. Bitcoin has a current supply of 18,801,148. The last known price of ...	mineable	\$50,813.80	04/28/2013	12/08/2021
Ethereum	ETH		Ethereum (ETH) is a cryptocurrency . Users are able to generate ETH through the process of mining. Ethereum has a current supply of 116,801,148. The last known price of ...	mineable	\$4,444.68	08/07/2015	12/08/2021
Binance Coin	BNB		Binance Coin (BNB) is a cryptocurrency . Binance Coin has a current supply of 166,801,148. The last known price of ...	marketplace	\$601.83	07/25/2017	12/08/2021
Tether	USDT		Tether (USDT) is a cryptocurrency and operates on the Ethereum platform. Tether has a current supply of ...	payments	\$1.00	02/25/2015	12/08/2021
Solana	SOL		Solana (SOL) is a cryptocurrency launched in 2020. Solana has a current supply of 510,812,288,5901596 with ...	pos	\$193.27	04/10/2020	12/08/2021

Shown here is the display box for adding a new crypto currency to the database. It is very important that the symbol when creating a new currency is a real symbol. The connected API will query the symbol that is inputted to make sure the currency is real.

List of Top CryptoCurrencies																																							
<div style="border: 1px solid #ccc; padding: 10px; width: fit-content; margin: auto;"> <p>Add New CryptoCurrency</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Currency Name: *</td> <td colspan="3"><input type="text" value="Enter Full Crypto Name"/></td> </tr> <tr> <td>Symbol: *</td> <td colspan="3"><input type="text" value="Enter Cryptocurrency Symbol"/></td> </tr> <tr> <td>Website Link: *</td> <td colspan="3"><input type="text" value="Enter Cryptocurrency Website Link"/></td> </tr> <tr> <td>Description: *</td> <td colspan="3"><input type="text" value="Enter Cryptocurrency's Description"/></td> </tr> <tr> <td>Obtainment Method: *</td> <td colspan="3"><input type="text" value="Enter Cryptocurrency's ob"/></td> </tr> <tr> <td>Price: *</td> <td colspan="3"><input type="text" value=""/></td> </tr> <tr> <td>Release Date: *</td> <td colspan="3"><input type="text" value="__/__/__"/></td> </tr> <tr> <td>Last Updated: *</td> <td colspan="3"><input type="text" value=""/></td> </tr> </table> <div style="text-align: center; margin-top: 10px;"> <input type="button" value="Save"/> <input type="button" value="Cancel"/> </div> </div>								Currency Name: *	<input type="text" value="Enter Full Crypto Name"/>			Symbol: *	<input type="text" value="Enter Cryptocurrency Symbol"/>			Website Link: *	<input type="text" value="Enter Cryptocurrency Website Link"/>			Description: *	<input type="text" value="Enter Cryptocurrency's Description"/>			Obtainment Method: *	<input type="text" value="Enter Cryptocurrency's ob"/>			Price: *	<input type="text" value=""/>			Release Date: *	<input type="text" value="__/__/__"/>			Last Updated: *	<input type="text" value=""/>		
Currency Name: *	<input type="text" value="Enter Full Crypto Name"/>																																						
Symbol: *	<input type="text" value="Enter Cryptocurrency Symbol"/>																																						
Website Link: *	<input type="text" value="Enter Cryptocurrency Website Link"/>																																						
Description: *	<input type="text" value="Enter Cryptocurrency's Description"/>																																						
Obtainment Method: *	<input type="text" value="Enter Cryptocurrency's ob"/>																																						
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Tether	USDT		Tether (USDT) is a cryptocurrency and operates on the Ethereum platform. Tether has a current supply of ...	\$1.00	02/25/2015	12/08/2021																																	
Solana	SOL		Solana (SOL) is a cryptocurrency launched in 2020. Solana has a current supply of 510,812,288,5901596 with ...	\$193.27	04/10/2020	12/08/2021																																	

Error messages are displayed upon trying to create an empty currency.

List of Top CryptoCurrencies							
<input type="text" value="Enter Global Search Query"/> <input type="button" value="Clear All Filters"/>							
« < > » 1 2 3 4 5 6 7 8 9 10 5							
Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓
Bitcoin	BTC		Bitcoin (BTC) is a cryptocurrency . Users are able to generate BTC through the process of mining. Bitcoin has a current supply of 18,801,148. The last known price of 1 BTC is \$50,813.80.	mineable	\$50,813.80	04/28/2011	12/05/2021
Ethereum	ETH		Ethereum (ETH) is a cryptocurrency . Users are able to generate ETH through the process of mining. Ethereum has a current supply of 116,801,148. The last known price of 1 ETH is \$4,444.68.	mineable	\$4,444.68	08/07/2011	12/05/2021
Binance Coin	BNB		Binance Coin (BNB) is a cryptocurrency . Binance Coin has a current supply of 166,801,148. The last known price of 1 BNB is \$601.83.	marketplace	\$601.83	07/25/2017	12/08/2021
Tether	USDT		Tether (USDT) is a cryptocurrency and operates on the Ethereum platform. Tether has a current supply of 100,000,000,000.00.	payments	\$1.00	02/25/2011	12/08/2021
Solana	SOL		Solana (SOL) is a cryptocurrency launched in 2020. Solana has a current supply of 510,812,288,5901596 with a current price of \$193.27.	pos	\$193.27	04/10/2020	12/05/2021

Enter the following to create a new CryptoCurrency.

Add New CryptoCurrency

X

Currency Name: *	PancakeSwap
Symbol: *	CAKE
Website Link: *	https://pancakeswap.finance/
Description: *	pancake crypto currency
Obtainment Method: *	not mineable
Price: *	12.43
Release Date: *	2020/09/01
Last Updated: *	2021/12/08

 Save

 Cancel

The currency will be successfully created and the new record will appear at the end of the table.

List of Top CryptoCurrencies

i CryptoCurrency was Successfully Created!

Enter Global Search Query Clear All Filters

Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓
Bitcoin	BTC		Bitcoin (BTC) is a cryptocurrency . Users are able to generate BTC through the process of mining. Bitcoin has a current supply of 18,811,192. The last known price of	mineable	\$50,813.80	04/28, 2021
Ethereum	ETH		Ethereum (ETH) is a cryptocurrency . Users are able to generate ETH through the process of mining. Ethereum has a current supply of 110,801,148. The last known price of	mineable	\$4,444.68	08/07, 2021
Binance Coin	BNB		Binance Coin (BNB) is a cryptocurrency . Binance Coin has a current supply of 166,801,148. The last known price of	marketplace	\$601.83	07/25, 2021
Tether	USDT		Tether (USDT) is a cryptocurrency and operates on the Ethereum platform. Tether has a current supply of	payments	\$1.00	02/25, 2021
Solana	SOL		Solana (SOL) is a cryptocurrency launched in 2020. Solana has a current supply of 510,812,288.5901596 with	pos	\$193.27	04/10, 2021

Crypto Name ↑↓ Symbol ↑↓ Logo Description ↑↓ Obtainment Method ↑↓ Current Price ↑↓ Release Date ↑↓ Last Updated ↑↓

par|  pancake crypto currency not mineable \$12.43 09/01/2020 12/08/2021

Clicking the view button shows the following panel.

View Cryptocurrency

X



Name:	PancakeSwap
Symbol:	CAKE
Website Link:	https://pancakeswap.finance/
Description:	pancake crypto currency
Obtainment Method:	not mineable
Price:	\$12.43
Release Date:	09/01/2020
Last Updated:	12/08/2021

Close

The user can also edit any record. Please note that this edit will be checked to make sure that the currency is a real currency after the edit.

Edit Currency

X

Currency Name: *	PancakeSwap
Symbol: *	CAKE
Description: *	pancake crypto currency
Obtainment Method: *	not mineable
Price: *	12
Release Date: *	2020/09/01
Last Updated: *	2021/12/08

 Save

 Cancel

The user can delete any record in the database. They will be prompted with a confirmation before deleting the record.

Crypto Name ↑								Description ↑↓				Obtainment Method ↑↓		Current Price ↑↓		Release Date ↑↓		Last Updated ↑↓	
Symbol ↑↓		Logo		pancake crypto currency															
Pan				pancake crypto currency															
PancakeSwap	CAKE																		

Deletion Confirmation

Are you sure you want to permanently delete the selected Cryptocurrency PancakeSwap from the database?

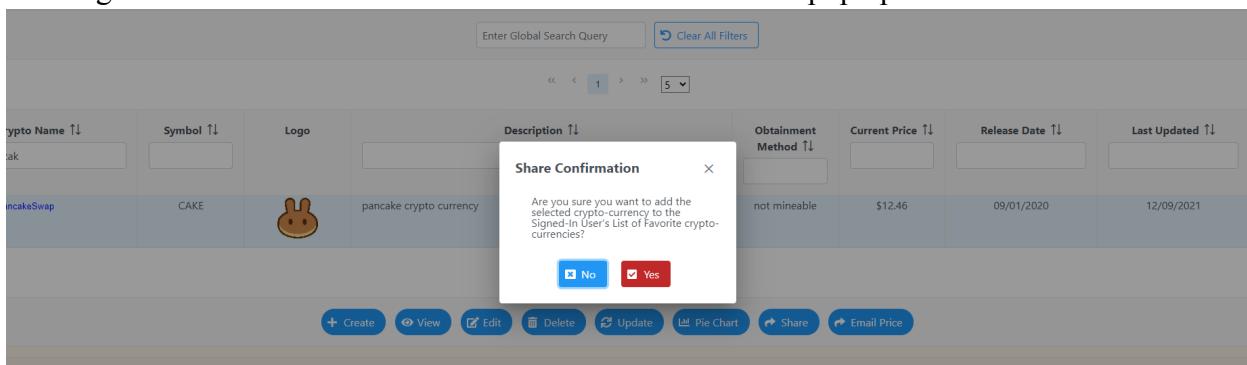
[+ Create](#) [View](#) [Edit](#) [Delete](#) [Update](#) [Pie Chart](#) [Share](#) [Email Price](#)

Clicking the pie chart button will query a sentiment analysis of the 10 latest tweets about that currency.

This does not work on the AWS deployment as the code to accomplish caused our project to be bigger than our AWS instance could handle so we had to remove it.



Clicking the share button will cause a confirmation window to pop up.



The user can only share if they can login.

List of Top CryptoCurrencies											
<input type="text" value="Enter Global Search Query"/> <input type="button" value="Clear All Filters"/>											
Info Unable to Share! To share a video, a user must have signed in!											
« < > » 1 2 3 4 5 6 7 8 9 10 5											
Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓				
Bitcoin	BTC		Bitcoin (BTC) is a cryptocurrency . Users are able to generate BTC through the process of mining. Bitcoin has a current supply of 18,601,148.	mineable	\$50,813.80	04/28/2013	12/08/2021				
Ethereum	ETH		Ethereum (ETH) is a cryptocurrency . Users are able to generate ETH through the process of mining. Ethereum has a current supply of 116,801,148.	mineable	\$4,444.68	08/07/2015	12/08/2021				
Binance Coin	BNB		Binance Coin (BNB) is a cryptocurrency . Binance Coin has a current supply of 166,801,148. The last known price of Binance Coin was \$601.83 on 07/25/2017.	marketplace	\$601.83	07/25/2017	12/08/2021				
Tether	USDT		Tether (USDT) is a cryptocurrency and operates on the Ethereum platform. Tether has a current supply of 100,000,000,000.	payments	\$1.00	02/25/2015	12/08/2021				
Solana	SOL		Solana (SOL) is a cryptocurrency launched in 2020. Solana has a current supply of 510,812,288,5901596 with a current price of \$193.27.	pos	\$193.27	04/10/2020	12/08/2021				

The user is also unable to email unless they are logged in.

List of Top CryptoCurrencies							
<input type="text" value="Enter Global Search Query"/> <button>Clear All Filters</button>							
« « 1 2 3 4 5 6 7 8 9 10 » »							
Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓
Bitcoin	BTC		Bitcoin (BTC) is a cryptocurrency . Users are able to generate BTC through the process of mining. Bitcoin has a current supply of 18,801,148. The last known price of \$50,813.80 was recorded on 04/28/2013.	mineable	\$50,813.80	04/28/2013	12/08/2021
Ethereum	ETH		Ethereum (ETH) is a cryptocurrency . Users are able to generate ETH through the process of mining. Ethereum has a current supply of 116,801,148. The last known price of \$4,444.68 was recorded on 08/07/2015.	mineable	\$4,444.68	08/07/2015	12/08/2021
Binance Coin	BNB		Binance Coin (BNB) is a cryptocurrency . Binance Coin has a current supply of 166,801,148. The last known price of \$601.83 was recorded on 07/25/2017.	marketplace	\$601.83	07/25/2017	12/08/2021
Tether	USDT		Tether (USDT) is a cryptocurrency and operates on the Ethereum platform. Tether has a current supply of 10,812,288,590,1596 with a current price of \$1.00.	payments	\$1.00	02/25/2015	12/08/2021
Solana	SOL		Solana (SOL) is a cryptocurrency launched in 2020. Solana has a current supply of 10,812,288,590,1596 with a current price of \$193.27.	pos	\$193.27	04/10/2020	12/08/2021

Going to the search tab will show the following UI. This screenshot is after a failed search of type 1.

Database Search

Type	Description	Search
1	Search crypto-currency name, symbol, or description individually or search in each.	<input type="button" value="Search Type 1"/> Please enter a search string!
2	crypto-currency description contains coinDescriptionQ and obtainment method contains obtainmentMethodQ	<input type="button" value="Search Type 2"/>
3	Crypto-currency price is between fromPriceQ and toPriceQ	<input type="button" value="Search Type 3"/>
4	Crypto-currency release date is between fromReleaseDateQ and toReleaseDateQ	<input type="button" value="Search Type 4"/>

Top Crypto Currencies | Fortune 500 | 100 Best | Largest Tech
 CS5704 Software Engineering course semester project application developed by Sean Gruber, Sandesh Jain, and Ryan Wood.
 Powered By: CoinMarketCap | Twitter | CoinGecko | ALPHA VANTAGE | IEX Cloud | Cloudmersive

Searching the following will bring up the results in the second screenshot.

Database Search

Type	Description	Search
1	Search crypto-currency name, symbol, or description individually or search in each.	<input type="button" value="Search Type 1"/>
2	crypto-currency description contains coinDescriptionQ and obtainment method contains obtainmentMethodQ	<input type="button" value="Search Type 2"/>
3	Crypto-currency price is between fromPriceQ and toPriceQ	<input type="button" value="Search Type 3"/>
4	Crypto-currency release date is between fromReleaseDateQ and toReleaseDateQ	<input type="button" value="Search Type 4"/>

Search Crypto-Currencies Database X

Search: All

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 Powered By: CoinMarketCap | Twitter | CoinGecko | ALPHA VANTAGE | IEX Cloud | Cloudmersive

List of Top CryptoCurrencies

List of Top CryptoCurrencies							
<input type="text" value="Enter Global Search Query"/> <input type="button" value="Clear All Filters"/>							
<< < > >> 5							
Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓
Bitcoin	BTC		Bitcoin (BTC) is a cryptocurrency . Users are able to generate BTC through the process of mining. Bitcoin has a current	mineable	\$50,813.80	04/28/2013	12/08/2021
Wrapped Bitcoin	WBTC		Wrapped Bitcoin (WBTC) is a cryptocurrency and operates on the Ethereum platform. Wrapped Bitcoin	medium-of-exchange	\$50,315.10	01/30/2019	12/08/2021
Bitcoin Cash	BCH		Bitcoin Cash (BCH) is a cryptocurrency . Users are able to generate BCH through the process of mining. Bitcoin Cash has	mineable	\$480.50	07/23/2017	12/08/2021
Bitcoin BEP2	BTCB		Bitcoin BEP2 (BTCB) is a cryptocurrency and operates on the Binance Chain (BEP2) platform. Bitcoin BEP2 has a	binance-chain	\$50,932.50	06/18/2019	12/08/2021

<< < > >> 5

Searching the following will display the results shown in the second screenshot.

Database Search

Type	Description	Search
1	Search crypto-currency name, symbol, or description individually or search in each.	Search Type 1
2	crypto-currency description contains coinDescriptionQ and obtainment method contains obtainmentMethodQ	Search Type 2
3	Crypto-currency price is between fromPriceQ and toPriceQ	Search Type 3
4	Crypto-currency	Search Type 4

Search Crypto-Currencies Database

Search: E Symbol ▾

Submit Cancel

Largest Tech
in Jain, and Ryan Wood.
Cloudmersive.

Enter Global Search Query [Clear All Filters](#)

Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓
Ethereum	ETH		Ethereum (ETH) is a cryptocurrency. Users are able to generate ETH through the process of mining. Ethereum has a	mineable	\$4,444.68	08/07/2015	12/08/2021
Tether	USDT		Tether (USDT) is a cryptocurrency and operates on the Ethereum platform. Tether has a current supply of	payments	\$1.00	02/25/2015	12/08/2021
Ethereum Classic	ETC		Ethereum Classic (ETC) is a cryptocurrency. Users are able to generate ETC through the process of	mineable	\$41.01	07/24/2016	12/08/2021

View Pie Chart Go Back

Searching the following will display the results in the second screenshot.

Database Search

Type	Description	Search
1	Search crypto-currency name, symbol, or description individually or search in each.	<input type="button" value="Search Type 1"/>
2	crypto-currency description contains coinDescriptionQ and obtainment method contains obtainmentMethodQ	<input type="button" value="Search Type 2"/>
3	Crypto-currency price is between fromPriceQ and toPriceQ	<input type="button" value="Search Type 3"/>
4	Crypto-currency release date is between fromReleaseDateQ and toReleaseDateQ	<input type="button" value="Search Type 4"/>

Search Crypto-Currencies Database

Search: Description

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Sean Gruber, Sandesh Jain, and Ryan Wood.
Powered By: CoinMarketCap, DevAPI, ALPHA VANTAGE, IEXCloud, Cloudmersive.

LIST OF top Cryptocurrencies

Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓
Ethereum	ETH		Ethereum (ETH) is a cryptocurrency . Users are able to generate ETH through the process of mining. Ethereum has a	mineable	\$4,444.68	08/07/2015	12/08/2021
Dogecoin	DOGE		Dogecoin (DOGE) is a cryptocurrency . Users are able to generate DOGE through the process of mining.	mineable	\$0.18	12/15/2013	12/08/2021
VeChain	VET		VeChain (VET) is a cryptocurrency . VeChain has a current supply of 86,712,634.466 with 643,15,576,989 in	logistics	\$0.09	08/22/2017	12/08/2021
Elrond	ELRD		Elrond (ELRD) is a cryptocurrency . Elrond has a current supply of 22,850,892 with 19,846,473,267,878,898 in	binance-smart-chain	\$300.56	09/04/2020	12/08/2021
NEAR Protocol	NEAR		NEAR Protocol (NEAR) is a cryptocurrency launched in 2020. NEAR Protocol has a current supply of	platform	\$9.45	08/11/2020	12/08/2021

The following will be displayed on an attempted empty search.

Crypto-Currencies and Companies

Hello, Guest

Database Search

Type	Description	Search
1	Search crypto-currency name, symbol, or description individually or search in each.	<input type="button" value="Search Type 1"/> X Coin Description Search String is required!
2	crypto-currency description contains coinDescriptionQ and obtainment method contains obtainmentMethodQ	<input type="button" value="Search Type 2"/> X Coin Obtainment Method Search String is required!
3	Crypto-currency price is between fromPriceQ and toPriceQ	<input type="button" value="Search Type 3"/>
4	Crypto-currency release date is between fromReleaseDateQ and toReleaseDateQ	<input type="button" value="Search Type 4"/>

Top Crypto Currencies | Fortune 500 | 100 Best | Largest Tech
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Powered By: CoinMarketCap, DevAPI, ALPHA VANTAGE, IEXCloud, Cloudmersive.

Searching the following will display the results in the second screenshot.

Type	Description	Search
1	Search crypto-currency name, symbol, or description individually or search in each.	<input type="button" value="Search Type 1"/>
2	crypto-currency description contains coinDescriptionQ and obtainment method contains obtainmentMethodQ	<input type="button" value="Search Type 2"/>
3	Crypto-currency price is between fromPriceQ and toPriceQ	<input type="button" value="Search Type 3"/>
4	Crypto-currency release date is between fromReleaseDateQ and toReleaseDateQ	<input type="button" value="Search Type 4"/>

CryptoCurrency Database Search Type 2

CryptoCurrency Description Search String

Obtainment Method *

Enter Global Search Query <input type="button" value="Clear All Filters"/>							
<< < > >> 5							
Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓
Bitcoin	BTC		Bitcoin (BTC) is a cryptocurrency . Users are able to generate BTC through the process of mining. Bitcoin has a current	mineable	\$50,813.80	04/28/2013	12/08/2021
Dogecoin	DOGE		Dogecoin (DOGE) is a cryptocurrency . Users are able to generate DOGE through the process of mining.	mineable	\$0.18	12/15/2013	12/08/2021
Litecoin	LTC		Litecoin (LTC) is a cryptocurrency . Users are able to generate LTC through the process of mining. Litecoin has a	mineable	\$165.15	04/28/2013	12/08/2021
Bitcoin Cash	BCH		Bitcoin Cash (BCH) is a cryptocurrency . Users are able to generate BCH through the process of mining. Bitcoin Cash has a	mineable	\$480.50	07/23/2017	12/08/2021
Filecoin	FIL		Filecoin (FIL) is a cryptocurrency launched in 2020. Users are able to generate FIL through the process of	mineable	\$41.84	12/13/2017	12/08/2021

The following is an attempted empty search on search type 3.

Type	Description	Search
1	Search crypto-currency name, symbol, or description individually or search in each.	<input type="button" value="Search Type 1"/>
2	crypto-currency description contains coinDescriptionQ and obtainment method contains obtainmentMethodQ	<input type="button" value="Search Type 2"/>
3	Crypto-currency price is between fromPriceQ and toPriceQ	<input type="button" value="Search Type 3"/>
4	Crypto-currency release date is between fromReleaseDateQ and toReleaseDateQ	<input type="button" value="Search Type 4"/>

Minimum Price is required!

Maximum Price is required!

[Top Crypto Currencies](#) [Fortune 500](#) [100 Best](#) [Largest Tech](#)
 CS5764 Software Engineering course semester project application developed by Sean Gruber, Sandesh Jain, and Ryan Wood.
 Powered By:     

Searching the following will display the results in the second screenshot.

The screenshot shows the 'Database Search' interface. A modal window titled 'CryptoCurrency Database Search Type 3' is open, containing fields for 'Minimum Price' (set to 5.00) and 'Maximum Price' (set to 50.00), with 'Submit' and 'Cancel' buttons. The background shows a table with four search types and their descriptions.

Type	Description	Search
1	Search crypto-currency name, symbol, or description individually or search in each.	<input type="button" value="Search Type 1"/>
2	crypto-currency description contains coinDescriptionQ and obtainment method contains obtainmentMethodQ	<input type="button" value="Search Type 2"/>
3	Crypto-currency price is between fromPriceQ and toPriceQ	<input type="button" value="Search Type 3"/>
4	Crypto-currency release date is between fromReleaseDateQ and toReleaseDateQ	<input type="button" value="Search Type 4"/>

The screenshot shows the 'List of Top CryptoCurrencies' page. It features a table with columns: 'Crypto Name ↑↓', 'Symbol ↑↓', 'Logo', 'Description ↑↓', 'Obtainment Method ↑↓', 'Current Price ↑↓', 'Release Date ↑↓', and 'Last Updated ↑↓'. The table lists five cryptocurrencies: Polkadot, Uniswap, Chainlink, FTX Token, and Internet Computer, with their respective details and logos.

Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓
Polkadot	DOT		Polkadot (DOT) is a cryptocurrency. Polkadot has a current supply of 1,103,303,471,382273 with	substrate	\$29.59	08/19/2020	12/08/2021
Uniswap	UNI		Uniswap (UNI) is a cryptocurrency launched in 2020 and operates on the Ethereum platform. Uniswap has a	decentralized-exchange	\$18.41	09/17/2020	12/08/2021
Chainlink	LINK		Chainlink (LINK) is a cryptocurrency and operates on the Ethereum platform. Chainlink has a current supply of	platform	\$22.52	09/20/2017	12/08/2021
FTX Token	FTT		FTX Token (FTT) is a cryptocurrency launched in 2019 and operates on the Binance Chain (BEP2) platform. FTX	marketplace	\$44.14	07/31/2019	12/08/2021
Internet Computer	ICP		Internet Computer (ICP) is a cryptocurrency launched in 2021. Internet Computer has a current supply	platform	\$31.07	03/23/2021	12/08/2021

The following screenshot is an attempted empty search on search type 4.

The screenshot shows the 'Database Search' interface. A modal window titled 'CryptoCurrency Database Search Type 3' is open, containing fields for 'Minimum Price' (5.00) and 'Maximum Price' (50.00), with 'Submit' and 'Cancel' buttons. The background shows a table with four search types. An error message 'To release date is required!' is displayed next to the 'Search Type 4' button.

Type	Description	Search
1	Search crypto-currency name, symbol, or description individually or search in each.	<input type="button" value="Search Type 1"/>
2	crypto-currency description contains coinDescriptionQ and obtainment method contains obtainmentMethodQ	<input type="button" value="Search Type 2"/>
3	Crypto-currency price is between fromPriceQ and toPriceQ	<input type="button" value="Search Type 3"/>
4	Crypto-currency release date is between fromReleaseDateQ and toReleaseDateQ	<input type="button" value="Search Type 4"/> To release date is required!

Searching the following will display the results on the third screenshot.

Type	Description	Search
1	Search crypto-currency name, symbol, or description individually or search in each.	<input type="button" value="Search Type 1"/>
2	crypto-currency description contains coinDescriptionQ and obtainment method contains obtainmentMethodQ	<input type="button" value="Search Type 2"/>
3		<input type="button" value="Search Type 3"/>
4	Cryptocurrency	<input type="button" value="Search Type 4"/>

Release Date-From Search String 1/1/2021

Release Date-To Search String December 2021

Type	Description	Search
1	Search crypto-currency name, symbol, or description individually or search in each.	<input type="button" value="Search Type 1"/>
2	crypto-currency description contains coinDescriptionQ and obtainment method contains obtainmentMethodQ	<input type="button" value="Search Type 2"/>
3		<input type="button" value="Search Type 3"/>
4	Cryptocurrency	<input type="button" value="Search Type 4"/>

Release Date-From Search String 2013/01/01

Release Date-To Search String 2014/01/01

List of Top CryptoCurrencies

« < 1 > » 5

Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓
Bitcoin	BTC		Bitcoin (BTC) is a cryptocurrency . Users are able to generate BTC through the process of mining. Bitcoin has a current supply of 18,855,999.99999999.	mineable	\$50,813.80	04/28/2013	12/08/2021
XRP	XRP		XRP (XRP) is a cryptocurrency . XRP has a current supply of 99,999,075.944 with 47,247,295.769 in circulation. The last update was on 08/04/2013.	medium-of-exchange	\$0.86	08/04/2013	12/08/2021
Dogecoin	DOGE		Dogecoin (DOGE) is a cryptocurrency . Users are able to generate DOGE through the process of mining.	mineable	\$0.18	12/15/2013	12/08/2021
Litecoin	LTC		Litecoin (LTC) is a cryptocurrency . Users are able to generate LTC through the process of mining. Litecoin has a current supply of 8,444,444.444 with 8,444,444.444 in circulation.	mineable	\$165.15	04/28/2013	12/08/2021

« < 1 > » 5

COMPANIES

Companies offers basically all of the same functionalities that the crypto currencies data table does.

Company Name ↑↓	Logo	Exchange ↑↓	Stock Symbol ↑↓	Price ↑↓	Description ↑↓	Analyst's Price ↑↓	Revenue Per Share ↑↓	Sector ↑↓
Apple Inc		NASDAQ	AAPL	\$175.19	Apple Inc. is an American multinational technology company that specializes in consumer electronics, computer	\$170.32	\$21.9	TECHNOLOGY
Microsoft Corporation		NASDAQ	MSFT	\$334.96	Microsoft Corporation is an American multinational technology company which produces computer software,	\$363.88	\$23.39	TECHNOLOGY
Alphabet Inc		NASDAQ	GOOGL	\$2966.04	Alphabet Inc. is an American multinational conglomerate headquartered in Mountain View,	\$3286.11	\$356.56	TECHNOLOGY
Amazon.com Inc		NASDAQ	AMZN	\$3522.61	Amazon.com, Inc. is an American multinational technology company which focuses on e-commerce, cloud	\$4107.2	\$909.11	TRADE & SERVICES
Tesla Inc		NASDAQ	TSLA	\$1067.83	Tesla, Inc. is an American electric vehicle and clean energy company based in Palo Alto, California. Tesla's current	\$855.58	\$48.27	MANUFACTURING

Create works like it does in crypto except there is not attempt at an api validation.

Create New Company

X

Name: *	<input type="text"/>
Exchange:	<input type="text"/>
Ticker:	<input type="text"/>
Price:	<input type="text"/>
Description:	<input type="text"/>
Logo:	<input type="text"/>
Analyst Price:	<input type="text"/>
Revenues:	<input type="text"/>
Sector:	<input type="text"/>
Website:	<input type="text"/>

 Save

 Cancel

The view works about the same as the crypto one does.

View Stock

X



Name:	Tesla Inc
Symbol:	TSLA
Description:	Tesla, Inc. is an American electric vehicle and clean energy company based in Palo Alto, California. Tesla's current ▲ ▾
Sector:	MANUFACTURING
Price:	\$1067.83

Close

Edit works like it does in the crypto currency table.

Edit company

X

Name: *	Tesla Inc
Exchange: *	NASDAQ
Ticker: *	TSLA
Price: *	\$1067.83
Description: *	Tesla, Inc. is an American e
Logo: *	https://storage.googleapis.com
Analyst Price: *	855.58
Revenues: *	48.27
Sector: *	MANUFACTURING
Website: *	www.tesla.com

Save Cancel

The screenshot displays three identical web pages showing a list of companies (Apple Inc., Microsoft Corporation, Alphabet Inc., Amazon.com Inc., Tesla Inc.) with their logos, stock exchange, symbols, prices, descriptions, analyst's price, revenue per share, and sector. A modal dialog box titled "Share Confirmation" is open over the list, asking if the user wants to add the selected video to their favorite YouTube videos. The dialog has two buttons: "No" and "Yes".

In the second and third screenshots, a blue callout bubble in the top right corner indicates that sharing is not possible because the user must be signed in.

Screenshot 1:

Company Name ↑↓	Logo	Exchange ↑↓	Stock Symbol ↑↓	Price ↑↓	Description ↑↓	Analyst's Price ↑↓	Revenue Per Share ↑↓	Sector ↑↓
Apple Inc		NASDAQ	AAPL	\$175.19	Apple Inc. is an American multinational technology company that specializes in consumer electronics, computer software, and services.	\$170.32	\$21.9	TECHNOLOGY
Microsoft Corporation		NASDAQ	MSFT	\$334.96	Microsoft Corporation is an American multinational technology company which produces computer software, personal computers, and services.	\$363.88	\$23.39	TECHNOLOGY
Alphabet Inc		NASDAQ	GOOGL	\$2966.04	Alphabet Inc. is an American multinational conglomerate headquartered in Mountain View, California.	\$3286.11	\$356.56	TECHNOLOGY
Amazon.com Inc		NASDAQ	AMZN	\$3522.61	Amazon.com, Inc. is an American multinational technology company which focuses on e-commerce, cloud computing, and digital streaming.	\$4107.2	\$909.11	TRADE & SERVICES
Tesla Inc		NASDAQ	TSLA	\$1067.83	Tesla, Inc. is an American electric vehicle and clean energy company based in Palo Alto, California. Tesla's current market value is approximately \$1067.83 billion.	\$855.58	\$48.27	MANUFACTURING

Screenshot 2:

Company Name ↑↓	Logo	Exchange ↑↓	Stock Symbol ↑↓	Price ↑↓	Description ↑↓	Analyst's Price ↑↓	Revenue Per Share ↑↓	Sector ↑↓
Apple Inc		NASDAQ	AAPL	\$175.19	Apple Inc. is an American multinational technology company that specializes in consumer electronics, computer software, and services.	\$170.32	\$21.9	TECHNOLOGY
Microsoft Corporation		NASDAQ	MSFT	\$334.96	Microsoft Corporation is an American multinational technology company which produces computer software, personal computers, and services.	\$363.88	\$23.39	TECHNOLOGY
Alphabet Inc		NASDAQ	GOOGL	\$2966.04	Alphabet Inc. is an American multinational conglomerate headquartered in Mountain View, California.	\$3286.11	\$356.56	TECHNOLOGY
Amazon.com Inc		NASDAQ	AMZN	\$3522.61	Amazon.com, Inc. is an American multinational technology company which focuses on e-commerce, cloud computing, and digital streaming.	\$4107.2	\$909.11	TRADE & SERVICES
Tesla Inc		NASDAQ	TSLA	\$1067.83	Tesla, Inc. is an American electric vehicle and clean energy company based in Palo Alto, California. Tesla's current market value is approximately \$1067.83 billion.	\$855.58	\$48.27	MANUFACTURING

Screenshot 3:

Company Name ↑↓	Logo	Exchange ↑↓	Stock Symbol ↑↓	Price ↑↓	Description ↑↓	Analyst's Price ↑↓	Revenue Per Share ↑↓	Sector ↑↓
Apple Inc		NASDAQ	AAPL	\$175.19	Apple Inc. is an American multinational technology company that specializes in consumer electronics, computer software, and services.	\$170.32	\$21.9	TECHNOLOGY
Microsoft Corporation		NASDAQ	MSFT	\$334.96	Microsoft Corporation is an American multinational technology company which produces computer software, personal computers, and services.	\$363.88	\$23.39	TECHNOLOGY
Alphabet Inc		NASDAQ	GOOGL	\$2966.04	Alphabet Inc. is an American multinational conglomerate headquartered in Mountain View, California.	\$3286.11	\$356.56	TECHNOLOGY
Amazon.com Inc		NASDAQ	AMZN	\$3522.61	Amazon.com, Inc. is an American multinational technology company which focuses on e-commerce, cloud computing, and digital streaming.	\$4107.2	\$909.11	TRADE & SERVICES
Tesla Inc		NASDAQ	TSLA	\$1067.83	Tesla, Inc. is an American electric vehicle and clean energy company based in Palo Alto, California. Tesla's current market value is approximately \$1067.83 billion.	\$855.58	\$48.27	MANUFACTURING

The above share and email attempts fail like they do in crypto as the user is not logged in.

Following the create an account link will lead to this page.

Create an Account

First Name: *	Sean
Middle Name:	
Last Name: *	Gruber
Address Line 1: *	Nowhere
Address Line 2:	
City: *	Nowhere
State:	AK ▾
Zip Code: ⓘ *	24060
Security Question:	In what city or town did your mother and father meet? ▾
Security Answer: *	Nowhere
Email: *	vgpsean@gmail.com
Username: ⓘ *	Vgpsean2@gmail.com
Password: ⓘ *	*****
Confirm Password: *	*****

↑ Submit Cancel

When logging in, hit sign in and then an email will be sent to your email containing a 2 factor authentication code.

Sign In

Username:	Vgpsean2@gmail.com
Password:	

Sign In Two Factor Create an Account Forgot Password Cancel

Success!
Email Message is Sent!

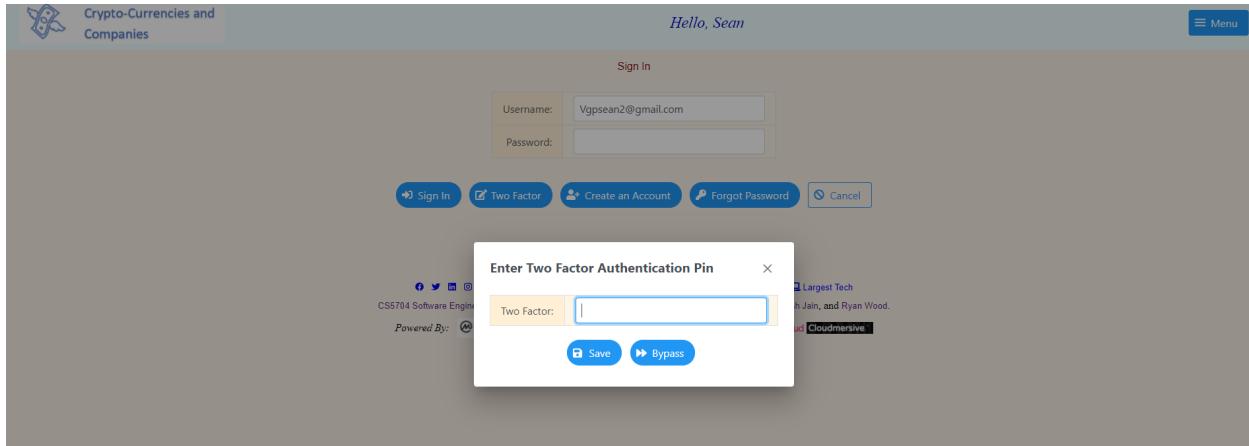
Facebook Twitter LinkedIn Instagram Top Crypto Currencies Fortune 500 100 Best Largest Tech
CS55704 Software Engineering course semester project application developed by Sean Gruber, Sandesh Jain, and Ryan Wood.
Powered By: CoinMarketCap Twitter CloudNLP ALPHA VANTAGE IEX Cloud Cloudmersive

This is what your email will look like.

To: vgpsean@gmail.com

Your two factor authentication password is: 5145

Enter the code here. To bypass 2 factor simply hit the bypass button.



This page is displayed if you enter the incorrect code.



After entering the correct code you will be taken to your profile page.

The screenshot shows Sean Gruber's account profile. At the top, it says "Sean Gruber's Account Profile". Below that is a blue circular placeholder for a profile picture. To the left is a sidebar with links: Home, My Crypto-Currencies, My Companies, Edit Profile, Change Photo, Change Password, Delete Account, and Sign Out. The main content area displays a table with account information:

First Name:	Sean
Middle Name:	
Last Name:	Gruber
Address Line 1:	Nowhere
Address Line 2:	
City:	Nowhere
State:	AK
Zip Code:	24060
Email:	vgpsean@gmail.com
Username:	Vgpsean2@gmail.com

At the bottom, there are social media sharing icons (Facebook, Twitter, LinkedIn, GitHub) and links to "Top Crypto Currencies", "Fortune 500", "100 Best", and "Largest Tech". It also mentions "CS5704 Software Engineering course semester project application developed by Sean Gruber, Sandesh Jain, and Ryan Wood." and lists "Powered By" logos for CoinMarketCap, CloudFlare, Alpha Vantage, IEX Cloud, and Cloudmersive.

You can edit the information on your account.

The screenshot shows the "Edit Account Profile" form. It consists of a table with input fields for account details:

First Name: *	Sean
Middle Name:	
Last Name: *	Gruber
Address Line 1: *	Nowhere
Address Line 2:	
City: *	Nowhere
State:	AK
Zip Code: *	24060
Email: *	vgpsean@gmail.com
Username:	Vgpsean2@gmail.com

At the bottom are two buttons: a blue "Save" button with a save icon and a white "Cancel" button with a cancel icon.

The following confirmation is displayed on an attempt to delete your account.

Sean Gruber's Account Profile

First Name: Sean

Account Deletion Confirmation

Are you sure to permanently delete your account? This cannot be undone!

No Yes

Username: Vgpsean2@gmail.com

Facebook Twitter LinkedIn GitHub Top Crypto Currencies Fortune 500 100 Best Largest Tech

CS5704 Software Engineering course semester project application developed by Sean Gruber, Sandesh Jain, and Ryan Wood.

Powered By: CoinMarketCap Twitter CloudNLP ALPHA VANTAGE IEX Cloud Cloudmersive

Changing password requires you to enter your username and to enter the answer to your security question.

Please Enter Your Username

Vgpsean2@gmail.com

Submit Cancel

Facebook Twitter LinkedIn GitHub Top Crypto Currencies Fortune 500 100 Best Largest Tech

CS5704 Software Engineering course semester project application developed by Sean Gruber, Sandesh Jain, and Ryan Wood.

Powered By: CoinMarketCap Twitter CloudNLP ALPHA VANTAGE IEX Cloud Cloudmersive

Hello, Sean

Please Answer Your Security Question

In what city or town did your mother and father meet?

Nowhere

Submit Cancel

Facebook Twitter LinkedIn GitHub Top Crypto Currencies Fortune 500 100 Best Largest Tech

CS5704 Software Engineering course semester project application developed by Sean Gruber, Sandesh Jain, and Ryan Wood.

Powered By: CoinMarketCap Twitter CloudNLP ALPHA VANTAGE IEX Cloud Cloudmersive

Please Enter Your New Password

Password: *

Confirm Password: *

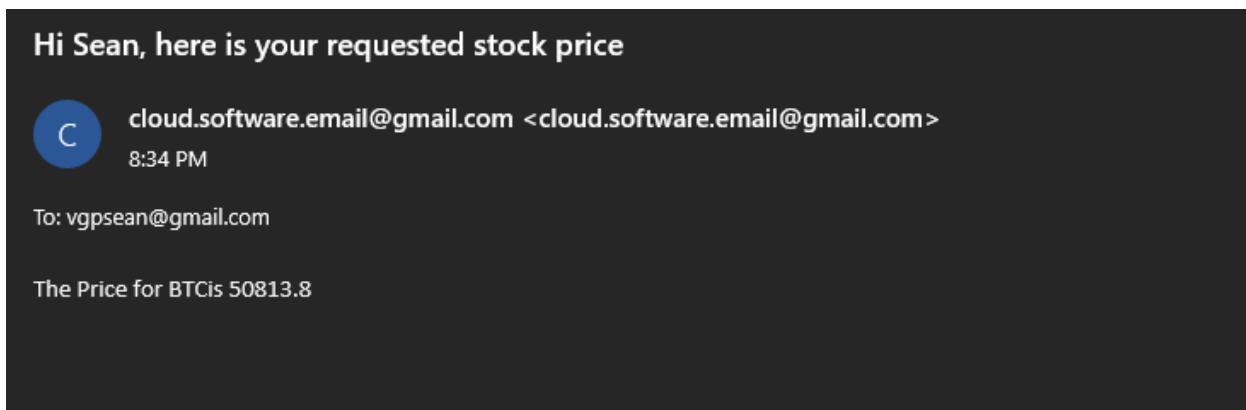
Top Crypto Currencies | Fortune 500 | 100 Best | Largest Tech
CS56704 Software Engineering course semester project application developed by Sean Gruber, Sandesh Jain, and Ryan Wood.
Powered By: CoinMarketCap | Twitter | DataAPI | ALPHA VANTAGE | IEX Cloud | Cloudmersive

While logged in the main crypto or companies tables you can hit email price and you will receive an email similar to the one shown in the two screenshots below.

List of Top CryptoCurrencies

Success! Email Message is Sent!

Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓
Bitcoin	BTC		Bitcoin (BTC) is a cryptocurrency. Users are able to generate BTC through the process of mining. Bitcoin has a current supply of 18,801,148. The last known price of	mineable	\$50,813.80	04/28/2013	12/08/2021
Ethereum	ETH		Ethereum (ETH) is a cryptocurrency. Users are able to generate ETH through the process of mining. Ethereum has a current supply of 166,801,148. The last known price of	mineable	\$4,444.68	08/07/2015	12/08/2021
Binance Coin	BNB		Binance Coin (BNB) is a cryptocurrency. Binance Coin has a current supply of 166,801,148. The last known price of	marketplace	\$601.83	07/25/2017	12/08/2021
Tether	USDT		Tether (USDT) is a cryptocurrency and operates on the Ethereum platform. Tether has a current supply of 100,000,000,000. The last known price of	payments	\$1.00	02/25/2015	12/08/2021
Solana	SOL		Solana (SOL) is a cryptocurrency launched in 2020. Solana has a current supply of 510,812,288,590,1596 with a	pos	\$193.27	04/10/2020	12/08/2021



The following two screenshots display the sharing between the CryptoCurrency and the UserCryptoCurrency table. This functionality is also present in the companies table.

The screenshots show a web application interface for managing cryptocurrencies. The top screenshot displays the 'List of Top CryptoCurrencies' and the bottom one displays the 'List of User CryptoCurrencies'. Both screens include search and filter functions, and a success message indicating a new entry was created.

List of Top CryptoCurrencies:

Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓
Bitcoin	BTC		Bitcoin (BTC) is a cryptocurrency. Users are able to generate BTC through the process of mining. Bitcoin has a current supply of 18,801,148. The last known price of Bitcoin is \$50,813.80.	mineable	\$50,813.80	04/28/2013	12/08/2021
Ethereum	ETH		Ethereum (ETH) is a cryptocurrency. Users are able to generate ETH through the process of mining. Ethereum has a current supply of 116,801,148. The last known price of Ethereum is \$4,444.68.	mineable	\$4,444.68	08/07/2015	12/08/2021
Binance Coin	BNB		Binance Coin (BNB) is a cryptocurrency. Binance Coin has a current supply of 166,801,148. The last known price of Binance Coin is \$601.83.	marketplace	\$601.83	07/25/2017	12/08/2021
Tether	USDT		Tether (USDT) is a cryptocurrency and operates on the Ethereum platform. Tether has a current supply of 100,000,000,000.00000000. The last known price of Tether is \$1.00.	payments	\$1.00	02/25/2015	12/08/2021
Solana	SOL		Solana (SOL) is a cryptocurrency launched in 2020. Solana has a current supply of 510,812,288,590,159,596 with a total supply of 510,812,288,590,159,596.	pos	\$193.27	04/10/2020	12/08/2021

List of User CryptoCurrencies:

Crypto Name ↑↓	Symbol ↑↓	Logo	Description ↑↓	Obtainment Method ↑↓	Current Price ↑↓	Release Date ↑↓	Last Updated ↑↓	User Photo
Tether	USDT		Tether (USDT) is a cryptocurrency and operates on the Ethereum platform. Tether has a current supply of 100,000,000,000.00000000. The last known price of Tether is \$1.00.	payments	\$1.00	02/25/2015	12/08/2021	
Test	ETH		adsf	asdf	\$50.21	12/09/2021	12/24/2021	

8. CONCLUSIONS

For our project we successfully built an application that loads information about Companies and CryptoCurrencies based on real world data. We implemented a database that stores information about Companies and CryptoCurrencies. Through our api we allow the crypto currencies to be updated to real time price information. Additionally, we built functionality to allow the user to search through the cryptocurrency database through 4 different search types. We successfully implemented Twitter API and Stanford NLP API to perform sentiment analysis on any crypto currency or company. Additionally, we successfully implemented facial detection on the profile pictures of the users. We successfully implemented in depth user accounts that hold several personal data fields. We also successfully implemented separate user tables for both crypto currencies and companies so that the users can save any crypto currency or company that they want to so that they can have easy access to that record. Lastly, we successfully implemented two factor authentication to allow the user to log in.

9. SUBMISSION INSTRUCTIONS

- Step 1: If your app uses a file storage directory, name it as CS5704-TeamN-FileStorage, where N is your team number.
- Step 2: Deploy your cloud software application to your AWS EC2 virtual private server computer.
- Step 3: Using the deployed software, each team member is required to create an account and generate *meaningful content* in the database for evaluation and testing. You will be penalized for not having sufficient content. In the case of two-factor authentication, your software is required to provide a **Bypass Two-Factor Authentication** option for grading. List the usernames and passwords under this option in the *User Accounts* section on page ii.
- Step 4: Open your IntelliJ project and **change the file paths for your app to run locally**.

Step 5: Create a ZIP file containing the following:

1. This file: *CS5704 Team N Semester Project Report.docx* (Replace N with your team number. Do not change this filename and do not remove the spaces in the filename!)
2. Your **IntelliJ IDEA Ultimate project folder** containing your entire documented application.
3. Your Database SQL file to populate the tables in your database.
4. Your CS5704-TeamN-FileStorage directory, original version with no data.

Step 6: Upload the ZIP file to your account in Google Drive, right click the uploaded file and select **Share** from the pop-up menu, enter balci@vt.edu, add a note as “CS5704 Team N Semester Project Submission – Your Name”, and click Send.

10. PERCENTAGES OF CONTRIBUTION

We hereby certify that the list of contributions and the corresponding percentages of contribution specified below truly reflect the actual contributions of the team members.

(Write your name as your signature)

<i>Student Name & List of Contributions</i>	<i>% Contributed</i>	<i>Signature</i>
Sean Gruber: 1. UI design 2. Database design 3. Crypto-Currency API implementation 4. Crypto-Currency Beans 5. Two-Factor Authentication Implementation 6. Crypto-Currency Database search 7. OV-1, OV-2, OV-5b 8. Homepage Galleria slider 9. User Account Implementation	33%	Sean Gruber
Sandesh Jain: 1. Facial Detection 2. Database design 3. Company Beans 4. Two-Factor Authentication Implementation 5. Sentiment Analysis Implementation 6. Company API implementation 7. SvcV-1, SvcV-2, SvcV-4 8. User Account Implementation	33%	Sandesh Jain
Ryan Wood: 1. Crypto-Currency UI Table 2. UI Design 3. Company UI Table 4. Facial Detection 5. Two-Factor Authentication Implementation 6. Sentiment Analysis Pie Chart UI 7. SV-1, SV-2, SV-4 8. User Account Implementation	33%	Ryan Wood
Sum of Percentages:	100%	

11. CALCULATION OF GRADES BASED ON PERCENTAGES OF CONTRIBUTION

Grade Calculation.xls						
	A	B	C	D	E	F
1		Grade Given for the Project	Student 1 Percentage of Contribution	Student 2 Percentage of Contribution	Student 3 Percentage of Contribution	
2	Example:	86	40%	25%	35%	100%
3						
4	Student 1	91.73	= B2 + B2 * (C2 - 33.333%)			
5	Student 2	78.83	= B2 + B2 * (D2 - 33.333%)			
6	Student 3	87.43	= B2 + B2 * (E2 - 33.333%)			
7						

Additional percentage of contribution cannot exceed 10%.

If a situation arises where a student is doing more than 10% extra work, Dr. Balci must be informed immediately.

12. TEAM PROJECT REQUIREMENTS

1. Each team member is expected to contribute equally.
2. You shall submit percentages of contribution together with a list of each student's individual contributions with signatures of all team members. In case of disagreement, you shall submit it separately with your rationale. (Write your name as representing your signature.)
3. Grades shall be determined based on the percentages of contribution.
 - a. If you contribute more than your equal share, then your grade shall be increased based on the extra percentage of contribution, which cannot be more than 10%.
 - b. If you contribute less than your equal share, then your grade shall be decreased accordingly.
 - c. The extra percentage of contribution shall not be more than 10%. Dr. Balci shall be notified immediately if a situation arises where a student needs to contribute more than 10% extra.
4. A team member who does not cooperate with other team members for conducting the project with equal contribution shall be penalized. **Doing more work than agreed upon by the team and claiming extra contribution shall not be acceptable.** Cooperation is essential!

13. GRADING SHEET

CS5704 Semester Project Grading: Team N			
	Points	Earned	Notes
Requirements Specification	10		Minimum 18 correct Functional Requirements (6 per team member) Minimum 9 correct Non-Functional Requirements (3 per team member)
Architecture Specification	16		Provide DoDAF diagrams of the Client-Server + Service-Oriented architecture for your cloud software application.
Software Design Specification	16		UI design specification with graphics created with Balsamiq and Database design specification with entities, relationships, and ER diagram.
Delivered Software Functionality			Description of the functionalities (features) of your deployed cloud software application by using annotated screenshots of user interfaces.
Quantity of Features	16		How many significant features each taking at least one hour to implement?
Variety of Features	16		User accounts, database, and API are required.
Complexity of Features	16		Difficulty of creating each feature? How many hours would it take for each?
Software Documentation (All Java and XHTML files)	5		Meaningful and informative documentation showing that you understand what the code is doing in all Java and XHTML pages.
Project Report Quality	5		(-5) Document instructions are not deleted in the final version of the report. Title page, table of contents, styles, formatting, hyperlinks, etc.
Documentation Penalty			
Subtract 3 to 10 points			After copy-and-paste of code, you are required to update the associated documentation and change the names of variables, constants, arrays, functions, methods, and classes to be meaningful.
	Total Points	100	0.00
	% Cont.	Grade	
Team Members:			Minimum time required: 6 hrs/week x 4 weeks x 3 students = 72 hrs
1. Student Full name 1	33.333%	0.00	
2. Student Full name 2	33.333%	0.00	
3. Student Full name 3	33.333%	0.00	

REFERENCES

- AlphaVantage (2021), “Alpha Vantage API,” <https://www.alphavantage.co/#about>
- Balci, O. (2021), “CS3754 Cloud Software Development Course Website,”
<https://manta.cs.vt.edu/cs3754>
- Coin Market Cap (2021), “Coin Market Cap API,” <https://coinmarketcap.com/api/>
- Cloudmersive (2021), “Cloudmersive API,” <https://cloudmersive.com/>
- Eclipse Foundation (2021), “Jakarta EE,” <https://jakarta.ee/>
- IEX Cloud (2021), “IEX Cloud API,” <https://iexcloud.io/>
- JetBrains (2021), “Intelligent Java Integrated Development Environment Advanced (IntelliJ IDEA),” <https://www.jetbrains.com/idea/>
- Medium, “Twitter Sentiment Analysis Reference”
<https://codeburst.io/analyzing-the-sentiment-of-tweets-with-java-d65405666c33>
- MySQL (2021), “MySQL Open Source Relational Database Management System,”
<http://www.mysql.com/>
- PrimeTek (2021), “PrimeFaces UI Component Library for JSF,” <https://www.primefaces.org/>
- Stanford NLP (2021), “Stanford NLP API,” <https://stanfordnlp.github.io/CoreNLP/api.html>
- Twitter (2021), “Twitter scraping API”, <https://developer.twitter.com/en/docs/twitter-api>
- WildFly (2021), “WildFly Jakarta / Java Application Server,” <https://www.wildfly.org/>

APPENDIX A: MEETING MINUTES

Meeting Number 1

Date & Duration:	9/27/2021 for 15 minutes
Location:	Torgersen Hall
Members Present:	All
Members Absent:	None
Discussions:	Distributing work and getting setup
Decisions Made:	We discussed what kind of project we wanted to do and any features that we wanted to add.
Work Assignments:	Write down different ideas for the project and compile them for next meeting - All
Minutes Prepared By:	Ryan Wood

Meeting Number 2

Date & Duration:	9/30/2021 for 30 minutes
Location:	McBryde Hall
Members Present:	All
Members Absent:	None
Discussions:	We met with the professor and talked about our project and some of the features we wanted to implement.
Decisions Made:	We decided on doing a project based on Cryptocurrencies and stock and using features such as accounts, two factor authentication, facial recognition, and sentiment analysis.
Work Assignments:	Front-end/Primefaces features to use - Ryan, Cryptocurrency apis - Sean. Facial recognition - Sandesh.
Minutes Prepared By:	Ryan Wood

Meeting Number 3

Date & Duration:	10/13/21 - 1 hour
Location:	Lavery Hall
Members Present:	All
Members Absent:	None
Discussions:	Updates on all previous tasks
Decisions Made:	Continue to work on tasks and to look at starting testing individual ideas.
Work Assignments:	Front-end/Primefaces - Ryan, Cryptocurrency apis - Sean. Facial recognition apis - Sandesh.
Minutes Prepared By:	Ryan Wood

Meeting Number 4

<i>Date & Duration:</i>	10/25/21 - 1 hour, 15 minutes
<i>Location:</i>	Torg 1040
<i>Members Present:</i>	All
<i>Members Absent:</i>	None
<i>Discussions:</i>	HTTPS on AWS, OpenCV with Java, Github repo, New primefaces documentation, Sentiment Analysis
<i>Decisions Made:</i>	Attempt to use new primefaces features and try found apis. Facial recognition requires HTTPS for webcam access so we are decided to
<i>Work Assignments:</i>	HTTPS - Sean, OpenCV - Sandesh, Github/Primefaces (look at arc for menu) - Ryan
<i>Minutes Prepared By:</i>	Ryan Wood

Meeting Number 5

<i>Date & Duration:</i>	11/01/21 - 30 Minutes
<i>Location:</i>	Torgersen Hall
<i>Members Present:</i>	All
<i>Members Absent:</i>	None
<i>Discussions:</i>	Updates on HTTPS, OpenCV, Primefaces.
<i>Decisions Made:</i>	We decided on switching from OpenCV to try a different API and looked through prepared Primeface examples and chose for the project.
<i>Work Assignments:</i>	Crypto APIs - Sean. New Facial Recognition - Sandesh. Implement Primefaces ideas - Ryan.
<i>Minutes Prepared By:</i>	Ryan Wood

Meeting Number 6

<i>Date & Duration:</i>	11/08/21 - 30 minutes
<i>Location:</i>	Torgersen Hall
<i>Members Present:</i>	All
<i>Members Absent:</i>	None
<i>Discussions:</i>	We went through different kinds of APIs and ideas that we could use for other features.
<i>Decisions Made:</i>	We decided on using Cloudmersive for facial recognition API.
<i>Work Assignments:</i>	All - Look into more APIs and any other ideas that we want to add.
<i>Minutes Prepared By:</i>	Ryan Wood

Meeting Number 7

<i>Date & Duration:</i>	11/15/21 - 30 minutes
<i>Location:</i>	Torgersen Hall
<i>Members Present:</i>	All
<i>Members Absent:</i>	None
<i>Discussions:</i>	Which APIs we want to use and what we want to look at over Thanksgiving Break.
<i>Decisions Made:</i>	Stanford NLP is the API for sentiment analysis.
<i>Work Assignments:</i>	Preparing frontend to connect APIs - Ryan, Working with Stanford NLP - Sandesh. Continue working with crypto and stock APIs - Sean
<i>Minutes Prepared By:</i>	Ryan Wood

Meeting Number 8

<i>Date & Duration:</i>	12/01/2021 - 1 hour, 15 minutes
<i>Location:</i>	Torg 1040
<i>Members Present:</i>	All
<i>Members Absent:</i>	None
<i>Discussions:</i>	API work and any ideas for the project from break, updates to previous tasks
<i>Decisions Made:</i>	We decided that we would continue to work on our tasks previously and that we needed to start looking through the rest of documentation and who would do what.
<i>Work Assignments:</i>	Continue on frontend connections - Ryan, Look through documentation and split it up - Sean, Continue on Stanford - Sandesh
<i>Minutes Prepared By:</i>	Ryan Wood

Meeting Number 9

<i>Date & Duration:</i>	12/04/2021 - 45 minutes
<i>Location:</i>	Zoom
<i>Members Present:</i>	All
<i>Members Absent:</i>	None
<i>Discussions:</i>	Cryptocurrency and stock API choices.
<i>Decisions Made:</i>	We decided on using the Alphavantage and IEX Cloud for information on the stocks and companies and Coinmarketcap for everything cryptocurrency related.
<i>Work Assignments:</i>	Work with the stocks' APIs and setup backend - Sandesh. Work with the cryptocurrency and setup backend - Sean. Prepare the project to connect the backend to lists and display any data - Ryan
<i>Minutes Prepared By:</i>	Ryan Wood

Meeting Number 10

<i>Date & Duration:</i>	12/06/2021 - 1 hour
<i>Location:</i>	Zoom
<i>Members Present:</i>	All
<i>Members Absent:</i>	None
<i>Discussions:</i>	Fixing Facial Detection, discussing CREATE operation, API info
<i>Decisions Made:</i>	We decided we needed to fix some bugs with how the photos were being taken for the facial detection software. Additionally, we discussed
<i>Work Assignments:</i>	Facial Detection - Ryan and Sandesh. Coinmarketapi - Sean
<i>Minutes Prepared By:</i>	Ryan Wood

Meeting Number 11

<i>Date & Duration:</i>	12/07/2021 - 4 hours
<i>Location:</i>	Torgersen Hall
<i>Members Present:</i>	All
<i>Members Absent:</i>	None
<i>Discussions:</i>	Facial Detection, DoD diagrams, Documentation
<i>Decisions Made:</i>	We decided on how we were going to implement the facial detection onto our deployment and how we were dealing with https on aws. Additionally, we decided on who was doing which diagrams and what parts of the documentation.
<i>Work Assignments:</i>	Facial Detection - Sandesh and Ryan. OV-1, OV2, OV-5b - Sean. SV-1, SV-2, SV-4 - Ryan. SvcV - 1, SvcV-2, SvcV-4 - Sandesh. Editing documentation/making the grammar consistent.
<i>Minutes Prepared By:</i>	Ryan Wood

Meeting Number 12

<i>Date & Duration:</i>	12/07/2021 - hours
<i>Location:</i>	Newman Library
<i>Members Present:</i>	All
<i>Members Absent:</i>	None
<i>Discussions:</i>	Continuation of Facial Detection, DoD diagrams, Documentation. New - Deploying to AWS, finishing writeup, commenting, troubleshooting.
<i>Decisions Made:</i>	How we were submitting the project and who was finishing different parts of the writeup.
<i>Work Assignments:</i>	None - Project Completed
<i>Minutes Prepared By:</i>	Ryan Wood