# **טכנולוגיות אינטרנט מתקדמות - 61776 (WEB)**

**הגשת פרויקט**

**<Crypto Market Analysis Tool> <B3> <19>**

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<Project Summary:

Our Crypto Market Analysis Tool is a comprehensive platform designed to empower investors with actionable insights and data-driven strategies for navigating the volatile cryptocurrency market. Through an intuitive interface and leveraging advanced technologies, our tool equips investors with the necessary tools to navigate the dynamic Bitcoin market landscape effectively.

**Key Functionalities:**

Bitcoin Graph Homepage: At the heart of our platform lies the Bitcoin Graph Homepage, providing users with real-time visualization of Bitcoin prices through interactive graphs. This intuitive interface allows users to track trends, patterns, and fluctuations in cryptocurrency prices over time, enabling informed decision-making.

**Customizable Prediction Parameters:** Our platform empowers users to tailor prediction parameters and timeframes according to their individual preferences and investment goals. By customizing prediction settings, users can refine their forecasts and make informed decisions aligned with their trading strategies.

**Data Visualization Techniques:** To enhance data interpretation and analysis, our tool supports a variety of visualization techniques including charts, graphs, and heatmaps. These visual representations provide users with intuitive insights into market trends, enabling them to identify opportunities and mitigate risks effectively.

**Investor Wallets:** The Investor Wallets feature offers users a comprehensive overview of their cryptocurrency transactions, including profit/loss calculations based on currency purchase date. Users can track the performance of up to three wallets, monitor their investment portfolio, and gain valuable insights into their trading activity.

**User Registration and Personalization:** Users can register for an account using their email, unlocking personalized features such as portfolio management and customized alerts. This seamless registration process enhances user engagement and enables a tailored trading experience.

**Dark Mode Option:** To accommodate varying preferences and reduce eye strain during extended usage, our platform offers a dark mode option. Users can seamlessly toggle between light and dark themes, enhancing usability and comfort.

**About Page:** The About page provides users with detailed information about our platform, including its purpose, features, and the technologies utilized in its development. Users can learn more about the team behind the project and our commitment to providing a secure and innovative trading experience.>

< Technologies Used:

Frontend: Our frontend is crafted using HTML, Tailwind CSS, React, and TypeScript, ensuring a modern and responsive user interface optimized for usability and performance.

Backend: We leverage Node.js and Express.js on the backend to deliver scalable and efficient server-side functionality, complemented by web crawlers for real-time data aggregation from diverse sources such as bitinfocharts.com and Yahoo Finance.

Database: MongoDB serves as our robust and flexible database solution, providing secure storage for user data, transaction history, and predictive analytics models..>

<<https://github.com/hadiDanial/Crypto-Market-Analysis-Tool>>

<<https://hadidanial.github.io/Crypto-Market-Analysis-Tool/frontend_react/build/>>

<<https://www.morethanwallet.com/app/343>>

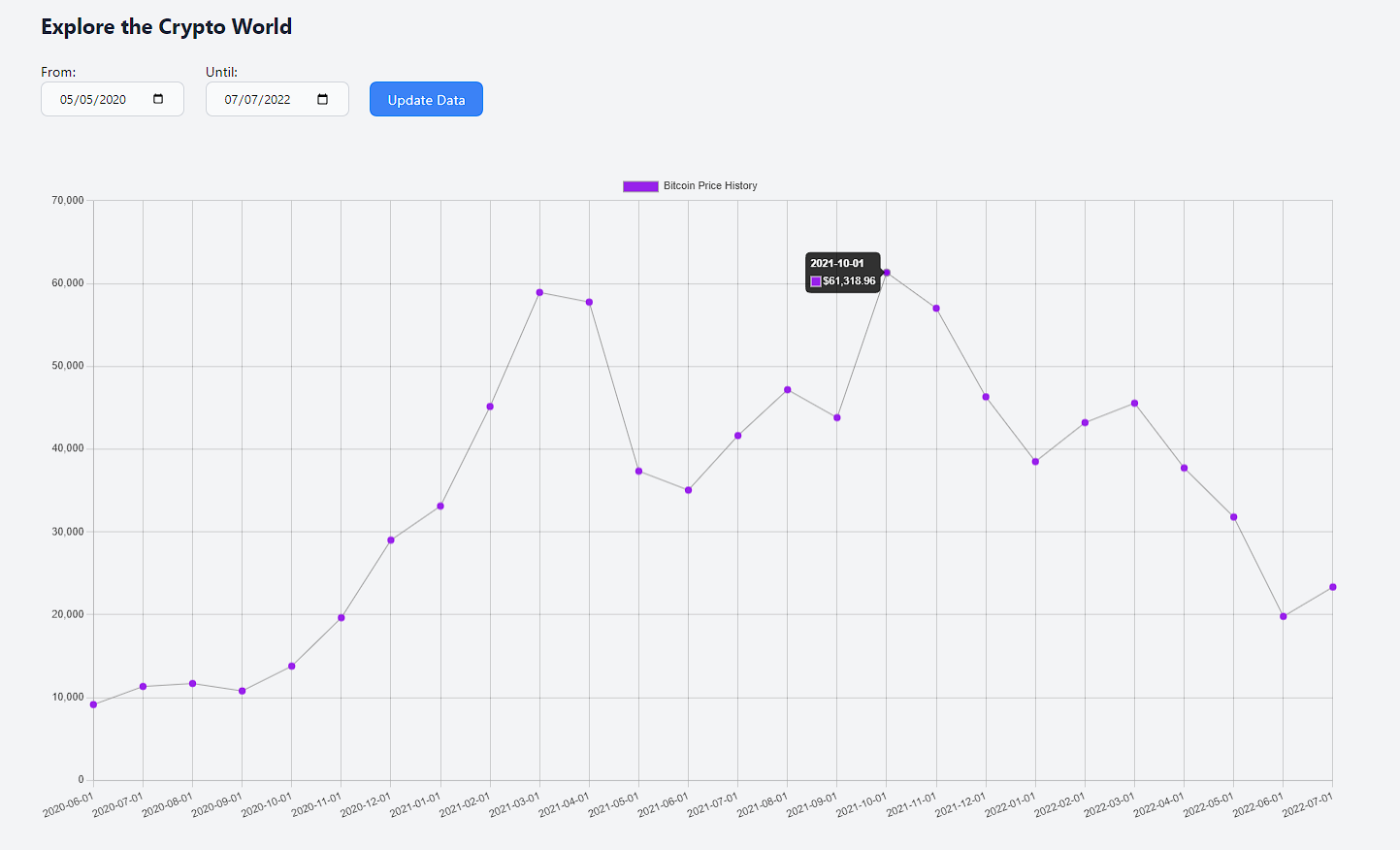
**User Manual:**

**The website:** Use the navigation bar at the top to navigate to different features, including a bitcoin price chart and investor wallets.

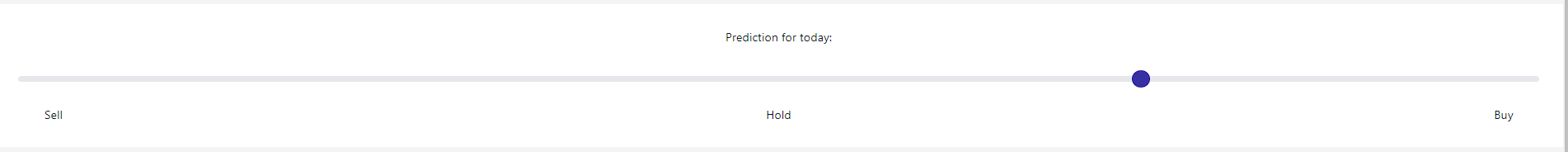
A graph with purple lines

Description automatically generated

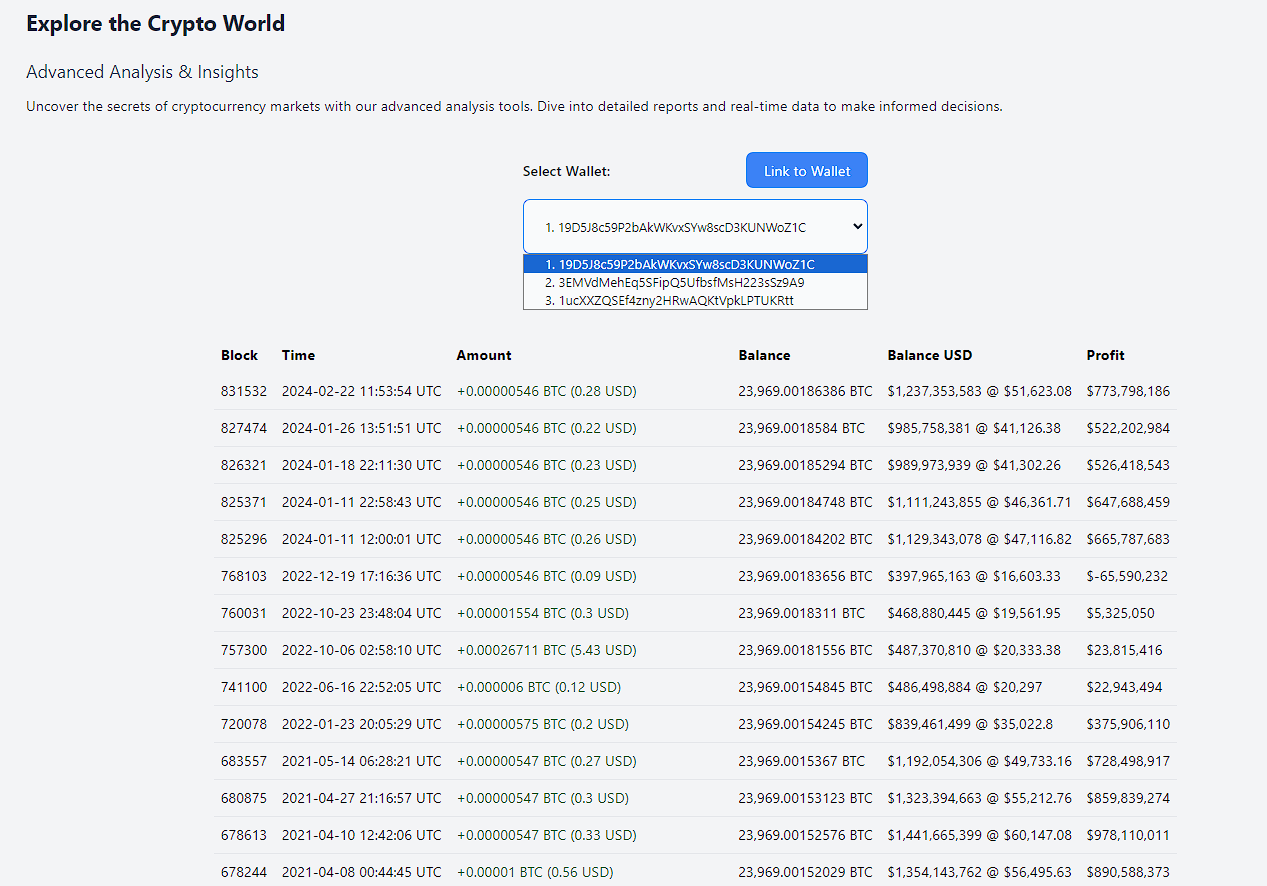
**Bitcoin Price Chart:** Pick start and end dates, and see the history of bitcoin prices over the years.

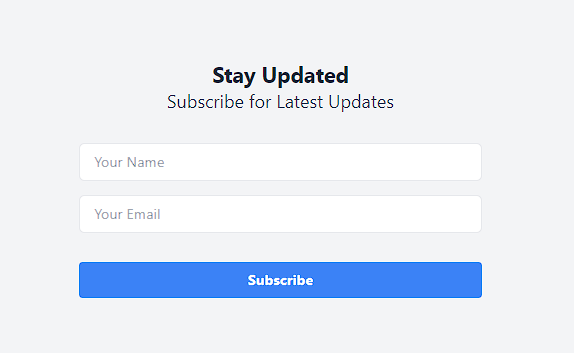


**Prediction:** A recommendation to the user on whether they should buy, sell, or hold their Bitcoin today based on our black box genetic algorithm



**Investor wallets:** Keep an eye on the biggest private wallets in the crypto world and see when they buy and sell their crypto currency so that you can make informed choices.



**Subscribe to our mailing list:** Subscribe to get notified about price changes and more interesting news in the world of crypto currencies! ****

**Programmer Manual:**

**Frontend:**

The frontend is built with React, using TypeScript and Tailwind. The website is divided into different screens: Chart, Wallet and About, using React Router to navigate between the screens while sharing the same header and footer.

We used RTK Query to send API requests.

**Backend:**

The main functions in the backend are the functions that get real time data from certain websites, in the *crawl.ts* file:

crawlBitcoinWallets

Responsible for getting the wallet data of investors from bitinfocharts.com, using the Crawl library.

crawlBitcoinHistory

Responsible for getting real time data on Bitcoin Price History from Yahoo Finance.

addMail

Add the subscriber’s name and email to the mailing list DB

**API:**

https://bitinfocharts.com/bitcoin/address/<WalletID>

Use the URL with specific wallet IDs and the web crawler in order to get historical data about wallet transactions.

https://query1.finance.yahoo.com/v7/finance/download/BTC-USD?period1=${from}&period2=${until}&interval=${interval}&events=history&includeAdjustedClose=true

Using this API we were able to get data about bitcoin prices between specific dates in a CSV format.

**Database:**

Link: mongodb+srv://omeciano:rNcgSXyfsstDfLWZ@cluster0.neigmyc.mongodb.net/?retryWrites=true&w=majority&appName=Cluster0

We used a Mongo database in order to save user emails so that we could send them update emails.

**Special environments:**

* Redux for state management
* RTK query for API calls
* Crawler package for getting data from the websites
* Papaparse to parse CSV data
* ChartJS for creating bitcoin price chart
* Swagger to generate Open API docs
* NodeMailer for sending emails

**Hosting:**

The backend is hosted on Heroku, while the frontend is deployed to GitHub pages. The links can be found in the GitHub repository README file.

**Exercise 3:**

הציגו רשימת דרישות פונקציונליות ולא פונקציונליות (בנפרד, יש לסווג דרישות לא פונקציונליות לפי wikipedia NFR).

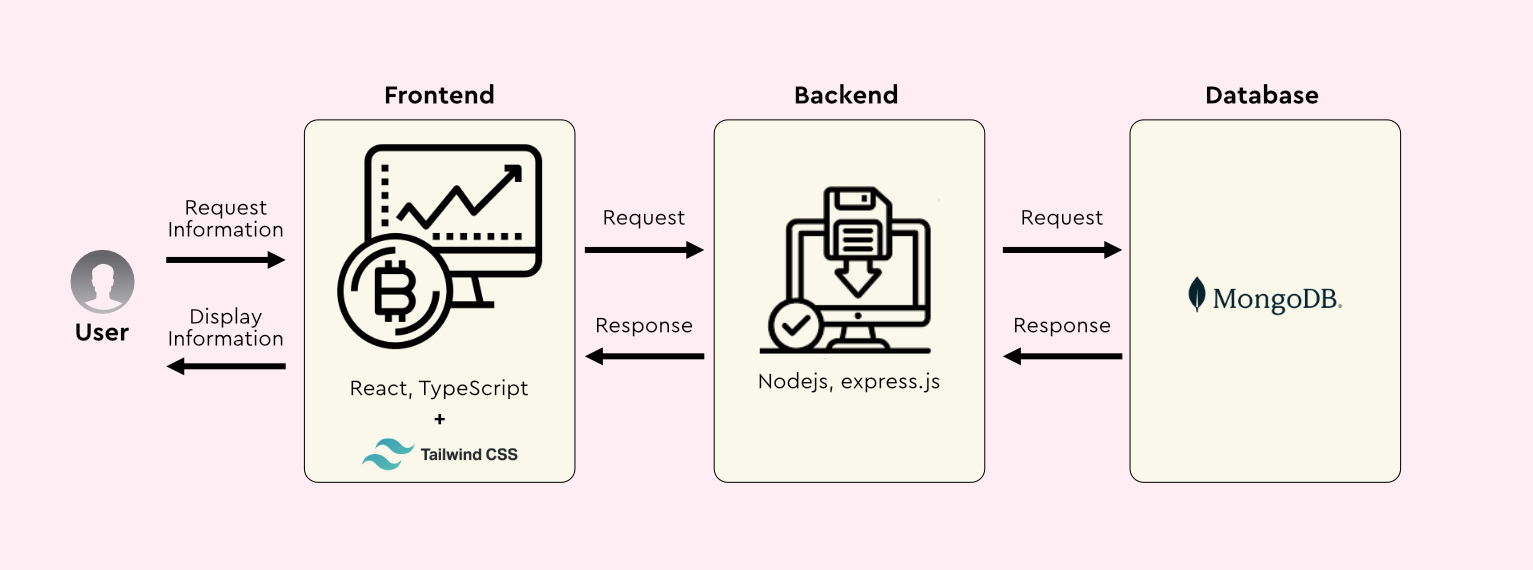
### **Requirements**

#### **Functional**

1. The system shall collect historical price data and wallet information from the BitInfoCharts and YahooFinance websites.
2. The system shall support the integration of additional data sources for comprehensive analysis.
3. The system shall provide user registration and login functionality.
4. The system shall store collected data in a MongoDB database.
5. The system shall ensure data integrity and consistency during processing and storage.
6. The system shall implement a genetic algorithm to predict Bitcoin prices based on historical data.
7. The system shall update predictive models in real-time as new data is collected.
8. The system shall provide an interactive and user-friendly interface built with React.
9. The system shall allow users to view and analyze historical price data and predictions.
10. The system shall provide customizable alerts for significant market events.
11. The system shall generate graphical representations of historical and predicted price trends.
12. The system shall provide real-time alerts for price changes, market trends, and prediction updates.
13. The system shall provide the ability to customize prediction parameters and timeframes.

#### **Non-Functional**

1. The system shall handle multiple concurrent users without significant performance degradation. (Scalability)
2. The system shall process and respond to data queries within an acceptable time frame (e.g., under 2 seconds). (Performance / response time (performance engineering))
3. The system shall be scalable to accommodate increasing volumes of data and user interactions. (Scalability (horizontal, vertical))
4. The system shall support horizontal scaling to manage additional load efficiently. (Elasticity)
5. The system shall have an uptime of 99.9% to ensure availability for users. (Availability (see service level agreement))
6. The system shall be designed with a modular architecture to facilitate easy maintenance and updates. (Maintainability)
7. The system shall have an intuitive and easy-to-navigate user interface. (Usability)
8. The system shall support integration with other financial tools and platforms. (Integrability)
9. Ensure that the application is responsive and adapts well to various screen sizes and devices, including smartphones and tablets. (Adaptability)

הציגו ארכיטקטורה מעודכנת של האתר (תרשים הכולל את האלמנטים המרכזיים).

. הציגו דיאגרמת use case המתארת את השימוש באתר.

A diagram of a wallet

Description automatically generated