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Design and Development of Information Systems Supporting Stock Investors "Batch Of Automatic Stock Analysis System"

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ABSTRACT: Many information systems make it easier for stock investors to make decisions to buy shares. But no information system provides an easy-to-understand display and exclusive features to make it easier for investors to make decisions and find information about stock investments, especially for novice investors. Therefore, this study aims to design and build a web-based information system that can assist stock investors in making decisions and seeking information about stock investments. The design of this information system is equipped with a stock overview, moving average analysis, analysis of Minervini trends templates, analysis of candlestick patterns, stock screeners, and stock lists. Stocks that can be analyzed using technical analysis and candlestick patterns are only stocks belonging to the LQ45, KOMPAS100, IDX80, IDX30, JII70, Investor33, Pefindo25 constituents. The results of this study are stock investors can get stock recommendations in real-time and information about stock investments quickly.

Keywords: Stocks, Predictions, Investors, Moving Average

INTRODUCTION

The Covid-19 pandemic has dramatically impacted the world economy, especially in Indonesia, which uses a domestic economy (UNICEF, 2021). Government policies restricting population movement have killed many sectors, especially the economic sector (Sobaih et al., 2021). The number of regulations limiting the population's activities has slowed the financial industry and even recorded negative economic growth (Abbas et al., 2021). Many sectors of the economy have stopped or even gone bankrupt due to the pandemic (Stephens et al., 2021). The Indonesian MSME Association (Akumindo), through CNBC Indonesia, stated that in 2020, approximately 30 million MSMEs would go bankrupt due to Covid-19. More than seven million MSME workers were laid off (Malahayati et al., 2021; Rosita, 2020).

The economy's weakening has forced people to look for other alternatives to earn income to meet their daily needs. People are interested in generating income by investing in the stock market (Abedifar et al., 2020; Elgebeily et al., 2021). This is in demand by the public due to the convenience provided in the facilities and the relatively high yields considered by the people to

invest in shares (Fahruri, 2017; Susanto, 2018). The convenience intended includes investing regardless of time because it can be done anytime and anywhere without disturbing the main work. Moreover, there is no minimum limit for investment capital, so people prefer stocks over other investments (Aulianisa, 2013).

Based on the Single Investor Identification (SID) growth data released by KSEI, there was a pretty drastic surge from investors in one year, from March 2020 to March 2021. This can be seen in Figure 1 below, and there is a very significant spike significant. This spike occurred during the ongoing pandemic (Sari, 2021; Tang, 2021).

Figure 1 Growth Chart for Single Investor Identification

Source: www.ksei.co.id, processed 2021

Based on Figure 1, Indonesia's SID growth data in 1 year shows that in April 2020, SID ownership in Indonesia increased by 68,295 right from 2,679,039 in March 2020 to 2,747,334 right in April 2020. This increase continued to occur in the following months, which was significant. This very significant growth can be seen starting from October to November 2020. In October, SID holdings were 3,398,974, increasing from 216,045 to 3,615,019 in November. This increase is double the September – October 2020 growth, with only 122,093 holdings.

The high growth of investors during this pandemic has created new problems in the stock market. Many novice investors experience fear of missing out (FOMO) (Pennington, 2021; Roberts & David, 2020). Fear of missing out is the fear of missing out, which refers to the feeling or perception that other people can have fun, live a better life, or experience better things and can even cause deep envy and affect prices (Roberts & David, 2020). This phenomenon can occur because other people's benefits tempt novice investors. Beginner investors have limited knowledge about investment, capital markets, stock price fluctuations, and technical and fundamental analysis. They tend to panic buy or sacrifice their valuable assets to enter the capital market with the hope of doubled profits. However, with this limited knowledge, novice investors tend to lose money (Baliga et al., 2021).

Losses from fear of missing out (FOMO) can be avoided in various ways. One way to avoid investments that can harm yourself can be by taking into account how to make suitable investments. Based on the Financial Services Authority (OJK), there are two types of

complementary analysis to start investing in stocks, namely fundamental and technical analysis. Fundamental analysis studies matters relating to the company's financial condition to know public companies' basic nature and operational characteristics (Susanto, 2018). At the same time, technical analysis is an analysis that uses data on prices and trading volumes in the past to predict future prices. Fundamental analysis and technical analysis can be a tool to identify stocks to buy. The fundamental analysis helps investors choose stocks to invest in, while technical analysis helps predict prices that will occur (Putri & Shabri, 2022), With two analyzes to start investing in stocks, it can make it easier for novice investors to know the right time to make stock transactions.

The fundamental and technical analysis of many pages on the internet can be done through websites or applications that can help investors analyze the shares. However, these websites and applications are less understandable for beginners (Makkulau & Yuana, 2021). There are still too many features and settings that must be done in advance to get the information needed by the user. The use of foreign terms that are less understandable by beginners also requires novice investors to know about investment to understand the use of these websites and applications. Moreover, particular features can make it easier for investors to get information about the stock but must be accessed by paying. In addition, the available pages are still done manually, so users do not get real-time information due to delays in information (Mauko et al., 2018).

Due to the problems that have been described, this website system was created so that users, especially novice investors, obtain data that is easy to understand in determining investment decisions based on various analyzes used. The data taken and processed on this web is taken from multiple information providers and processed in real-time so that investors can obtain data to support stock investment decisions easily but with complete data. In addition, this system is made to make it easier for novice investors who do not have a background in investing to access and understand the procedure. The system also aims to reduce the problem of fear of missing out.

Based on the reference, the first application is an application that can provide information about stock price trends using the exponential moving average method to minimize investor losses (Mirza, 2015). This application has advantages in the form of data inputted and used by the system, and the admin pays attention to the truth. This is because each data input is done manually. However, this application still has drawbacks in the form of data inputted manually, so that it cannot be done in real-time, so investors will feel there is a delay in information (Sebriwahyuni & Kurniawan, 2020).

Meanwhile, the journal as the following reference, namely the Design and Build of Stock Price Prediction Applications with Three Interpolars through Restful API, is an application to facilitate investors in supporting decision making (Barus, 2020). This application provides information in the form of stock recommendations that are given quite quickly and entirely, along with the value of technical analysis. This is because of the features in the form of Restful API. In addition, data can be generated from the Restful API, resulting in applications being developed quickly. Because the data is only provided in the form of a Restful API, it is less understandable by users in general because it requires an easy-to-understand display.

From the shortcomings based on existing references, this system was created, which has advantages in applications that are not limited to only 1-2 technical analysis indicators. Still, various indicators can be used. In addition, this system contains the "Minervini Trend Template" stock analysis tool template recommended by an investment figure named Mark Minervini, who

has experience in the capital market (Bagnoli, 2016; Enriques, 2009; Xuan & Giang, 2022). Then the data system is inputted and processed in real-time so that investors will get real-time information, and there is no manual data input (Xuan & Giang, 2022).

The user profile of this system is intended for investors who have just entered the capital market investment and have little information about technical analysis. In addition, the system also makes it easier for investors who have little time to conduct technical analyses of a stock. Then it is also addressed to investors who want to get a quick and accurate analysis of a stock.

Therefore, it is necessary to have a supporting tool to facilitate investment decision-making. The ease of investing can be obtained by using currently available technology. Thus the author proposes research entitled *Design and Development of Information Systems Supporting Stock Investors, Batch Of Automatic Stock Analysis System*.

METHOD

Research Objectives

The target of this application program is aimed at investors and potential investors in the city of Semarang. These prospective users have qualifications, namely investors and potential investors who are still academics. Then investors and potential investors who have limited knowledge about investment. Next are investors and potential investors who do not have much time to analyze technical and fundamentals.

Data collection

In this study, the method used in obtaining the required data is as follows:

a. Observation

Observation is a technique to make observations directly in the field. With direct observation, you can get to know the processes that need to be carried out and an overview of what is required in carrying out an operation. Observations in this study were carried out by making direct observations of activities in analyzing a stock technically and fundamentally in an academic institution. So that in creating a system, the author will get an overview of the process from the beginning to the end of the analysis (Creswell, 2017; Sugiyono, 2019).

b. Interview

According to Esterberg in (Fitri & Purnamasari, 2018), "an interview is a meeting conducted by two people to exchange information or an idea utilizing question and answer so that it can be reduced to a conclusion or meaning in a particular topic". This interview was conducted with students and the general public regarding information systems and stock investment information. The purpose of conducting this interview is to obtain detailed and complete information regarding analyzing a stock and what outputs are expected from the analysis by related parties, especially the object of research.

c. Literature review

According to Nazir in (Febriyanti, 2020), a literature study is a data collection technique by conducting a review study of books, literature, notes, and reports that have to do with the problem being solved. This research literature study was conducted by reading journals and books on information systems and stock investment.

Data type

Secondary data is data taken from sources that do not directly provide data to data collectors. The data used by the researcher is secondary data in the form of historical data on stock prices, volumes, and transaction times. The source of data used by the author comes from the website id.investing.com. The collected information is then merged into a panel or pooled data (Fitri & Purnamasari, 2018).

Problem Analysis

According to (Prabowo et al., 2014), "Fishbone diagrams, or commonly called Ishikawa diagrams or cause-effect diagrams, are one of the most popular root cause analysis tools among industry practitioners to carry out quality improvement based on efforts to identify the root causes of variations. On certain quality, characteristics to be achieved. In this study, the author uses this diagram to identify the root cause of the problem "potential dangers of stock investment without technical or fundamental analysis". However, before using this diagram, the author has also analyzed the 6M method, namely Materials, Man Power, Method, Machine, Measurement, and Mother Nature. Found potential causes that cause these factors (Kumar & Schmitz, 2011; Pham et al., 2010).

Table 1 Table of Potential Causes

Machine	The analysis technology is too complex and not easy to understand for investors new.
	The tool is not always compatible with various devices.
Method	Difficulty analyzing stocks using fundamental analysis.
	Not planning a trading plan.
Material	Information cannot be directly interpreted.
	Lack of knowledge to interpret.
	The data to be analyzed is incomplete.
Man Power	Have no knowledge.
	No time to analyze stocks.
	Did not understand the method well.
	Psychological investors are still easily led by opinion.
	Too much hope for profit without thinking about risk management (less aware).
	Wrong mindset and psychology in trading or trading investment.
Measurement	Each investor's interpretation is different.
	There are often misinterpretations.
	Limited investment knowledge.
	Do not have a mentor in investing.

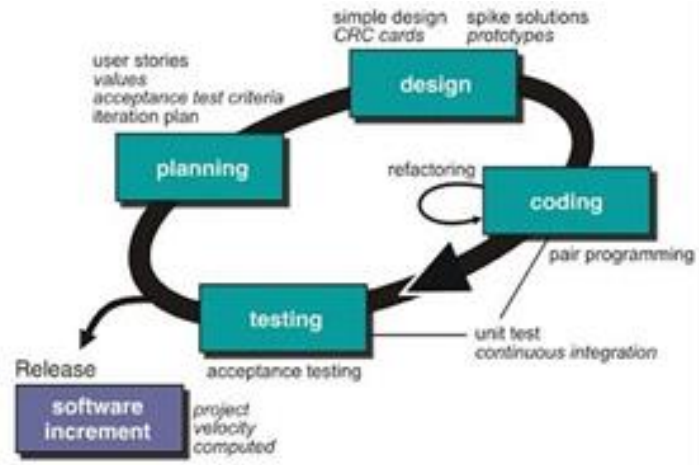
Mother Nature	Do not have a community that has the same interest in investing.

Based on table 1 potential causes, it will be shown as follows when described in the form of a fishbone diagram.

System Development Method

The author uses the Extreme Programming development method to develop this investment decision support information system. Extreme Programming (XP) is a software engineering process that tends to use an object-oriented approach. The target of this method is a team formed on a small to medium scale. This method is also suitable if the unit is faced with unclear requirements or changes in conditions very fast (Nurkholis et al., 2021).

Figure 2 Stages of Web Application Development



Source: Processed Primary Data, 2021

The stages of web application development for the selection of job training participants with XP are as follows (Nugroho et al., 2021; Sánchez-Hernández et al., 2020).

1. Planning

a. Identify the problem.
b. Analyze system requirements.
c. Analyze the feasibility of the system.

2. Design

a. Create system designs.
b. Making prototypes.

3. Coding

This stage is the implementation of the system model design made into program code that produces a prototype of the software. In developing the "Batch of Automatic Stock Analysis

System" web application, the author uses the PHP programming language combined with HTML, CSS, and Javascript and a framework to simplify coding. For database implementation, the Database Management System used is MySQL.

4. Testing

a. Implementation
b. Testing

RESULT AND DISCUSSION

Stocks are an investment tool that some people use to develop assets and prepare assets for the future. Investment is based on the desire to continue to earn profits, but such a great desire is not balanced with the desire to study analysis to minimize risk. Moreover, during the COVID-19 pandemic, stock investors in Indonesia increased more rapidly, trying to divert their funds to stock investment tools to gain profits.

Extreme Programming Method System Development Stage

In the extreme programming method system development stage, several steps need to be done, and these stages include planning, designing, coding, and testing stages.

The planning stage is the initial stage to start system development by identifying problems, defining requirements and outputs or outputs required based on user stories, and analyzing the system's feasibility.

Planning

Several stages are carried out at the planning stage, explained below.

Problem identification

Problem identification is made through the Root Cause Analysis (RCA) technique as an effective way to identify and solve what is happening among novice investors. Some things that need to be considered in determining this problem are:

1. Many investors still don't know how to analyze stocks properly. Sometimes, investors do not use the basis of technical or fundamental analysis in transactions but just belief.

2. Many investors do not have time to analyze a stock. Analyzing stocks requires sufficient time, not just looking at them but also paying attention to the conclusions interpreted by the analysis used.

3. Lack of knowledge, investors often do not know what analysis to use to invest.

System Requirements Analysis

System requirements analysis is an analysis of the needs in the system design and development process and the needs when the new system is run. The analyzed are hardware requirements, software requirements, information needs, and user needs. Some of the requirements are as follows:

1. Hardware Requirements

Hardware requirements analysis is carried out to find out clearly about the hardware needed to support the system development process and the use of the results of the developed system.

Because the applications run continuously for 24 hours every day, hardware needs can be replaced by using a Virtual Private Server (VPS). VPS can always be used without a budget for electricity costs, component procurement, and system maintenance. VPS itself is provided by web hosting providers with price variations and can be rented periodically as needed. Developers only need to lease the required VPS specifications and then pay the rental fee regularly selected.

2. Software Requirements

Software requirements analysis is carried out to identify the software needed to carry out the instruction process so that the system can be developed and run smoothly.

3. Information Needs

Information needs analysis is carried out to identify the information required by users and researchers to develop a new system. The description of the required information and the resulting information can be seen in table 2 and table 3.

Table 2 Information Required

No.	Information	Description
1	Data on closing stock prices of all issuers listed on the Indonesia Stock Exchange	Contains information on the closing price of each share according to the transaction time-frames of 5 minutes, 15 minutes, 60 minutes, and one day. The shares in question are not currently in a state of suspension.
2	Data on opening stock prices of all issuers listed on the Indonesia Stock Exchange	Contains information on the opening price of each share according to the transaction time-frames of 5 minutes, 15 minutes, 60 minutes, and one day. The shares in question are not currently in a state of suspension.
3	Data on the highest share prices for all issuers listed on the Indonesia Stock Exchange	Contains information about the highest price for each share according to the transaction time-frames of 5 minutes, 15 minutes, 60 minutes, and one day. The shares in question are not currently in a state of suspension.
4	Data on the lowest share price for all issuers listed on the Indonesia Stock Exchange	Contains information about the lowest price for each share according to the transaction time-frames of 5 minutes, 15 minutes, 60 minutes, and one day. The shares in question are not currently in a state of suspension.
5	Stock transaction volume data for all issuers listed on the Indonesia Stock Exchange	Contains information on the transaction volume of each share according to the transaction time frame of 5 minutes, 15 minutes, 60 minutes, and one day. The shares in

No.	Information	Description
		question are not currently in a state of suspension.
6	List of shares listed on the Indonesia Stock Exchange	Contains information on shares listed on the Indonesia Stock Exchange and their constituent stock index

Source: Processed Primary Data, 2021

Table 3 Information Generated

No.	Information	Description
1	Technical Analysis Results	Contains information on the results of technical analysis using the Simple Moving Average (SMA) and Exponential Moving Average (EMA) methods.
2	Candle Stick Pattern Analysis Results	Contains information on the pattern that has occurred including the name of the pattern and also a confirmed indication of the pattern.
3	Minervini Analysis Results Template	Contains information on the results of the analysis of a stock with qualifications according to the method used by Mark Minervini or better known as Minervini Templates.
4	Stock Screener Tool	Contains information that can be used to filter stocks according to the parameters we want to use. The parameters that can be used are the break moving average and exponential moving average, the comparison of price to the moving average, the momentum of the moving average cross, the momentum of the exponential moving average cross, the momentum of the weight moving average cross, momentum analysis using the relative strength index (RSI) method.), moving average convergence divergence (MACD), parabolic sar, bollinger band, williams %r, commodity channel index (CCI), stochastic, ichimoku, measures the strength and momentum of a trand using the average directional index (ADX), accumulation/distribution line (ADL), on balance volume (OBV), compares the current price to the highest price (high), lowest price (low),

No.	Information	Description
		closing price (close), and volume (volume)
5	List of shares listed on the Indonesia Stock Exchange	Contains information on the list of shares listed on the Indonesia Stock Exchange with their constituent stock index.

Source: Processed Primary Data, 2021

4. User Needs

Analysis of user requirements describes the system's capabilities being built from the user's point of view. Users or users are visible and needed parties in appreciating the system. Some of the things that can be seen in this system are access and parties.

a. Administrator

Administrators have full rights and authority over the management, development, user permissions, and management of the system and database.

b. User (User)

Users can use all the features on the public website page that the administrator has provided. The features that can be used are:

1) Insights / Overview Page

2) Technical Analysis page

3) Minervini's Page

4) Candlestick Pages

5) Stock Screener Page

6) Stock List page

7) Contact Me page

Users only have access rights to use this application system publicly. This system was created to assist investors in conducting technical and fundamental stock analyses.

The user does not need to log in or register to perform the analysis in its use. Users can use it directly by visiting the cuansaham.my.id page and immediately using its features.

Users can also request admins to provide new features by contacting the admin via the contact me menu.

System Feasibility Analysis

System feasibility analysis determines whether the system development project is feasible to continue or be discontinued. This is done to assess the probability of success of the proposed system through an assessment of technological feasibility, legal feasibility, operational feasibility, and economic feasibility.

1. Technology Feasibility

A technology feasibility analysis was conducted to assess the technical aspects used in system development. System development can be technologically feasible if what is used is not difficult to obtain, inexpensive, and the level of use is easy. The system developed is a web-based information system. Web-based information systems have a high level of accessibility because they can be accessed anywhere with technological devices that are not difficult to obtain and adequate internet speed at a not high cost. The instrument used is a computer or smartphone connected to the internet via a web browser. A web browser is an application for displaying web pages that are generally installed on a computer or smartphone device that are easy to use based on. Based on these reasons, it can be concluded that the information system developed technologically is declared feasible.

2. Legal Eligibility

Legal feasibility analysis is carried out to assess whether the system developed contains elements of legal customers or not when the system is implemented. The system is said to be legally feasible if the system does not cause problems in the future due to violations of the law. The development of this information system is carried out using open source software that anyone can use for free without being bound by a license. This integrated system uses open source software or free versions of legal programs, namely PHPMyAdmin and MySQL. In contrast, the coding in the manufacture of this system is JavaScript, and the PHP software is licensed so that it can be used and is legally feasible. Based on these considerations, it can be concluded that the legally developed information system is said to be possible.

3. Operational Feasibility

Operational feasibility analysis is carried out to assess whether the system developed later can be appropriately operated or not, assessed using the PIECES framework. The PIECES framework includes performance to determine whether the system can provide sufficient throughput and response time, information to determine whether the system can provide quality information for end-users, and economy to determine whether the system can offer adequate levels and capacity of services to reduce and increase profits. , control to determine whether the system can provide commands to overcome fraud - fraud and ensure the accuracy and security of data. Efficiency to determine whether the maximum use of available resources, including people, can minimize process delays, and service to determine whether the system can provide reliable services according to user requirements and whether the system is flexible and extensible. Operational feasibility according to PIECES can be seen in table 4.

Table 4 Operational Feasibility According to PIECES

Components	**Old System**	**New System (Following)**
Performance	Updating information and data in the system is still done manually.	Information system updates in the system are carried out automatically.
Information	The information produced is still limited to certain shares and is	The resulting information is more complete, close to perfect. More updated information, analysis is

Components	Old System	New System (Following)
	not comprehensive.	also carried out regularly.
Economy	In previous studies, investors in analyzing still require independent procurement to carry out the analysis.	Currently, investors do not need to procure hardware, they only need to access the cuansaham.my.id website from any browser.
Efficiency	There is a risk of delays in updating information which can reduce the chances of an investor's success in investing.	Users / investors do not need to bother in updating data, everything has been done automatically and continuously.
Service	Inputting stock data to the analysis process still takes a long time.	Data input to the analysis process is done automatically.

Source: Processed Primary Data, 2021

The operation of the newly developed method does not require the user to have special skills. The new system is designed to be easy to use so that users can operate it. System users only treat adaptations to adapt to the new system. Based on these reasons, it can be concluded that the newly developed information system is operationally feasible.

4. Economic Feasibility

Economic feasibility analysis is the most dominant aspect of profitability because the motivation for system development cannot be separated from the profit motive. The advantages and disadvantages of system development must be taken into account. System development could be economically feasible if the benefits received are more significant than the costs sacrificed. Economic feasibility can be measured by investment research methods which include Coast-Benefit Analysis (CBA), Payback Period (PP), Return On Investment (ROI), and Net Present Value (NPV).

Designing

Information system design is the development of a new system based on the old system running. Problems that occur in the old system are expected to be resolved in the new system implemented.

System Modeling Concept

The system modeling concept used in building an information system to support decision making for stock investors is the following diagram used in this study:

1. Use Case Diagrams

Use case diagrams to show the relationship between actors and cases in a system.

2. Activity Diagrams

Activity diagrams describe the various flow of activities in a system that is being designed, how each flow begins, decisions that may occur, and how it ends.

3. Sequence Diagrams

Sequence diagrams describe a scenario or series of steps taken in response to an event in a sequence or time series to produce a particular output. Sequence diagrams are used to show interactions between objects in a time series. The time series in question is a sequence of events carried out by actors in running a system based on a previously created use case scenario.

4. Deployment Diagram

Deployment diagrams show component configurations in the application execution process. The deployment diagram represents a system development view so that there will only be one deployment diagram for a system.

Coding

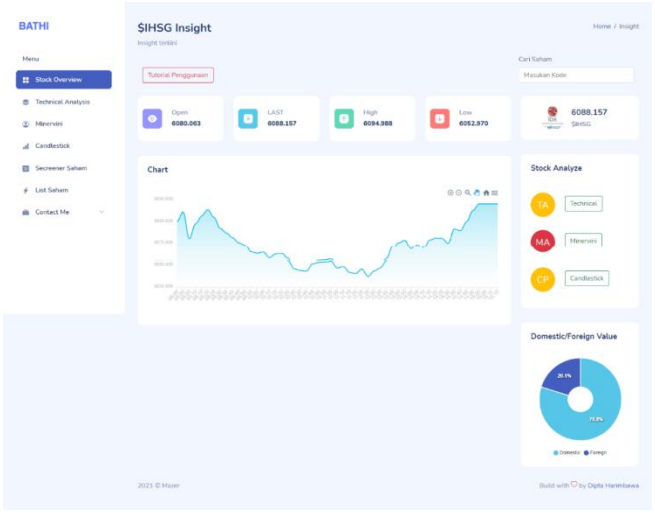
The coding stage is preparing the code to build support for stock investor decision-making. The inventory management sub-system consists of a user interface with a page that displays stock insights, technical analysis, candlestick patterns, Minervini templates, stock screeners, and stock lists. In the development details on the back-end developing side, there is the development of technical analysis data updater, stock maker data, stock data updater, candlestick analysis data updater, Minervini analysis templates, stock screener, stock list updater. The coding details in the development of support for decision making for stock investors in the information system supporting decision making for stock investors are presented in the appendix to the coding program.

Testing

The following research process is testing the application that has been completed using the black box method and testing the use directly by the user with several participants. The results of this application are the actual results of the design of the interface page at the design stage, which was developed with the coding stage. The results of the application are shown in Figures 3 to 8.

1. Stock Insights Page View

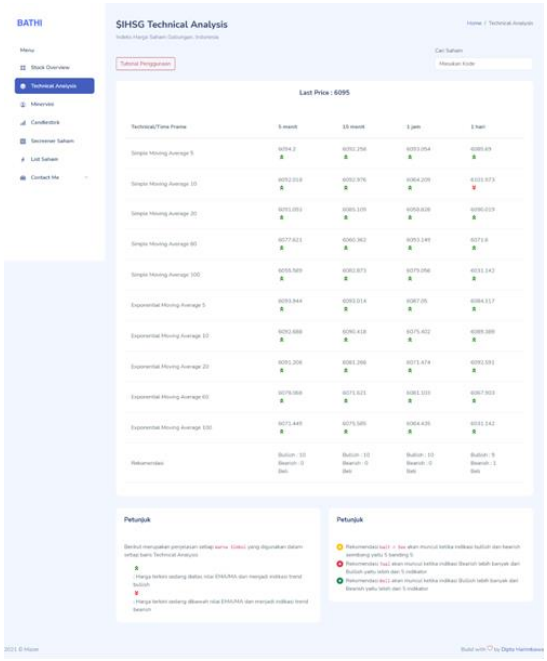
Figure 3 Stock Insights Page View



Source: Processed Primary Data, 2021

2. Technical Analysis Page Display

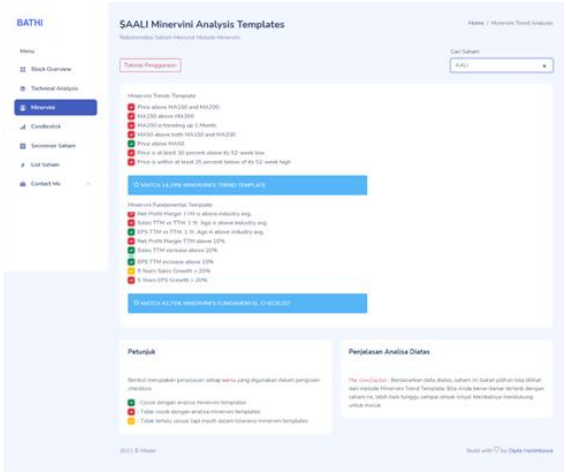
Figure 4 Technical Analysis Page Display



Source: Processed Primary Data, 2021

3. Minervini's Page Display

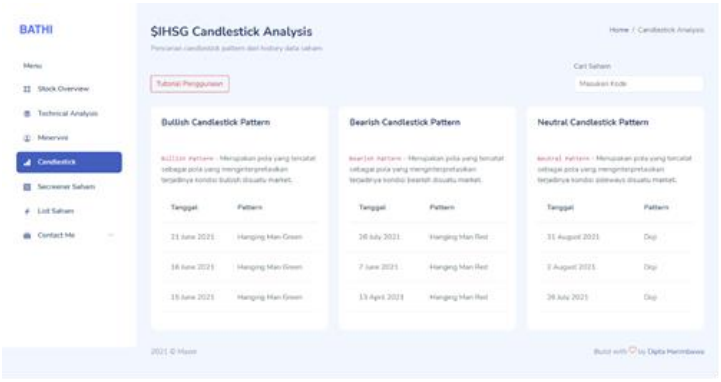
Figure 5 Minervini's Page Display



Source: Processed Primary Data, 2021

4. Candlestick Pattern Page Display

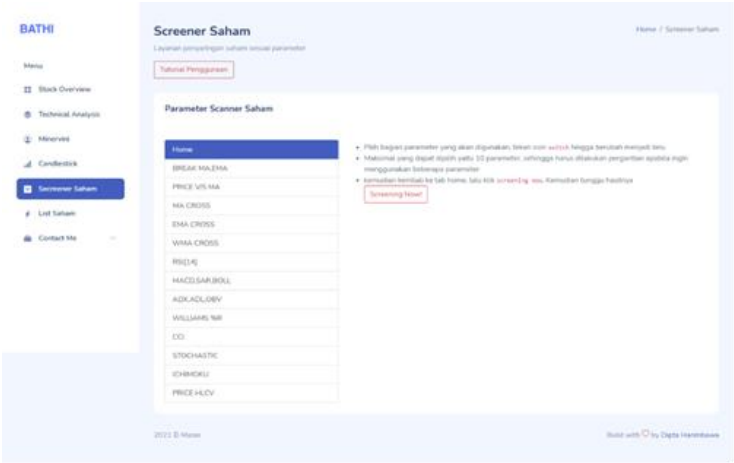
Figure 6 Candlestick Pattern Page Display



Source: Processed Primary Data, 2021

5. Stock Screener Page Display

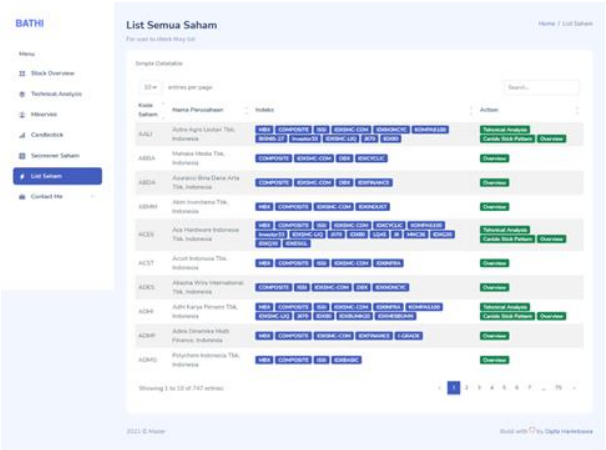
Figure 7 Stock Screener Page Display



Source: Processed Primary Data, 2021

6. Stock List Page Display

Figure 8 Stock List Page Display



Source: Processed Primary Data, 2021

System testing has been carried out in this study. System testing is carried out to determine the functionality of the system components and ensure that the system is running as expected. System testing is done through black-box testing. The results of black-box testing show the system has been running according to its functions and benefits.

Several participants have also tested this application on September 13-17, 2021, and the results are as follows:

Table 5 Application User Participants

No	Stock Code	Description	*Entry Price*	*Gain/Loss* (*Close Price*)
1	BNLI	1. *Golden Cross* MA (5,13) 2. *Golden Cross* MA (5,20) 3. *Price Above* MA (10) 4. *Price Above* MA (20) 5. *Price Above* MA (5) 6. *Match* 62.50% *of your picking strategy*	1.875	1.800 (-4%)
2	BRIS	1. *Price Above* MA (10) 2. *Price Above* MA (20) 3. *Price Above* MA (5) 4. *Match 37.50% of your picking strategy*	2.150	2.150 (0%)
3	ERAA	1. *Price Above* MA (10) 2. *Price Above* MA (100) 3. *Price Above* MA (20) 4. *Price Above* MA (5) 5. *Price Above* MA (50) 6. *Match 62.50% of your picking strategy*	600	590 (-1.6%)
4	EXCL	1. *Price Above* MA (10) 2. *Price Above* MA (100) 3. *Price Above* MA (20) 4. *Price Above* MA (50)	2.840	3000 (+5.63%)

No	Stock Code	Description	*Entry Price*	*Gain/Loss* (*Close Price*)
		5. *Match 50.00% of your picking strategy*		
5	TLKM	1. *Price Above* MA (10) 2. *Price Above* MA (100) 3. *Price Above* MA (20) 4. *Price Above* MA (5) 5. *Price Above* MA (50) 6. *Match 50.00% of your picking strategy*	3.430	3.530 (+2.9)
6	TPIA	1. *Price Above* MA (5) 2. *Match 20.00% of your picking strategy*	7.025	7.450 (+6.0%)

One of the results of the use of the application by participants is shown in table 5. Based on the research results obtained, it can be concluded that the application of the Stock Investor Decision Support Information System "Batch of Automatic Stock Analysis System" is running according to its function as indicated by an analysis of the relevant participants obtaining recommendations. Which shares can be declared again.

CONCLUSION

Design and develop a stock investor decision-making support information system "batch of automatic stock analysis system" that can be used to get recommendations quickly, accurately, and in real-time. Where the design of this information system is made using the Extreme Programming (XP) method, where the system design concept that has been created using context diagrams and using the Unified Modeling Language system modeling concept is then implemented into a code structure in the form of Hypertext Markup Language (HTML), Hypertext Preprocessor (PHP), javascript, and Cascading Style Sheets (CSS), this information system can be used to analyze stocks using the simple moving average, exponential moving average, mineral analysis templates, candlestick patterns, stock screeners and stock lists as limitations that each analysis can perform.

This system is expected to be developed further to increase its usability of the system. The information system that supports decision-making for stock investors, "batch of the automatic stock analysis system," certainly has many limitations. Therefore, there is still a need for further development, such as optimizing the system by adding a feature to delete unused data to minimize the use of data in the database. In future research, various other analytical features can be added that can support the convenience of investors in making investment decisions.

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