Real-Time Stock Market Trend Window Using XPath and Html Agility Pack

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ABSTRACT

Real-time stock market data must be acquired, processed, and disseminated efficiently. Certain methods for acquiring stock market data have limitations. Stock market prices in Iraqi dinars are unreliable for exchange shops and satellite channels in underdeveloped countries like Iraq. In this study, XPath and HTML Agility Pack were used to predict an accurate Real-Time Stock Market Trend Window. In Iraqi dinars in three languages, the trend pane shows metals, energy, and currency stock values. XPath and Html Agility Pack display real-time stock market data in a stock market window. C# is used for the window's front-end and back-end designs, and SQL Server is its data warehouse. Currency, metal, and energy prices are shown in a stock market trend window. Pricing updates every 10 seconds in the trend pane. In Iraqi dinars and three languages, the window displays cash, metal, and energy values. In developing nations, stock traders, satellite channels, and anyone interested in stock market prices can use it. A future study may investigate techniques to create a standard dataset using conserved cash, metal, and energy values.

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1. Introduction

The demand for the real-time stock market has significantly risen right now. It is essential to contemporary trading and offers a good moment to purchase and sell stocks [1,2]. Nowadays, many websites and applications are providing stock market prices [3-7]. Investing.com is one of the top websites for giving stock market prices, the website link is listed in appendix A. It has real-time data, financial tools, breaking news, and analysis in 44 global languages. Tradingview.com is also another top website for stock, forex, and crypto trade and it has applications for desktop, mobile, and tables. The website link of Trading view is listed in appendix A. Izzah et al. [8] developed an android mobile application for stock prediction using a machine-learning linear regression model. They acquire stock data from the Yahoo Finance website; however, the app did not display any stock market information. Furthermore, various stock price websites have been established in Iraq. For example; Cbi.iq is a governmental bank of Iraq and its website shows dollar-to-dinar prices daily, while Smarttraderiraq shows only daily local currencies across the Kurdistan Region of Iraq. The websites of Cbi and Smarttraderiraq have been listed in appendix A. Moreover, taifib.iq is a Taif bank in Iraq and it has up-to-date exchange tool from the dollar to Iraqi dinars. However, it does not include information about the stock market. Although I did a thorough search of the literature, just a few papers specifically linked to my subject exist. The stock exchanges described above lack functionality; they don't provide real-time currency, metal, and energy values in Iraqi dinars, and their user interfaces are complicated and challenging to navigate. They don't deal with the issue that neighborhood exchange stores and satellite channels have. Daily dollar-to-dinar exchange rates are obtained by neighborhood exchange shops from banks and provided to satellite networks. The price is used to convert Iraqi dinars to foreign currencies and to determine the pricing of energy and metals. This method takes too long and is ineffective. In this study, I suggest creating a real-time stock market trend window with XPath and the HTML Agility Pack. The window obtains the dollar in dinar price from Taif bank's exchange tool while automatically obtaining foreign currency, metal, and energy prices from investing.com. At the same time, it calculates the prices of currencies, energy, and metals. The window displays stock market values in three distinct languages, which are updated every 10 seconds. This will assist everyone in the market in staying up to date on the stock market's pricing.

2. Materials and Methods

Figure 1 and Figure 2 show the flow diagram and overview of the proposed system's mechanism, respectively.

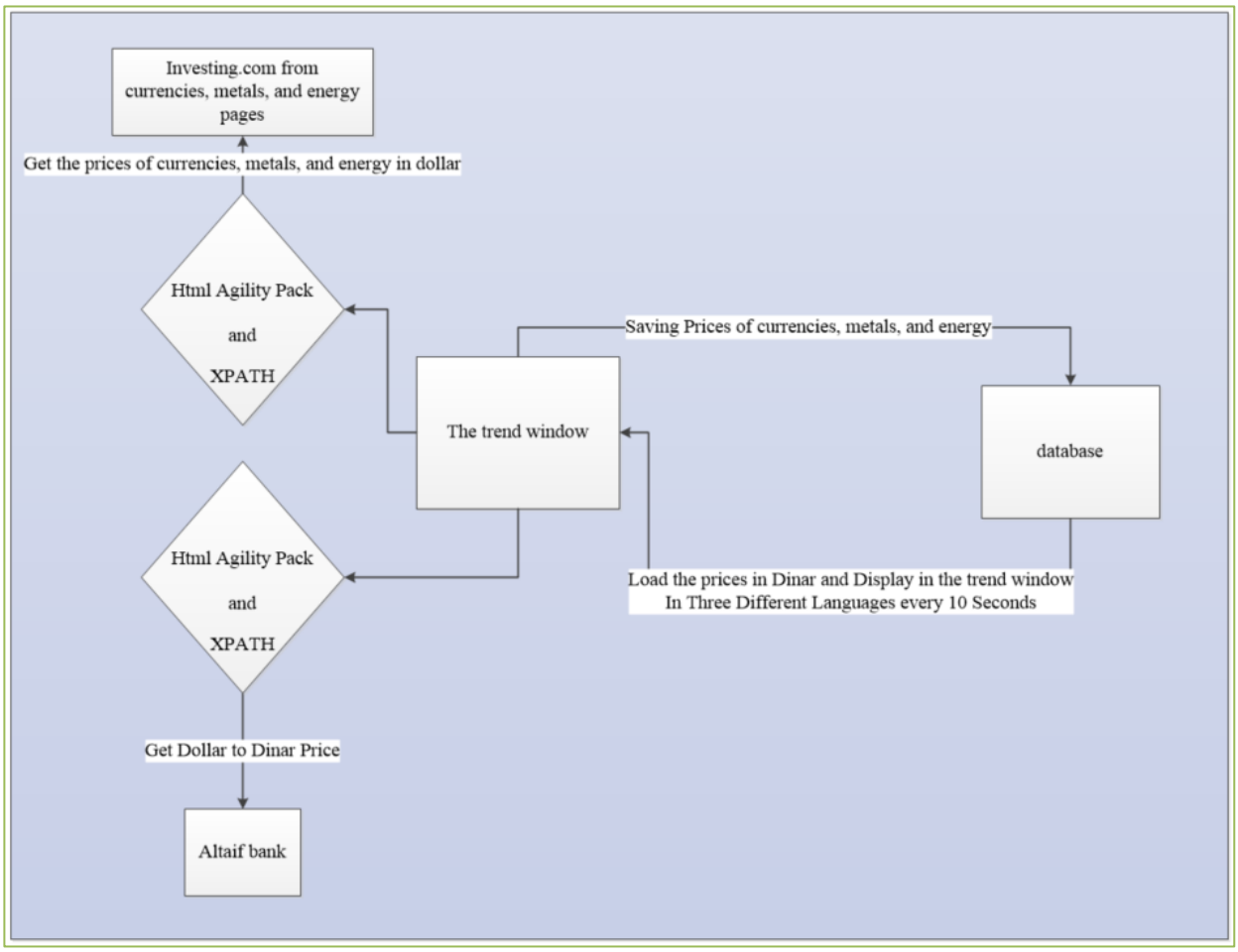

Fig. 1: The flow diagram of the proposed system

2.1 General Overview

Figure 2 depicts the system's three components: the stock market trend window on the left, Taif bank on the top right, and investing.com on the bottom right. The stock market window is the user's point of entry into the system. It is accessible over the Internet using a computer device. The trend window obtains the dollar-to-dinar exchange rate from Altaif Bank. Then, using the XPath approach, it obtains foreign currencies, metals, and energy from investing.com. The trend window then calculates currencies, metals, and energy prices in Iraqi dinars and saves them

locally rather than on the server because cloud servers lack security and require monitoring [9]. Finally, it continually displays the results in the stock market trend window.

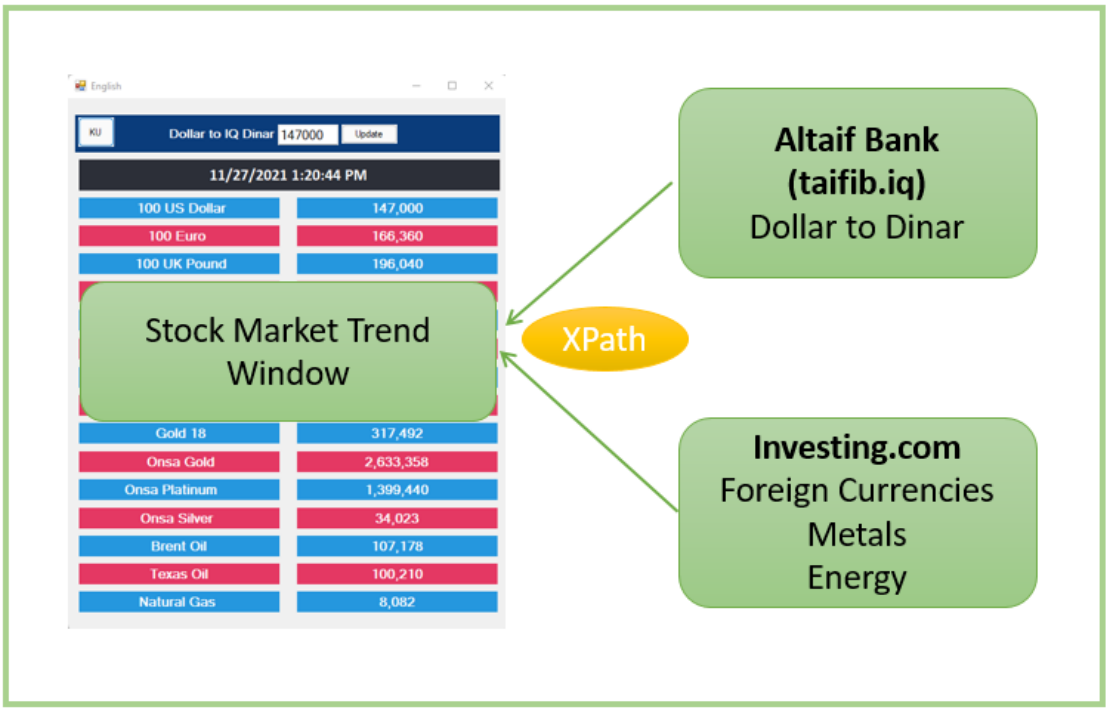

Fig. 2: The overview of the proposed system

2.2 XPath and Html Agility Pack

2.1.1 XPath

It is a language for pointing to various sections of HTML and XML texts [10] and its website is mentioned in Appendix A. It has around 200 built-in methods for node manipulation, numeric values, date and time comparison, Booleans, string values, sequence manipulation, and much more. Here I utilize it for determining the value of currencies, metals, and energy on the investing.com website. Figure 3 explains how to obtain EUR to USD using the XPath language node.

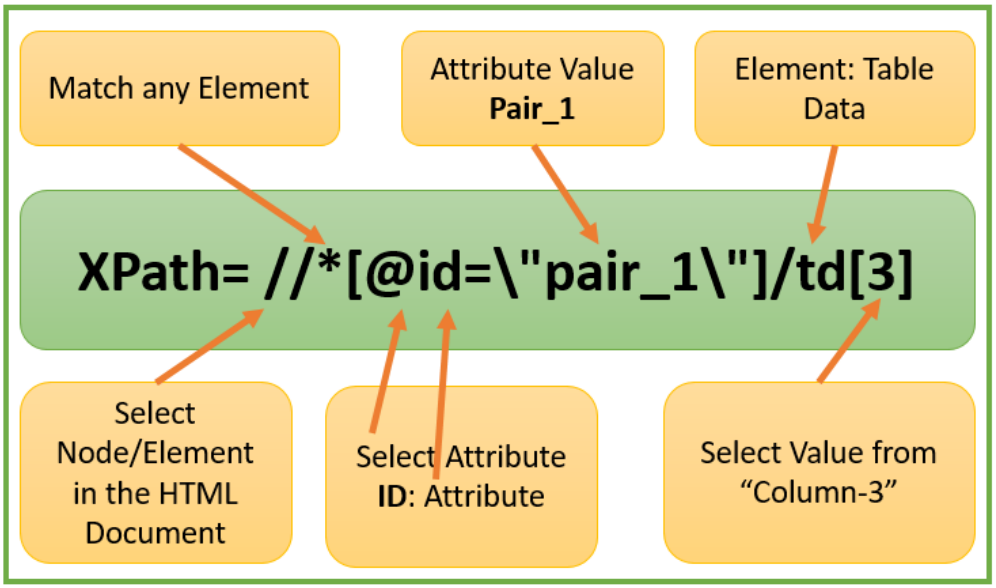

Fig 3: An XPath example for converting EUR to USD from table data in an HTML page.

2.1.2 Html Agility Pack

HAP is “an HTML parser written in C# to read/write DOM and supports plain XPATH or XSLT” [11], [12]. HAP website is mentioned in Appendix A and it includes HTML selectors for selecting HTML nodes from an HTML page. I used this to convert EUR to USD in the following steps:

1- Copied XPath of EUR to USD from the HTML page of investing currency page.

2- HtmlWeb and HtmlDocument classes of the HtmlAgilityPack package are used to load investing currency page URL.

3. Then DocumentNode and SelectNodes methods of the HtmlAgilityPack package are used to get the value of EUR to USD from the XPath

These processes are presented in the C# code below.

- HtmlAgilityPack.HtmlWeb web = new HtmlAgilityPack.HtmlWeb();
- HtmlAgilityPack.HtmlDocument doc =web.Load(url:*investing.com currencies page*);
- doc.DocumentNode.SelectNodes("//*[@id=\"pair_1\"]/td[3]")

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2.3 Design

SQL Server and the C# programming language were utilized to create the data warehouse and construct the stock market trend window [13]–[17]. The data warehouse of the window has been saved in two SQL Server tables, one for dollar-to-dinar conversion and the other for currency, metal, and energy values, as shown in figure 4.

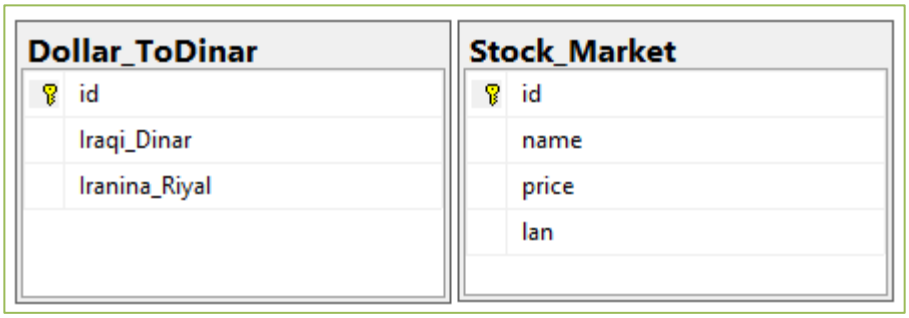

Fig 4: Stock Market Data Warehouse Tables

Furthermore, Stock Market Window was created with the C# programming language. Three C# windows forms were employed, one for English, one for Arabic, and one for Kurdish, as seen in figures 5, 6, and 7, respectively. The outcomes of the real-time stock market have been shown using buttons, text boxes, and labels.

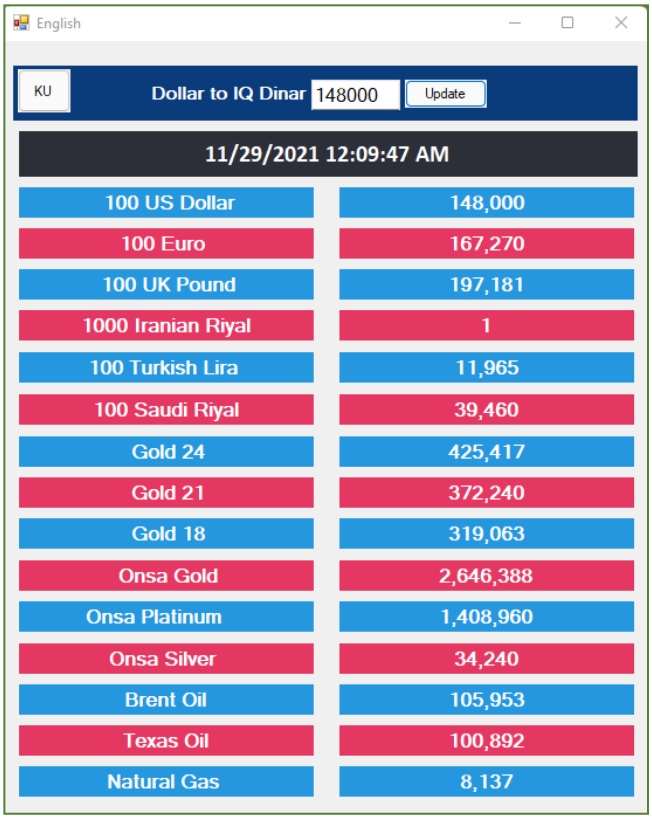

Fig. 5: The English Version of the Stock Market Window

Fig. 6: The Arabic Version of the Stock Market Window

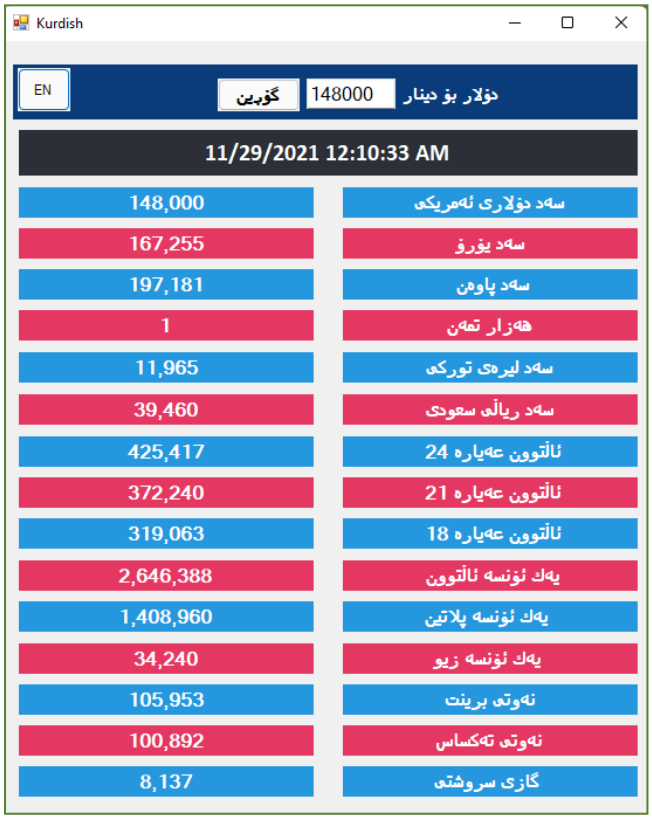

Fig. 7: The Kurdish Version of the Stock Market Window

3. Results

The stock market trend window has been created in three different languages: English, Arabic, and Kurdish. Each of them is showing real-time stock market prices of currencies, metals, and energy.

Fig. 8: results in 2:08:13 time

Fig. 9: results in 2:08:23 time

Both Figures 8 and 9, show the results of the real-time stock market in seconds 13 and 23 respectively. Firstly, the stock market window got the Dollar to Iraqi dinar price from Taif bank. Secondly, the price is used for calculating currencies, metals, and energy, which have been taken from the investing.com website. As can be seen, the prices of the UK pound, Onsa-Platinum, Brent, and Texas Oil have decreased in figure 9 as compared to figure 8. Whereas, Turkish Lira, Gold-24, Gold-21, Gold-18, Onsa-Gold, and Onsa-Silver prices have increased in figure 9 as compared to figure 8. Euro, Iranian Riyal, Saudi Riyal, and Natural Gas prices have been unchanged in figure 9 as compared to figure 8. Gold-24, Gold-21, and Gold-18 are more common in Iraq and the middle east, these prices are obtained by the following equations.

$$\text{a Mithqal Gold-24} = (\text{float})\ \frac{\text{goldprice}}{31.1034768} * 5 * (\text{float.Parse(txtDollartoDinar.Text.Trim())}/\ 100 \qquad \textbf{(1)}$$

The above equation gets Onsa-Gold then changes it to a gram of Gold by dividing it by 31.10 and changing it to a Mithqal Gold-24 by multiplying by 5. Lastly, its price changed to a Mithqal of Gold-24 in Iraqi dinars.

$$\text{a Mithqal Gold-21} = (\text{float})\ \frac{\text{goldprice} * 0.875}{31.1034768} * 5 * (\text{float.Parse(txtDollartoDinar.Text.Trim())}/\ 100) \quad \textbf{(2)}$$

The above equation gets Onsa-Gold then multiplied by 0.875 because only 0.875 of a Mithqal Gold-21 is a Gold. Then, changes it to a gram of Gold by dividing it by 31.10 and changing it to a Mithqal Gold-24 by multiplying by 5. Lastly, its price is changed to a Mithqal of Gold-21 in Iraqi dinars.

$$\text{a Misqal Gold-18} = (\text{float})\ \frac{\text{goldprice} * 0.75}{31.1034768} * 5 * (\text{float.Parse(txtDollartoDinar.Text.Trim())}/\ 100) \quad \textbf{(3)}$$

Equation 3, gets Onsa-Gold and then multiplies by 0.75 because only 0.75 of a Mithqal Gold-18 is pure Gold. Then, changes it to a gram of Gold by dividing it by 31.10 and changing it to a Mithqal Gold-18 by multiplying by 5. Lastly, its price is changed to a Mithqal of Gold-18 in Iraqi dinars.

The real-time stock market window of the Arabic and Kurdish languages are shown in figures 10, 11, 12, and 13.

Fig. 10: results in 11:12:43 time

Fig. 11: results in 11:13:01 time

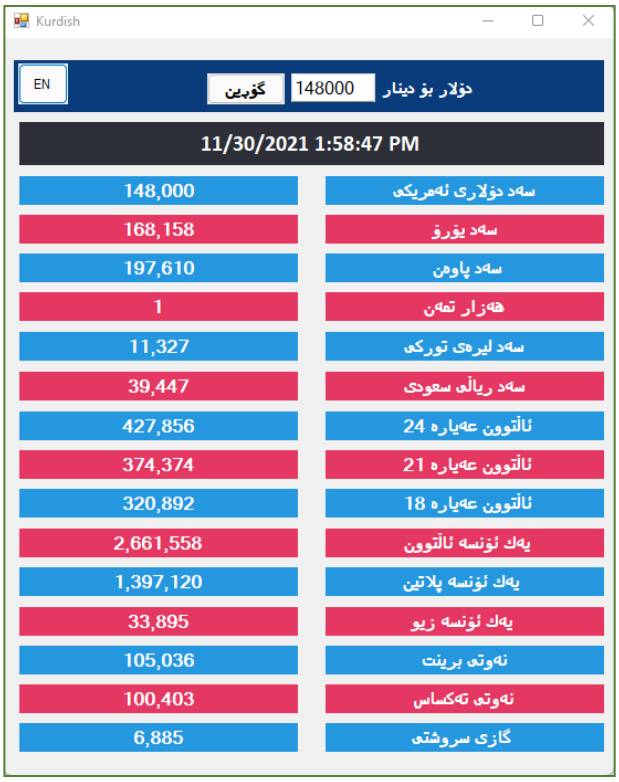

Fig .12: results in 1:58:47 time

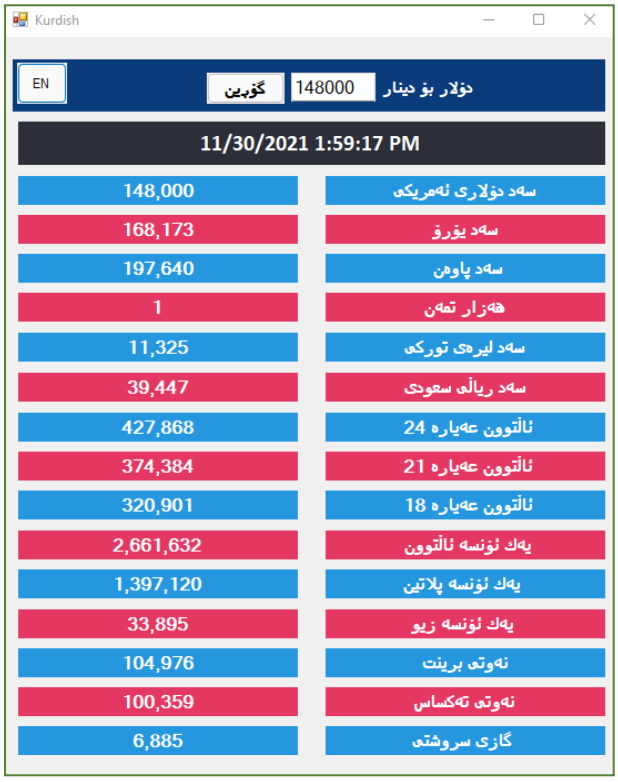

Fig. 13: results in 2:59:17 time

These figures show the same findings as the window's English version. Some values have been increased, while others have been dropped, with the remainder remaining untouched. Furthermore, the prices in the English, Arabic, and Kurdish windows are updated every 10 seconds.

4. Discussion

A real-time stock market trend window has been proposed. Results of this research show that currencies, metals, and energy prices can be obtained every 10 seconds. With the classic method, exchange shops and satellite channels should call banks to get the prices of dollars to Iraqi dinars every day and calculate the prices of other currencies, metals, and energy by themselves. As it is obvious, stock market prices are changing in seconds so the prices in the market are not precise and sometimes they cause serious problems. Consequently, exchange shops and satellite channels can use this stock market window to obtain currencies, metals, and energy prices every 10 seconds. Thus, it facilitates the process not only for stock traders but also for anyone who needs or is interested to know the prices. Investing and trading-view websites have real-time data, stock, forex, and breaking news features. They have more features than my stock market trend window. But the stock market trend window is simple, easy to use, and shows currencies, metals, and energy prices in Iraqi dinars and three different languages. The stock market trend window refreshes all prices every 10 seconds. Moreover, its interface needs improvement for increasing and decreasing prices. However, the research's limitation is that just a tiny amount of work related to this topic was located after a thorough search of the literature. Despite these, there are not any real-time tools available to know the stock market prices in Iraqi dinars. Hopefully, this stock market trend window can be used to know currencies, metals, and energy prices in Iraqi dinars and three different languages. The trend window can be adapted to show stock market prices in more languages and currencies. Future research might improvements of the trend window to support all international currencies, metals, and energy, as well. The trend window can be developed for web and mobile applications with extra features.

5. Conclusion

In this research, a real-time stock market trend window has been proposed. The window shows the currencies, metals, and energy prices in three different languages continuously. Stock traders, satellite channels, and anyone who needs or is interested to know the prices of the stock markets can use the window to see the real-time prices of stock markets in Iraqi dinars. Also, it can be used by developing countries. However, the research's limitation is that just a tiny amount of work related to this topic was located after a thorough search of the literature. Currently, Mobile and Web versions of the window are under development and they will be available soon. Future research might include more improvements to the trend window to have extra features.

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نافذة اتجاه سوق الأسهم في الوقت الفعلي باستخدام XPath وHtml Agility Pack

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المستخلص

يتضمن سوق الأوراق المالية في الوقت الفعلي التقاط البيانات ومعالجتها وتوفيرها بطريقة خفيفة وفعالة. تم استخدام عدة طرق للحصول على بيانات سوق الأوراق المالية بوظائف محدودة. في البلدان النامية مثل العراق ، لا تملك محلات الصرافة والقنوات الفضائية طريقة موثوقة للحصول على أسعار البورصة بالدينار العراقي. في هذه الورقة ، أحاول حل المشكلة من خلال اقتراح نافذة اتجاه دقيقة لسوق الأسهم في الوقت الفعلي باستخدام XPath و .Html Agility Pack تظهر نافذة الاتجاه أسعار أسهم المعادن والطاقة والعملات في آن واحد بالدينار العراقي وبثلاث لغات مختلفة .يتم استخدام XPath ، والتي تعني XML Path Language، وحزمة Html Agility لإحضار بيانات سوق الأسهم في الوقت الفعلي إلى نافذة سوق الأوراق المالية. تم تصميم نافذة الاتجاه باستخدام C # لتصميمات الواجهة الأمامية والخلفية و SQL Server لمستودع البيانات الخاص به .يتم عرض أسعار العملات والمعادن والطاقة في وقت واحد في نافذة اتجاه سوق الأسهم. كل عشر ثوان ، يتم تحديث نافذة الاتجاه لإظهار أحدث الأسعار.

استنتاج

تظهر النافذة أسعار العملات والمعادن والطاقة بشكل مستمر بالدينار العراقي وثلاث لغات مختلفة. يمكن استخدامه في الدول النامية من قبل تجار الأسهم والقنوات الفضائية وأي شخص يحتاج أو يهتم بمعرفة أسعار البورصات. قد يتضمن البحث المستقبلي مزيدًا من التحسينات على نافذة الاتجاه للحصول على ميزات إضافية.