**STOCK PRICE PREDICTION**

# Vangala Shiva Chaithanya

## Department of Computer Science and Engineering SR University hasanparthy Warangal,hanamkonda

### e-mail: vangalashivachaithanya@gmail.com

***Abstract--*Over** the past **few** **years,** **researchers,** **legislators,** **experts** **and** **business** **developers** **have** **become** **interested** in **the** **gambling** **industry.** The **aim** of the proposed work is to study and **develop** supervised learning algorithms **for** **predicting** **stock** **prices.** **Using** **data** **mining** **for** **stock** **market** **analysis** **will** **help** **new** **investors** **trade** the stock market **as** **much** **as** **possible** **through** software. **It** includes daily activities like **stock** **market,** Sensex calculation, **stock** **market.** The **stock** **market** provides an efficient and transparent market for trading **stocks,** debt instruments and derivatives. Our aim is to create **a** software that **analyzes** **historical** stock data of **some** **companies** with **the** help of **some** parameters that affect stock **prices.** We **will** **use** these **results** in **the** data **search** **algorithm** and decide which algorithm gives the best **results.** This will also help us determine **what** the stock will **be** **worth** in **the** future. We will **use** **machine** **learning** **algorithms** **to** **identify** patterns in data.

***Keywords--Online social media, Rumours, user’s behaviour, author, readers, Classifier, Precision***.

### I. INTRODUCTION

A stock market, **share** market or **stock** market is **a** **collection** of buyers and sellers **representing** **ownership** **in** **the** **business** **(also** **known** **as** **stock)** **sold** **(loosely** **a** **business** **transaction** **rather** **than** a physical or **separate** **entity);** **Securities** **traded** on public stock **exchanges** **and** **stock** **exchanges** **are** **private.** Examples of the latter include **selling** shares of private companies to investors through **crowdfunding** platforms. Stock exchanges list **stocks** **in** **the** **same** **way** as other **securities,** **such** **as** **stocks,** corporate **bonds,** and convertible bonds.  
Stock price prediction is one of the most studied **problems** **that** **attracts** **the** **attention** **of** researchers from many fields. The **volatility** of the stock market makes it **very** difficult to **use** simple **time** **series** or regression techniques. Financial institutions and traders **often** **create** various models **for** **trading** for themselves or their clients, but **few** achieve the **same** **old** average **return** **from** **shrinking** **capital.** The challenge of **predicting** **betting** price is **very** appealing because an improvement of a few **percentage** points can increase **profits** by millions of dollars. This **article** discusses the **general** application of **support** **vector** **machine** and **linear** **regression** **and** the **advantages** and **disadvantages** of the given methods. **This** **article** **explains** the **gaps** and **differences** **that** can be used to **identify** **price** patterns **that** **can** **aid** **future** **predictions** **and** **provides** **support** **that** can be **combined** with various machine learning algorithms to improve the accuracy of our **predictions.**

### II. LITERATURE SURVEY

[1]. AA Ariyo, AO Adewumi, [CK Ayo](https://scholar.google.com/citations?user=kjYjvvgAAAAJ&hl=en&oi=sra)

This IEEE conference paper explores the use of the ARIMA model for predicting stock prices. The study suggests that ARIMA models have potential for accurate short-term stock price prediction, performing competitively with other existing techniques.

[2]. W Lu, J Li, J Wang, L Qin

This research proposes a CNN-BiLSTM-AM approach for predicting stock prices. It combines convolutional neural networks (CNNs) for feature extraction, bidirectional long short-term memory (BiLSTM) for sequence analysis, and an attention mechanism (AM) to focus on important features, achieving high accuracy in stock price prediction compared to other methods.

[3]. Hu, Z.; Zhao, Y.; Khushi

This study examines the application of deep learning techniques in forecasting foreign exchange (Forex) and stock prices. The authors analyze various deep learning models, finding that Long Short-Term Memory (LSTM) networks and combinations with other methods like deep neural networks (DNNs) are particularly promising for financial price prediction.

[4]. Yu, P., Yan

This research highlights the potential of deep neural networks (DNNs) for stock price prediction due to their ability to handle complex, non-linear financial data. The paper explores DNNs' advantage over traditional methods in effectively capturing the underlying patterns within stock price movements.

[5]. S. Selvin, R. Vinayakumar, E. A. Gopalakrishnan

This IEEE conference publication compares three deep learning models (RNN, LSTM, CNN) with a sliding window approach for stock price prediction. The study finds that CNNs might outperform RNNs and LSTMs in certain cases, possibly due to their focus on capturing patterns within the current window rather than relying heavily on historical data, which can be less reliable in the dynamic stock market.

[6]. Jae Won Lee

This IEEE conference paper investigates applying reinforcement learning (RL) to stock price prediction. Unlike traditional forecasting methods, RL models the agent's interaction with the market environment, potentially leading to more adaptable predictions that consider the dynamic nature of stock prices.

[7]. K. Khare, O. Darekar

This IEEE conference publication delves into using deep learning techniques for short-term stock price prediction. The study acknowledges the inherent difficulty of short-term forecasting in the stock market but explores the potential of deep learning models to capture short-term trends and outperform traditional methods.

[8]. S. Mohan, S. Mullapudi

This IEEE conference paper explores the link between news sentiment and stock prices. It investigates the use of sentiment analysis techniques to analyze news articles and assess their potential to predict short-term stock price movements.

[9]. X. Ji, J. Wang

This study introduces a deep learning method for stock price prediction that incorporates both traditional financial data and social media text data. The model extracts features from social media text using Doc2Vec and then combines those features with financial metrics to train a Long Short-Term Memory (LSTM) network for improved prediction accuracy.

[10]. Sharaf, M., Hemdan

StockPred proposes a framework for stock price prediction using a combination of machine learning and deep learning models. This framework aims to achieve higher accuracy and consistency in predicting closing stock prices compared to existing methods. It leverages techniques like Lasso regression to enhance the overall prediction performance.

[11]. M. İ. Y. Kaya and M. E. Karsligil

This IEEE conference paper examines the potential of financial news articles for stock price prediction. It explores methods to analyze the content of news articles, proposing that positive news sentiment might correlate with rising stock prices and vice versa, potentially aiding short-term prediction.

[12]. Y. E. Cakra and B. Distiawan Trisedya

This IEEE conference paper investigates a simpler approach to stock price prediction. It explores using linear regression, a statistical method, to analyze the relationship between sentiment analysis data (positive, negative, neutral) and stock prices. The idea is to see if sentiment can be a basic indicator for short-term stock price movements.

III. PROPOSED APPROACH

### **1. Overview**

### **Over** the past **few** **years,** **researchers,** **legislators,** **experts** **and** **business** **developers** **have** **become** **interested** in **the** **gambling** **industry.** The **aim** of the proposed work is to study and **develop** supervised learning algorithms **for** **predicting** **stock** **prices.** **Using** **data** **mining** **for** **stock** **market** **analysis** **will** **help** **new** **investors** **trade** the stock market **as** **much** **as** **possible** **through** software. **It** includes daily activities like **stock** **market,** Sensex calculation, **stock** **market.** The **stock** **market** provides an efficient and transparent market for trading **stocks,** debt instruments and derivatives. Our aim is to create **a** software that **analyzes** **historical** stock data of **some** **companies** with **the** help of **some** parameters that affect stock **prices.** We **will** **use** these **results** in **the** data **search** **algorithm** and decide which algorithm gives the best **results.** This will also help us determine **how** **valuable** **certain** **products** **will** **be** **in** the future. We will **use** **machine** **learning** **algorithms** **to** **identify** patterns in **the** **data.**

a. **MODULE DECRIPTION**

The implementation of this project is divided into following steps

1. Data Preprocessing
2. Feature selection
3. Building and Traning Model

## .

***Data Preprocessing:***

**This** **information** **is** **available** in the **database.** **df** **=** **drop** null values **​​using** **df.dropna();** where df is the data frame. **Convert** categorical attributes **(date,** **high,** **low,** **close,** **update)** **to** **numbers** **using** **the** **tag** **encoder.** **Date** **attributes** are **split** into new **attributes,** **such** **as** **all,** **that** can be used as **attributes** **in** **models.**

***Feature selection:***

**Feature** selection is **complete** **and** can be used to **create** **patterns.** The attributes used for **custom** selection **are:** **Date,** **Price,** **Adj** **close,** **Weather** X **function,** Y coordinate, **latitude,** **longitude,** **time** and month,

***Building and Training Model:***

**Once** **the** feature **is** **selected,** location and **moon** **behavior** are used for training. The **data** **set** is divided into **xtrain,** **ytrain** and xtest, y **test** **pairs.** The **algorithm** model is imported **from** **scleran.** **The** **design** **consists** **of** **patterns.** **fit(xtrain,** ytrain). This **stage** **includes** linear regression, **ensemble** classifiers (like Adaboost, **random** **forest** **classifiers),** etc. **It** **will** **include** **classification** **techniques** **such** **as**

**PYTHON TECHNOLOGY**

Python is an **interpretive** programming language similar to PERL, **popular** **for** its **clarity** and readability. Python is said to be **very** easy to learn and **port;** **This** **means** **that** its **language** can be interpreted **on** **many** operating systems, including **UNIX-based** systems, Mac OS, **MS-DOS,** OS/2, and various versions of Microsoft Windows 98. **It** was **performed** by **former** **Dutchman** Guido van Rossum, whose **favorite** **troupe** at the time was Monty Python's Flying Circus. The source code is freely available and open **to** modification and reuse. Python has **many** users. **An** **important** feature of Python is **the** **indentation** of **raw** **words,** **which** **makes** the code easier to read. Python **provides** dynamic **data,** **ready-made** **classes,** and interfaces to many system calls and libraries. It can be **extended** using C or **C++** **language.**  
Python can be used as **a** script in Microsoft's Active Server Page (ASP) technology. **Average** **score** **at** Melbourne (Australia) Cricket Ground written in Python. Z Object Publishing **Environment** **is** a popular **web** **server** also written in Python

### **Python Platform**

**The** CPython **application** runs on 21 different **platforms** **in** **addition** **to** **Windows,** **Linux** **and** **MacOS.** IronPython is a .NET **Framework-based** Python **application** **that** **can** **run** **on** **Windows,** **Linux,** and other **platforms** **with** .NET **Framework.**

**Python library**:

* Machine **learning,** as the name suggests, is the science of programming **computers** to learn from different **types** of data. **The** general definition given by Arthur Samuel is **as** **follows:** **"Machine** **learning** is the **study** of **giving** computers the ability to learn without **detailed** **explanation.** **It** **is** **often** used to solve various **problems** of **people."**  
  In the **past,** people **performed** **machine** **learning** tasks by manually coding all the **algorithms,** mathematical and statistical **formulas.** This **makes** the process **time-consuming,** **tiring** and **ineffective.** **However,** **today,** **thanks** **to** **many** **Python** **libraries,** **frameworks** **and** **models,** **it** **has** **become** **much** **easier** **and** **more** **efficient** **than** in the **past.** Today, Python is one of the most popular languages **​​for** this **job** and has replaced many languages **​​in** the **business** **world,** **partly** **because** **it** **has** **a** **large** **number** of libraries. Python libraries used in **machine** **learning** are:
* Numpy

* Scipy

* Scikit- learn
* Theano
* TensorFlow

* Keras

* PyTorch

* Pandas

**NumPy:**

Numpy is a very popular **Python** library **that** **can** **be** **used** **to** **manipulate** **large,** **multidimensional** **objects** and **matrices** with the help of a **number** of **advanced** **arithmetic** **operations.** It is very useful for **computational** **science** in **machine** **learning.** It is **especially** useful for linear algebra, Fourier **transforms,** and random number **functions.** **Advanced** libraries like TensorFlow **use** NumPy internally **to** **manipulate** **tensors.**

### **SciPy:**

### **It** is a very popular library among **machine** **learning** enthusiasts as it contains different **models** for optimization, **linearization,** **integration,** and statistics. There **are** **differences** between the SciPy library and the SciPy stack. SciPy is one of the core packages that make up the SciPy **cluster.** SciPy is also useful for image **processing**.

**Skikit;**

learn is one of the most popular ML libraries for classical ML algorithms. It is built on top of two Python libraries, NumPy and SciPy. **Scikit-learn** supports most supervised and unsupervised learning algorithms. **Scikit-learn** can also be used for **data** mining and **data** analysis, **making** it a great tool **to** **get** **started** with **machine** **learning.**

**Theano:**   
We all know that **machine** **learning** basically **consists** **of** mathematics and statistics. Theano is a popular **Python** library used to **efficiently** **identify,** **evaluate,** and optimize **code** **containing** **multiple** **threads.** It is **done** by optimizing CPU and **GPU** **usage.** It is **widely** used **in** **laboratory** and **self-testing** to **identify** and diagnose **various** types of errors. Theano is a very powerful library that has **long** been used in **large** projects **in** **computer** **science,** but is simple enough to be used by individuals for their own projects.

**Keras**:   
**It** is a very popular **Python** **library.** **TensorFlow** is **an** **advanced** neural **network** API **that** **can** **run** on **CNTK** or Theano. It **works** seamlessly **between** CPU and GPU. Keras really **allows** ML beginners to **design** **and** build **neural** **networks.** One of the best **things** about Keras is that it **makes** **prototyping** easy and fast.

**PyTorch:**  
pytorch is a popular **Python** **open-source** **machine** **learning** library based on Torch, an **open-source** **machine** **learning** library implemented in C **and** **wrapped** in Lua. It has **a** **wide** **range** of tools and libraries **to** **support** **computer** **vision,** **natural** **language** **processing** **(NLP),** and many **machine** **learning** programs. It allows developers to **work** on **tensors** **via** GPU acceleration and also helps **create** computational **graphics.**

**Pandas:**  
pandas is a popular Python library for data analysis. It is not directly related to **machine** **learning.** As we **all** **know,** the **data** **set** must be prepared before training. In this case, Pandas comes **in** handy as it **is** specifically **designed** for data **consumption** and preparation. It provides **the** **best** data and **various** data **analysis** **tools.** It provides many **ways** **to** **search,** **combine** and **filter** data. **Picture.**

IV. EXPERIMENTAL RESULTS

In this section, we explain the details of experimental results. Under this section initially, we explain the details of datasets, then the results of our experiments.

### 1. Experimental Setup

**This** **information** **is** **available** in the **database.** **df** **=** **drop** null values **​​using** **df.dropna();** where df is the data frame. **Convert** categorical attributes **(date,** **high,** **low,** **close,** **update)** **to** **numbers** **using** **the** **tag** **encoder.** **Date** **attributes** are **split** into new **attributes,** **such** **as** **all,** **that** can be used as **attributes** **in** **models.**

### 2. Results and Discussion

**RESULT:**

By **evaluating** the accuracy of the **linear** **regression** **algorithm,** we found the **best** algorithm for predicting market **prices** based on various points **in** historical data. The algorithm will **become** a **major** asset for **traders** and investors investing in the stock market **as** it **learns** a **lot** of historical data and **is** **selected** after **testing** a sample **of** data. **This** project **shows** **that** **a** machine learning model **can** predict **prices** **of** **products** **better** **than** **previous** machine learning models.

**FUTURE WORK (DISSCUSSION)**

**The** **future** scope of **the** project **may** **include** **additional** parameters and **financial** **comparisons,** **various** **scenarios,** **etc.** **It** **will** **include** **various** factors **such** **as.** The **algorithm** can also be **used** **to** **analyze** the **content** of **advertisements** **to** **identify** patterns/relationships between **customers** and **company** **employees.**  
Table.1 Sample Confusion Matrix

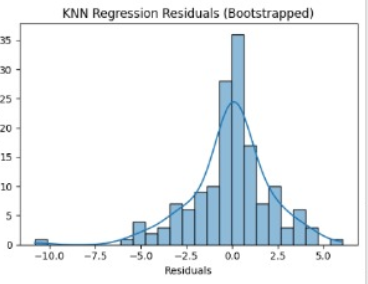
|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Predicted** | |
| Rumour | Non-Rumour |
| **Original** | Rumour | True Positive (TP) | False Negative (FN) |
| Non-Rumour | False Positive (FP) | True Negative (TN) |

During the testing, the posts are tested one by one and the performance metrics are measured from the confusion matrix as depicted above. Based on the TPs, FPs, FNs and TNs, the performance metrics are modeled and their mathematical representation is done as follows;

|  |
| --- |
| Table.2 Performance at fivefold cross validation for different classifiers |

Here TP is considered when the post related to rumour is detected as Rumour, FN is considered when the Rumor is detected as non-rumour, FP is considered when the Nonrumour is detected a rumour and finally TN is considered when the non-rumour is detected as non-rumour. At every validation, the performance is measured and they are explored in the following Table.2. The results shown in Table.2 are belongs to the simulation study with During testing, **reports** are tested one by one and performance **is** measured **against** the confusion matrix **described** **above.** **The** **index** **is** **modeled** **according** **to** **TP,** **FP,** **FN** **and** **TN** **and** **its** **mathematical** **expression** **is** as **follows:  
  
Table.2** **Five-fold** **cross-validation** **performance** **of** **different** **classifiers  
  
Compared** **to** the **words** **selected** **here,** TP is **taken** **into** **account** **regarding** **the** **selected** **words** **is** **taken,** when the **selected** **words** **are** **determined** to **be** **unspecified** **words,** **FN** **is** **determined,** **when** **Non-Hear** is detected as **hearsay,** **FP** is **determined** **and** **finally** the **end.** **If** **something** **that** **is** **not** **a** **rumor** is detected as **a** **non-rumor,** **it** is considered **TN.** **Performance** is measured **for** **each** **validation** and **search** in **Table** **2** **below.** The results shown in **Table** **2** are **from** simulation **learning** with **all** features and two machine learning algorithms such as K-NN and SVM.full set of features and two machine learning algorithms such as K-NN and SVM.



**KNN REGRESSION**

KNN **Regression  
K-Nearest** **Neighbor** (KNN) regression is a supervised machine learning algorithm that can be used for **many** regression tasks, including energy efficiency analysis. In KNN regression, the goal is to predict a continuous **target,** such as **power** consumption or **power** **consumption,** based on the similarity of data points **at** **a** **particular** **location.** **Below** **explains** how **to** **use** KNN regression in energy efficiency **analysis:  
1.** Data **collection:  
First** **collect** data **on** energy **usage.** This **information** should include features (independent variables) and **objective** **variables** **(utility** or **benefit).** **Characteristics** may include **architectural** **features,** environmental factors, and other **parameters.** Data **Preprocessing:  
Preprocessing** data by handling missing values, normalizing or scaling features, and splitting **them** into training and **test** **sets** for model **evaluation.** Model **selection:  
Select** KNN regression as **the** regression model. In KNN regression, the **estimated** data point is the average (or weighted average) of the **target's** values **​​across** its **nearest** neighbors **at** **a** **given** **location.** **Hyperparameter** **tuning:  
Determine** the **best** value of the **hyperparameter** **"K"** (the number of nearest neighbors to consider) **by** **matching** or other techniques. The **"K"** **option** **may** affect the **performance** **of** the **model.** **Demonstrate** **the** **model:  
Train** the KNN regression model on the training dataset. The model **remembers** the vectors and their corresponding **targets.** **Prediction:  
Using** the **learning** model to make predictions on **test** **data.** For each data point in the **experiment,** the model identifies the **K** **nearest** neighbors from the training data and calculates **predictions** based on their target values.

1. Data Collection:

Start by collecting data **on** energy **consumption.** This **information** should include features (independent variables) and **objective** **variables** **(utility** or **benefit).** **Characteristics** may include **architectural** **features,** environmental factors, and other parameters.

2. Data Precprocessing:

Clean and preprocess data by handling missing values, **modeling** or **measurement** features, and **split** into training and testing for model evaluation.

3. Model Selection:

**Select** KNN regression as **the** regression model. In KNN regression, the **estimated** data point is the average (or weighted average) of the **target's** values **​​across** its **nearest** neighbors **at** **a** **given** **location.**

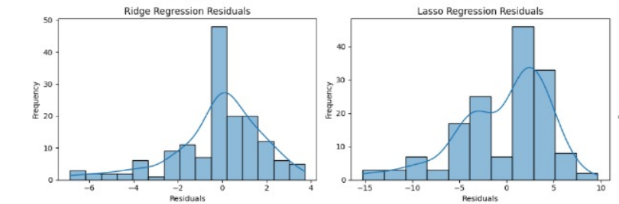
4. Hyper parameter Tuning:

Determine the value of the **hyperparameter** **"K"** (the number of nearest neighbors to consider) **by** **matching** or other techniques. The **"K"** **option** **may** affect the **performance** **of** **the** **model.**

5. Training the Model:

Train the KNN regression model on the training dataset. The model memorizes the feature vectors and their corresponding target values.

6. Prediction:

Use the **training** model to make predictions on **test** **data.** For each data point in the **experiment,** the model identifies the **K** **nearest** neighbors from the training data and calculates **predictions** based on their target values.

User Behaviour Features

Fig. 2 Recall analysis at different features and classifiers   
Linear **regression,** also known as multiple regression, is a statistical technique that uses **more** **than** **one** explanatory **variable** to **estimate** the **probability** of a response **variable.** **.** **Essentially,** multiple regression is **an** extension of ordinary **least** **squares** (OLS) regression because it **has** more than one explanatory **variable.** **Set** **(x1,x2,…,xp).** **This** **article** **introduces** **the** **theory** **of** multiple **horizontal** **lines** of **convenience** and **gives** **an** **example** of regression analysis **of** census data to illustrate the **theory.** **Complex** or tedious algebra will be avoided **everywhere** **and** **many** **theoretical** **texts** **on** **the** **process** will be **consulted.** **Key** issues that arise when **conducting** multiple **cross-sectional** **analyzes** are discussed in **detail,** including **sample** **design,** **key** assumptions, and interpretation of results. **But** before we **even** consider linear regression **analysis,** we **will** **briefly** review simple linear regression.

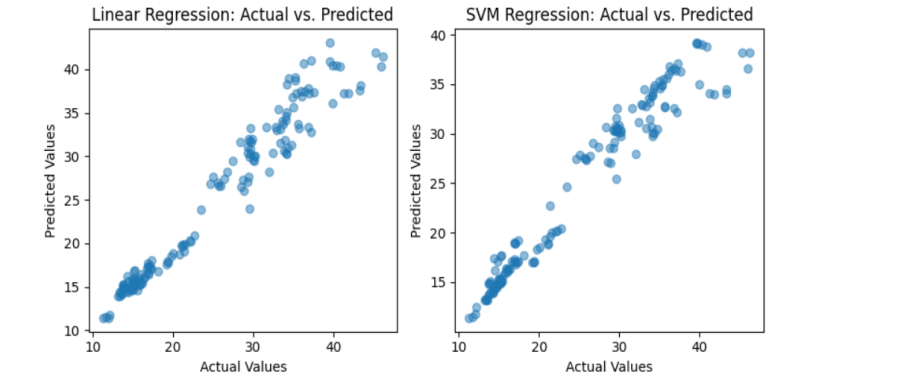
User Behaviour Features  


Fig. 3 F1-Score analysis at different features and classifiers   
Linear **regression,** also known as multiple regression, is a statistical technique that uses **more** **than** **one** explanatory **variable** to **estimate** the **probability** of a response **variable.** **Modelling.** **Essentially,** multiple regression is **an** extension of ordinary **least** **squares** (OLS) regression because it **has** more than one explanatory **variable.** **Set** **(x1,x2,…,xp).** **This** **article** **introduces** **the** **theory** **of** multiple **horizontal** **lines** of **convenience** and **gives** **an** **example** of regression analysis **of** **census** **data** to illustrate the **theory.** **Complex** or tedious algebra will be avoided **everywhere** **and** **many** **theoretical** **texts** **on** **the** **process** will be **consulted.** **Key** issues that arise when **conducting** multiple **cross-sectional** **analyzes** are discussed in **detail,** including **sample** **design,** **key** assumptions, and interpretation of results. **But** before we **even** consider linear regression **analysis,** we **will** **briefly** review simple linear regression.

**V. CONCLUSION**

By **evaluating** the accuracy of the **linear** **regression** **algorithm,** we found the **best** algorithm for predicting market **prices** based on various points **in** historical data. The algorithm will **become** a **major** asset for **traders** and investors investing in the stock market **as** it **learns** a **lot** of historical data and **is** **selected** after **testing** a sample **of** data. **This** project **shows** **that** **a** machine learning model **can** predict **prices** **of** **products** **better** **than** **previous** machine learning models.  
Future **work** of **the** **project,** **financial** **allocation,** **further** **status** **etc.** **It** will **include** adding **many** parameters and factors **such** **as.** The **algorithm** can also be **used** **to** **analyze** the **content** of public **messages** **to** **identify** patterns/relationships between **customers** and **company** **employees.**

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