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Bank Statement Analyzer using SVC

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Abstract: ***In today's world money transfer has become an easy process because of evolving technologies in the banking domain , people are doing hundreds of transactions in a day, and thousands in month which makes it difficult to manage their spending's to have control over their spending.so having the system or technology which analyse the transactions provided it in PDF format like Bank Statement and it provides you back with the data in easy and understandable format that helps you to manage your spending's will be beneficial for all the users.***
Bank Statement Analysis is a methodology to study the bank statement provided by various banks as per your spending/earnings. Bank Statement Analysis helps individual to keep track of his/her spending's and have control over it. It will also help banks to have maximum satisfaction of their members/customers. There are various pre-existing systems , websites which provide the analysis of the bank statement but it's complexity is high to understand and it cost more than expected for individual to do analysis of his/her bank statement. the output provided by pre-existing systems is not simplified hence it costs time for user to understand and reduces their progress.
We are aiming to innovate a system which will intake an bank statement of an individual and process the data and categories the data into meaningful fields and will do some mathematical calculations to provide the systematic and diagrammatic view of created fields which will increase the understanding of the user and indirectly will increase the efficiency. The cost and time require for the analysis will be very less and efficiency is 100%.
Keywords: Bank Statement Analyzer, UPI, Diagrammatic, Efficiency, EMI.

I. INTRODUCTION

Financial Analysis is a principal field of business**,** the banking sector**,** and many other domains which helps them to analyze and manage their expenses and it needs to be very accurate. Various Existing methods are available which provide Financial Analysis but their accuracy is not satisfactory**,** and complexity as well as the cost**,** is too high which alters their progress and also costs them time. Bank Statement Analysis is an idea where bank statements are uploaded and getting the expenditure categorized into various categories**,** this helps the users to manage their expenses and get a pictorial view to keep track of their expenses. This reduces the burden of users**,** and not to think of money and where their money is going
Bank Statement analysis is an idea that involves uploading a large bank statement and classifying expenses into various categories. This allows users to manage their spending and to get personalized reports and track their spending. This gives users a way to track where he/she has spent their money.
Our goal is to create a system that analyzes users' bank statements and classify the users' expenses systematically and very accurately. The expenses are classified in many ways such as EMI**,** Food**,** Medicine**,** Stationery and so on. There are many portals or systems available for analyzing Bank Statements that are either too inaccurate or some portals or systems are accurate but very expensive. Our main goal is to achieve maximum accuracy at minimum cost.
This System will also be helpful for Banks to give out loans to individuals. The Bank will get the analysis of the individual Bank Statement on that basis the bank may or may not provide him/her with a loan. This will reduce the number of default loans for banks. Our main motive is to innovate a system that matches today's world and provides the accurate output for which it is designed**,** at an affordable cost.

II. LITERATURE SURVEY

In searching for relevant literature, we extensively used libraries and the Internet to find literature specific to our research topic. Research areas include bank statements, machine learning concepts, data processing, and PDF processing.
To extend the literature review, research topics were divided into concepts and subject areas such as banking, machine learning, PDF processing, and transaction identification.

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1) Elaine Henry and Thomas R. Robinson, in "INTERNATIONAL FINANCIAL STATEMENT ANALYSIS", argues that their work addresses the growing need for investment and encourages students to think about analysing financial statements from a global perspective. This text is effectively an introduction to balance sheet analysis, combining a true international orientation, a structured presentation style, and numerous illustrations and tools to aid in the concepts presented in the text. The authors cover the area comprehensively, with an eye on the reader's success at every level in the complex world of financial statement analysis.

After reading the research paper, you will be able to do the following:

a) Describe the roles of financial reporting and financial statement analysing
b) Describe the roles of the statement of financial position, comprehensive income, changes in equity, and statement of cash flows for evaluating a company stance and financial position.
c) Describing the importance of financial statement notes and supplementary information including disclosure of accounting methods, estimates, and management commentary.
d) Describe the goals of financial statement audits, the various types of audit reports, the audit process, and importance of effective internal controls.
e) Identify and describe the information sources that analysts use in financial statement analysis besides annual financial statements and supplementary information.
f) Describe the steps in the financial statement analysis framework.

2) Book by George Foster “FINANCIAL STATEMENT ANALYSIS”. This book provides an intensive study of financial statement analysis, seeking to explain

a) The demand and supply forces underlying the provision of financial statement data
b) The properties of numbers derived from financial statements
c) The key aspect of decisions that use financial statement information.
d) The characteristics of the setting in which these decisions are made.

The intended outcome is for readers who understand these four factors are in a strong position to exploit the richness of the information contained in many financial statements as well as to fully appreciate the limitations of that information. The book goes through each and every step of analyzing a financial statement including

- Demand for financial information.
- How to get the information needed?
- Methods to analyse the financial statements
- Forecasting financial statement information
- Cross sectional analysis of financial statements
- Time series analysis of financial statements
- Information Efficiency
- Asset Pricing

It also discusses corporate financial statements and.also discuss about loan decisions for banks to give to corporate sectors and individuals as well.

III. PAGE STYLE

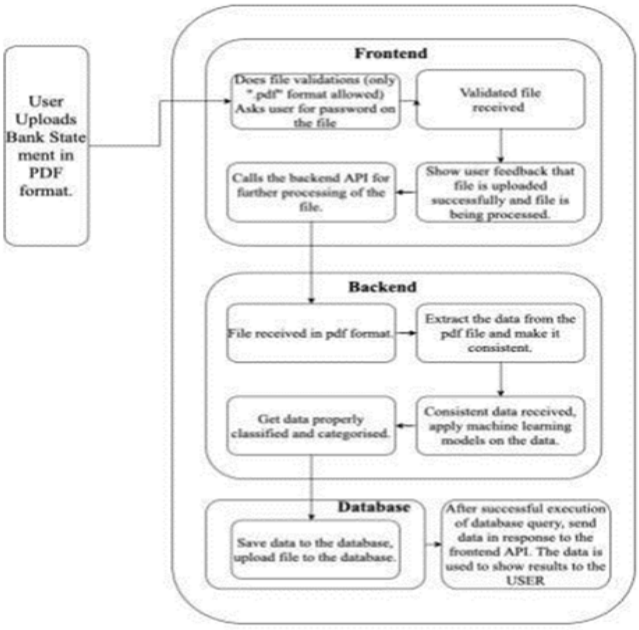
1) Process the uploaded bank statement and provide the data categorized into various categories for analysis.
2) Helps to manage and control the expenses and capital flow in the Business , banking sector and many other domains.
3) Banks will have the advantage of providing the loans by analysing the individual’s loan background.

IV. SYSTEM REQUIREMENT

1) Operating System :- Windows 9/10/11
2) RAM/ROM :- 4GB/20GB
3) Script :- Javascript
4) Language :- Python
5) Database :- My Sql
6) IDE :- Anaconda

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V. SYSTEM ARCHITECTURE



VI. METHODOLOGY

To analyse the bank statement we have studied various bank statements of banks such as SBI ,HDFC ,Post Bank, Federal Bank.
By observing many bank statements we then came to conclusion that bank statements are most available in two formats PDF and Excel.
If the user uploads a PDF file we will first convert the pdf file to excel file which will be easy to work with.
We can do that by using tabula library which has convert into function that can convert the pdf into excel or csv. If the user upload excel we will use the file as it is for analysis.
We also concluded that each bank statement has 4-5 columns in those columns there is one that is common called as transaction particulars which stores all the information regarding that particular transaction.
By using this column we can classify the transaction based on mode used. If it's a cash transaction the transaction particular will include ATM. Similarly for UPI the transaction particulars will include upi. For other charges deducted by bank it will include SMS,MAB.
By using this we were able to classify the transaction based on its types.
For further classification of UPI transaction we first had to extract upi id's from the particulars column but the problem is that each bank statement has a limit on the particular column that it contains on 50 characters some upi id's for google pay or paytm qr it exceeds those limits so some upi id's are incomplete into the column but still we can extract all upi id's even if its incomplete. For complete upi id's we can extract them by using the '@' symbol. For paytm qr it always include paytmqr in the upi id so we can extract it by using if condition similarly for the google pay upi id's.
After extracting upi id's we can classify the upi id's whether the upi id belong to a merchant or an individual. Each upi id has its own feature for merchant upi id it will always start with Q, paytmqr, BHARATPE, EKART, BILLDESK, RAZORPAY if any upi id include these key words then it's a merchant upi id for any other upi id it becomes individual.
So we used SVM model to classify this categorical data that is upi id's into three separate classes individual, merchants ,others. Other class is for those upi id's that are incomplete
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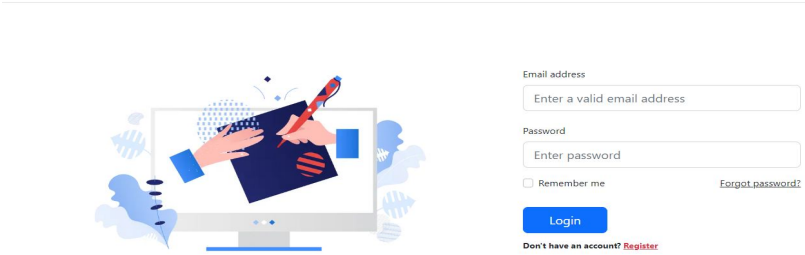
After extracting upi id's we can classify the upi id's whether the upi id belong to a merchant or an individual. Each upi id has its own feature for merchant upi id it will always start with Q, paytmqr, BHARATPE, EKART, BILLDESK, RAZORPAY if any upi id include these key words then it's a merchant upi id for any other upi id it becomes individual.

So we used SVM model to classify this categorical data that is upi id's into three separate classes individual, merchants ,others. Other class is for those upi id's that are incomplete

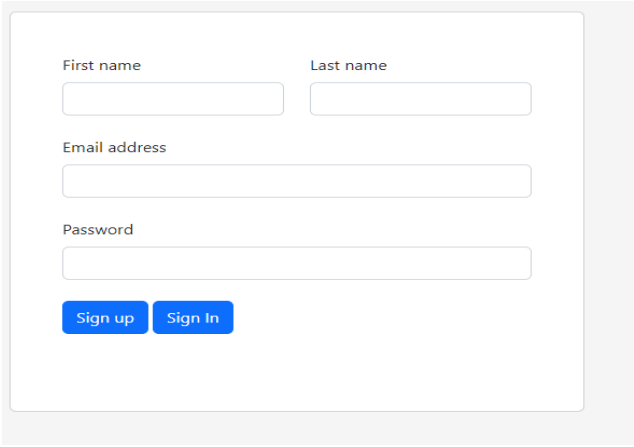
VII. RESULTS AND DISCUSSION

To access the website to upload the bank statement the user will have to login, if user is not registered they might register and then proceed to upload their bank statement.

The login page looks as follows

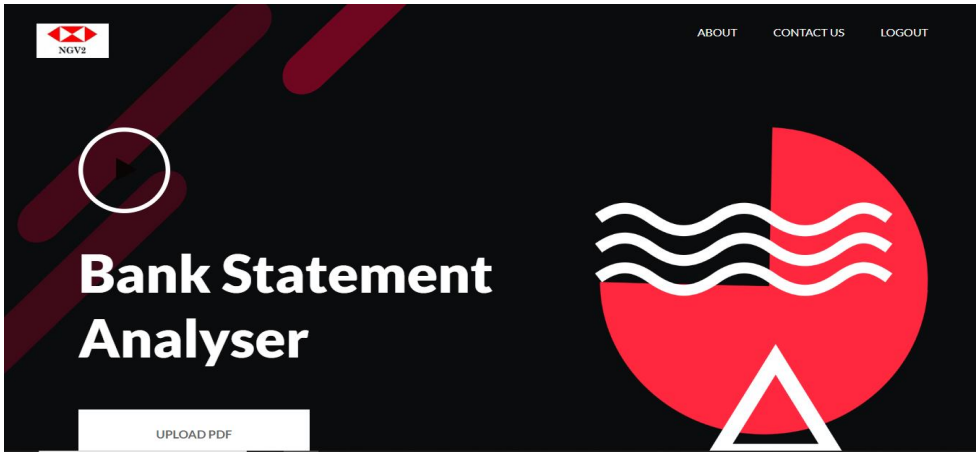


If the user is not registerd he may then proceed to register by clicking on the register link on the login page.



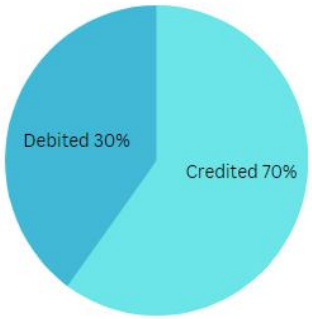
The user needs to fill this form in order to register and to use the services.

After the user has registered they will be redirected to the upload page where they can upload their bank statement.

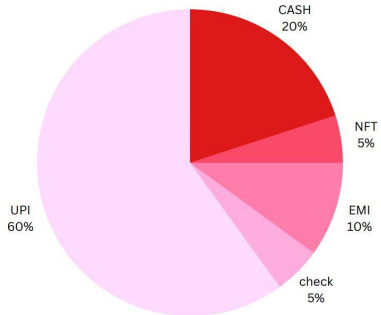


Here the user will only be able to upload the bank statement in PDF or Excell format other formats are not allowed.
After uploading the statement the model will analyse the statement and classify the transaction into its type and also classify the upi transaction into merchant or individual.
As the bank statement has a limit of 50 characters for the particulars column some upi id's will be incomplete those upi'id will be classified as others.
The result shown to the user will be in the form of pie charts.

The first pie chart will show the credit and debit pie chart

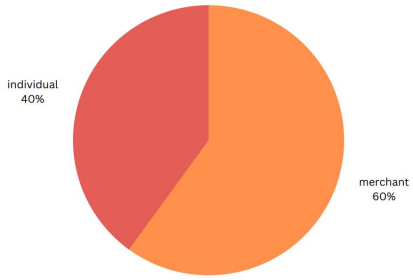


Followed by the pie chart of transaction mode types such as UPI,Cash,Cheque,NEFT etc.



If the user later wishes to see more details on each transaction they can click the specific area of pie chart and will be shown table consisting of all the transaction of that particular type.

If the user clicks on upi then the user will see a pie chart denoting the number of transaction made to individual and merchant.



Further the user will be shown detailed table of each merchant or individual transaction based on users choice.

Merchant Name	Transaction Id	Date	Amount	UPI ID	Address	Location	Mobile Number
ABC store	153	12/12/2022	500	abc@merchantupiid	XYZ street Pune Maharashtra	18.446762, 73.816229	9999999999

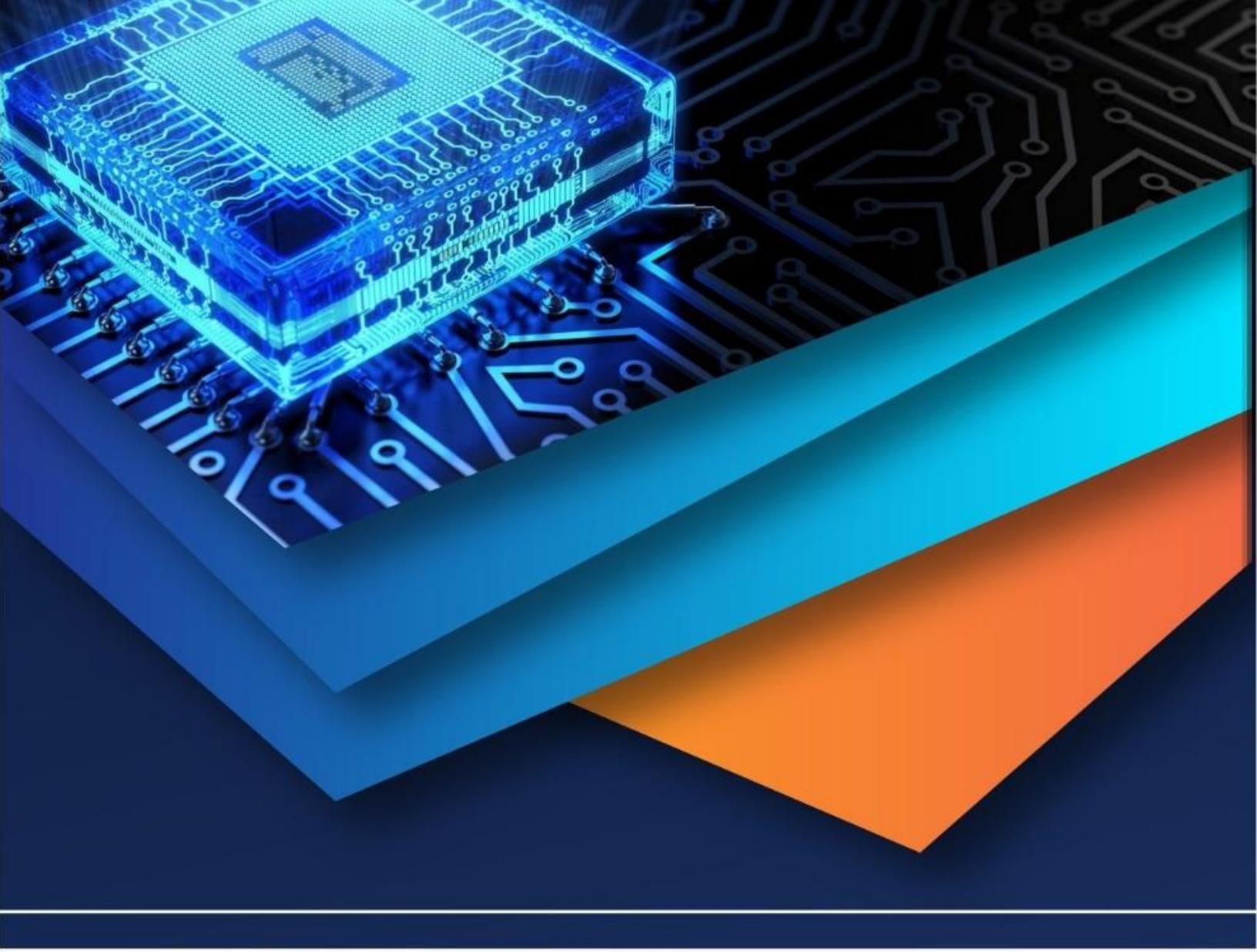
VIII. CONCLUSION

This Application help user to analyse the bank statement and provide the analytical report on the account expenses. The provided output by the model in the graphical formats increases the understanding of the individual by studying different categorized fields and helps to manage and control their daily expenses. It also helps bank to make decisions on providing the loan for an individual.

REFERENCES

[1] Bank Statement Analyzer research paper published by Dr. Sulochana Sonkamble1, Gaurav Bansode, Nilima Bhadane, Vikrant Jagtap, Vinay Borse.
[2] Book by George Foster “FINANCIAL STATEMENT ANALYSIS”.

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