NPA Tracker Mobile Application- An Innovative Application of Computer Engineering in Economic Development of the Nation

Y.V.S. Bharadwaj[1], Sai Bhageerath Y.V.S[2], Dr. Prasada Rao YVSSSV[3]
School of Computer Science and Information Technology, Central University of Hyderabad, Hyderabad, India[1]
National Institute of Technology, Warangal, India[2]
Principal, NRI Institute of Technology, Guntur, A.P., India[3]

Abstract:
NPA (Non-Performing Asset) is a mounting problem which has been an agony for economies globally. The increasing NPA levels in financial institutions calls for immediate attention and earliest action as it hits the GDP levels and most importantly is a menace to the public. An NPA tracker application is a tool to check this menace. It is a mobile cum web application which tracks the NPA customer by tagging the borrower's location using GPS map, updates on recovery status, real time approval of requests, video and audio data upload, monitoring team performance and so on. This paper outlines on what NPA is, it's negative impact on the country's economic stability and how does NPA tracker help in curbing this menace. Various modules involved in the NPA tracker application, its development process, architecture and security features involved in the development of the NPA tracker application explained.

Keywords: Non-Performing Asset, GDP, NPA tracker, tagging, GPS map, video and audio data upload.

1. INTRODUCTION

A healthy and a sound financial system are very essential for an economy in order to grow and remain in a competitive environment [4]. A financial asset is classified as a non-performing asset (NPA) if, due in the form of principal and interest are not paid by the borrower for a period of 90 days. An asset including a leased asset, becomes non-performing when it ceases to generate income for the financial institution [2]. If any advance or credit facilities granted by banks to a borrower become non-performing, then the bank will have to treat all the advances/credit facilities granted to that borrower as non-performing without having any regard to the fact that there may still exist certain advances/credit facilities having performing status. Though the term NPA connotes a financial asset of a commercial bank, which has stopped earning an expected reasonable return, it is also a reflection of the productivity of the unit, firm, concern, industry and nation where that asset is idling. Viewed with this perspective, the NPA is a result of an environment that prevents it from performing up to expected levels.

1.1 Reasons for Debt Become NPA

Granting of credit for economic activities is the prime duty of banking. Apart from raising resources through fresh deposits, borrowings and recycling of funds received back from borrowers constitute a major part of funding credit dispensation activity. Lending is generally encouraged because it has the effect of funds being transferred from the system to productive purposes, which results into economic growth. However lending also carries a risk called credit risk, which arises from the failure of borrower. Non-recovery of loans along with interest forms a major hurdle in the process of credit cycle. Thus, these loan losses affect the bank's profitability on a large scale. Though complete elimination of such losses is not possible, but banks can always aim to keep the losses at a low level. A few major reasons for NPA's are:
1. Business losses due to changes in business/regulatory environment.
2. Unplanned expansion of corporate houses during the boom period and loan taken at low rates later being serviced at high rates, therefore, resulting in NPAs [5].

3. Due to mal-administration by the corporates, for example, wilful defaulters.
4. Due to misgovernance and policy paralysis which hampers the timeline and speed of projects, therefore, loans become NPAs. For example the Infrastructure Sector.
5. A bad lending practice which is a non-transparent way of giving loans.
6. Irregular follow up of the NPA customers by the loan recovery officers.
One of the many causes for NPA can be attributed to lack of due diligence process (or) conducting it in a haphazard manner [1].

1.2 IMPACT OF NPA

Countries economic status majorly depends on the health of its financial institutions. With a trend of increasing NPA's, the financial health of the institutions take a negative track, and this weakens the country's GDP growth [3]. The countries deficit status (both the fiscal deficit and current account deficit) would have an impact, due to this the inflation rate will not be stable and hence would adversely impact the country's currency. This leads to economic slowdown where the unemployment rate would increase and the country's economy would collapse. So, for ensuring healthy economy, the increasing NPA should be curbed. An NPA tracker application is a solution to check this menace.

1.3 NPA TRACKER MOBILE BANKING APPLICATION AND ITS NEED
1.3.1 NPA TRACKER MOBILE BANKING APPLICATION

Despite the many inherent benefits of traditional websites, mobile apps and mobile websites are becoming very popular. This is because majority of the population is using mobile apps in daily life. With this advantage, financial institutions are also using latest technology in the system to serve the better to their customers. Even banks are using apps to its operations to manage their day today business operations to its convenience and accessibility. NPA Mobile Tracker application is used to track the loans and advances released by the financial institution through its various digital channels. The NPA

Mobile Tracker application will be developed on Android, IOS and Windows based mobiles which wil be used by the NPA recovery officers. Application will be linked to present CBS (Core Banking Solution) system. The application will be secured with user name and password. Application will be having GPS tracking facility, reports facility and status monitoring facility. NPA status can be update through the app, which will be automatically will be available at the CBS system of the financial institution, giving the NPA details as on date. This app will help the management to manage their NPA's and track the customers online and at the premises of the customers. If any customer is ready to pay small instalment amounts, the concerned recovery officer can collect the amount and immediately update through the app. This facility will be useful and easy process to recover NPA's and shows the performance of the recovery officers about recovery process of NPA's.

1.3.2 NEED FOR NPA TRACKER APPLICATION
1. Create a Direct Management Channel:
NPA App serves many functions like: The application can provide general information about the borrowers, their corporate information, advance details, search features, user accounts, messengers, news feeds, and much more. Through push notifications you're getting even closer to a direct interaction, and can easily remind the recovery officers about NPA accounts and services whenever it makes sense.

2. Provide Value to Management:
On-hand information can be procured, digitalizing that loyalty program instead of sticking to the old point-collection card, it would make it possible to collect status via mobile app.

3. Improves vigilance in Recovery Process:
The recovery officers need a way to reach NPA Customers. Having a messaging (or help desk) feature within bank app can really make a difference in the way financial institution management and staff communicate with each other about NPA accounts.

1.4 ADVANTAGES OF NPA TRACKER MOBILE APPLICATION

Despite many inherent benefits of traditional websites, mobile apps and mobile websites are becoming very popular. This is because majority of the consumers now basically browse the Internet using their mobile phones or tablets. There are specific scenarios where mobile will be your best choice:

Interactivity
For interactive application, a mobile app is almost always going to be your best choice, at least for the foreseeable future to recover the NPA's.

Complex Calculations or Reporting
In this application date can be upload and allow you to manipulate it with complex calculations, charts or reports, a mobile app will help you do that very effectively.

Native Functionality or Processing Required
NPA Tracker will have certain mobile-specific functions such as click to call, SMS and GPS system to process and track NPA recovering process. This app will surely do that much more effectively.

Internet Connection is Not Always Required
If you need to provide offline access to content or perform functions without a network/wireless connection then a mobile app will surely deliver. NPA Mobile apps have one clear advantage in general, a well-made app can provide a far better user experience than even the best websites are capable of right now.

2. FEATURES OF NPA TRACKER MOBILE APPLICATION

Account Details: Based upon the branches the recovery officer is assigned, the list of NPA Account Numbers of those branches will be displayed. Then on selecting particular Account number, the Account details will be visible like Account Number, Loan Amount, NPA Amount and so on, of that particular NPA account.

Borrower Details: Here details like Name of that person, Address, Phone Number and so on, of particular NPA person is available.

Remarks: It lists the payment history particular of the NPA account like he/she paid the loan amount or pending.

TAS (Task): Here the task will be assigned to the sub-ordinate officer by the higher authority /management of the financial institution. The assigned officer needs to update the status of particular NPA Account. This gets automatically reflected in the CBS of the financial institution.

Recovery: Collection and Recovery History are available with different types of Payment modes and history of payments. After submitting the amount it will automatically updated in the CBS of the financial institution.

Legal: SARFEASI, Suit File and Auction details will be available. On submission, the details will automatically get updated in the CBS of the financial institution.

Image: Image uploading facility of the documents of NPA Account person or selecting an capturing the image of the borrowers location can be done, which will be automatically updated in the CBS of the financial institution.

Reports: Graph, PDF, Excel reports on payments of loans and net NPA of particular branch will be available. This is of much use to the management of the financial institution, as this helps them to tack the performances.

Location: This will help in capturing the latitude and longitude of the borrower's location, through GPS. This shall keep the lender informed on the borrower location updates. The same shall be updated in the CBS of the financial institution.

Email: This enables sending mail to the particular NPA Account person regarding to the loan amount by the NPA Tracker mail id.

3. NPA TRACKER APPLICATION ARCHITECTURE, TECHNICAL SPECIFICATIONS

3.1 ARCHITECTURE OF NPA TRACKER MOBILE APPLICATION

The most important undertaking is to ensure non-repudiated and integrated access to the NPA tracker application and also restricting the access to sensitive data from external factors like MIM (Man in the Middle attack), data sniffing and so on. This is to be ensured even before the login phase. Recovery officers will be required to register into the application. This process involves the following:

1.   **Device Binding:** Each mobile phone has a SIM slot, which has an IMEI number (Device ID) assigned to it. In device binding, it is ensured that the SIM (ICC ID) is binded with the IMEI number (Device ID) of the slot. This would act as a layer of security.

2.   **SMS Verification:** This would force the user to send an SMS from his mobile number. This process would check, if the SMS was sent from the user's (recovery officer) registered mobile number (or) not.

3.   **Credential Authentication:** After the device binding and SMS verification process, the credentials of the user are verified. This involves, a few private details being checked like DOB etc. On successful authentication, the user would set his login passcode.

On completion of the registration process, the next important phase is the login phase. Fig. 1 shows the login flow involved in the tracker application. This involves the following phases:
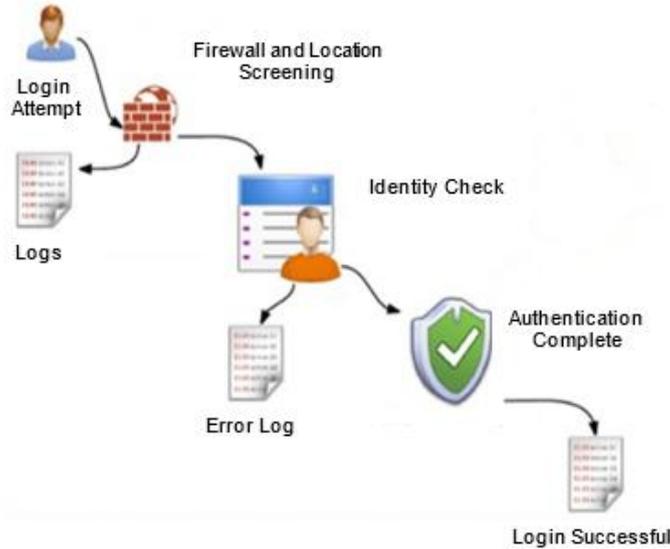

Figure.1.Login Flow to the NPA tracker application

- **Login Attempt:**
When the recovery officer tries to login, the device binding data captured during the registration process is used as a checker. Later, security firewalls as prescribed and followed by the financial institution comes into picture. In case of deviation from the protocols mentioned, the data logs in the login process get captured and access to the application is denied.

- **Identity Check:** This involves, the identity of the user is verified. The private details taken from the user during the registration process are used to authenticate the user. In case, of wrong credentials, error log gets generated. Three successive un-successful attempts would lock access to the binded device (i.e., combination of DEVICE ID and ICC ID).
On successful login, the actual data flow and control flow comes into picture. The architecture of the access is depicted in Fig.2 below.
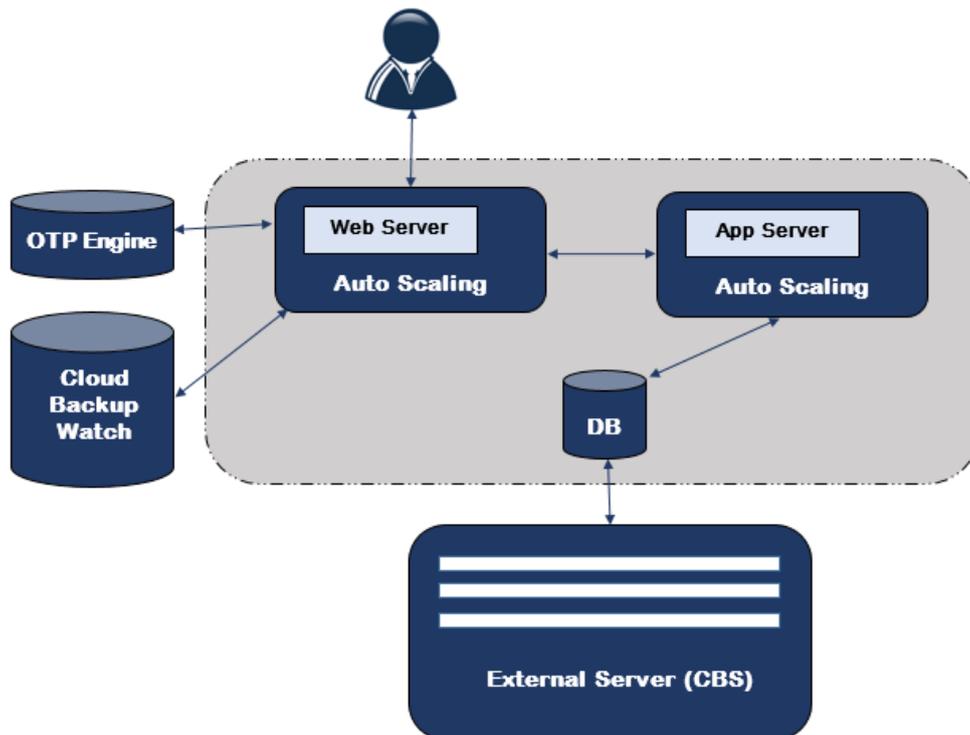

Figure.2. Architecture of NPA Tracker mobile application

The communication flow from the mobile application is as below:

Web Server: Communication from external sources is pointed to the web server. The web server is configured in such a way that, it auto scales based on the load from external sources. The configuration process involves mapping the communication received from external sources to the application server.

Application Server: The request messages from external sources are pushed to the application server by the web server. The application server contains SSL integrated security files which filters the requests from the web server. In case, the security requirements are met, the requests are blocked, in case the requests are for data fetch, update etc., it is forwarded to the DB. A few requests like OTP requests etc., requires the application server to forward to the web server after filtering the request dataset through SSL. Database: It writes the request received from the application server and pushes it to the CBS, only after receiving response from the CBS, it updates the response to the application server.

3.2 TECHINCAL SPECIFICATIONS OF THE SERVERS

The server configuration, security features are the backbone of the application, as this determines the performance, robustness and data integrity of the application. A few technical specifications of the application are:

WEB SERVER	Apache tomcat 2.4.25
APPLICATION SERVER	JBOSS
DATA BASE	SQL SERVER

The configuration files, in apache 2.4.25 are altered to point to the application server and the SSL integrated security files as per the standard guidelines followed by the institution and are dumped into the application server. There are four config files in the web server, which require to be altered, which are: httpd.conf file (This contains the https addresses of the application servers and the required port through which the connection needs to be established). mod_jk.conf file (This constitute the data mounting essentials). workers. property and uriworkermap.pro files

4. CONCLUSION

With the growing need to curb the bad loan problem, NPA tracker stands out as a solution. Its features like Real time Request, Response and Approval help in real time loan tracking, GPS mapping helps in position tracking, administrator console for routine maintenance activities improves the performance tracking, and image upload facility helps in location tracking. Unlike the traditional ways of bad loan recovery, this helps in better and efficient monitoring the borrower's records. With the growing demands for industrialization, the loan requirements also tend to increase. In such a need NPA tracker mobile application would be of immense use. Also, there could be a lot of scope in the future, to include enhanced features like real time loan account opening, sovereign gold bond issuance and so on, this could be contended with incorporating additional features into the NPA tracker application.

5. REFERENCES:

[1]. Gourav Vallabh et al., "Methodology to predict NPA in Indian Banking System", Theoritical Economics Letters 2016, pp. 827-836.

[2]. Sulagna Das et al., "A Study on NPA of Public Sector Banks in India", IOSR Journal of Business and Management, Volume 16, Issue 11, Ver. 1 (Nov 2014), pp. 75-83.

[3]. Siraj. K.K et al., "A Study on the Mediating Effect of GDP on Relationship between Gross Advances and NPA of Indian SCBS", ISSN 2222-1697 (Paper) ISSN 2222-2847 (Online) Vol.4, No.1, 2013, pp. 55-64.

[4]. Ashly Lynn Joseph et al., "A Study on Analyzing the Trend of NPA Leel in Private Sector Banks and Public Sector Banks", International Journal of Scientific and Research Publications, Volume 4, Issue 7, July 2014, ISSN 2250-3153.

[5]. https://www.clearias.com/non-performing-assets-npa/