crediwatch
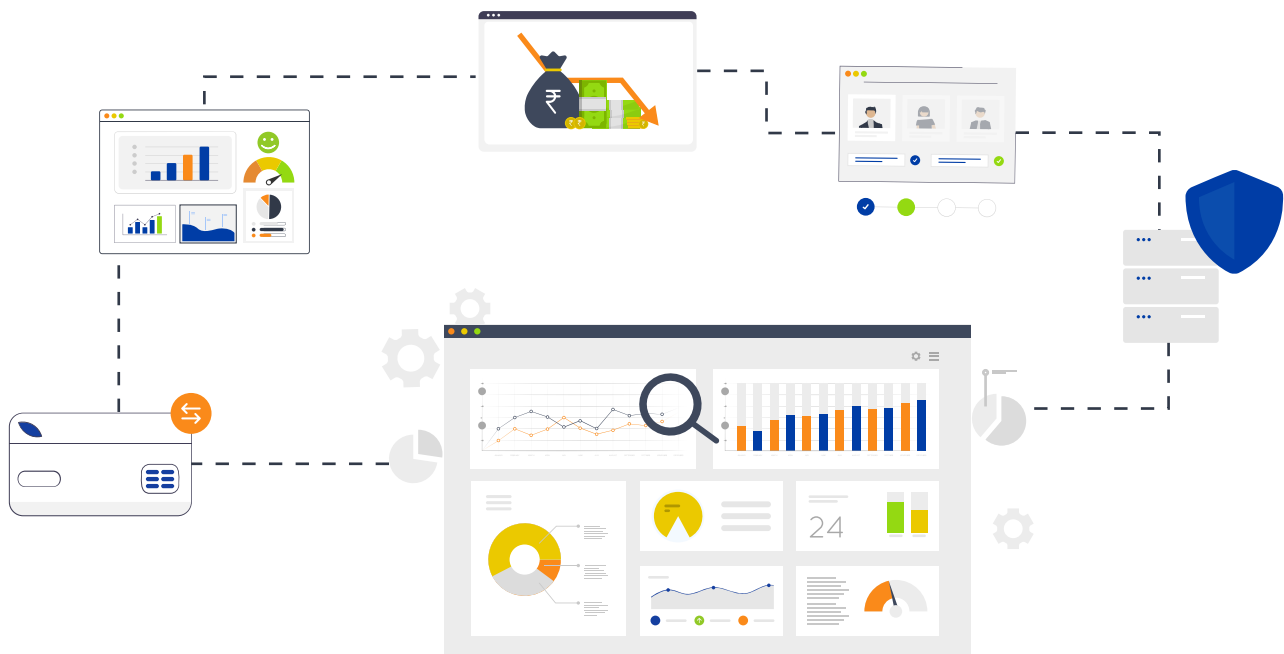
EARLY WARNING SYSTEM

Mitigate losses with real-time monitoring and risk classification.

A Case Study on Measuring, Monitoring & Mitigating Credit Risk

Learn how to leverage **200+ Early Warning Signals** and a Machine Learning driven Risk Classification model to redesign your credit risk monitoring. The Crediwatch platform seamlessly integrates public insights with account conduct information to build a 360 degree monitoring dashboard of a borrower, along with a Case Management Module to manage the downstream workflow for signals and a Reporting Module with portfolio level risk migration and assessment capabilities.

CANARIES IN A COAL MINE

Canaries in a coal mine - the earliest early warning signals. Used at the start of the industrial revolution by coal miners working in treacherous conditions, trying to stay alive hundreds of feet below the earth's surface. Canaries are small birds that are originally from the Macaronesian Islands. You may have commonly seen them as pets. However, during the 19th and 20th Centuries, these birds were used by coal miners to detect the presence of carbon monoxide gases in the mines.

The earliest known Early Warning System.

Photo credit: blog.une.edu.au

Mining foreman R. Thornburg shows a small cage with a canary used for testing carbon monoxide gas in 1928.(George McCaa, U.S. Bureau of Mines)

Continued exposure to carbon monoxide is fatal and the death of these birds would serve as the first signal of danger to miners. Fortunately, in the 21st Century, generating early warning signals for a business is no longer a matter of life and death.

THE INDIAN NPA STORY

The issue of Non Performing Assets has been a subject of discussion and scrutiny for several years. In the Reserve Bank of India's Bi-Annual

Financial Stability Report (FSR) dated January 2021, NPAs may rise to as high as 14.8% in one year in case of a severe stress scenario, from 7.5% as of September 2020 (baseline scenario is 13.5%). This is despite Indian banks working out a restructuring package for borrowers impacted by the Covid-19 pandemic.
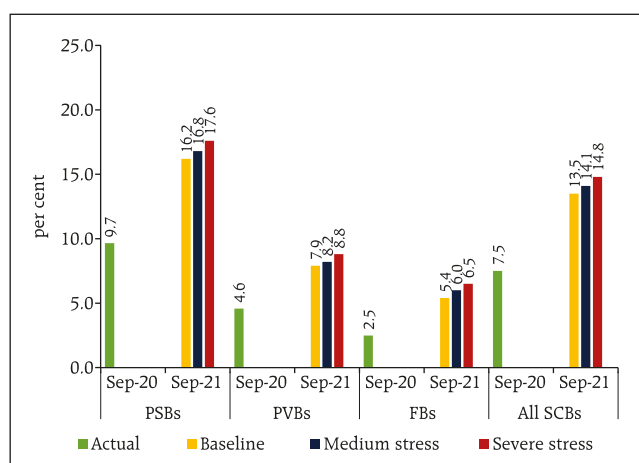
Note: The system level GNPAs are projected using three complementary econometric models- multivariate regression, vector autoregression (VAR) and quantile regression; and averaging the resulting GNPA ratios. For bank-group level projections, average of multivariate regression and VAR results are used.
Source: RBI Supervisory Returns and Staff Calculations.

While bank credit growth has remained subdued and may remain so in select segments, the Central Bank continues to emphasize prudent risk monitoring practices to ensure control over non-performing assets.

GUIDELINES FOR EARLY WARNING SIGNALS

In May 2015, the Reserve Bank of India released a framework for dealing with loan frauds (RBI/2014-15/590). This framework introduced the concept of Red Flagged Accounts (RFA) for fraud risk control.

- Growing formalization of data sets related to Indian businesses has made it possible to capture disparate structured and unstructured datasets for tracking business performance and compliance behaviour. (e.g. GST)

- Several unconventional data sources which were only available only in physical format were made public and available by regulatory and quasi-regulatory agencies in India, either in a digital format or via APIs for easy consumption. (e.g. Legal cases, EPFO)

- The use of Data Science, Artificial Intelligence and Machine Learning techniques in banking and credit underwriting / monitoring started gaining acceptance as more professionals entered the financial services industry from this domain.

PROBLEM STATEMENT

The IL&FS crisis in 2018 sent a severe jolt to the Indian NBFCs and lending institutions. While the SFIO (Serious Fraud and Investigations Office) investigated elements of audit related fraud, the Central Bank revived conversations with both public and private sector banks to start implementing prudent measures for Fraud Risk Management, especially the Early Warning System. Till date, Indian lending institutions have been monitoring their customers through Credit Monitoring Groups, who rely on manual processes and in-person meetings on a monthly or quarterly basis to evaluate the borrowers. Given the large number of commercial businesses in a lender's portfolio, this means that the process is not real-time and non-scalable, leading to delay in fraud detection.

In addition, while some lenders had centralized credit monitoring teams, the majority of the others relied on branch level credit managers to monitor the customers, leading to gaps in risk assessment.

WHAT HAS CHANGED?

Against this backdrop, three key developments in India has made the automation of Risk Monitoring workflow possible.

OPPORTUNITY

Rising NPAs and increasing formalization of public data related to Indian commercial entities has created an opportunity for Fintechs to provide an advanced solution for Risk Monitoring in India. While Indian banks were actively looking to adopt new technologies for automation and generating early warning signals (especially the 45 signals prescribed by the RBI), Crediwatch identified the need to bring a comprehensive Risk Monitoring product to the Indian Lending Ecosystem.

SOLUTION

Crediwatch's intuitive EWS platform seamlessly integrates public insights with account conduct information to build a **360 degree monitoring** dashboard of a borrower. The platform taps into

a library of **200+ signals** that come together in a neat dashboard to constitute the **Early Warning System (EWS)**. This provides lenders with a reimagined credit risk monitoring toolbox. Put simply, EWS will be able to monitor one's portfolio and provide alerts that can help detect default possibilities by the borrower with a **9-12 month lead time.**

Today, lenders have no means to monitor all the signals that can indicate a default risk probability of a customer. An always - ON risk monitoring can go a long way in helping you keep tabs on all the borrowers. In view of the same, Crediwatch provides the following modules for credit monitoring -

A. Public Early Warning System (Public EWS)
　　i)Scorecard with Risk Classification
　　ii)Signal Library
　　iii)Borrower & EWS Dashboard
　　iv)Credit Reports
　　v)Email Alerts

B. Private Early Warning System (Private EWS)
　　i)Integration of lender's private data for
　　　Risk Classification
　　ii)Generation of Alerts based on private
　　　data
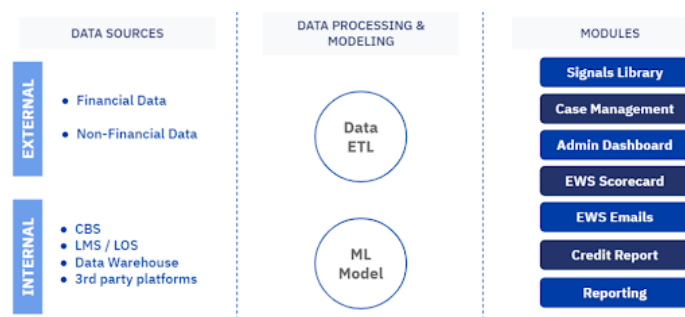**C. Case Management Module (CMM)**

D. Reporting Module

Traditionally, lenders were relying on financial and some basic non-financial information related to borrowers for monitoring purposes. These either came from the borrower himself or through the account conduct data generated in the bank's core banking system (CBS) or loan management system (LMS). There was no single platform which brought together all financial, non-financial and account conduct data under a single system to facilitate monitoring.

The emergence of new data sources also led to the acceptance of alternate data sources for risk monitoring, especially legal cases and EPFO (Crediwatch was the first Fintech to mine the EPFO or the Employee Provident Fund Office database for credit use cases).

While signal generation is helpful, one key learning in early deployments was that there was no efficient workflow to manage the downstream impact of these signals throughout the bank. This led to the requirement for a case management system, with a configurable escalation matrix for case closure and internal reporting. In addition, senior stakeholders at the bank/NBFC required a Reporting tool to quickly evaluate the portfolio performance and plan actions for risk mitigation based on portfolio migration across risk buckets.

HOW DOES CREDIWATCH EWS WORK?

Along with External or Public Data, the EWS system has ready-to-deploy schemas to ingest the internal or private data from lenders. ML models are ready, backtested and deployed for public data based risk classification scorecards. For private data, Crediwatch leverages its in-house MLDS (Machine Learning & Data Science) team to build ML models specific to the data provided by the lender.

All the processed data and models are deployed to deliver the following modules -

・ **Signal Library** - 200+ signals driven by external and internal data, delivered on web-based Alerts Dashboard and Emails

・ **Case Management** - Configurable module to manage cases generated by the signals, with manual case creation, case escalation and auto-assignment features

・ **Admin Dashboard** - Single dashboard to manage customer list, portfolios, signal library and all case configurations

・ **EWS Scorecard** - ML driven scorecard for public and private data parameters, classifying each customer/borrower as HIGH, MEDIUM or LOW Risk.

- **EWS Emails** - Biweekly Emails highlighting Risk migration metrics for each portfolio

- **Credit Report** - Standard Credit Report with all public data on each customer

- **Reporting** - AI based data analytics and reporting module for internal, auditor and regulator reporting requirements

BENEFITS

The Crediwatch EWS platform is deployed leading public and private sector banks, as well as Tier 1 and 2 NBFCs. As of June 2021, across all our customers, the platform is monitoring c. **20,000 businesses**, including both MCA registered and non-MCA registered (proprietorships and partnerships), totaling nearly **Rs 1 million crores** in loans. Our customers have shared some of the following benefits they have derived from our EWS system -

- Early identification of Red Flagged Accounts (RFA) through the predictive models deployed for early prediction of distress through automated Risk Classification

- Integrated approach to Risk Monitoring by monitoring publicly available data along with account conduct data, has helped in identifying new trends in borrower performance. (e.g. Out-of-norm changes in directors and auditors along with delayed filing in GST and rising OD utilization levels have indicated build of stress in the borrower)

- For banks, adherence to RBI's guidelines on EWS and compliance to the Fraud Risk framework laid out in 2015 and reiterated in 2016 and 2017. Crediwatch has deployed all 45 RBI signals for multiple banks helping adhere to the guidelines.

- A 200+ signal library available off-the-shelf, along with the ability to create custom signals, has allowed lenders to benefit from a large set of alerts on their customers. Our signal library is configurable for different types of portfolios and allows administrators to manage at their end.

- Crediwatch's unique approach to managing downstream workflow through the Case Management Module has allowed multiple stakeholders to action upon the signals for quick turnaround and action upon certain accounts. (Some customers have shared that they have been able to exit certain MSME accounts during Covid-19 pandemic based on publicly available scores and signals).

- One of our customers is the first Indian bank to deploy a Machine Learning driven model for Risk Classification - setting an industry standard for EWS deployments. This has been well appreciated by the regulator.

The Private Data installation of Crediwatch EWS is compliant with all RBI guidelines on Information Security and in line with the best practices in data security and information management. The virtualized cloud based deployment (dedicated and deployed within the bank's environment) has helped banks achieve a scalable solution - some of them started with monitoring c.1000 borrowers and increased the volume to 10,000+ within months with no adverse impact on the platform. Even post deployment, the fact that the EWS system is pre-integrated with publicly available data sources and there is no dependency on 3rd party vendors for inputs (Crediwatch manages all data sources and models itself), technical management of the application has been smooth with no significant downtime.
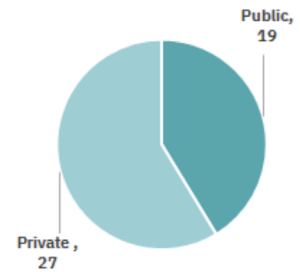
ABOUT EWS SIGNAL LIBRARY

The Crediwatch Signal Library consists of 220+ signals driven by public, private and consent data. All the 45 RBI signals are covered in the library.
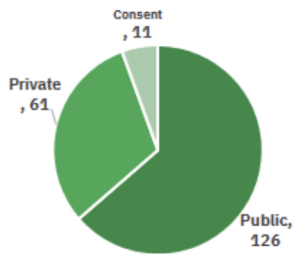
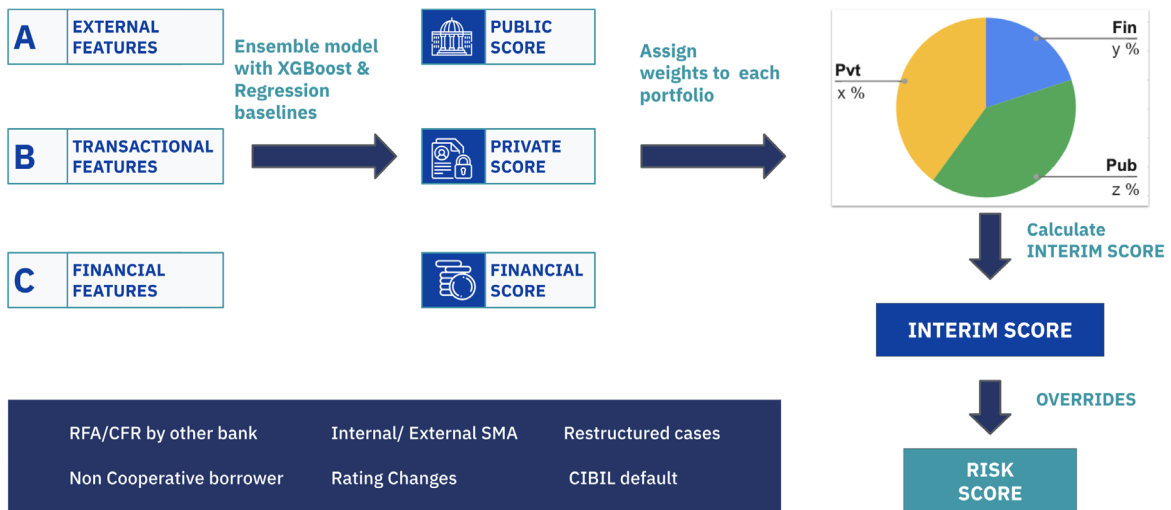126 out of the 198 signals in the library are triggered by Public data.
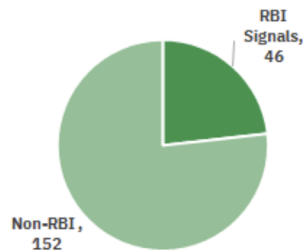
All 46 RBI EWS signals are covered in the library.

19 out of the 46 RBI EWS Signals are triggered by Public data.

ABOUT ML-BASED RISK MODELING

A	EXTERNAL FEATURES
B	TRANSACTIONAL FEATURES
C	FINANCIAL FEATURES

Ensemble model with XGBoost & Regression baselines

PUBLIC SCORE
PRIVATE SCORE
FINANCIAL SCORE

Assign weights to each portfolio

Fin y %
Pvt x %
Pub z %

Calculate INTERIM SCORE

INTERIM SCORE

OVERRIDES

RISK SCORE

| RFA/CFR by other bank | Internal/ External SMA | Restructured cases |
| Non Cooperative borrower | Rating Changes | CIBIL default |

ABOUT CREDIWATCH

Crediwatch has built the easiest way to connect the world of business and financial data and convert them into analytics powered insights for quick and effective decisioning. Businesses and Lenders can integrate their private datasets into Crediwatch's platform to analyze the companies that matter most to them. Businesses can share these insights with potential lenders and partners.

GET IN TOUCH

Crediwatch Information Analytics Private Limited

Corporate Headquarters:
No.1, 28th B Cross road, 4th Block,
Jayanagar, Bangalore — 560 011
Office: +91 (80) 4710 4701

Mumbai Office: +91 (22) 4897 7898

Email us:
General: info@crediwatch.com
Business queries: sales@crediwatch.com
Product: support@crediwatch.com