Validata **Sense.ai**™

intelligent incident management for DevOps and testing teams

Proven AI experience in defect classification

Introduction

'Test the right thing' has been our mantra for years, as it can transform client perspective from a defect detection experience to defect prevention and prediction. Preventing defects from occurring requires a structured disciplined methodology; including gathering and analysing data and conducting root cause analysis, determining and implementing the corrective actions and sharing the lessons learned between projects to avoid future defects.

The impact of fixing defects as early as possible can make a massive difference to your project costs. The cost of a defect found during the design phase is $70, whereas it increases to $1,050 if found in QA phase and $7,000 when found in production. The cost of doing nothing can be astronomical and damaging to your digital performance.

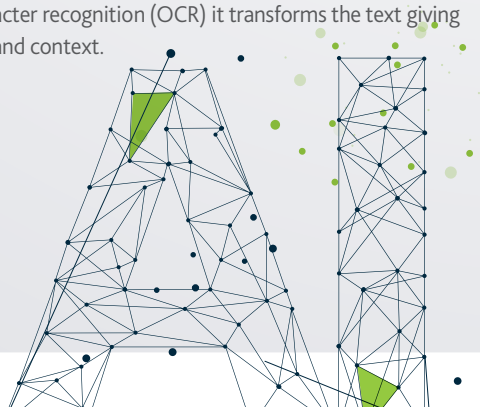
What is Validata Sense.ai for intelligent incident management?

It is a cognitive solution that is able to provide real-time classification on the root cause of the defects based on existing defect patterns and trends. In doing so, it results in fast routing of the defect to the right person or team for fixing.

An AI engine that thinks and learns

Validata Sense.ai has fully automated the defect prediction and analysis process, leveraging machine learning algorithms and AI techniques to predict defects in real-time and determine the 'next best action'. It can truly causate and automatically drive to the precise root cause of the issues, enabling DevOps to achieve lower development costs and a reduced project impact.
It is able to connect to your production and defect data, looks for common failure patterns and enables AI-generated recommendations and predictions, enhancing the ability of QA, DevOps, Project Managers and other IT specialists to manage their projects better and faster by getting contextual insights of the defect metrics.

The self-optimising AI engine continuously learns from the defect reports including text pre-processing, features extraction and selection and classifier building, and through natural language processing (NLP) and optical character recognition (OCR) it transforms the text giving more relevance and context.



What problem does it solve?

Quite often, identified defects are assigned to the wrong person or team based on incorrect assumptions on their root cause.
This is because the person that assigns the defect, use his own insights, experience and sometimes intuition. A wrong defect assignment can delay its fixing by hours or even days.
Unlike human intuitions that are not quantifiable, a machine learning algorithm can automatically analyse and identify the patterns of defects to find the root cause and enable the assignment to the correct team, reducing defect turnaround time and improving productivity.

Predicting defects with speed, accuracy and intelligence

Consider the case of a tester working at a global bank, who is raising and assigning defects of their core banking product to developers, BAs or environment managers based on his personal interpretation and intuition. After spending 2 days to analyse the nature of the defect, the developer suggests that the issue is environment-related and reassigns the defect to the environment manager who then spends another couple of hours to fix the issue. This is a very common situation and if the tester was able to know the exact root cause of the defect from the beginning, the issue would have been fixed within 2 hours rather than 2 or 3 days. Validata Sense.ai is able to automatically identify the root cause of the defects and provide the right justifications to ensure confidence in the recommendation.

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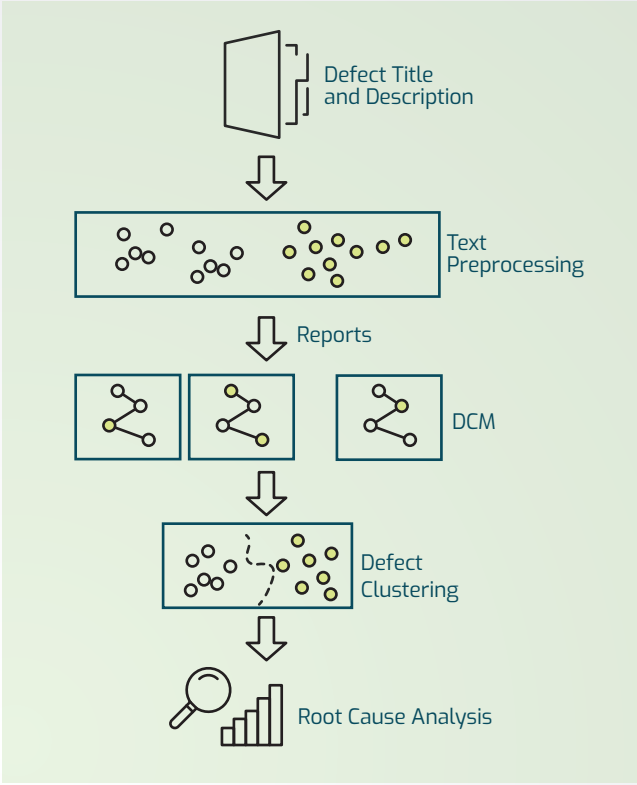
Defect Classification and Defect Prediction models

To generate defect analytics the platform uses two models; the Defect Classification model (DCM) and the Defect Prediction Model (DPM).

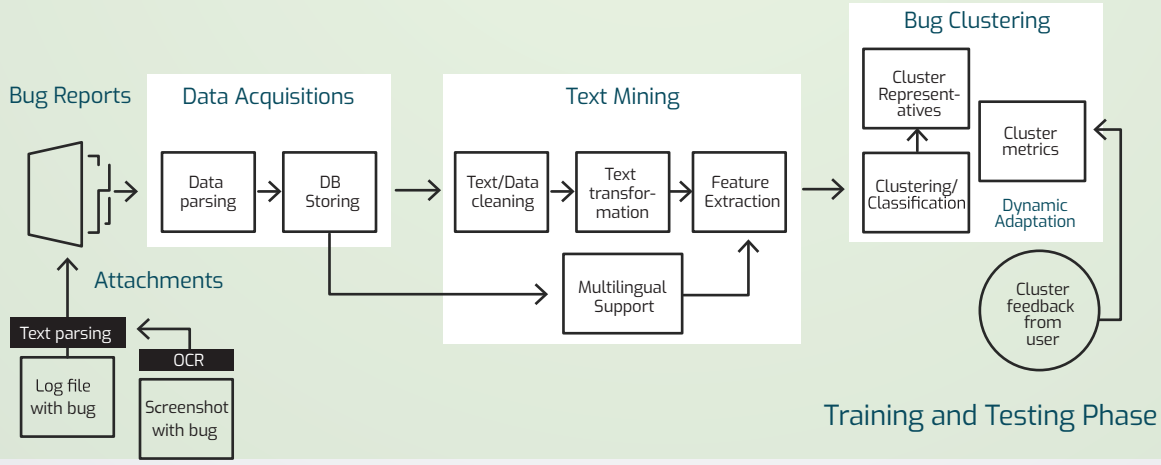
DCM is built upon historical multi-dimensional data (i.e. defect reporting entries) and applies a hierarchical approach, in order to analyse each incoming defect report in real-time and reveal characteristics of a higher abstraction level, as well as its multi-level the dependencies. It acts as a Decision Support System generating recommendations. To this end, state-of-the art algorithms (e.g. LDA, TF-IDF, probabilistic models, etc.) facilitating efficient text & data mining, incorporating advanced Natural Language Processing and human data understanding. This way, each new entry is precisely perceived updated & completed, if needed, while accurately categorized/classified following a hierarchical approach within the automatically formulated keywords taxonomy and Feature extraction.

DPM role is to automatically generate efficient & realistic exploitation strategies regarding the defect resolution roadmap, so as to minimize the time-to-fix and the effort requested, facilitating thus, the time-to-market. As of that, the DPM receives as input an abstract, reduced in dimensionality, but holistic & aggregated representation of the multi-dimensional defect reports, as clustered & categorized from previous model of the system's pipeline, that summarised all numerical & textual properties of defect report. It should be highlighted that the input received contains enriched information including root cause insights about the defects origin, as well as test coverage information, derived by deep data analysis & pattern recognition algorithms. This way, the DPM is capable of combining nominal & ordinal data, in order to prioritize the defect groups to be resolved, serving the feasibility of production forecast while maximizing its effectiveness.



Interpreting prediction results

The outcome from the defects classification should be interpreted to extract the predicted classification.
A sample JSON output would look like this: [{"defectClass": "priority", "severity": 65}, {"defectClass": "data", "description": 16}, {"defectClass": "target date", "root cause": 11}] In this example the probability of a defect being classified under Priority has the highest score.



AI generated recommendations and deep analytics

It can estimate the probability of software defects related to a feature based on historical data, to prioritize what tests to perform (defect analytics). Keeping track of features' usage frequencies gives us a hint to what might be relevant to test, what to automate and even what to build. It identifies and extracts unique workflow patterns that are being revealed within the execution log files. It uses Convolutional Neural Networks (CNN) with a linear regression top layers. The deep learning model is able to understand the hidden dependencies beyond pair-wise entities in a more abstract way.

Key capabilities

- Automatically enriched bugs containing all relevant logs events and test data with metrics you need.
- Predict where issues are most likely to occur and correlate data to quickly identify and resolve them
- Automated Root Cause Analysis
- Continuous feedback to development teams to improve 'time to fix'
- Text processing and re-assembling the defects description with semantic enrichment on the actual wording for accuracy and completeness
- Creates taxonomies more efficiently
- Optimizes release planning and corrects the release policy

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