

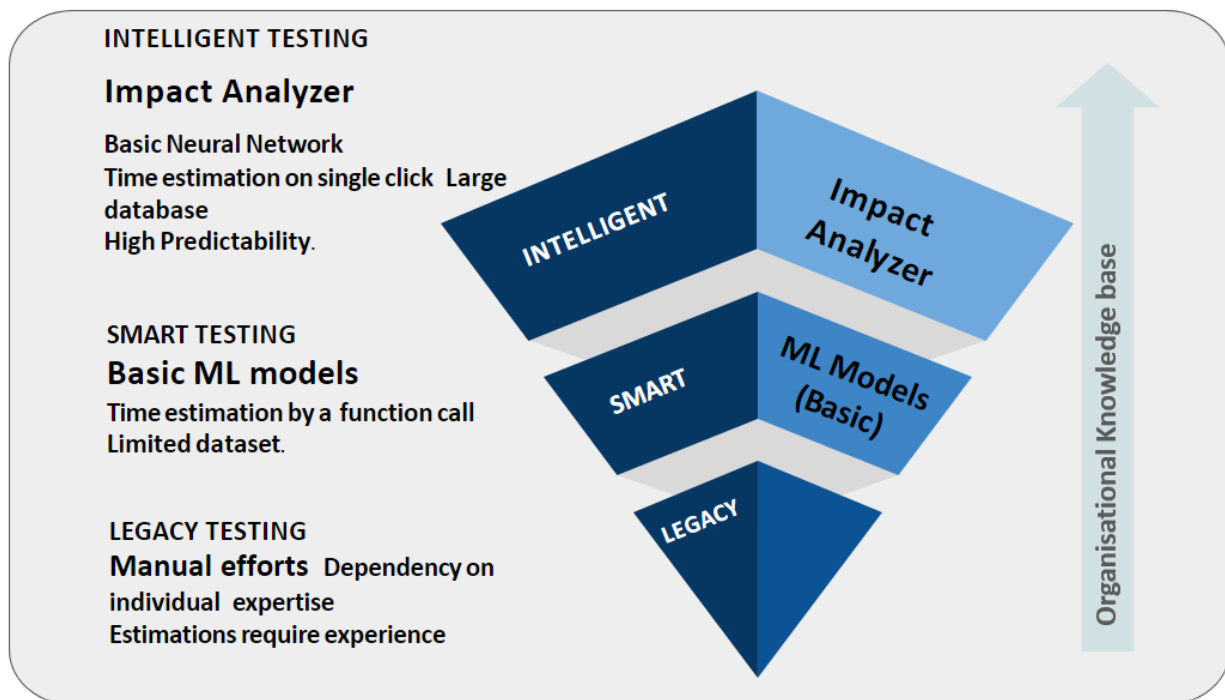


Intelligence is in Learning

We have all been tested over time, and in many cases we failed. Yet not lost... We learnt & evolved. As is said, you either win or learn.

The essence of intelligence is the ability to learn and understand. quickly, and smartness is in how well we apply that acquired learning.

Testing as a Service (TaaS)



We, at Jasmin Infotech, have had many learnings over the past 20 years of delivering testing services to our worldwide customer base. With repeated cycles of testing of multi-generation products & platforms, we were able to define the Smart Test Management Process. This saved significant resources for our customers. Its ability to automate routine processes & remotely run the tests.

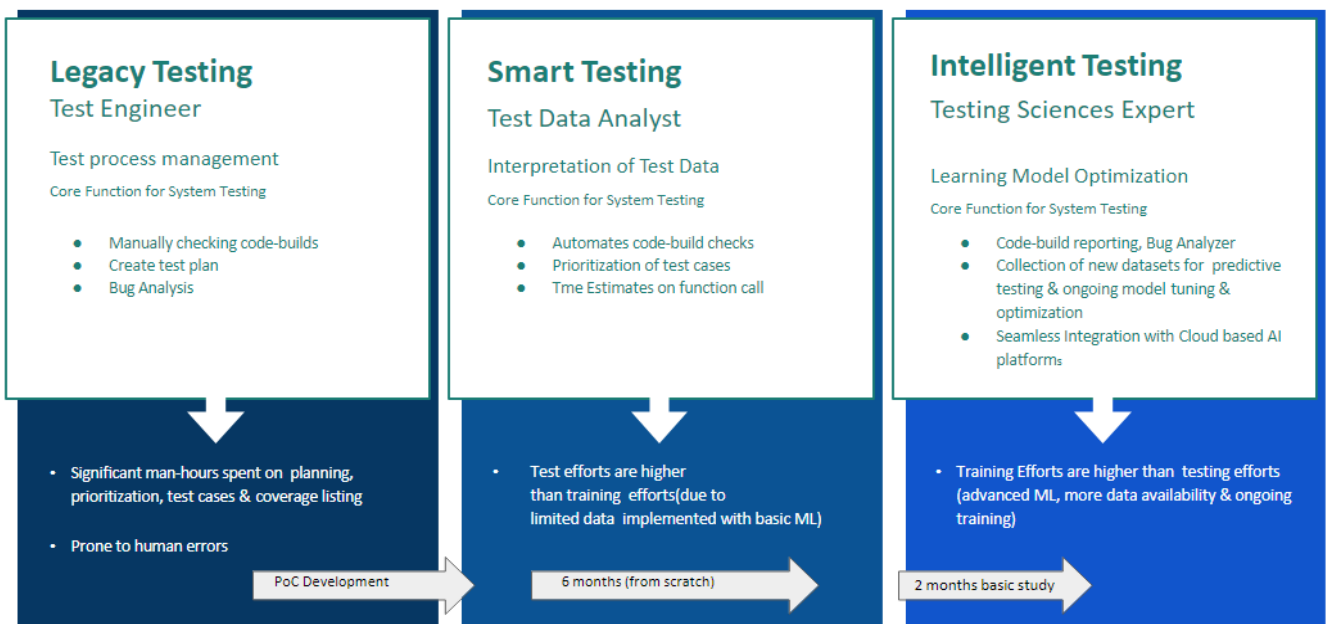
From offshore facilities, Smart Test Management went a long way in optimizing location & manpower costs. Legacy testing methodologies had a clear partitioning



between intelligence & process. The intelligence was human, the system was in the process & the tools. It worked well, as it was methodical & well thought out. But it had limited scalability, constrained by time & resources. As features & performance enhanced, diverse functions integrated, use cases evolved & test-sites multiplied, it became apparent that processes needed catching up. The legacy test management system has evolved into Smart Test Management System and the smart one has now changed into an Intelligent Test Management System (iTMS) which is designed to revolutionize the way teams approach testing, Intelligent Test Management System leverages a diverse array of advanced machine learning algorithms to enhance various aspects of the testing processes. The streamline process focuses on the cutting-edge features to enhance efficiency across your testing lifecycle.

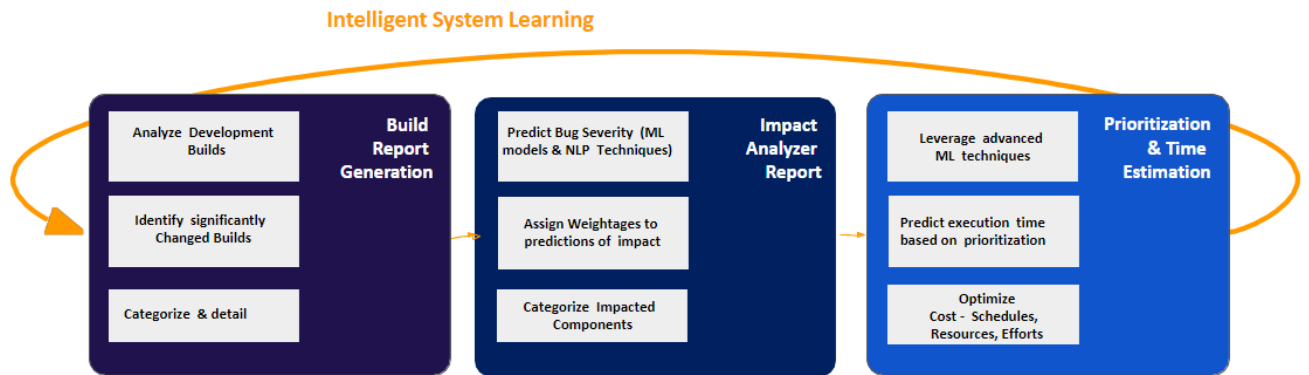
Legacy Test Management System vs Smart Test Management System vs intelligent Test Management System

Compared to the previously created Smart Test Management System, Intelligent Test Management System has improved a lot. A set of new features has been implemented in this Intelligent Test Management System and the modelling part has become more optimized.





Workflow of Intelligent Test Management System:



The intelligent Test Management System starts with the Build Report Generation, this is used to generate detailed insights of the builds and their respective changes, categorize them, visualize them, and identify the build with significant changes. The next stage comes with Impact Analyzer, which analyzes the testing dataset, predicts the impact level and identifies the most impact components. The final stage is the test planning - here the test cases are prioritized, and time & effort required to execute the respective testcases are calculated has been predicted from the system.



What models are chosen and why?

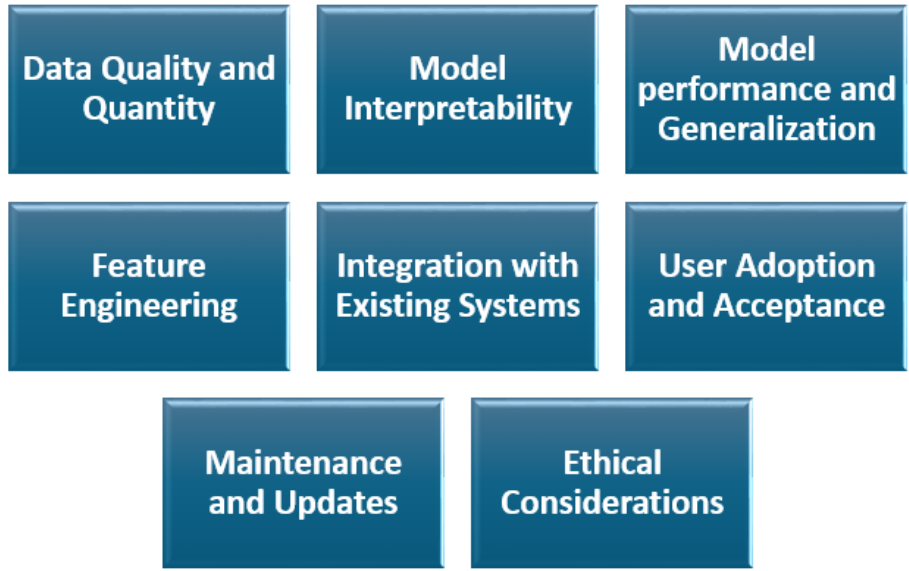
	JUSTIFICATION	RELEVANCE	NON-RELEVANCE
NLP	Preprocess testing data, making it suitable for machine learning models.	Enhances feature extraction from testing dataset, improving the performance of classifiers.	May not be effective if the testing data lacks meaningful patterns or if the preprocessing steps are not appropriate for the specific task.
RANDOM FOREST	Handles high-dimensional data like TF-IDF vectors, capturing complex relationships in testing data through multiple decision trees.	Effective in testing dataset due to its capability to handle non-linear relationships between features and the target variable.	Lacks interpretability.
SVM	Classification tasks with TF-IDF vectors as it can find an optimal hyperplane to separate classes on the testing dataset.	SVM with linear kernel is effective in handling high-dimensional data and finding clear boundaries between classes.	SVM's training time complexity can be a limitation, particularly with very large datasets.
VOTING	Combines predictions from multiple base classifiers to improve overall performance and robustness.	Leverages the strengths of individual classifiers, resulting in better generalization and handling of diverse data patterns.	May not be suitable for highly imbalanced datasets or cases where individual classifiers perform underfitting.
LOGISTIC REGRESSION	Simplicity, interpretability, and effectiveness in handling ordinal classification, where the target variable has the priorities	Provides interpretable coefficients, making it suitable for understanding the impact of each feature on the priorities of the testing dataset.	Might not fully capture the complex relationships in testing data with non-linear patterns.
MLP REGRESSION	Capability to learn complex non-linear relationships in data, making it suitable for predicting time based on the given testcase data.	Effectively captures the underlying structure in the test cases and predicts continuous output values, such as time, based on the learned features.	Performance might degrade if the testcase data is noisy or if the network architecture is not appropriately tuned for the task, leading to overfitting or underfitting.

Among many Supervised Learning models, these models are chosen for their ability to handle the complex nature of the data, offer a balance between performance and interpretability, and provide robust predictions across various scenarios. Various SL models were experimented on this problem and the above-mentioned models stand better and fit to understand the data

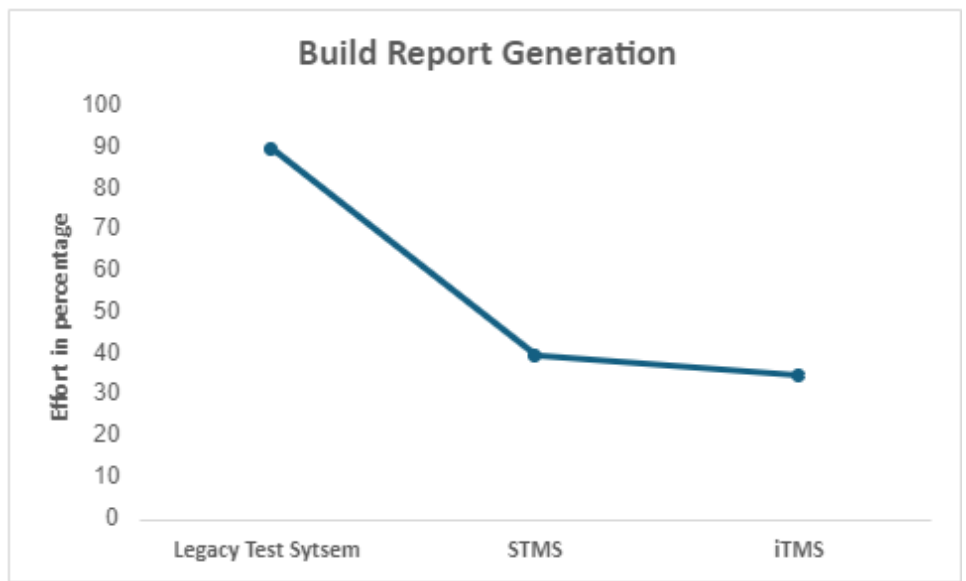


patterns for the given requirement. Also, ensemble methods are used for optimizing the model performance.

Challenges involved in intelligent Test Management System:

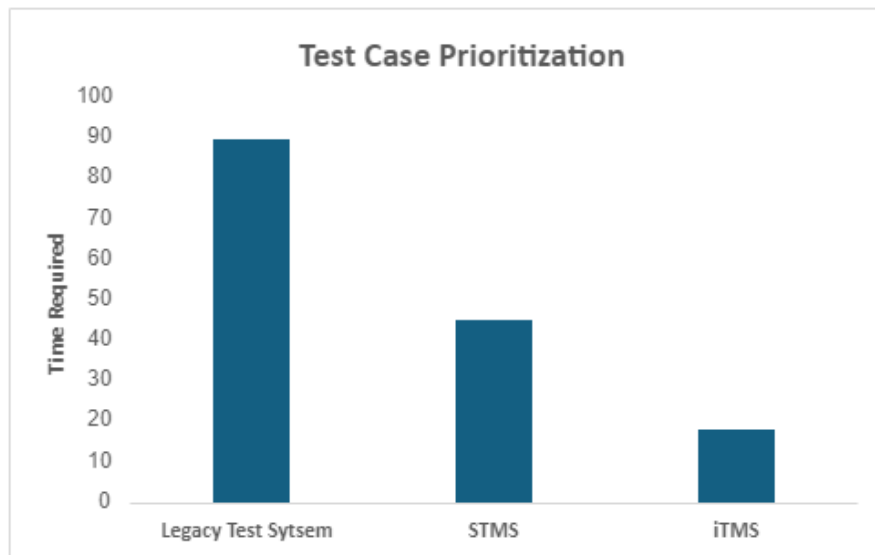


Intelligent Test Management System – Insights:

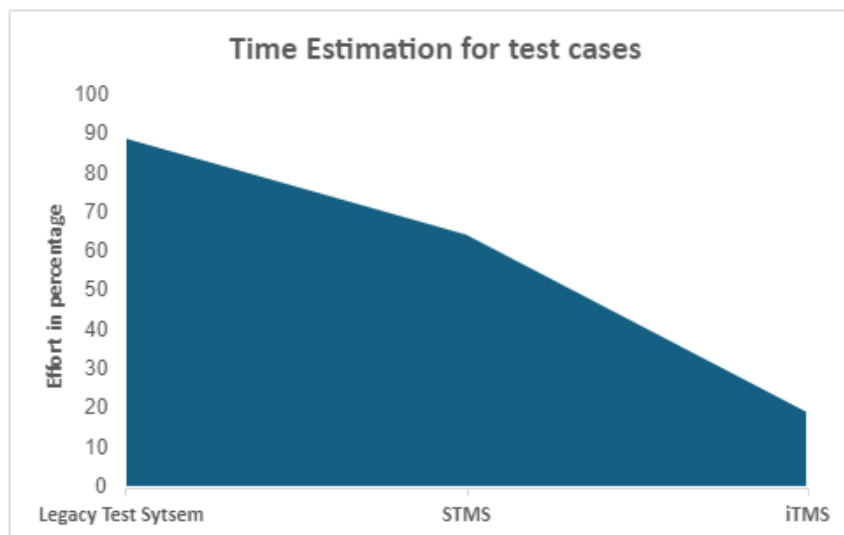




In Legacy Test System, observing the build and selecting a build for the test requires manual effort. However, with Smart Test Management System and Intelligent Management System, an analysis of the build data is performed and generates a comprehensive report with minimal effort.

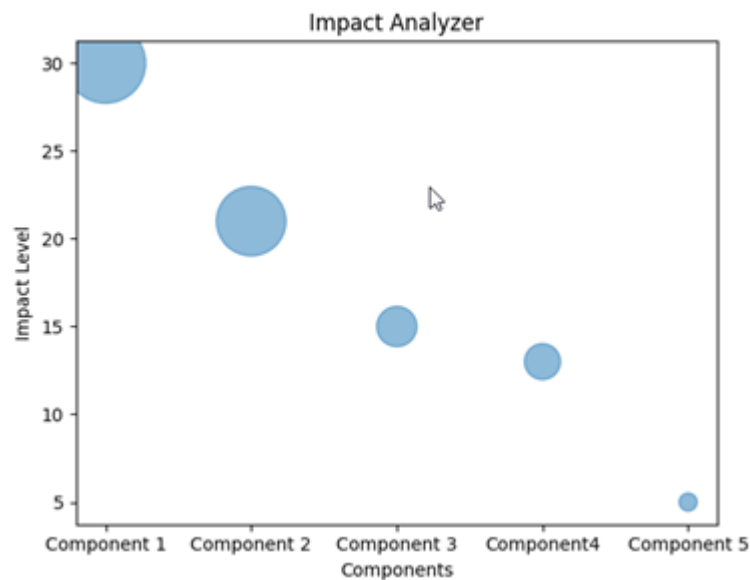


The test plan requires a significant amount of manual effort and time to prioritize the test cases. Our Smart Test Management System involves cutting down the effort required to do it. Then the Intelligent system further makes it simple and gives an optimistic result in a quick period and with a minimal effort.





Effort involves estimating the execution time for the test cases requires a great manual effort and experience in the legacy test system. In Smart Test Management System, the time estimation can be calculated, and the effort is reduced. In Intelligent Test Management System, the time estimation is done by the predictive analysis and the effort is further reduced and gives a better result.



The Impact Analyzer gives the impact level for each component and then it shows the result of the most impacted component from the test data sources.



ABOUT JASMIN EMBEDDED SOFTWARE TESTING TEAM

Jasmin Infotech's embedded software testing team has perfected the skill of testing with over two decades of delivering testing services to plenty of customers around the world.

The categories served range from networked, Audio Video Consumer, Professional, Prosumer products. From standalone units to now cloud delivered products & services.

DISCLAIMER

Earlier generations of products were relatively less complex with limited functionalities, use cases, and technology blocks.

However, as software and system components become more intricate, integrating intelligent test management systems into existing test automation solutions or customer's development lifecycle to improve test coverage and boost test efficiency.

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