APPLICATION OF PREDICTIVE ANALYSIS IN FUNCTIONAL TESTING

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Abstract - *This keynote discusses the use of Predictive Analytics for Software Engineering, and in particular for Manual Testing, by presenting the latest results achieved in these fields leveraging Artificial Intelligence, Search-based and Machine Learning methods, and by giving some directions for future work. With the application of predictive analytics, one can analyze legacy data and make predictions related to resource usage, user behavior, moderating your testing methods, and much more.*

Key Words: Predictive Analysis, Functional Testing, Data Analytics

1. INTRODUCTION:

Predictive Analytics, now a day is a concept which is being widely exercised across business and industries to obtain the required inferences and to take necessary business decisions. Traditional Software Quality Assurance (QA) is revising and picking up new responsibilities. Therefore, there is increasing demand for teams to take an analytics-based approach towards future generation QA. Organizations need to achieve the goals of both quality and speed, which in turn, aggravates the pressure on development teams to understand the types of challenges and failures that might come up**.**

Predictive Analytics assists in pulling out project or business-critical information from data sets by applying machine learning and statistical algorithms. It helps in estimating future aims that are advantageous in identifying failure points. Predictive Analytics acts as a forecast which is very important in QA for making proactive decisions. Predictive Analytics is an important aspect when it comes to Software Testing. It combines various aspects of machine learning, statistics, statistical algorithms, artificial intelligence, modeling, and mining to make the predictions.


Pic 1. Overview of Predictive Analysis

2. PREDICTIVE ANALYSIS PROCESS AND TECHNIQUES:

Predictive analytics demands a high level of expertise in statistical methods and the ability to build predictive data models. As a result, it's typically the domain of data scientists, statisticians and other skilled big data analysts. They're bolstered by data engineers, who help to assemble relevant data and prepare it for analysis, and by software developers and business analysts, who help with data visualization, dashboards, and reports.

Predictive models are being used by Data scientists to look for correlations between different data elements in website clickstream data, healthcare records and other types of data sets. Once the data collection is completed, a statistical model is formulated, trained and modified as needed to generate accurate results. The model is then run against the selected data set to generate predictions. Full data sets are analyzed in some applications, but in others, the data sampling technique is being used by analytics teams to streamline the process. The data modeling is validated or revised since additional information becomes available.
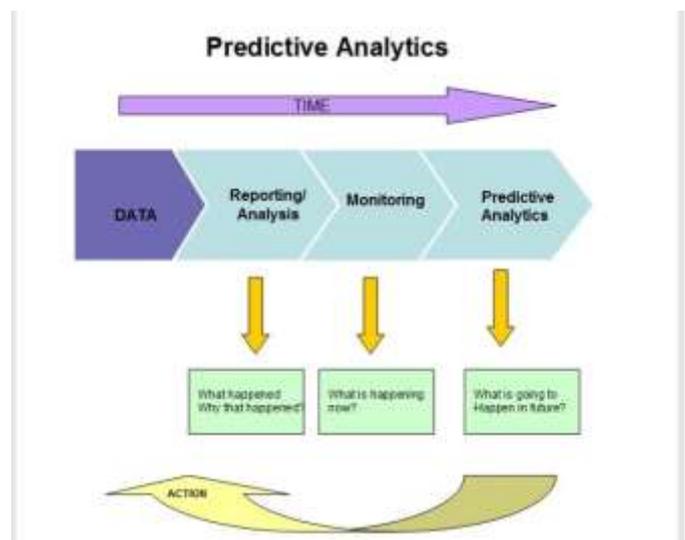
Pic 2: Predictive Analysis Processes

2.1 Predictive Analytics Process

1. Define Project: Outline the project outcomes, deliverables, scoping of the effort, business objectives, find out the data sets which are going to be used.

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2. Data Collection: Data mining for prognosticative analytics prepares data from multiple sources for analysis. This provides a complete view of the customer interactions.

3. Data Analysis: Data Analysis is the process of inspecting, cleaning, transforming, and modeling data with the objective of discovering useful information, arriving at conclusion

4. Statistics: Statistical Analysis enables to validate the assumption, hypothesis and test them with standards using statistical models.

5. Modelling: Prognosticative modelling provides the ability to automatically create accurate predictive models about future. There are also options to choose the best solution with multi model evaluations.

6. Deployment: Predictive Model Deployment provides the option to deploy the analytical results in to the everyday decision-making process to get results, reports and output by automating the decision based on the modeling.

7. Model Monitoring: Models are managed and monitored to review the model performance to ensure that it is providing the results expected.

3. APPLICATION OF PREDICTIVE ANALYSIS:

Amongst various usage of Predictive analysis, Online marketing is one area in which predictive analytics has had a significant business impact. Retailers, marketing services providers and other organizations use predictive analytics tools to identify trends and patterns in the browsing history of a website visitor to personalize advertisements. Retailers also use customer analytics to drive more informed decisions about the types of products the retailer should stock.

Predictive maintenance is also booming as a valuable application for manufacturers looking to monitor a piece of equipment for signs of failure. With the advent of internet of things (IoT), manufacturers are attaching sensors to machinery on the factory floor and to mechatronic products, such as automobiles. Data collected from the sensors are used to forecast when maintenance and repair work should be done in order to avoid break down.

IoT also enables similar predictive analytics to monitor oil and gas pipelines, drilling rigs, windmill farms and various other industrial IoT installations. Another IoT-driven predictive modeling application is localized weather forecasts for farmers based partly on data collected from sensor-equipped weather data stations installed in farm fields.

4. ADVANTAGES OF PREDICTIVE ANALYTICS TO QA

Predictive analytics help organization in following ways:

Formulate strategy in which customer is the king-

Predictive analytics provides results with the support of data, that could be used to offer products/services that are more customer oriented. For example, if a QA person can find a pattern on why the Software getting uninstalled within few minutes of its installation, it would help the firm in redesigning their product which would be more customer focused.

Understands Customers and their emotions-

Predictive Analytics can help a QA person in identifying the high rated functionalities and low rated functionalities. The same could be conveyed to development and support team, and it could contribute to enhancing the high rated functionality with more exclusive features.

Prioritize Your Testing

Collecting, organizing the data could help QA team in the scheduling of testing in production environment. While the usual norm is to schedule it during off-hours, the data could predict an exact time when testing could start, with prioritizing the high priority test scenarios and stopping it when users land in.

Enhance Test efficiency

When comparing efficiency of testing based on product managers inputs and real-time user inputs, the former would surely win. For an example, analyzing build system data could reveal the size of the build, the time to build and dependent variables, that could help in reducing the dependency and making the build more stable.

Saves Time and Money

QA is all about saving budget and time! With increased efficiency, quick defect detection, knowing your customer we at one place can help in enhancing Time-to-market and saving money by reducing cost. Just for example of analyzing the past production defects, one may build a relationship with how and what sort of bugs get introduced? Are they because of new technology or new progression functionality? Analytics may conjointly facilitate in providing an insight to project schedule, were they on time or was there a lag? And what were the possible reasons for the delay? And then building a strategy to avoid them.

5. CONCLUSION:

Data has a lot to tell. One can utilize it to help firm in various ways. When predicted accurately, it can make your work easier in manifolds. All you need to do is to analyze it properly and make the best out of it. Predictive analytics is a vast field when you go deep into it. By utilizing various statistical tools, one can grab a big deal out of it.

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