Framework to Classify Reusable Software Components, Measure and to Enhance the Security in It

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ABSTRACT

Reusable Software components have a major role in different industries. Using reusable software components has an advantage of reducing time and efforts in developing software projects. Frameworks help in designing, developing software applications from two aspects: domain engineer and re-user.

In this thesis, proposing a framework that can classify reusable software components; measure and enhance the security in it through two perspectives: domain engineering presented as built-in and re-user as Ad-hoc. The domain engineering's point of view is shown by using a set of proposed guidelines to build a secure reusable software component; referring that security issues are expanding endlessly and due to the world's rapid evolution; new mechanisms and techniques to prevent or minimize these security issues from affecting the technology expands as well;

Classifying reusable software components by using feature-oriented domain analysis that helps in analyzing security requirements and working through the set of guidelines that help in developing software components that can be added to the repository that is represented as data collection. Data collection has set of free and open-source reusable projects and applications from different online resources, which will be classified by Extracting each reusable software components' classes with its methods; then applying some computations to calculate the number of classes, number of methods in each class, number of class signature and get method's distance.

This information will be presenting by excel sheet and calculate some other computation to measure security authentication of a component entities and ad-hoc security mechanism(s) when needed. Security authentication value can be either 0 or 1; where (0) means no security and (1) means it is a secured software component. This technique is referred as Binary Measuring.

Classification is done by computing similarity degree, and finding the maximum, minimum, and average similarity for each class's method to use it in a metric normalization formula by reducing the effect size of the outcome values that were represented in a metric form; using Levenshtein Distance formula to get the distance between each method.