

بسم الله الرحمن الرحيم



Sudan University of Science and Technology
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**A Technique for Automated Test Scripts
in Model Based Testing using
Model Driven Architecture (MDA)**

تقنية أتمتة الاختبارات النصية في نماذج الإختبارات
باستخدام أداة تسمى المعمارية المبنية على الأ نموذج

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

"سبحانك لا علم لنا إلا ما علمتنا إنك أنت

العليم الحكيم"

البقرة (32)

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Abstract

Testing is performed to evaluate product quality, and for improving it, by identifying defects and problems. Model based testing is the automatic generating of software test procedure, using models. Using a manual testing process is very time consuming. This research proposes a method to automate testing to reduce time. Test script is a term used in automating tests. A test script is an executable script that can run one or more test cases. Writing a test script for each test case for any System under Test (SUT) is difficult and time consuming, and complex to maintain, we must reduce the effort and improve the quality. And an automated test script is more expensive to write and requires more effort and time. Object Management Group (OMG) adopted a new framework called Model Driven Architecture (MDA). In MDA automated transformations play a key role. The aim of MDA is to decrease the cost of development and increase the quality of the product through automation and making artifact reusable. This is realized through developing Platform Independent Model (PIM), Platform Specific Model (PSM) and transformation or mapping rules. In this research MDA is used to automate testing by generating PSM instance automatically from PIM using standard mapping tool like Query/ View/ Transformation (QVT), where a PIM metamodel represents the test cases and PSM metamodel represents the test scripts. The result shows test script could be generated from test case abstraction level with less programming skills if we scope the platform for a class of technology, but still more effort is needed to standardize PSM. Generally the development time and effort could be reduced. As well as testing quality which could be improved and so simplifies the maintenance of the testscripts.

الملخص

يتم تنفيذ الاختبار لتقييم جودة المنتج وتحسينها، من خلال تحديد العيوب والمشاكل . النموذج القائم على الاختبار هو التوليد التلقائي لبرنامج إجراء الاختبار باستخدام النماذج. إجراء هذه الإختبارات يدويا يتطلب فترات طويلة من الزمن يقترح هذا البحث طريقة لأتمتة الاختبار للحد من الوقت. الاختبار النصي هو مصطلح يستخدم في أتمتة الإختبارات. الاختبار النصي هو الإختبار القابل للتنفيذ ويمكن تشغيل واحد أو أكثر من حالات الاختبار. كتابة الاختبار النصي لكل حالة اختبار لكل نظام تحت الاختبار عملية صعبة وتستغرق وقتا طويلا . فيجب تقليل الجهد وتحسين الجودة. وأتمتة الاختبار النصي عملية مكلفة الكتابة وتتطلب جهد وزمن كبيرين . جمعية إدارة الكائن تبنت أداة جديدة تسمى المعمارية المبينة على النموذج (MDA) تعمل على أتمتة التحولات بين النماذج . هدف هذه الأداة خفض تكاليف بناء وتطوير البرامج وزيادة جودتها من خلال أتمتة الإختبارات وقابلية إعادة إستخدامها. ويتحقق ذلك من خلال بناء بعض النماذج منها منصة النموذج المستقلة (PIM) ومنصة النموذج المحدد (PSM) وقواعد وقوانين التحول . في هذا البحث تم استخدام المعمارية المبينة على النموذج لأتمتة الاختبار عن طريق توليد (PSM) تلقائيا من (PIM) باستخدام أداة تحول قياسية مثل الاستعلام / عرض / تحول (QVT). حيث يمثل PIM metamodel حالات الاختبار و PSM metamodel يمثل اختبار البرامج النصية .

فنتيجة هذا البحث هي إمكانية توليد الإختبار النصي من حالة الإختبار مع استخدام قليل من المهارات البرمجية. ولكن لا تزال هناك حاجة إلى بذل المزيد من الجهود لتوليد PSM . عموما باستخدام هذه الطريقة تم تخفيض الجهد والزمن وكذلك تحسين الجودة الذي أدى الى تبسيط صيانة الاختبارات النصي.

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Table of Abbreviations

Problem	How to automate generating test script using MDA
Objectives	-Developing PIM -Developing PSM -Mapping PIM to PSM -Evaluation
Overview	-Test Script -MDA - QVT
MDA	Framework adopted by OMG as approach using the model
OMG	Standards organization to help reduce complexity, lower costs and present a new software applications.
PIM	Model With high level of abstraction
PSM	Modeling technology concepts or APIs so considered high level model of specific technology
Transformation	Converting one model into another model of the same system
XMI	XML Metadata Interchange using for transform models between the tools
QVT	Standard language for model transformations in the MDA architecture defined by the OMG (Object Management Group).
MBT	Set of techniques and tools to automate the generating of test cases relies on a model of a system.
Testing	The activity of executing a system in order to find failure
Mapping	Set of rules and techniques tells how elements of a certain type should be transformed into elements of another type.

