ENHANCEMENT OF RAPID OBJECT PROCESS FOR EMBEDDED SYSTEM (ROPES) TO SUPPORT PATTERN ORIENTED DEVELOPMENT

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I declare that this project report entitled "*Enhancement of Rapid Object Process for Embedded System (ROPES) to Support Pattern Oriented Development"* is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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ABSTRACT

The complexity of Embedded Real Time (ERT) software development represents a challenging of analysing, designing and building ERT software. From this standpoint, the complexity of ERT software development means a challenging to adapt all ERT software requirements such as timing and resource constraints into its software lifecycle. Against these claims, a wide range of software development methodologies have been devised such as patterns. Patterns codify an effective solution for recurring problems that allows software engineers to reuse. By applying patterns into ERT software development, the complexity of ERT software development can be decreased and at the same time promote high degree of reuse through software patterns. In this project, the integrated Rapid Object Process for Embedded System (ROPES) and Pattern-oriented Analysis and Design (POAD) methodology has been developed to represent a promising way to build ERT software with software patterns reuse. To make the integrated methodology more compelling and confirm the rules of patterns oriented modelling, the integrated ROPES and POAD metamodel has been developed. The aim of the integrated metamodel is to conform the correctness of the integrated methodology modelling rules in term of pattern uses. In addition, the integrated ROPES and POAD software process also has been built as the continuity to describe concrete integrated software development process. To verify the correctness of the integrated metamodel, the mapping process of Meta-Object Facility (MOF) using graph theory has been conducted. The results of implementing the integrated metamodel and software process for Feedback Control System (FCS) shows that the complexity of ERT software development has been decreased besides promote software patterns reuse.

ABSTRAK

Pembangunan perisian Sistem Masa Nyata Terbenam (ERT) yang kompleks menunjukkan keunikan menganalisa, merekabentuk dan membina perisian ERT. Daripada ciri-ciri ini, pembangunan perisian ERT yang kompleks bermakna cabaran untuk merealisasikan semua keperluan perisian ERT seperti masa and kekekangan sumber keatas proses kitaran pembangunan perisiannya. Berpandukan kenyataan tersebut, pelbagai metodologi pembangunan perisian telah diubah atau dinaiktaraf sebagai contoh adalah corak. Corak memberikan penyelesaian yang efektif bagi penyelesain masalah yang berulang serta membolehkan jurutera perisian menggunakan semula kaedah ini bagi menyelesaikan masalah lain. Dengan mengaplikasikan penggunaan corak keatas pembangunan perisian ERT, kerumitan prosesnya dapat dikurangkan selain menggalakkan penggunaan semula corak. Di dalam projek ini, gabungan *Rapid Object Process for Embedded System (ROPES)* dan *Pattern-oriented Analysis and Design (POAD)* metodologi telah dibangunkan. Untuk menjadikan gabungan kedua-dua metodologi ini lebih kukuh dan mengikut peraturan pembangunan perisian berasaskan corak, gabungan metamodel telah dihasilkan. Matlamat utamanya adalah untuk memastikan rekabentuk perisian ERT mengikut corak. Selain itu, pembangunan proses perisian juga telah dibangunkan. Untuk memastikan gabungan metamodel tepat, proses teori graf bersama *Meta-Object Facility (MOF)* telah dilakukan. Hasil keputusan keatas pelaksanaan gabungan metamodel dan proses pembangunan perisian menunjukan kerumitan pembangunan perisian ERT telah dikurangkan dan penggunaan semula corak keatas rekabentuk perisian telah ditingkatkan.

TABLE OF CONTENTS