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On Multimedia CSCW Platform Design and Its Applications

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Abstract

As the size and complexity of modern projects get larger and larger, people with different types of expertise need to interact closely with each other in order to complete the work. However, these experts may live at different places and work at different times; there will be many problems if they have to work on the same project due to the space and time limitations. This dissertation proposes a computer supported cooperative work (CSCW) environment for supporting geographically dispersed project members to achieve group collaborations effectively. Issues include the CSCW environment modeling, framework and platform architecture design, and, furthermore, design and implementation of important applications for helping the collaborations. Considering actual group collaborative behaviors, three CSCW stages are modeled with their own specific types of collaborations as the creation stage, the execution stage, and the archiving stage, respectively. In the creation stage, group members create schedules and task graphs of the collaborative work for execution. Following these schedules and task graphs, group members execute the collaborative work in the execution stage. Finally, in the archiving stage, important information and operations generated during the execution stage are preserved to help future collaborations. A complete group collaboration process is composed of these three stages. Specifically designed applications are needed to handle the collaboration of each stage. To overcome obstacles met in group collaboration processes, a generic four-layer framework with all necessary functionalities for the three CSCW stages is proposed in accordance with important criteria in software engineering. Following this four-layer framework design, a CSCW platform architecture is proposed with complete functionalities such that people can easily use necessary ones to create their own applications for collaborative usage without coding all the modules to achieve group collaboration. With this kind of framework and platform design, people can work for their common goals efficiently. Specific applications are designed for each stage to fulfill its special

requirements. Activities in the CSCW creation stage are supported by Project Coordinator. Project Coordinator helps the distributed creation of project task graphs with resource allocations. On-line monitoring and exception handling capabilities are also designed for integrating the project execution process. For the execution stage, an application prototyping and platform implementation is proposed which contains several fundamental key modules. Lastly, a conference minute system in the CSCW archiving stage is proposed to store important information of meetings using WWW technologies. Consequently, designs and implementations for the CSCW environment in this dissertation not only gives a formal model and framework for group collaborative processes, but also supports most activities in group collaborations with the CSCW platform built upon the framework.

Key words : Multimedia; Computer Supported Cooperative Work; CSCW

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多媒體群體合作平台之設計與應用

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摘要

隨著現今人們所執行的計畫日益龐大與複雜，愈加需要具有各種專長的專家來進行緊密的合作，以完成工作。然而，這些專家可能散居在各地，並且可能在不同的時間工作。在這樣的時空條件限制之下，要讓專家們進行合作，著實有相當大的困難。本論文的目的在於提出一個支援電腦輔助群體合作（Computer Supported Cooperative Work, CSCW）環境的設計，輔助咫尺天涯的群體成員進行合作，藉以提昇工作的效率。主要的議題包括了群體合作環境的模型化，框架與平台架構的設計，以及設計與實作一些在從事群體合作時相當重要的應用程式。當考慮到群體合作的真實面貌時，其實可以根據不同時期特殊的合作模式，將整個合作的過程區分為三個階段，分別是合作形成階段（Creation Stage）、合作執行階段（Execution Stage）、與合作保存階段（Archiving Stage）。在合作形成這個階段，群體成員為他們從事的合作計畫，規畫完成細部的工作項目，並訂定每位成員的工作時間。緊接著在合作執行這個階段，每位成員就會依據設定好的工作時間，執行每個工作項目，進而完成合作事項。而在工作執行的過程之中，

常常會產生許多重要的資訊與動作，這些資訊與動作應該被記錄與保存下來，一方面作為未來執行的依據；另一方面可以累積經驗，以作為從事新的合作事項時的重要參考。這個時期則稱之為合作保存階段。一個完整的群體合作過程都會包含這三個階段，而隨著每個階段的不同特性，群體成員迫切的需要特殊設計的應用程式，以輔助各個階段的進行。為了克服在從事群體合作時期所遇到的困難與障礙，本論文提出了一個具有四個層次的一般性框架。在此框架之中提供群體合作三個階段所有必須的功能，設計上完全符合軟體工程學上重要的標準。根據這個四層的框架設計，本論文更提出了一個提供完整功能的群體合作平台之架構，使得群體成員可以很容易的使用必須的功能，發展他們在合作過程中所需要的應用程式，而不需每次都從頭發展必須的功能。因此，在這樣的框架與平台設計之下，人們可以更效率的完成他們的工作。針對每個階段所設計的特殊應用程式能夠滿足使用者的需求。合作形成階段的活動是由計畫協調者（**Project Coordinator**）所支援。計畫協調者支援了分散式計畫工作圖的建立與資源的分配。對於計畫的執行，更進一步的提供了線上即時監督與例外處理的能力，整合了合作的形成與執行階段。對於合作執行階段，本論文完成了包含數個重要模組的合作平台之實作與其上應用程式的開發。最後，對於合作保存階段，藉由 **WWW** 的技術，本論文提出了一個記

錄與保存會議重要資訊的會議記錄系統。綜而言之，本論文中所提出關於群體合作環境的討論，除了為群體合作模式提出了一個正式的模型與框架之外；更在架設於此框架之上的群體合作平台，設計與實作了在合作時所必需的重要應用程式。藉由本論文的研究，增進對於群體合作模式的瞭解，發展了群體合作的架構，真正大幅的提昇群體合作的效率。

關鍵字：多媒體；群體合作