Poster on:

Electronic Circulation of Copyrighted Information in CSCW Environments

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Computing and communication technologies have revolutionized the methods for creation, reproduction, and dissemination of copyrighted multimedia information. The demand on this electronic information increases rapidly as developers and users migrate to computer supported cooperative work, or CSCW, environments. Central to CSCW environments is information sharing both at the intra- and inter-group levels. The electronic circulation of copyrighted information among group members poses numerous problems. Firstly, the time frame of transactions executed to obtain conventional copyrights is largely incompatible with information circulation time frames in group activities. In principle, a group activity is halted until respective members obtain legal rights on all copyrighted objects that they will access during this activity; an unacceptable delay, especially if members are cooperating in real-time. Secondly, group members often engage in ad-hoc and short-lived activities in which they utilize composites of copyrighted objects; object composition, decomposition, and encapsulation activities will incur unnecessary delays under conventional copyright mechanisms. Thirdly, conventional cost models for copyrighted objects largely fail to support the economics of group activities, specifically, minimizing the cost per member and per application of a copyrighted object. Finally, conventional copyright mechanisms neither allow nor account for autonomous sharing of an object under different rights for different members in the same group or across groups.

Accordingly, we can identify a set of requirements for the electronic circulation of copyrighted objects in CSCW environments: (1) a circulation mechanism must provide online real-time transactions for securing rights to copyrighted objects, and incorporate such transactions into the sharing activity itself; (2) autonomous intra- and inter-group sharing at varying levels of rights on the object must be supported and accounted for in the cost model; (3) the cost model must be adaptive to the dynamics of group characteristics (for example, size, structure, activities, etc.); (4) economic incentives should be provided to groups so as not to violate the rights on an object; and (5) these requirements should be met while still protecting the rights of the copyright owner.

We present a novel approach to satisfy these requirements. Our approach is to commercialize autonomous inter-entity sharing in order to discourage unauthorized reproduction activities and promote autonomous sharing of copyrighted information in group activities. The stakeholders are single and group user entities, engaged in producing, sharing, and using objects subject to honoring the circulation rights imposed on these activities. Consequently, we developed a framework comprised of a group activity model, a 3-layer object model, a set of circulation rights, and an adaptive cost model. The interactions between the various models are defined in an electronic circulation protocol. Within our framework, circulation rights are the commodity in inter-entity sharing and are structured to enable intra- and inter-group administration of rights independent of the copyright owner. Nonetheless, for every circulation right issued, either by a copyright owner or a user entity, the copyright owner is guaranteed a designated revenue. Using the group activity model and the layered object model, the electronic circulation protocol provides a real-time mechanism for sharing and circulating copyrighted objects. Adaptation in the cost model is achieved by a set of reimbursement functions defined over objects in different layers circulated under specific circulation rights.

Research in the area of electronic copyright management is still in its infancy. Existing studies have focused only on single-user entities and have not addressed the issues of autonomous inter-entity sharing or adaptive cost computation.

We are currently developing a prototype of the system. We are also investigating algorithms and protocols to support copyrighted object derivatives, guaranteed customer satisfaction, and alternative cost models.