DIPRM IN E-COMMERCE SYSTEM – A UML BASED APPROACH

A Thesis Abstract

BY

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Introduction
The advantage of the digital age encourages the creator and the consumer of the IP to produce and consume their IP digitally, known as Digital Intellectual Property (DIP). The widespread use of Internet Communication Technology (ICT) could transform the traditional business model for buying/selling product/services through E-Business in which DIP could be distributed across the world instantaneously. This leads to the DIP from being infringed.

DIP and associated problem
The risk and the challenges of DIP are ease of copying, modifying, circulating etc. which violates the rights of the owner such as Print, Copy, Play etc. Legal framework is there to protect the right but the same are only enforceable after infringement caused by hackers, i.e. law cannot protect the rights being infringed.

To manage the rights of the DIP and to avoid digital piracy, we need a system that prevents unauthorized access to digital content and manages content usage rights. Digital Rights Management (DRM) is a system which may be used to protect the digital assets and control the distribution and usage of those digital assets. Hence, there is a need for developing appropriate technological tool using DRM to guard the DIP from being infringed.

Basic idea of DRM
The key concept in DRM is the use of digital licenses [1]. Instead of buying the digital content, the consumer purchases a license granting certain rights to him. A license is a digital data file that specifies certain usage rules for the digital content.

In general, DRM process involves four parties: the creator, the distributor, the consumer and the clearing houses. Any typical DRM model [2][3][4] uses the following procedural steps:

Step 1: The creator of the content creates IP and transforms it digitally.
Step 2: The digital content is then encrypted and packaged for the preparation of distribution.
Step 3: The protected content is then transferred to the distribution server for online distribution. The digital license containing content decryption keys and usage rules is sent to the clearing house.
Step 4: The consumer downloads the digital contents from the distribution server and requests a valid license to the clearing house.
Step 5: The clearing house gets a payment from the consumer’s account based on the content usage rules and only after successful completion of the transaction the license is delivered to the consumer’s computer.
Step 6: The protected content now can be decrypted and used according to the usage rights in the license.
In case of DIP protection in E-commerce, encryption could be a way based on cryptographic algorithms, but this is not sufficient [5] and also not feasible as large chunks of data is transmitted between buyer and seller. Therefore, DRM is introduced, where the rights of the owner of the DIP such as Print, Copy, Play etc. could be managed efficiently and which is competent enough to avail the advantages of the appropriate technology to overcome the discussed deficiency and become an important infrastructure for the present digital media age [6].

As DRM is still at the nascent state, so, there are very limited number of DRM based solutions available in the market. Among these Microsoft’s Windows Media Rights Manager (WMRM) [7], IBM’s Electronic Media Management System (EMMS) [8], InterTrust’s Rights System [9] and RealNetwork’s Real Systems Media Commerce Suit (RMCS) [10] are very popular. From the above discussion it is clear that the current DRM researches remain confined within the areas like music services and E-book publishing [11]. There is no DRM based solution in E-commerce transaction system for protecting DIP transacted over the Internet.

**Objective of the study**

In the light of the above discussion on the disadvantages of the current E-Commerce transaction model there is a strong justification to develop a DRM based DIP protection model called Digital Intellectual Property Rights Management System (DIPRMS) that is expected to become an effective tool in overcoming all the discussed functional deficiencies and that can be used safely to transact DIP in E-Commerce system.

We have proposed DIPRMS as a prototype model which seeks not only to look after the digital transaction over the E-Commerce system but also to manage and distribute the rights of the DIP. Hence, the proposed DIPRMS model will rectify the functional deficiencies of the traditional DIP transaction by means of ensuring the efficient and secure management of the Intellectual Property Rights (IPR) of all participants of E-commerce system.

**Methodology for accomplishing the stated objectives**

We have used Unified Modeling Language (UML) [12][13][14][15] to design the proposed system which is the recent trends of software engineering practice that allows to develop a very flexible, secure and efficient model that facilitates maintainability, reusability, portability and other Object Oriented programming features inherent in the new E-commerce scenario. This model will be primarily considered as an abstract design of the proposed system which will allow us to hide superfluous details and will reduce the system to a more readily understandable generic form. UML consists of a number of object oriented software engineering tools which we have applied to design our DIPRMS based Ecommerce transaction system. The purpose of the diagram is to present multiple views of the system and such multiple views may be combined to form our proposed model.
To design the proposed system first we have identified relevant objects either internal or external, which are related to our system such as creator, consumer, distributor, clearing house etc. This is followed by Object oriented analysis and design, where we associates the identified objects and finally we find out the behavior and interaction of such objects with our system [18][19][20]. UML’s Use Case Diagrams are explaining the functionality of the actors with the system. The Sequence Diagram is used to describe interactions among objects in terms of exchange of messages over time. The Collaboration Diagram is used to make interaction between objects as a series of sequenced messages, which is also, describes the behavior of the proposed system in simpler manner and Class Diagram is used to establish relationship among different classes of participants of E-commerce.

We have applied the proposed DIPRMS model in the following application areas:

- In E-commerce system the credit card based transaction can be more secured using DRM technologies [16]. Credit cards are primary means of payment for product and services purchased online. With the increase in credit card use on the web, credit card fraud has gone up dramatically. This has resulted in bringing down the trust of the customers on the E-commerce system. Therefore, the DIPRMS based credit card transaction could be a solution of the above mentioned problem.

- DIPRMS can facilitate E-learning system by establishing a secured trade and exchange of study materials and student’s information over the internet through E-Commerce. It helps in promoting the exchange and reusing the quality learning objects, besides respecting and rewarding the IP of the various contributors [17].

**Conclusion**

We have made an attempt to throw some light on the different security risks of the DIP transacted over E-commerce system and discussed different initiative taken by the different researchers with a reference to India to offer solution. However, to fill the observed deficiency of the E-commerce transaction system no such efficient functional solution so far has been developed.

We have proposed a generic functional model to fill different deficiencies of DRM. In order to improve the performance of DRM we have integrated DRM, UML and XrML (Extensible Rights Markup Language) technologies for managing rights of different participants of E-commerce system in a very efficient and secured manner. To do this we have first designed those objects either internal or external and established their association with the help of UML diagrams.
The proposed model can be successfully applied by means of making a very little change in the current E-commerce transaction system and have flexibility to reuse and maintain which can be used in future to transact DIP in E-Business system.

References


[7]. Microsoft: [http://www.microsoft.com/windows/windowsmedia/].


[9]. InterTrust Technologies Corp.: [http://www.intertrust.com].


