DRMSDE: A DIGITAL RIGHT MANAGEMENT SYSTEM FOR DISTANCE EDUCATION

Ajit Kumar Singh
Department of Computer Science
Netaji Mahavidyalaya
Arambagh, India

Abstract: The main obstacle on the way of quality Distance Education(DE) is a violation of Intellectual Property Rights(IPR). If we cannot protect our Digital Content(DC) from an unauthorized user then the standard of DE is not maintained . In this paper, we design and implement a Model DRMSDE that focus on how to protect different user access rights to different users of Distance Education System(DES). We develop an algorithm to protect our DC from unauthorized users implemented in JAVA using Object Oriented Programming(OOP).

Keywords: Distance Education , Digital Rights Management , JAVA ,OOP

I. INTRODUCTION

The education system in which teachers and students are separated by geography is called DE[1]. The DE started its journey in the mid –nineteenth century in Europe. In India, it is started in 1985 by Indira Gandhi National Open University(IGNOU)[2].

In DE, students and teachers are not communicating face to face . So a DE must required a communication media . Initially, postal system was to meet the need of teacher and student. After that radio and television started being used for communication. With the invention of computer, Distance Education System takes a big leap. Now the geographical boundary between teacher and students is minimized.

Though computer increases the popularity of DE, the quality is hampered with it as digital data are easily manipulated by unauthorized user . To maintain the quality of DE we have to protect Digital Rights[3] of different users. Hence we design and implement a simple but secure Distance Education System using OOP .

In our system DRMSDE, the Distance Education Authority(DEA) instruct Course Designers(CD)[4][5] for designing courses . The CD consulted with DEA and design course structures and send to the Content Writer (CW)[4][5] for digitalization . The CW write the courses and submit to DRM server[6] for protection of Digital Data. DRM Server imposed different Rights specified by DEA for protection of Digital Content (DC). A student registers himself or herself into the course and has access DC according to their rights. Teachers also communicate with DRM Server to support
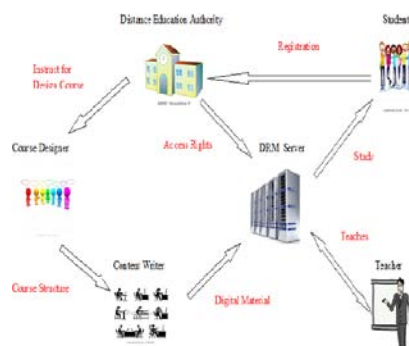

Figure 1: DRMSDE

II. OBJECTIVE OF DRMSDE

The main objective of DRMSDE is to provide a secure environment in which student , teachers and other users are feeling secure and disclose their personal as well as research related information[7]. The DRMSDE guide students of every corner of the country[8]. In our Model authorized students are free to access their notes , tutorial , assignments etc. and documents like Admit Card , Mark sheet , Registration Certificate , Pass Certificate etc. at their convenient time.

III. BENEFITS OF DRMSDE

The benefits of our proposed model are summarized below:

- ❖ Minimizing the distance between the student and teacher , our system allows people to study from home[8].
- ❖ Protects access rights of different users.

❖ Digital data are secure from unauthorized user.
❖ Safe and secure digital data Management [9] is provided by DRMSDE.
❖ It provides a high quality and efficiently education with minimum cost.
❖ Distance Education provides education in 24X7 mode.

IV. SYSTEM DESIGN

Here we discuss some issues related with DE and how we are incorporating it into our system and also produces design of Authentication control[10][11] of our system.

A. Tutorial

In DE the main things that we want to protect from unauthorized user is Digital Tutorial or DC for different courses . In our system tutorial can be classified into three different types which are as follows:

- **Audio Tutorial:** In audio tutorial , lectures are stored in audio format for different courses.
- **Video Tutorial :** This is most important and easily understandable tutorial. In video tutorial experts are explaining each and every topic for a particular course in an easily understandable manner. This tutorial is very helpful for students and this is the first choice of every student.
- **Text Tutorial :** This is the traditional method of notes. In text tutorial a note is written on a particular topic for a particular course with examples for students.

In our system DRMSDE when a tutorial is stored into database then for each tutorial a **Tutorial Code** is attached with tutorial , that represents the course for which tutorial is prepared so that user can access only their respective course tutorials.

B. Constraints

In Distance Education System(DES)[12] some constraints must be imposed on Digital Tutorial for security reasons . In our system we overcome following constraints:

- **Time Constraints**: In DES we allow students to access tutorial for a particular time period . If time expires then the students will not authorized to access tutorial. In our system the time constraints are implemented with the help of DRM code.
- **Download Constraints**: This is very important operation where the entire document is downloaded into the user computer and he or she can easily misuse the content. So before allowing a user to download our system check twice about his/her authenticity.
- **Copy Constraints**: Not every user is allowed to copy each tutorial. In our System DRMSDE students can copy only their course related tutorials not other course tutorials.
- **Print Constraint**: We apply print constraint in our system. If students need to print any tutorial

document then he or she has to put their respective DRM Code and our system will verify if the material is related to student's course. If it be so, only print option is active otherwise student can't print documents.

C. DRMSDE Algorithm for Authentication of User
We follow following steps to protect our Digital Tutorial from unauthorized user:

- *Step 1:* Student login into the system with valid user id and password and search in tutorial index server for the audio , video and text tutorials .
- *Step 2:* Student found a tutorial and wants to access it then the system demanded for DRM Code that was provided by DEA at the beginning of each academic year. This DRM Code is given on the basis of Course and years and it will change every year so that Second year student can't access first year tutorial.
- *Step 3:* In our system DRM Code extract Course Code from DRM mapping table and tutorial selected by student extract tutorial code from Tutorial table (audio or video or text).
- *Step 4:* If Tutorial Code and Course Code match then students are allowed to download ,print and copy the required tutorials.
- *Step 5:* But if the tutorial code does not match with course code that means students wants to download tutorial from other courses, he or she is not allowed to download or copy or print the tutorial.
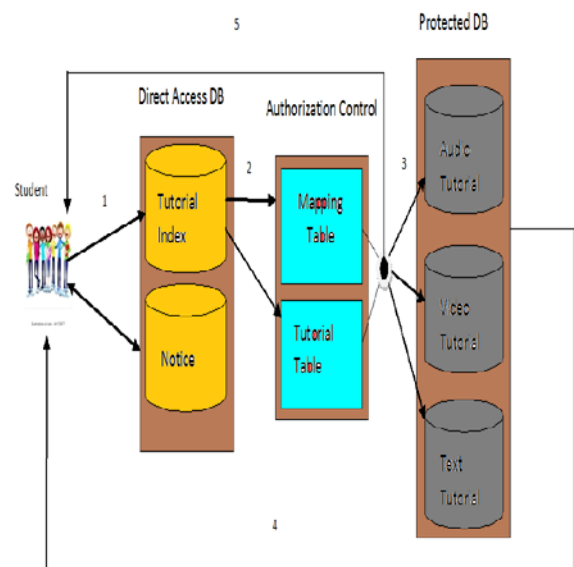

Figure 2 DRMSDE Authentication Check

V. IMPLEMENTATION

Here we are using Object Oriented Programming Language JAVA and MySql for implementation of algorithm.

```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
  try {
      Connection conn=DriverManager.getConnection("jdbc:derby://localhost:1527/ajitdb", "kumar", "singh");
      Statement st=conn.createStatement();
      ResultSet rs=st.executeQuery("select * from MAPPING");
      while(rs.next())
      {
          if(rs.getString(1).equals(jTextField1.getText()))
          {
              break;
          }
      }
      Statement st1=conn.createStatement();
      ResultSet rs1=st1.executeQuery("select * from AUDIO_TUTORIAL");
      while(rs1.next())
      {
          if(rs1.getString(1).equals(jTextField2.getText()))
          {
              break;
          }
              }
          if(rs.getString(2).equals(rs1.getString(2)))
      {
          jButton2.setEnabled(true);
          jButton3.setEnabled(true);
          jButton5.setEnabled(true);
      }
      else
      {
          JOptionPane.showMessageDialog(null, "!!!!!!!!!!!!Access Denied!!!!!!!!!!!!");
      }
  } catch (SQLException ex) {
      Logger.getLogger(signin.class.getName()).log(Level.SEVERE, null, ex);
  }

}
```

Figure 3: Code for Authentication Check

Figure 3 shows Mapping and Audio Tutorial table extract Course Code and Tutorial Code and check whether the two codes are equal or not. If codes are equal then download , copy and print button become active. Otherwise an access denied message will appear.

VI. CONCLUSION

In this paper we have tried to implement a Distance Education System in which unauthorized user never uses our digital tutorial. To enhance the security in future we are thinking for a biometric input along with DRM Code or we will add an otp message facility to students mobile when he or she puts his/her DRM Code. If we implement any one of two options, then our system security will reach the next level.

VII. REFERENCES

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