Static and Dynamic Security in Web Data Management
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Goal:

In the original design of the Internet protocols, networks were assumed private, isolated and physically secure, or else completely public. With the growing use of the World Wide Web, especially in e-commerce, security over the web becomes one of the major problems. Our researches focus on how to prevent unauthorized users an access to information that they are not supposed to access.

Accomplishments:
Research on Static Security Approach

Static web views are determined using "user profile approach". We investigated the problems of building user profiles, verifying the user information, protecting user's privileges, generating different views according to the user profile, including its security level and special interest, authorizing the view under request, and updating user profile and the corresponding view.

Research on Dynamic Security Approach

- **Mobile Agent Approach**
  We investigated the problem of how to model user-interaction in a dynamic environment and how to provide access privileges automatically based on verification. We have developed an algorithm for new and old user authentication and providing secured views depending on the user profile.

- **Authentication-Driven Authorization on Web Access**
  We proposed an authentication-driven authorization approach, where authentication is integerated with authorization. The validity of a user is checked using authentication routines associated with the data object requested by the user. The access permission is achieved by authentication rather than by inheriting from group/role membership relateion.

- **Integrate Data Mining Technology into Web Security**
  Data mining technology has been used as an efficient tool to discover interesting and useful patterns in large amount of data. We investigated the feasibility of integrating data mining techniques into web security.

We worked on two prototypes that were implemented using the dynamic security approaches.

- **Prototype A: A Smart User Modeling Agent**
  We designed the structure of the agent, which includes three parts: *User Modeling System*, *Information System* and *Smart Mapping System*. We have finished the *new user's initial modeling system* and the "set dynamic questions" algorithm.

- **Prototype B: Authentication-Driven Authorization Execution Environment**
  We have finished a primitive implementation, which demonstrates the ideas of integrating authentication with authorization.

1. **Published Papers:**

   - **World Wide Web Data Management**, S. Madria, M. Mohania and B. Bhargava, in *WWW Journal*, Vol. 3, No. 2, 2000, pp 1-3

   - **Security in Data Warehousing**, B. Bhargava, in *Intl. Conference on Data Warehouse & Knowledge Discover, DaWak-2000)*, London, Sep. 2000, pp 287-289 (Keynote Talk)

   - **Data Organization Issues in Location-dependent Query Processing in Mobile Computing**, S. Madria, B. Bhargava and et al., in *Proc. of Intl. Conference, ADBIS-DASFAA 2000*, Prague, Sep. 2000, pp 142-156

   - **Secured Web Access**, M. Mohania, V. Kumar, Y. Kambayashi and B. Bhargava, in *Intl. Conference on Digital Libraries: Research and Practice*, Kyoto, Nov. 2000, pp 132-146

   - **Authentication-Driven Authorization on Web Access** , Y. Zhong and B. Bhargava, to appear in *Proc. of the 2001 Intl. Conference on Internet Computing*, Las Vegas, Jun. 2000

   - **Data Mining for Web Security**, M. Mohoui, B. Bhargava and M. Mohania, to appear in *Proc. of the 2001 Intl. Conference on Internet Computing*, Las Vegas, Jun. 2000

2. **Technical Reports:**

   - **User Content Mining Supporting Usage Content Mining for Web Personalization**, M. Mohoui, B. Bhargava, and M. Mohania, CERIAS-TR-2001-21

   - **Authorization on Web Access**, Y. Zhong and B. Bhargava, CERIAS-TR-2001-17

   - **Unauthorized Access Agent**, L. Chang and Liyun, TR-CS, 2001, UM-Rolla

3. **Talks:** TRW (Jul. 2000), CERIAS Seminar (Nov. 2000), Northwestern Univ. (Nov. 2000), UCLA (Feb. 2001), Univ. of ILL-Chicago (Mar. 2001)

4. **Chairman** of IEEE Workshop on "Security in Distributed Data Warehousing" (www.cs.wmich.edu/~mohania/sddw01.html), New Orleans, Oct. 2001, Co-sponsored by CERIAS

5. **Represented** CERIAS in "Telecommunications & Information Security" workshop in Tulsa, Sep. 2000