

Inference Attack-Resistant E-Healthcare Cloud System with Fine-Grained Access Control

ABSTRACT:

The e-healthcare cloud system has shown its potential to improve the quality of healthcare and individuals' quality of life. Unfortunately, security and privacy impede its widespread deployment and application. There are several research works focusing on preserving the privacy of the electronic healthcare record (EHR) data. However, these works have two main limitations. First, they only support the 'black or white' access control policy. Second, they suffer from the inference attack. In this paper, for the first time, we design an inference attack-resistant e-healthcare cloud system with fine-grained access control. We first propose a two-layer encryption scheme. To ensure an efficient and fine-grained access control over the EHR data, we design the first-layer encryption, where we devise a specialized access policy for each data attribute in the EHR, and encrypt them individually with high efficiency. To preserve the privacy of role attributes and access policies used in the first-layer encryption, we systematically construct the second-layer encryption. To take full advantage of the cloud server, we propose to let the cloud execute computationally intensive works on behalf of the data user without knowing any sensitive information. To preserve the access pattern of data attributes in the EHR, we further construct a blind data retrieving protocol. We also demonstrate that our scheme can be easily extended to support search functionality. Finally, we conduct extensive security analyses and performance evaluations, which confirm the efficacy and efficiency of our schemes.

SYSTEM REQUIREMENTS:

HARDWARE REQUIREMENTS:

- System : Pentium i3 Processor.
- Hard Disk : 500 GB.
- Monitor : 15'' LED
- Input Devices : Keyboard, Mouse
- Ram : 4 GB

SOFTWARE REQUIREMENTS:

- Operating system : Windows 10.
- Coding Language : Java
- Web Framework : Flask

REFERENCE:

W. Zhang, Y. Lin, J. Wu and T. Zhou, "Inference Attack-Resistant E-Healthcare Cloud System with Fine-Grained Access Control," in IEEE Transactions on Services Computing, vol. 14, no. 1, pp. 167-178, 1 Jan.-Feb. 2021, doi: 10.1109/TSC.2018.2790943.