International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Impact Factor (2012): 3.358

Privacy Preserving ANN Over Cloud

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Abstract: ***Back–propagation is very good and effective method for learning neural networking. This method is widely used various application. As compare to learning with local data set the collaborative learning is very effective to learn new things. The collaborative infrastructure like cloud computing the participating parties carries out learning not only their own data set, but also on other data set .The cloud computing is more convenient than ever for user across the internet. The user internet can shared all data without knowing with each other. Beside of this advantage there one crucial issue pertaining to the internet-wide collaborative neural network learning is the protection of the data privacy for each participant. The participant in the cloud computing is from different trust domain and they may not Want to release their private data set which may contain proprietary information to anybody else. The solution shall be effective and scalable enough to support an random number of participants each processing arbitrarily participant data set. Co-operative data sharing is an important aspect that is emerging heavily in cloud computing. This comes with a large risk of data leakage from the cloud. Thus a need for encrypting data before storing on cloud becomes almost mandatory. But, in a multi owner data access structure it is important for clients to find mining results, to make any system function effortlessly. This paper supports architecture for storing data in an encrypted manner on the server, yet making it feasible to apply ANN for mining on encrypted data with an encrypted query, which makes it impossible for a curious cloud owner to find and meaning of data, not even from the query.***

Keywords: Privacy reserving, learning, neural network, back-propagation, cloud computing

1. Introduction

Cloud computing is emerging as the latest trend for IT field. cloud computing how business improves with the help of the information technology As a disruptive technology with profound implications, cloud computing is transforming the very nature of how businesses .Cloud is a place where information is stored which helps the clients users to use it as and when required Cloud is a user friendly system which is an innovation is this very 21st century. Now as the technology improves on the same side threat increases there is a need to avoid the threats to the data. It is in developing stage the ways to store data .The data stored in the cloud should be kept confidential between user and client .The data should not be misused by the service provider and the TPA Third party auditing. As users no longer physically possess the storage of their data, outmoded cryptographic primitives for the purpose of data security protection cannot be directly adopted.

The main objective is to provide security to the data that will be stored in the cloud. Presently the data stored in the cloud is been audited by third party. Now this data is available with the service provider .After a period of time even if the data is corrupted .It is not known to any one and the wrong data is forwarded to clients. This data is available where there are multiple user. Hence it's very important to have security to data. We would have to provide security to the data which we are going to store in the cloud .This comes in many ways by providing signature, by using encoding and decoding techniques etc. now a day's even the service provider are miss using the data even the TPA.

Challenges

1)To keep each member's private data set and transitional results generated during the BPN network learning process, it requires safe calculation of various operations, for example, addition, scalar product, and the nonlinear sigmoid function, which are needed by the BPN network algorithm;
2)To guarantee the practicality of the proposed solution, the communication cost introduced to each participant shall be affordable. To accommodate a large range of cooperative learning, the proposed solution shall consider system scalability. In particular, it shall be able to support an random number of participants without introducing tremendous communication costs to each participant.
3)For collective training, the training data sets may be possessed by different member's and partitioned in arbitrary ways rather than a single way of partition.

2. Related Work

Many of privacy preserving BPN network learning schemes have been proposed recently. N.Schlitter [4] introduces a privacy preserving BPN network learning scheme that enables how two or more parties are jointly perform BPN network learning without disclosing their private data sets. The limitation of this schema is that this schema is proposed only for horizontal partitioned data. The disadvantage of this schema is that this scheme cannot protect the transitional results, which may also contain sensitive data, during the learning process.

To overcome this drawback Chen and Zhong [3] suggest a privacy preserving BPN network learning algorithm for two-party scenarios. This scheme provides strong security for data sets including transitional results. However, it just supports vertically partitioned data.

To overcome this limitation, Bansal. [2] Proposed a privacy preserving BPN network algorithms for two party scenarios. This scheme is provide solution for arbitrarily partitioned data.

And providing protection for strong data sets including intermediate result.

Directly spreading them to the multiparty setting will introduce a communication complexity increases as increasing the number of participants. In applied implementation, such a difficulty represents a remarkable cost on each party considering the already expensive operations on the underlying groups such as elliptic curves.

From the previous base paper we can say that, none of present schemes have solved all these challenges at the same time. There still lacks an efficient and accessible solution that supports collaborative BPN network learning with privacy preservation in the multiparty setting and allows randomly partitioned data sets

3. Existing System

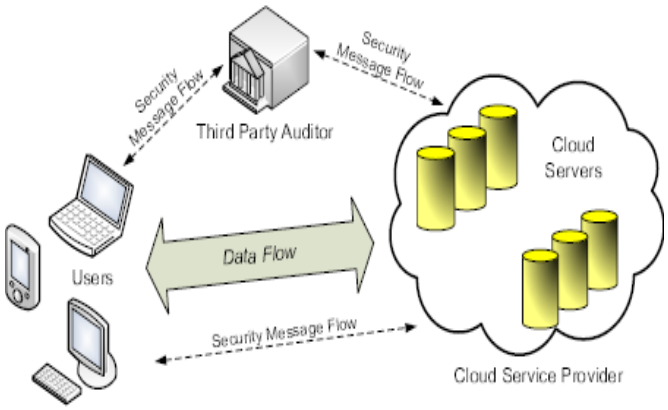


Figure 3: Partitioning and Domain Integrity Checking For Data Storage In Cloud Computing

The existing system represents how data is stored and distributed on the cloud using partitioning to provide security and availability across two servers.

3.1 Work Flow

3.1.1. Client Side

a. File Selection

The user/users select a File to upload on the server.

b. Sending File

The client/clients sends respective file to Third Party Auditor (TPA) across the network using a File Transfer Protocol (FTP).

3.1.2. TPA

TPA performs six types of steps on the received file/files from the respective clients for storage across cloud with security and availability.

a) Receiving File
   Third Party Auditor Receives File from the client/clients.
b) Partitioning File
   TPA partitions file received from the client/clients.
c) e. Digital Signature Extraction
   TPA extracts Digital Signature of each file partition.
d) Secret Key Generation
   After partitioning, Third Party Auditor generates Secret keys for each partition respectively.
e) Encryption
   TPA encrypts each partition using respective secret keys.
f) Storing Partition Sequence
   TPA stores Partition Sequence, Signature, Keys and File attributes on its own server.

3.1.3 Server Side

a) Sending Partitions
   Third Party Auditor sends the respective partition to the respective storage.
   The Respective Storage Server receives the respective File from the Third Party Auditor.
b) Storing
   The storage server stores the partition received from the TPA.

4. Proposed System

The diagram shown above shows the proposed system. The system consists of end users, cloud server on which data to be stored.

1) The user can login on his system.
2) After login he can send the data to the server which is training data.
3) After receiving the data and ANN parameter by server using this data ANN server will train.
4) Then he will waiting for the test data from the user. Then user loads the test data.
5) The test data is received to server then server can apply Privacy preserving BPNN on the data. Then this data is stored on that server.
6) User can retrieve this encoded data and decode this data using key.

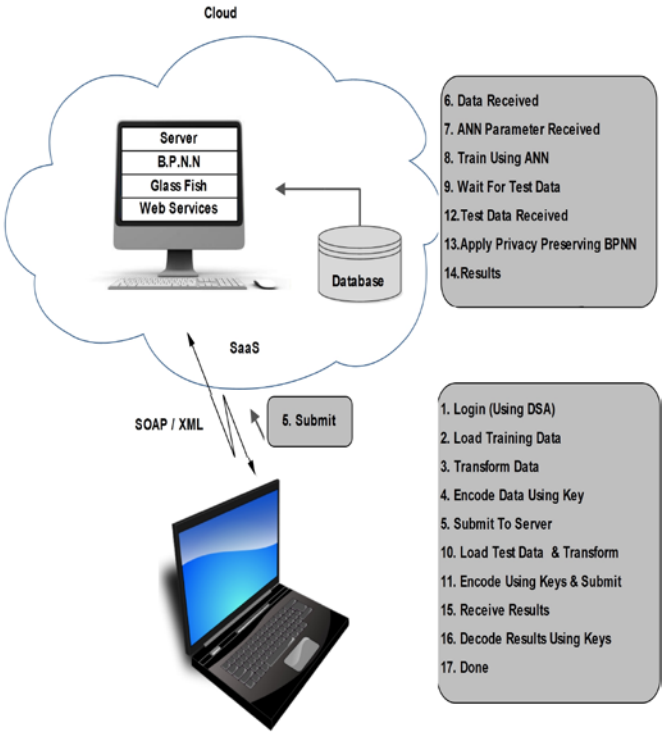
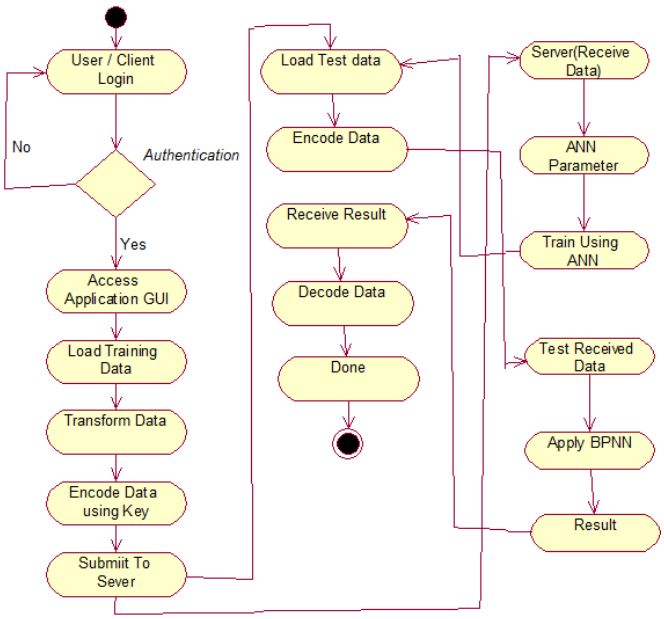


Figure 4: Privacy preservation using ANN over cloud.

5. Flowchart



6. Conclusion

The Proposed system, we proposed the first secure and practical multiparty BPN network learning scheme over arbitrarily partitioned data. In our proposed approach, the parties encrypt their arbitrarily partitioned data and upload the cipher texts to the cloud. The cloud can execute most operations relating to the BPN network learning algorithm. Without knowing any private information. The cost of each party in our scheme is independent to the number of parties. This work adapts the BGN holomorphic encryption algorithm to support the multiparty scenario, which can be used as an independent solution for other related applications. Complexity and security analysis shows that our proposed scheme is scalable, efficient, and secure. One interesting upcoming work is to enable combined cooperative learning without the help of TA.

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