RESEARCH METHODOLOGY

The research focuses on the development of a novel technique for cloud infrastructure resource allocation and security for big data applications. The method proposed for the same is the utilization of the enhanced bat algorithm for the security and privacy confidence during the process of downloading of the data from the cloud.

The methodology for the same is discussed in the given section. Firstly, the study considers a data centric network which would be designed keeping in mind the research objectives of the study. The data centric network so designed is assumed to be having n number of hosts or users who store the data or the information on the data network also known as the cloud instead of using the local storage. This helps building of the first step or the initial and important component of the study. The data of the users would be stored in the cloud which would be accessible remotely.

The cloud infrastructure resource allocation is taken care of in the research. The data varying over a spectrum of fields is stored in the cloud and is organised in a variety of categories according to different fields. The enhanced bat algorithm generates an encryption key for each user depending upon the field and type of the data which is being stored in the cloud. Further, the data which is being uploaded by the users or the hosts is secured using advanced encryption standard (AES) in the process of transfer as well as storage. This ensures that the data of the user which contributes to the big data is secure during the process of transmission and communication as well as in the stages of storage in the cloud. The AES is adopted for the security of the data to the cloud. The key which is generated by the enhanced bat is the input for AES algorithm responsible for encryption before upload to data centre.

This cloud stored data is categorised in different fields as explained earlier. When any of the n number of users having different data requirements want to access data specific to any one field, it has to be remotely downloaded by the said user. For this, at the receiving end of the cloud, the user needs a key which would help him download the data specific to the data category or field. This downloading key would be again generated by the enhanced bat algorithm and it would match the encryption as well as the decryption key. The key would be matched with numerous data keys of the different data on the data centre. When the enhanced bat algorithm finds a successful match of the keys, the data corresponding only to the matched key is downloaded.
from the cloud for the specific user and would be decrypted. Hence, in such a manner, the data is made available for the use of the user holding the specific key.

Figure 1: Flowchart of the proposed methodology

**SCOPE**

The said research undertakes the development of a novel technique for cloud infrastructure resource allocation and security for big data applications using enhanced bat algorithm. With the help of this research, the optimum solution to the defined problems is found in a novel manner. This research would also contribute richly to the field of security of big data and cloud computing which are highly sought after in the present times.

**HYPOTHESIS**

We have investigated the resource allocation problem in cloud computing. We consider multiple types of resources like CPU, memory, and storage on virtual machine level to propose an allocation algorithm called Enhanced BAT. The algorithm supports not only fair resource allocation for users, but also efficient resource utilization for each physical server. The resource
allocation problem is modeled as a finite extensive game with perfect information and the BAT algorithm results in a Nash equilibrium decision.

PLAN OF WORK:

1. Type of Research – Exploratory and Descriptive Research.
3. Conducting Literature Review.
4. Initiating Research work through Hypothesis.
5. Secondary Research Collection.
6. Developing Questionnaire.
7. Primary data collection on Questionnaire.
8. Analysis & Interpretation of the collected data.
9. Testing the hypothesis.
10. Drafting the thesis.