

HUGE INFORMATION INTEGRATION FOR EMERGENCY MANGAMENT IN BIG DATA ENIVROMNENT

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Abstract: The sound locale of emergency association has been in the purpose of joining of thought for different demands particularly the item constructing. In the data focused and PC driven world, a basic motivation behind PC authorities is to oversee and dismantle Big Data, remove data from heterogeneous sources and store it in joined structure deals with that permit in addition dealing with. In this paper, Big Data examination techniques and instruments that are imperative in all seasons of emergency association are appeared. What's more, a structure arranging arrangement of an essential information association structure will be bankrupt down that contains four stages; information age, information securing, information storing up, and information examination. Purposes of enthusiasm of the utilization of Big Data for emergency association are reviewed. An imaginative perspective of open issues concerning Big Data in emergency association is shown.

Keywords: *Big data analytics, crisis and disaster management.*

I. INTRODUCTION

Fruitful organization of crises and disasters is an overall test. All social order are helpless against crisis, both trademark and impelled by human activities. An orderly technique with fundamental goal to confine the negative impact or aftereffects of crises and calamities, along these lines guaranteeing societal system, is called convincing crisis and fiasco organization. It is essential all through the world to extend learning of crisis and cataclysm organization, for the reason improving responsiveness. All the above focuses may be supported by Big Data Analysis.

Big Data and Computer Science

The likelihood of Big Data meander is on an incredibly basic level identified with programming working since the start of figuring. The term Big Data delineates measures of information got with mechanical recommends that are routinely unusable by people because of volume and which with fitting electronic managing will expel immense data.

Big Data Characteristics

Colossal Data may be depicted as having four estimations: Data Volume, measuring the measure of data available, with typical instructive lists having various terabytes. Data speed is a measure of the rate of data creation, spouting and gathering. Data grouping is a measure of the wealth of data depiction – content, pictures, chronicles et cetera. Data regard, measures the support of data in choosing. [2]. A further trademark has starting late appeared, specifically Variability, which addresses the amount of changes in the structure of the data their explanation. Gartner [3] abbreviates this in the importance of Big Data as high volume, speed and arrangement information assets that demand reasonable getting ready.

Tremendous Data in Crisis Management-Surveillance The organization of immense volumes of data is perhaps one of the best troubles to be tended to by programming building. The wide arrangement of data acquiring sources available amidst crisis makes a prerequisite for data compromise, collection and portrayal. Such strategies help crisis organization experts to redesign the essential authority procedure. In the midst of the change of a crisis, the masters trustworthy ought to quickly choose. The idea of these decisions depends upon the idea of the information open. A key factor in crisis response is situational care. A legitimate, correct examination of the condition can connect with pioneers in the midst of a crisis to settle on accommodating decisions, take fitting exercises for the most loaded with feeling crisis organization [4]. Situational care definitions: "wisdom, where parts of the current condition are watched, recognition where information gained through discernment is solidified and interpreted and, projection where satisfactory information and understanding exists to make estimates about moving toward events" [5].

II. A BIG DATA CHAIN

A. Big Data systems-engineering approach

A structures delineating methodology of a critical information association framework works in four stages: information age, information securing, information putting away, and information examination [6]. A vital information structure is versatile, offering capacities to bargain grouped stages in the modernized information life cycle, connecting from first involvement with the world to its pulverization.

Then, the structure overall fuses different particular stages for various applications. [7]. Unpleasant information can be taken as the grungy materials with information age and information getting being the relating misuse process. In a tantamount sense, information gathering might be considered as a buffering methodology and information examination as the last age process that uses the foul material to make new respect [8]. The imperative mastermind impelling examination is Data age. The rate of information age is broadening a consequence of innovative developments. When in doubt, IBM assessed that 90% of the information on the planet today has been made in the previous two years [9]. The clarification behind the information affect has been altogether wrangled about. A related portrayal is the immense measure of web information being made, for example, web gathering posts, electronic long range casual correspondence, passing by records. This immense measure of information might be unusable, yet by techniques for sensible examinations may yield noteworthy data concerning the inclinations and side interests of clients. Isolating this data may render conceivable to foresee practices, emotions and cases. The information age process is in like way subject to consider, as it joins both controlled and eccentric areas. A course of action of sensors sent recalling a definitive target to watch a specific circumstance, is a controllable wellspring of high volume information. Then again, there exist in the web significant measures of clients, every one stimulating themselves energetically and making self-administering information a great many. These information takes after, when seen as an aggregate may furnish data with true blue ramifications for the economy, the security and different subjects of intrigue. In the future, the term monstrous information is selected to mean wide, masterminded, and complex datasets that are conveyed from different information sources, both physically and in each handy sense appropriated, that join sensors, video, click streams and different particular sources. [10].

B. Data Acquisition

Information acquisition intimates the course toward getting data and is subdivided into information accumulation, information transmission, and information pre-arranging. One of the reasons for the information acquisition organize is to indicate data in a modernized shape for help storing up and examination. Quickly since information may begin from a changing game-plan of sources, for example, goals that host made substance, pictures and records, and so forth. Information gathering recommends submitted progresses that shielded harsh information from particular information age conditions. In this manner, in the wake of get-together harsh information, fast transmission instruments are required, to move the information into the best accumulating supporting structure for different sorts of educational applications. At last, amassed datasets may contain different pointless information, which irrationally increment the measure of

storage room required and contrarily affect the subsequent information examination. For instance, high excess is unbelievably standard among datasets gathered by sensors for condition viewing. Information weight advancement can be related with diminish the excess. Along these lines, information pre-arranging operations are essential to guarantee proficient information putting away and mail. Marvelous information gathering systems are used so as to expand harsh information from particular information age conditions. This revelation implies the course toward recovering harsh information from certifiable articles. The framework should be especially shaped. Something interesting, stirred up information get-together would impact the accompanying information examination structure lastly actuate invalid outcomes. In the interim, information conglomeration frameworks not just rely on the physical attributes of the information sources, yet in addition on the targets of information examination. Along these lines, there are different sorts of information gathering procedures. In the running with districts, three general methodology for tremendous information social event will be explained, while some related frameworks will be depicted out.

Data Collection methods

1. Log files: As one by and large used data gathering procedure, log archives are record records normally created by the data source system, keeping in mind the end goal to record practices in allocated record positions for coming about examination. Log archives are consistently used as a piece of about each and every automated device. For example, web servers record in log archives number of snaps, click rates, visits, and other property records of web customers. To get activities of customers at the destinations, web servers basically consolidate the going with three log record positions: open log archive sort out (NCSA), broadened log orchestrate (W3C), and IIS log outline (Microsoft). All the three sorts of log records are in the ASCII content design. Databases other than content records may all over be used to store log information to upgrade the inquiry adequacy of the gigantic log store. There are moreover some other log records in perspective of data gathering, fusing stock markers in cash related applications and affirmation of working states in sort out watching and development organization.

2. Web Crawlers: A crawler is a program that downloads and stores WebPages for a web crawler. Around, a crawler begins with a concealed game-plan of URLs to visit in a line. Every last one of the URLs to be recovered are kept and formed. From this line, the crawler gets a URL that has a specific need, downloads the page, sees every last one of the URLs in the downloaded page, and adds the new URLs to the line. This strategy is rehashed until the point that the minute that the crawler stops. Web crawlers are general information gathering applications for site based applications, for example, web records and web stores. The creeping system is overseen by a few strategies, including the affirmation strategy, return to course of action, affordability

approach, and parallelization approach. Standard web application slithering is an especially gotten some information about field with different fit designs. With the progression of wealthier and further made web applications, some slithering philosophy [20] have been proposed to creep rich Internet applications. Beginning at now, there are a lot of broadly important crawlers open as demonstrated in the quick overview.

3. Particular Methodology: in spite of the approaches examined above, there are different information gathering procedures or frameworks that relate to particular space applications. For instance, in certain association divisions, human biometrics, for example, fingerprints and stamps, are gotten and secured for character attestation and to track guilty parties.

Information Collection Tools The bit of progression could without a considerable measure of a broaden be encouraged into different subtopics on emergency and calamity association. The reasons for energy for recognizing, systems association and correspondence pass on redesigns in emergency association from both the examination and practice points of view. Inventive advances are basic to move the common sense of emergency association frameworks. Reference must be made to the part Geographical Information Systems (GIS), the Global Positioning System (GPS) and Remote Sensing Technologies have concerning information securing. Land Information Systems are profitable structures arranged for securing, examining, sharing, and showing geographically referenced data information. With the use of GIS emergency heads are in position to amass spatial data over a wide geographic area, to take a gander at and collect uncommon data. Moreover, given the data from GIS can be effortlessly dealt with, giving a pictorial system of what occurring in a region was hit by the emergency. GIS applications can be noteworthy in the running with works out:

To promote situational awareness. Situational awareness is a prerequisite in any

- To influence threat to stock maps. At this level GIS can be used for the pre-reasonableness examination of developmental endeavors, at all between city or zone level.
- Locate fundamental workplaces. The GIS structure is exceptionally useful in giving information on the physical zone of sanctuaries, channels and other physical workplaces. The use of GIS for disaster organization is proposed for coordinators in the early time of common change wanders or extensive building wanders.
- Create and direct related databases. The use of GIS at this level is proposed for coordinators to detail wanders at achievability levels, notwithstanding it is in like manner used to deliver danger and peril maps for existing settlements and urban regions, and in the orchestrating of disaster status and failure easing works out.

- Vulnerability examination. GIS can give important information to assist cataclysm care with government and general society, so that (on a national level) decisions can be taken to set up or develop fiasco organization affiliations. At such a general level, the objective is to give a supply of calamities and in the meantime recognize "high-shot" or vulnerable regions inside the country.

GIS development can outfit the customer with exact information on the right region of an emergency condition. This would exhibit accommodating as less time is spent trying to make sense of where the bother locales are. Ideally, GIS advancement can give quick response to an impacted domain once issues are known. Mapping and geo-spatial data will give an entire show on the level of mischief or interference that was kept up on account of the emergency. GIS can give an once-over of what has been hurt, where, and the amount of individuals or establishments that were impacted. This kind of information is extremely important to the recovery methodology. [24]. A major instrument gave by GIS advancements is the GRP, that energizes progressing following of the exact position of social occasions of interest. By the usage of proper gear, GPS can be used for a grouping of activities from course to viewing volcanic development.

Remote Sensing

Remote recognizing infers sensors that are connected to transporters or satellites. Mechanical vision structures the utilization of remote recognizing shows the running with highlights: Data procurement far from the crisis area, standard invigorating of the information what's more gives monster picture information of huge zones. Sensors additionally are utilized routinely to assess a physical whole and change over it into a sound impelled flag for preparing (and potentially securing). Sensor sorts join acoustic, sound, vibration, auto, creation, electric present, climate, weight, warm, and vicinity. Through wired or remote systems, this data can be exchanged to an information collection point. Wired sensor systems use wired structures to relate a social event of sensors and transmit the collected data. This condition is sensible for applications in which sensors can without a lot of a broaden be passed on and coordinated. For instance, different video observation frameworks in industry are specifically manufactured utilizing a solitary Ethernet unshielded twisted match per moved camera wired to a focal district. [12].

Web sorting out Big Data examination gives a stunning chance to uncover various wellsprings of information. Investigating electronic frameworks organization tends to a huge test for immense information examination in emergency and debacle association. Research has developed that courses of action with checking the cases of online frameworks organization like Face book, twitter, and so on, earlier or amidst times of emergency. Thusly,

online frameworks organization address another colossal information wellspring of intrigue.

C. Data storage

The dangerous headway of information powers strict necessities on farthest point and association. Monstrous information storing up recommends the point of confinement and association of enormous scale datasets while completing pace, relentless quality and accessibility of information get to. It is basic to audit essential issues including enormous cutoff structures, streamed restrict structures, and epic information gathering systems. On one hand, the farthest point structure needs to give data collecting association proven storage room; then again, it must give an extraordinary access interface to demand and examination of a lot of data. The information hoarding subsystem in an essential information compose shapes the amassed data in an obliging approach for examination and respect extraction. Subsequently, the information putting away subsystem should give two strategies of highlights:

1. The storage infrastructure must accommodate information persistently and reliably.
2. The data storage subsystem must provide a scalable access interface to query and analyze a vast quantity of data.

This accommodating decay demonstrates that the information gathering subsystem can be detached into equip framework and information association contraptions. Equipment foundation is in charge of physically securing the amassed data. The breaking point foundation can be comprehended from exchange viewpoints. Ordinary aggregating improvements join RAM and spare memory, hard plate drives and circle groups. Farthest point foundation can be asked for from a systems association setup viewpoint. In a specific order, the utmost subsystem can be managed in various ways, including, however not bound to the running with

Encourage Attached Storage (DAS): DAS is an utmost structure that contains a social event of information gathering contraptions. These gadgets are connected direct to a PC through a host transport connector (HBS) with no restriction arrange among them and the PC. DAS is a reasonable aggregating expansion to a present server.

Point of confinement Area Network (SAN): SANs are conferred structures that give square level accumulating to a social event of PCs. SANs can combine two or three putting away contraptions, for example, circles and plate shows, and impact them to open to PCs with the genuine target that the farthest point gadgets have each one of the stores of being subtly joined devices.

System Attached Storage (NAS): NAS is record level aggregating that contains different hard drives arranged into astute, excess accumulating compartments. Separated and SAN, NAS gives both breaking point and a _le structure, and can be considered as a record server, while SAN is volume association utilities, through which a PC can secure circle storage room.

Emergency association information hoarding contraptions Storage parts for enormous information might be depicted into three base up levels: record structures, databases, and programming models. Record frameworks are the establishment of the applications at upper levels. Google's GFS is an expandable scattered record framework to empower tremendous to scale, surrounded, information concentrated applications. GFS utilizes trashy item servers to satisfy acclimation to non-fundamental disillusionment and outfits clients with world class associations. GFS bolsters tremendous scale record applications with more dynamic looking at than making. In any case, GFS in like way has two or three constraints, for example, a solitary inspiration driving disappointment and poor shows for little records. Such hindrances have been overwhelmed by Colossus, the successor of GFS. Additionally, extraordinary affiliations and bosses in like way have their reactions for meet the unmistakable requesting for cutoff of giant information. For instance, HDFS and Kosmosfs are reinforcements of open source codes of GFS. Microsoft made Cosmos to help its demand and notice business. Face book uses Haystack to store the colossal measure of little evaluated photographs. Taobao in addition made TFS and FastDFS. With everything considered, scattered record structures have been generally make following quite a while of progress and business operation. A piece of the accessible gadgets to engage colossal information gathering are:

1. Google Big Table: a scattered, sorted out data storing system, which is expected to process the huge scale (PB class) data among thousands business servers. The basic data structure of BigTable is a multi-estimation sequenced mapping with pitiful, appropriated, and relentless storing. Records of mapping are push key, fragment key, and timestamps, and every motivator in mapping is an unanalyzed byte show. Enormous Table relies upon various critical fragments of Google, including GFS, group organization system, SSTable record outline, and Chubby. GFS is used to store data and log records.

2. Cassandra: a passed on storing up structure to deal with the tremendous apportion of arranged information scattered among different business servers. The framework was made by Facebook and changed into an open source gadget in 2008. It gets the insights and musings of both Amazon Dynamo and Google BigTable, particularly sorting out the scattered framework headway of Dynamo with the BigTable information appear. Tables in Cassandra are as appropriated four-dimensional dealt with mapping, where the four estimations including line, zone, piece family, and super segment. The area and duplicate parts of Cassandra are in a general sense the same as those of Dynamo, to accomplish consistency.

3. Hadoop: a best level Apache meander that began in 2006. Hadoop would procedure be able to a mind boggling degree huge volume of information with various structures. Is utilized generally in mechanical applications, inquires about monstrous information with particular breaking

points, for example, spam segregating, deal with snap stream examination and social recommendation. Truly, Hadoop has for a long time been the backbone of the huge information headway, Instead of depending upon over the top, prohibitive equipment to store and process information, Hadoop empowers spread treatment of a significant measure of information on enormous social occasions of thing servers. Hadoop offers adaptability, cost capacity, flexibility and change in accordance with inside dissatisfaction. Hadoop can recuperate the information and check thwarted expectations caused by focus point breakdown or system blockage. The Apache Hadoop programming library is a huge selecting structure containing two or three modules, including HDFS, Hadoop Map Reduce, HBase, and Chukwa.

4. Map Reduce: a thing system for sufficiently making applications which process enormous measures of information (multi-terabyte instructive aggregations) in-parallel on monstrous social events (an impressive number of focus focuses) of item equipment in a solid, denounce tolerant way. The computational model contains two client portrayed breaking points, called Map and Reduce. The structure oversees organizing attempts, checking them and re-executes the fizzled assignments. The traditionalist Map Reduce structure just gives two foggy cutoff points, without likely the most comprehended operations (e.g. Projection and sifting).

5. Dryad: an extensively supportive coursed execution motor for dealing with parallel utilizations of coarse-grained information. The operational structure of Dryad is an arranged non-cyclic diagram, in which vertices address endeavors and edges address information channels. Dryad executes operations on the vertices in gatherings and transmits information by strategies for information channels, including annals, TCP affiliations, and shared-memory FIFO. A broad assortment of information is especially transmitted between vertexes. What's more, Dryad licenses vertexes to utilize any evaluate of information and yield information, while Map Reduce bolsters just a singular data and yield set. DryadLINQ is the moved language of Dryad and is utilized to encourage the already indicated SQL-like vernacular execution condition.

6. NOSQL databases (non – relational databases)

With the headway of the Internet and circulated registering, there expect databases to have the ability to store and process enormous data effectively, enthusiasm for world class when scrutinizing and creating, so the standard social database is going up against various new challenges. Various database systems are delivered to manage datasets at different scales and support diverse applications. Traditional social databases can't address the challenges on characterizations and scales acknowledged by enormous data. No SQL databases (i.e., nontraditional social databases) are winding up more outstanding for tremendous data storing. Especially in broad scale and high-concurrency applications, for instance, web crawlers

and SNS, using the social database to store and request dynamic customer data has had every one of the reserves of being insufficient.

D. Data Analysis

The last and most essential time of the enormous information respect chain is information examination, the objective of which is to evacuate steady respects, propose conclusions and furthermore help principal specialist. Promptly, the reason and strategy metric of information examination will be investigated. Along these lines, the application change for different information sources and system the six most enormous locales will be considered. At long last, two or three crucial frameworks that acknowledge essential parts in information examination will be shown. Information examination keeps an eye out for data acquired through wisdom, estimation, or trials about a contemplate of intrigue. The motivation behind information examination is to autonomous however much data as could be depended upon that is related to the subject under thought. The likelihood of the subject and the reason may move fantastically. Some blueprint centers combine:

- To extrapolate and interpret the data and determine how to use it,
- To check whether the data are legitimate,
- To give advice and assist decision-making,
- To diagnose and infer reasons for fault, and
- To predict what will occur in the future

In [53] information examination are portrayed into three levels as appeared by the essentialness of examination: attracting examination, quick examination, and prescriptive examination.

Specific Analytics: abuse certain information to outline what happened. For example, a descend into sin might be utilized to discover fundamental cases in the datasets, depiction presents information note worthily, and information displaying is utilized to amass, store and cut the information gainfully. Unmistakable examination is ordinarily connected with business learning or perceptible quality frameworks.

Farsighted Analytics: concentrates on reckoning future probabilities and illustrations. For instance, prudent indicating utilizes legitimate strategies, for example, quick and figured lose the faith to comprehend slants and foresee future results, and information mining empties cases to give data and theories.

Prescriptive Analytics: addresses basic specialist and sufficiency. For instance, age is utilized to investigate complex structures to get understanding into framework coordinate and perceive issues and movement systems are utilized to discover culminate designs under given necessities.

III. BIG DATA IN CRISIS PHASES

Crisis Professor C. Hermann in his article in Administrative Science magazine in June 1963 states that "the crisis is a condition depicted zoned out, high threat of authentic regards and short reaction time". The four times of crisis are: Prevention, Preparedness, Response and Recovery. This arrangement the crisis cycle. There are numerous charming strategies about the usage of Big Data in crisis organization.

Tremendous Data and Crisis Prevention Information got from the examination of Big Data can predict crises or if nothing else diminishes the perils that would rise up out of a fiasco the genuine crisis affect. One case is in a noteworthy tremor hurt develops in media transmission frameworks inciting interruption of trades, in like manner has been viewed incalculable. There exists a need to consider this data for development of the normal establishment to sidestep this crisis impacts.

Huge Data and Crisis Preparedness Big Data examination can help on a very basic level to the arranging of crisis organization. Through the data examination ought to be conceivable seeing the dangers and to give a sound key approach by the individual head of the crisis. Tremendous Data examination can in like manner deal with the proactive association of resources for totally adjust to a moving toward kind of disaster.

Gigantic Data and Crisis Response

Gigantic Data examination continuously can perceive which zones require the most squeezing thought from the crisis administrators. With the usage of the GIS and GPS structures, Big Data examination can enable the right course to individuals all in all to keep up a key separation from or move a long way from the dangerous situation. Other than examination from prior crisis could help recognize the best method for responding to future catastrophes.

Enormous Data and Crisis Recovery

Exactly when the recovery incitation will logically start, the system would give a noteworthy data source. The Big Data examination sharing supportive information for recovery procedures about volunteer coordination and collaborations in the midst of the crisis.

IV. CONCLUSION

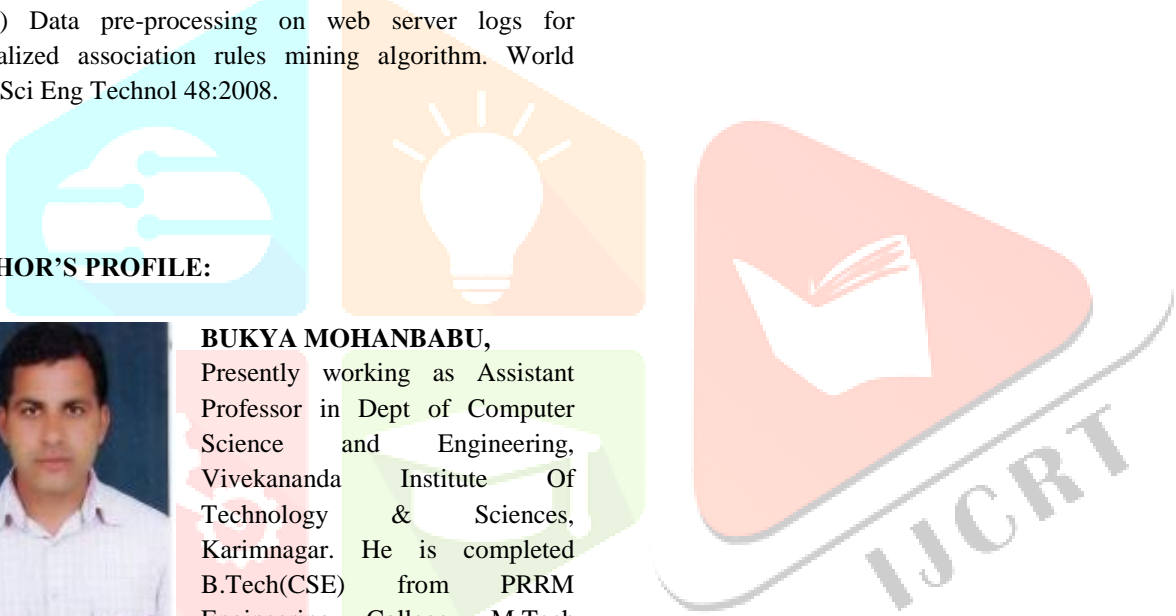
In this paper, the comfort of the examination of Big Data organization in crises and disasters was presented. A short examination of the social occasion data sources in the midst of the crisis, the mechanical means and the gadget accumulating and getting ready of Big Data. The challenges rising up out of the review concerns the imperative research fields of the Social media data use in crisis organization. In this particular circumstance, a system planning philosophy of a noteworthy data organization structure into four phases, data age, data acquisition, data amassing, and data examination was in like manner outlined out. The season of colossal data has

arrived, conveying with it a basic prerequisite for bleeding edge data securing, organization, and examination instruments. In the colossal data securing stage, customary data amassing developments were investigated in the midst of each period of the data life cycle the organization of gigantic data is the most asking for issue. Numerous troubles in the tremendous data structure require also investigate thought. Huge data ask about remains in its embryonic period. Research on regular colossal data applications, is required that can upgrade the profitability of government parts, and propel the change of human science and development, while it is similarly required to stimulate gigantic data progress. Other than there are intriguing challenges in data mining in crisis and calamities organization. Counts ought to be made for completing assignments, for instance, plan burrowing for finding fascinating affiliations and connections, gathering and example examination, to understand the nontrivial changes and examples, and course of action to maintain a strategic distance from future reoccurrences of vexatious wonders. Finally a couple of security challenges away and transmission of data ought to be under unfaltering examination, remembering the ultimate objective to address as of late creating perils.

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