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IOT BASED VEHICLE MOUNTED WEIGHT SENSORS

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ABSTRACT

Since most goods trucks in the developing world are overburdened with cargo, this issue needs to be managed intelligently. The Internet of Things (IoT) and smart sensors, which are cutting-edge technology, can be used to do this. The advantage of this system is that additional goods or loads cannot be added while trucks are in motion; if additional goods are added, government agencies can be notified immediately and in real-time, or the weight on the trucks can be monitored by the central government organisation. In this paper, we propose weight mounted sensors can dynamically give an accurate inputs about weight variation. This essay will offer an Internet and smart sensor integration.

Keywords— Internet of Thing(IoT), IoT Weight Detectors, IoT Transportation System, Block Chain, Sensors, Cloud Computing service.

[1] INTRODUCTION

Transportation of the commodities via land, air, or water There have been significant changes in the way people travel, and there are now many smart highways being built around the globe to ensure a seamless inflow of vehicles. A prevalent problem in developing countries is the burden on the transport exchanges, which has led to an increase in deadly accidents and slower vehicle movement, which causes huge traffic jams on the back roads. We are developing a smart Internet of Things (IoT) weighs vehicle-mounted detector since the exchanges are immorally overfilled after being weighed in the weigh station. This will allow us to identify and track any immorally overfilled in-between while travelling in real-time.

[2] PROBLEM STATEMENT

The system, the goods, and the cargo of exchanges transportation import and export process is carried out by means of homemade paperwork regarding the vehicle information and the cargo weight on the exchanges, which are gathered through homemade paperwork in the overall goods transportation. As a result, the process will be delayed and the exchanges will

have to wait longer on the public roads, which will cause a delay in the delivery of the goods to the destination.

Figure. 1. Traffic jam in front of a traditional toll plaza and weigh bridge center

In the traditional system, the delicacy of weighbridge systems is the goods on the exchanges are typically measured incorrectly, and truck owners end up paying more in taxes than anticipated actual quantum. Dynamic Internet of Things (IoT) weigh systems can reduce this error. The other drawback of these homemade weigh grounds is driver manipulation of the weigh ground and computer system. The driver of the weighbridge captures can manipulate and induce.

Figure. 2. Over Loaded goods trucks exceeding the load threshold values, set by the government organization

[3] INTERNET OF THINGS

The Internet of Things (IoT) is a network of physical objects and the software that controls them, enabling objects to communicate with one another and exchange data. IoT is a quickly expanding industry that will generate $11.2 trillion in revenue by 2025. Because IoT makes it possible for devices to speak with one another, it has the potential to increase both the effectiveness and safety of our daily lives. For instance, a smart home might be able to regulate a room's temperature based on another room's temperature, while a smart car would be able to alert drivers to traffic conditions. But there could be security issues connected to

IoT as well. A smart home, for instance, can be exposed to cyber-attacks if the security measures track the movements of individuals.
IoT is still a developing subject with a lot of potential despite these hazards. Making sure that the devices are safe and that the data is adequately protected is essential for the IoT to succeed. IoT is the upcoming technological giant. It is a system of connected devices that may exchange data with one another. IoT can be utilised for many things, including managing industrial operations, tracking vehicle movements, and monitoring energy usage. IoT has the ability to increase corporate productivity and reduce costs. IoT might be used by businesses, for instance, to monitor energy use and cut costs. Additionally, they might utilise it to monitor traffic and avoid accidents. IoT could also support the management of commercial operations like manufacturing. Businesses must deal with a number of difficulties while deploying IoT. They will need to figure out how to link all of the network's devices, for instance. Additionally, they will need to determine how to deal with the data that is being gathered. For a variety of reasons, weight sensors fitted on vehicles are growing in popularity. They can be used to monitor a range of vehicle data and are easy to install and accurate. The load cell is one of the most often used weight sensors for vehicle mounting. These sensors can be used to monitor a number of vehicle parameters in addition to weighing the vehicle. Among the most. Truck traffic that is overloaded is a severe issue for many emerging businesses since it results in exorbitant maintenance and road network restoration expenditures.

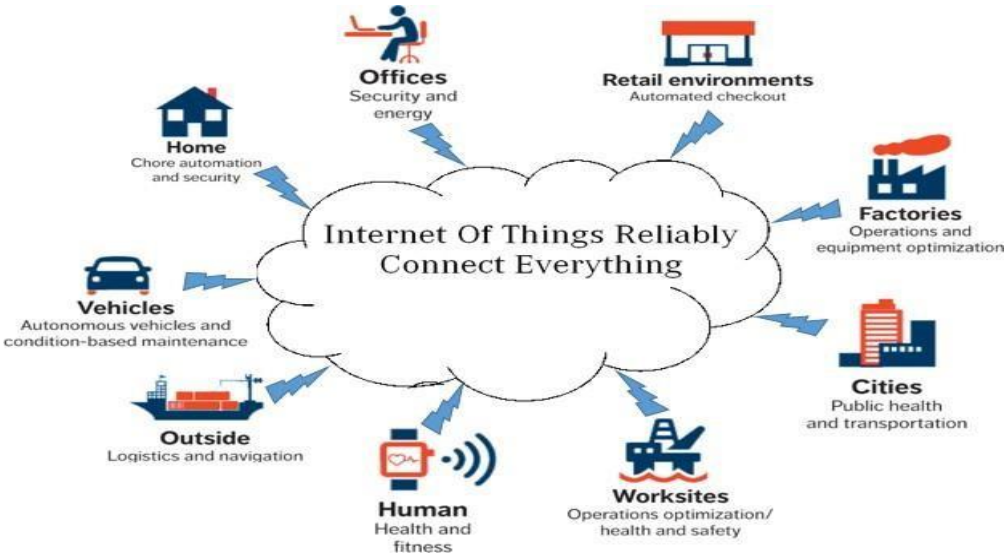

Figure 3. A Schematic View of the Block Chain Structure

[4] LITERATURE REVIEW

Due to the enormous expenses associated with preservation and repair of damaged road networks, the overfilled truck industry is a significant issue in many developing nations. In addition to financial loss, the overfilled trucking industry also poses a risk to safety and the environment. In recent years, various African and Asian nations have attempted to solve this issue. Even so, it represents an inevitable turning point for successful growth and expansion. This review of the literature looks at the causes, context, and background of the overfilling

situation in truck transportation. The review is supported by relevant academic articles and international business reports. The literature review is organized as an examination of the overfilling of exchanges in developing nations, an examination of the overfilling in developing nations, an examination of the proposition, and an examination of the weight dimension. Three primary ideas have been related in this review. First off, lucrative growth inexorably leads to overloaded truck transport. This issue arises before each industrialized nation's profitable system reaches a mature state. Second, it is impossible to entirely rule out the issue of overloading given that it also occurs in the commercial systems of advanced nations like the United States and Canada. Nevertheless, the overfilling probability varies between 2 and 5 percent in rich countries and 80 percent of all roadside trades in poor nations. Eventually, monitoring, legislation, and education will be the only means of controlling this issue. Therefore, it is clear that affluent nations consistently fund road safety instruction, while emerging nations.

The global user community does not currently have a consensus definition for the Internet of Things. Although the term's initial use has been credited to Kevin Ashton, a specialist in digital innovation, many diverse organisations, including academicians, researchers, practitioners, innovators, developers, and business personnel, have defined it. The idea that the original version of the Internet was about data created by people while the second version is about data created by things is shared by all of the definitions. An open and comprehensive network of intelligent things with the ability to automatically organise, share information, data, and resources, reacting and acting in the face of situations and changes in the environment".

A ubiquitous networking era, in which all networks are connected and everything from tyres to clothing will be a part of this vast network, was predicted by the ITU in 2005. Consider searching the internet for a watch that you misplaced in your home. This is the core idea behind the Internet of Things: a world where objects can communicate with one another and have their data analyzed by machine learning to carry out specific activities. Twine, a soon-to-be-released piece of small, low-power hardware that combines with real-time web software to realize this idea, serves as an example of how the Internet of Things might be used practically. However, different individuals and groups have various perspectives on the Internet of Things. IoT strategies were exposed in a Network World article.

[5] IOT VEHICLE WEIGHING SYSTEM

The system design entails installing the necessary packages and configuring the hardware components as described below. The term "Internet of Things" describes a network of actual physical things (or) a group of entities, each of which has been given an internet address for connectivity, as well as the communication that takes place between these objects and other internet-enabled devices, computers, and mobile systems. The Industrial Internet of Things (IIoT) applications that have been developed and deployed recently, such as the remote smart home monitoring environment, can help in shaping supervisory of larger organisations or industrial machinery systems and the even the smallest of devices and other applications.

The block chain, which also goes by the name distributed ledger technology, is a type of circulated database that stores user transactions in millions of expanding blocks. A chain of one or more blocks, each containing data values, is known as a block chain. The truck plate number, driver information, and owner information are among the data contents in this study paper that are saved inside the blocks. These data are then masked and transferred to the government's central monitoring trucks department (or) to vendors. Every block contains a

current timestamp value that records the time it was generated, a current hash value that contains 256-bit hash values, and a preceding hash value that records the 256-bit hash values of the block before it. It does not, however, contain any earlier block hash value content for the first block. To make a chain the block, it only serves as the default block. Each time a new block is created, a hash value is generated, and any subsequent changes to the block will result in a change in the hash value.

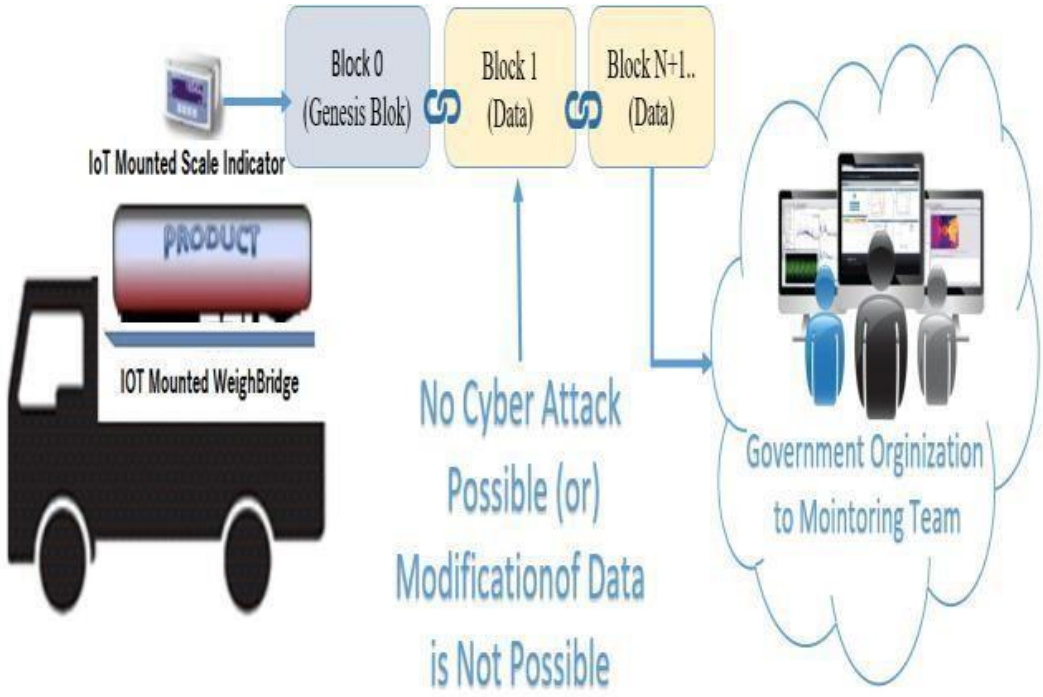

Figure 4. Proposed Block Diagram Architecture model of the IOT Mounted Scale Indicator

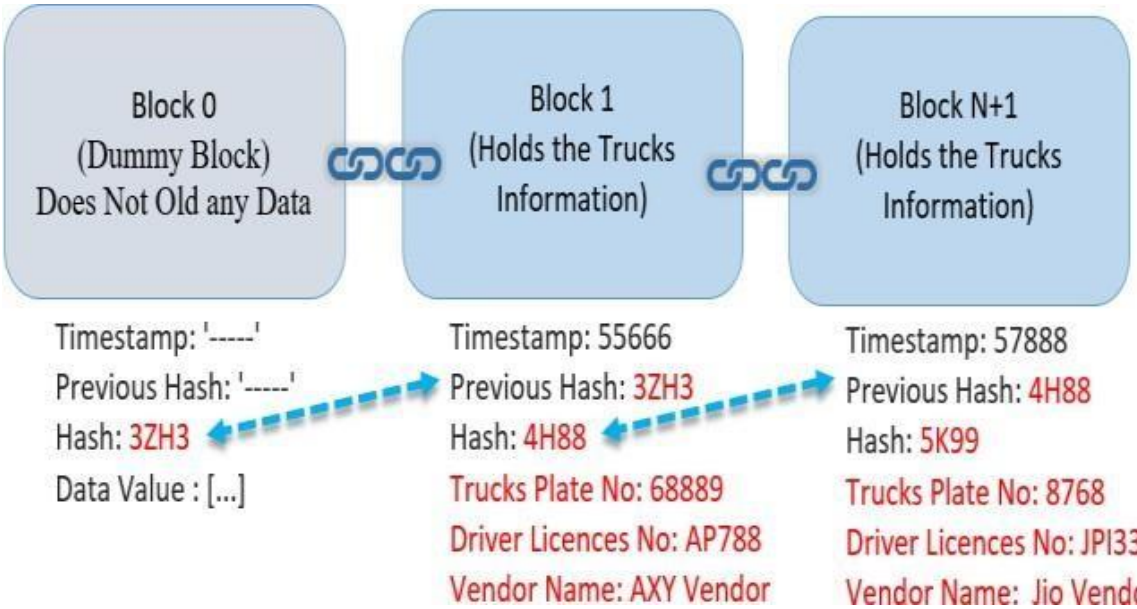

Figure 5. A Schematic View of the Block Chain Structure

The Internet of Things (IoT) weigh sensors are immediately attached on the back of the truck alongside the weighbridge. The weight of the product values are transferred via block to the government organisation, and the data can be displayed in real-time on a truck-mounted Internet of Things (IoT) scale indicator. If any hackers or operators try to manipulate the block data values, then the hash values of the block will change, and it is then easily predicted that the weight value of the block data is changed by operators or hackers while transferring the data over the network. The Internet of Things' (IoT) additional benefits. The real-time data is captured every hour or while travelling, and if any operator tries to overload the truck while travelling, the same information can be traced by the government organisation. If the truck driver tries to overload with the extra goods on the truck, then an immediately a notification message is sent over the mobile to the truck owner or the government organisation. The initial dummy block, known as the genesis block, is generated depending on the current timestamp when the data is taken, and from block one, the actual data are saved.

The masking function is used to further mask the data values after they have been stored in the cloud. As shown in figure 6, the masking generating algorithm's pseudocode, the block chain masking function is created using the random string function, and the data that needs to be masked is inserted into a block. The mask function produces random number or text values.

```
INPUT: MASKING BLOCK CHAIN FUCNTION(Vehicle Information Details)
Variable Vehicle  Processing Data = Vehicle Information Details
Variable Text Arrary Length = Input Data.Split("").lenght_Data_Value
For(Variable i =0; i < Text Array Length; i++)
{
Maksed Data Block += Processing Data.ChartAT(Math.floor(math.radomn()*Text Array Length));
}
OUTPUT: Mask(Maksed Data Block)
```

Figure 6. Pseudo code for masking\ random generating algorithm

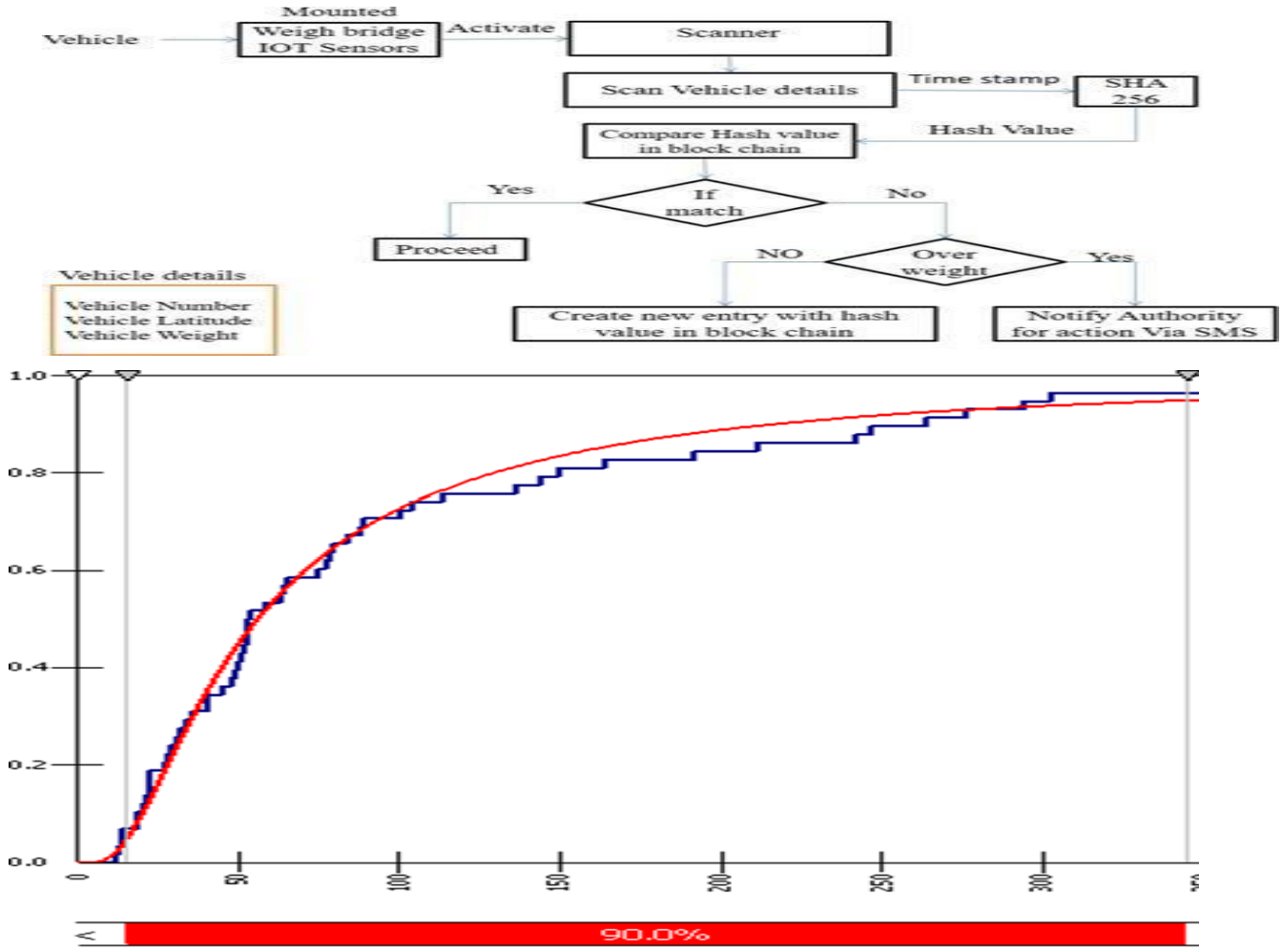

Figure 8. Pearson5 distribution result of class 8 truck

	Best Fit	Input data
Left X	15.3	15.3
Left P	5.00%	6.90%
Right X	345.3	345.3
Right P	95.00%	96.55%
Minimum	-3.7979	11.748
Maximum	+Infinity	372.4
Mean	116.994	94.366

Figure 9. Pearson5 distribution result of class 8 truck

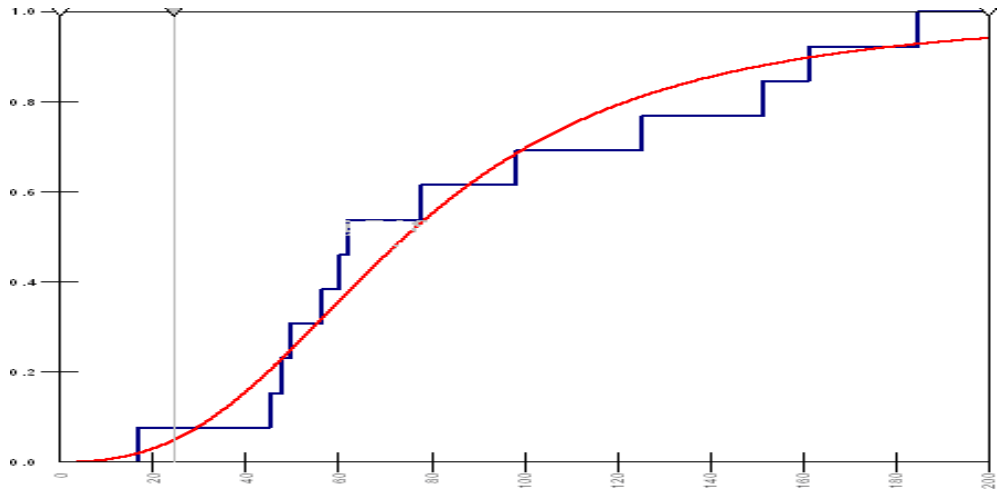

Figure 10. LogLogistic distribution result of second case of class 9 truck

[6] CONCLUSIONS

High-end Internet of Things (IoT) sensors are proliferating, so all data are accurately captured and transported over the target system using block chain application concepts. This increases the security of the data transfer from source to target location. These papers outline future work that must be done on analyses of the data generated by Internet of Things (IoT) devices and further improvement of the sensors for the better. As more and more devices are connected to the internet, real-time data can be published throughout the world as it is connected to the internet, and the amount of data generated by IoT devices can be further analysed for future business benefits. precision and effectiveness of the system. We hope that this report will serve as a starting point for more study or improvement to identify workable answers to these unsolved issues.further improvement of the sensors for the better performance and accuracy of the system. We hope that this paper could act as a source for further research work or enhancement to find feasible solutions to these open problems.

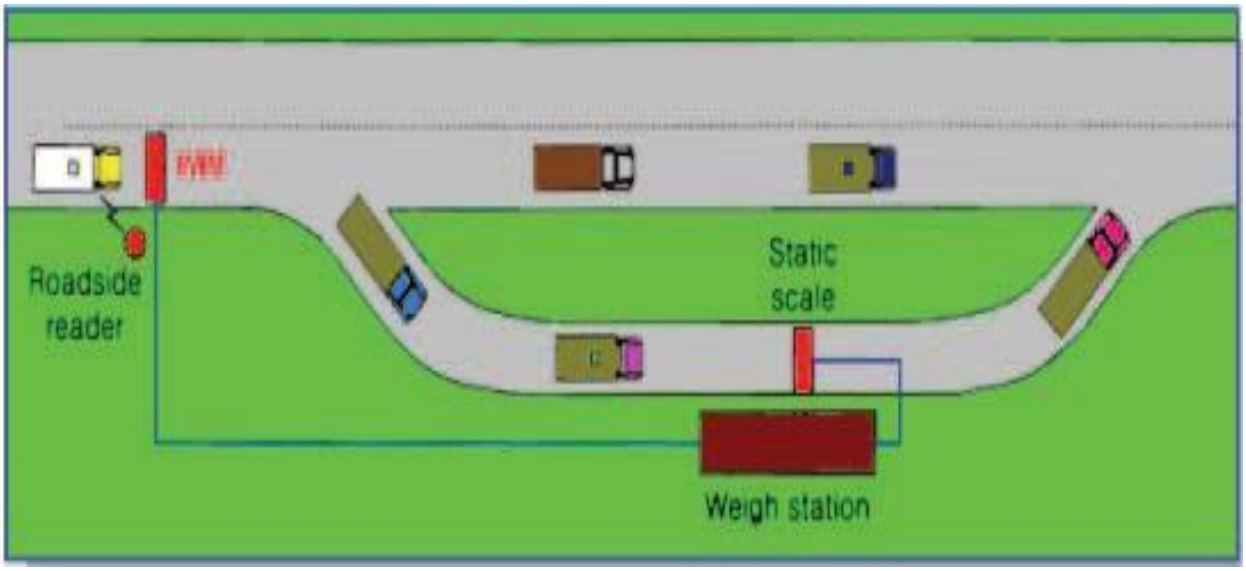

Figure 11. model and data Transferring.

The sensors on the truck that is hauling the weight on the IoT-mounted weighbridge record the values, and the data from these values is stored in the cloud computing for later processing and analysis. as depicted in figures 8 and 13. Since it's a prototype, a few tiny objects are placed on the IoT-mounted weighing sensors to gauge their relative worth. The object in the truck-1 case weighs around 0.56 grammes, while the object in the truck-2 case weighs approximately 0.70 grammes, both of which are within the range of the government organization's 1 KG weighing threshold values. The SMS message is delivered to the recipient if the values surpass 1 kg. These values are kept on the cloud server database by mobile phone device.

After being stored in the cloud computing server, the data values for the Truck 1 and Truck 2 details are extracted and delivered in the form of masked blocks. The output results values are displayed in Figures 10 and 13. Each block contains data from the weighbridge that was collected over the course of one hour; each block also includes a timestamp and a hash value based on the time the data was captured; the first block is a dummy block known as the genesis block; from the second block on, the actual vehicle information is stored in the blocks.

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