An Acquisition On Big Data Model For Quality Tracing Of Iron And Steel Industries

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Abstract*: Quality determine is essential affair for steel industries. Due to complication and variation of nature input that turn to be changed into many forms. Due to this, it is tough to explicit the report and trace over the whole product life cycle from designing, construction, etc. According to big data approach, study of the essence of steel brand and the factor of their manufacturing system and it is effective viable multi row system which consists of four structure , [1]the basis quality bill of material [BQBOM] ,[2]the general process bill of material[GPBOM],[3]the production and scheduling bill of material[PSBOM] ,[4]the final quality bill of material[FQBOM]. This mode would be useful to builders to frame a kind of scheme in big data production environment.

***Index Terms*: big data , bill of material , hadoop , hdfs, mapreduce ,quality data.**

I. INTRODUCTION

The use of computerized information has transformed the classical program management mode into a more advanced one which is building basis competitiveness for modern program. Due to the promoting of computer and network technology, more iron and steel enterprises implemented financial management, quality management, production control and automation based on IT, the asset of which are not only greatly reducing the production cost, improving the management level, but also greatly improving the quality of the products, reports of these application including more than 20 iron and steel enterprises such as Thyssen krupp has implemented SAP/R3 systems, and others such as voestalpine has successfully implemented MES system. Due to the development and improvement of the IT applications in steel industry, more and more enterprises realize the big data in the industry is forming and ready to be used to support further management level promotion.

Big data refers to data sets that are both big and high in variety and velocity, which makes them tough to handle using classical tools and techniques. Nowadays, the big data is generally analyzed and used in both academics and industries on management. In this paper, cause influencing decision-making in management based on big data are proposed, for example, paper emphasizes on storage, pre-processing, altering bond. Common software planning such as APACHE HADOOP and HADOOP eco system are widely used by major, and even some precise architectures are proposed to associate enterprises to build their own big data architecture in a smooth way.

The fast scheduled of the advanced quality construction and industrial information has forced to the rapid growth of quality data. These data are very essential to the tracing and control of the products and the data measuring is very large. So these data can be called as quality big data. As for the quality big data, some of the researches target on the origin ideal description, blunder disclosure and indicator. But there is few researches about the operation of quality big data in steel industries. In this paper, we will discuss about the effective determining and management purpose of steel industries based on the quality of steel products and its limited process characteristics.

II. QUALITY BIG DATA AND THE PRODUCTION PROCESS OF IRON AND STEEL PRODUCTS

Quality data is heavily similar to some industries as for iron and steel industries, which is a common semi-processed and semi-distinct procedure, quality data is complicated, volatile and developed along the full biological clock of the product including layout constructing, giving use and destruction, etc..,

The construction of iron and steel industry is a disintegration access with lots of disconnected section to different products which are derived from the same iron smelting blast furnace. Firstly, raw materials such as ore, coke, and limestone are mixed in the blast furnace which can smelt out about 25 tons liquid iron.

Then the liquid iron is transmitted into basic oxygen furnace and electrical furnace to control the segment of the iron into diverse steels. At this part of the cycle, the components of the steel are scanned and recorded for more interpreting of the steel product are satisfied with the difficult features, the liquid iron is allowed to turn into die drop or sequentially casting into ingots or casting blanks. Before the ingots or blanks are transferred to next procedures, they should be collected inti quality big data, too.

At the end, semi-products would be sent to the final process to form the final products such as bars, sheets, wire steel products, slabs, plates, and so on. Before the products are delivered to customers, the end test should be taken to make sure the products are good, and relative quality data would be collected into quality big data too.

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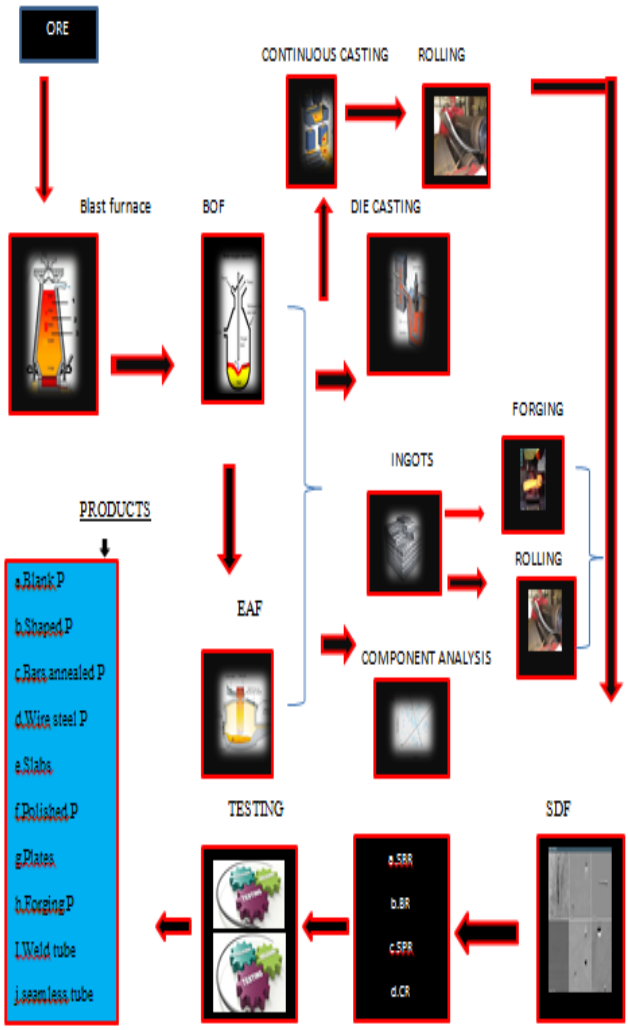
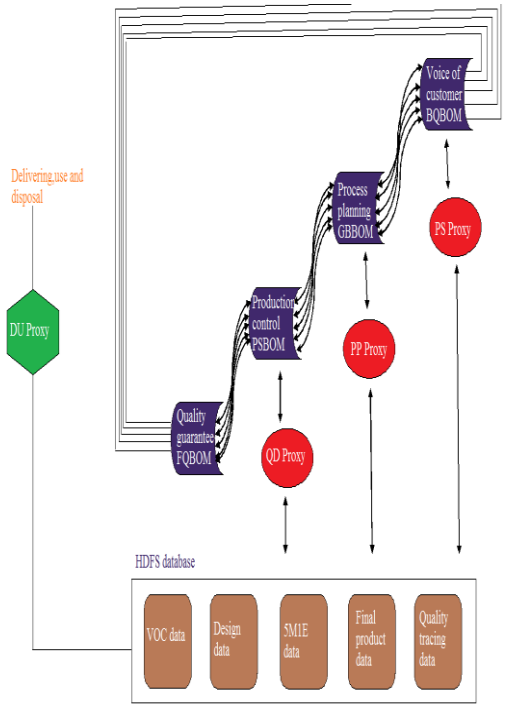


Besides these quality data introduced above all the 5M1E (man, machine, material, method, measurement, environment) data related to the form of the products should be collected in some right form to support the quality tracing and quality control. By this means, the quality data of the iron and steel industry is big and high in variety and velocity.

III. QUALITY BIG DATA MODEL WITHIN THE LIFE CYCLE OF STEEL PRODUCTS

In order to know the quality tracing and control within the whole life cycle, a effective combined big data model of quality for steel industries should be designed which would be able to treat a effective growing multi-layered data structure which consists of 1)the basic quality bill of material(BQBOM) which means the voice of the customers; 2)the general process bill of material(GPBOM) which means the process action ,methods and relative parameters to know the product ; 3) the production plan control and relative quality control specification ; 4)the final quality bill of material(FQBOM) which means the final product quality features to hand over to the customers and users.



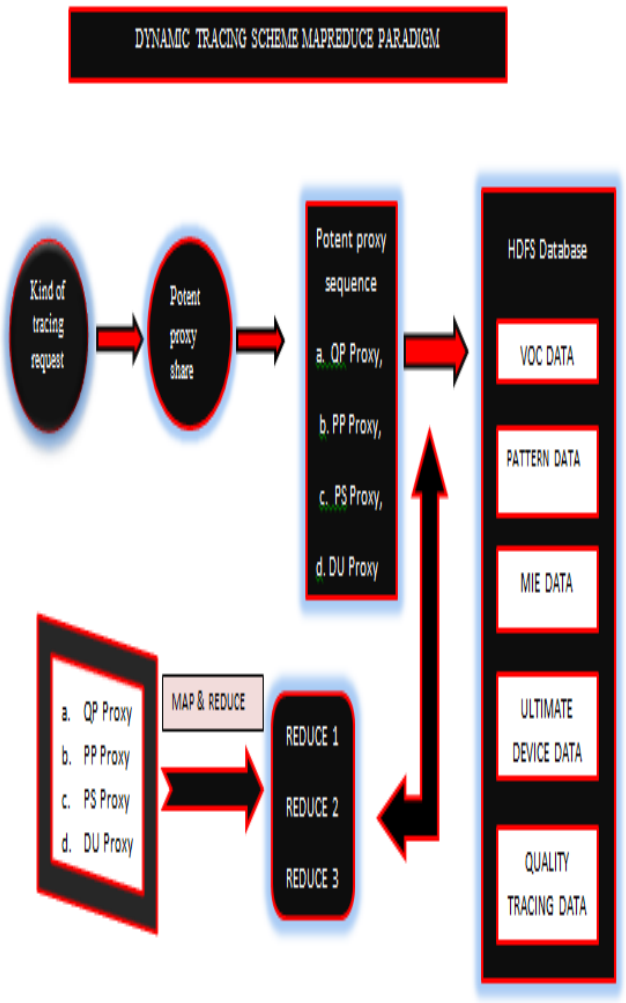
The format of the model is based on the quality function development(QFD) and the hadoop distributed file system (HDFS), where each step has two-way relation for example , in the quality design step, the basis quality BOM consists of the voice of customers is transformed into the process specification and relative parameters and when the commodity is formed , the relative data is should be traced through the back-way relation of the data. While the quality data is effective formed and changed in production , so, how to trace the information and make sure the quality in control is a quite complicated issue . To solve the problem , we apply the HDFS database to store the quality data in a distributed file systems, and use alternate to appeal and reply to each functions in quality tracing requirements.

IV. EFFECTIVE TRACING PLAN OR STRUCTURE ON MAP REDUCE

The effective tracing method is based on the open-source operation of the apache hadoop (along with it's distributed file system HDFS): the mapReduce paradigm which is based on grouping the data into pairs of keys and values , we try to know the effective quality tracing for steel industry based on HDFS database and map reduce method.

a. QP Proxy
b. PP Proxy

In particular , when a quality tracing request is earned ,it'll be given to the right proxy or consolidation of alternate ,these proxies will use mapReduce paradigm to form input map ,according to special process routes and association test , the intermediate maps are generated , and by reduce methods , the output map will be finally worked out and stored back to HDFS.



V.CONCLUSION

In this paper, an effective Big Data Model for quality tracing of iron and steel industries is being suggested. The component of the iron and steel product life cycle is considered, an effective growing of multi-layered data structure which contains BQBOM, GPBOM, PSBOM and FQBOM. Based on Hadoop and MapReduce model, an effective tracing framework is analyzed which can be used as a simple recognition framework for program to recognize the quality of tracing iron and steel industries.

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