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# Information Extraction for Defect Free Products with Business Intelligence Improvement Using Ai

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***Abstract**: Artificial intelligence and technological advancements are exceptionally influenced the entire society and mankind. In today's highly competitive global market, winning requires near perfect quality. Although most mature organizations operate their processes at very low defects per million opportunities, customers expect completely defect free products. All research works present different methodologies without showing clear guidelines or key issues for the development of intelligent completely defect free products for Business Intelligence. Artificial neural networks, fuzzy logic systems and Bayesian belief networks are AI techniques Information Extraction for Scheming Processes with Business Intelligence Improvement Using AI.*

***Keyword:** Artificial Intelligence, Business intelligence, fuzzy logic ,artificial neural networks*

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## I. Introduction

Business intelligence (BI) refers to techniques and tools that aim to provide businesses with support for decision-making by collecting and analyzing information relevant to business leaders. The enormous volume of textual information that is available in online

Sources and in the internal storage of organizations makes it nearly impossible to follow and analyse all the relevant sources manually or to apply traditional storage and retrieval methods. Useful business information is hidden in a mass of data that is constantly increasing and evolving. Information extraction (IE) deals with extracting relevant and high-quality information from unstructured sources, such as texts and document collections. The extraction process involves representing information contained in textual data in a structured and normalized way. BI offers an interesting field for applying IE techniques. The relevant information in the business context is represented by named entities (NE) and the relationships between them. We use the term IE to refer also to the extraction of events that are relevant to the entities that are being tracked. Many monitoring systems based on artificial intelligence (AI) process models have been successfully developed in the past for

optimising, predicting or controlling defect free products processes. In general, these monitoring systems present important differences among them, and there are no clear guidelines for their implementation. In order to present a generic view of defect free products monitoring systems and facilitate their implementation, this paper reviews six key issues involved in the development of intelligent defect free products systems: (1) the different sensor systems applied to monitor defect free products processes, (2) the most effective signal processing techniques, (3) the most frequent sensory features applied in modelling defect free products processes, (4) the sensory feature selection and extraction methods for using relevant sensory information, (5) the design of experiments required to model a defect free products operation with the minimum amount of experimental data and (6) the main characteristics of several artificial intelligence techniques to facilitate their application/selection.data driven models of biological systems. AI methods compared with traditional regression statistical methods appears to be accurate and more explorative with respect to analysis of large data cohorts. Different AI method has unique characteristics and it can be used to perform various tasks [1]. AI models allow more thorough, but flexible investigation of large data with reliable prediction of disease outcome. Discovery of novel biomarkers and wide use of electronic medical records are necessary to increase the scope and accuracy of AI in health care. Requirement for skilled operator and limited commercial uptake are barriers to the implementation of AI in health care. Potential and accuracy of AI systems can allow this important tool to be developed further to assist the health care decisions in the diagnosis and treatment of diseases [23]. The various applications of AI platform in health care sector are summarized in Table 1The paper is organized as follows: In Section 2 we introduce the background of this work and the most relevant previous research work. Section 3 describes BEECON in detail and explains how the system works. In Section 4, we describe the test settings, evaluation measures and data used for evaluating BEECON. In Section 5, we report on the outcomes of the evaluation, analyze the results and compare them to other related systems. Finally, in the Section 6 we draw conclusions and suggest new directions for future work.

## II. Related work

Ahmad, A. S.[1] Emulation of human cognitive abilities is developed based on the modelling of system interaction with the environment and information fusion, which can be used to conduct Inference, so when this occurs repeatedly it will produce knowledge that grows. This process is called Knowledge Growing System which is Brain Inspired Cognitive Artificial Intelligence and can be used for information extraction and when applied to instrumentation system will realize Intelligent Instrumentation System.

Strohmeier, S., et al[2]To this end, a brief foundation elaborates on the central functionalities of Artificial Intelligence Techniques and the central requirements of Human Resource Management based on the task-technology fit approach. Based on this, the potential of Artificial Intelligence in Human Resource Management is explored in six selected scenarios (turnover prediction with artificial neural networks, candidate search with knowledge-based search engines, staff roistering with genetic algorithms, HR sentiment analysis with text mining, résumé data acquisition with information extraction and employee self-service with interactive voice response). The insights gained based on the foundation and exploration are discussed and summarized.

Abellan-Nebot, J. V et al[3] Many machining monitoring systems based on AI process models have been developed in the past for optimising, predicting or controlling machining processes. All research works present different methodologies without showing clear guidelines or key issues for the development of intelligent machining systems. In order to overcome the lack of a global view on how to develop machining monitoring systems.

Arendarenko, E. et al[4]In this paper, we have presented BEECON, an IE system for BI that uses an ontology for storing and processing domain knowledge. Due to its domain-specific language resources, the system has a wide coverage of the business events domain. The system also includes a novel co-reference resolution algorithm for company names. Being built on top of well-known Java tools, it introduces new components as well as improvements to the original components.

Hamadache, M., et al[5]Thus, the paper provides an overall platform for researchers, system engineers, and experts to select and adopt the best ft for their applications. Second, the paper provides overviews of contemporary REB PHM techniques with a specific focus on modern artificial intelligence (AI) techniques (i.e., shallow learning algorithms). Finally, deep-learning approaches for fault detection, diagnosis, and prognosis for REB are comprehensively reviewed.

Wodecki, A. (2018).the basic concepts and methods of artificial intelligence are presented. The introduction describes the various aspects of Big Data and shows how it is crucial for the implementation of AI solutions. Next, the various definitions, methods, learning mechanisms and technologies used to create intelligent systems are discussed. The final section explains how cognitive computing IT solutions are exerting an increasing influence on the development of the whole field of AI.

Patil, S et al[7]Artificial intelligence has drastically revoltunaised the performance and appearance of various enterprises. Applications of AI tools and techniques in the healthcare sector has changed the traditional diagnosis and treatment opportunities. Advancements in IT have been gathering the large amount of data in various sectors. The term Big Data refers to the data which is unable to handle and analyse by traditional software's and hardware's. The specialized systems are required to handle this Big Data. Analysis of healthcare big data leads to the discovery of valuable information which can improve the patient care.

## III. Scheming processes challenges

The new quality and the amount of data, information and knowledge that can be generated from them, is the source of opportunities as well as challenges. The large amounts of data, available in various forms, coming from various sources and generated at high speed, cause difficulties in assessing its credibility, business potential and the possibility of using it. On the other hand, a wide spectrum of potential applications makes concentration difficult in the choice of strategic goals and their consistent implementation. The high dynamics of the existing evolution and the emergence of new solutions supporting the creation of AI class systems raises the complexity of the processes of creating data processing strategies and designing these system architectures. Breaking down the barriers connected with creating advanced class solutions affects the acceleration of development in virtually all industries, which increases competitiveness and reduces the problems with new, more flexible competitors entering the market. In order to be able to take advantage of opportunities and meet the challenges related to the increasing access to data and tools enabling its effective processing, managers should develop: 1. the awareness of data generated by already owned systems in various elements of the value chain; 2. the ability to identify business potential inherent in internal, external and customer-generated data; 3. the ability to use AI class systems to assess the reliability of data, especially from external sources; 4. the ability to create solutions based on data streams available in near real time, and not just historical data; 5. the ability to identify and quickly implement solutions drastically simplifying the creation of AI class systems.

## IV. Proposed methodology

Data Processing Methods To release the potential hidden in the collected data, it should be processed and analyzed. This can be achieved by many different solutions: from pure programming to Business Intelligence class systems. Interestingly, the most advanced of them are offered for free under the Open Source licenses, while the knowledge necessary for their effective use is also often available for free in the form of manuals or even professionally prepared electronic courses. As a result, this increases the chances of companies that do not have large budgets to compete with large, According to the literature, a generic methodology for developing an intelligent monitoring system for defect free products is composed of six key issues: 1. Sensors: Which sensors are to be applied? The cutting process can be characterised by a variety of physical quantities. Appropriate sensors such as dynamometers, AE sensors, accelerometers, current/power sensors, thermostats, etc., transform a physical quantity into the corresponding electrical signals. It is important to take into account the reliability of each sensor, the cost, its intrusive nature, and its application in order to select the most appropriate sensor system for a given monitoring purpose. 2. Signal processing: How to acquire and process sensor signals? Signal processing can be more or less complex, consisting in amplifying and filtering (with analogical low-pass, band-pass, or high-pass filters) the signals. Sample frequency limitations of acquisition boards must be taken into account to avoid aliasing. In addition, digital signal processing through digital filters and signal segmentation operations has to be considered to be able to acquire the part of the signal which is of interest. 3. Feature generation: Which features could describe the signal adequately? The sensor signal has to be transformed into features that could describe the signal adequately. Many different features from the time domain, frequency domain and wavelet domain can be used for this purpose. 4. Feature selection/extraction: Which of the generated features are the most meaningful? In order to develop robust and reliable models for monitoring, it is necessary to use the most meaningful features which best describe the defect free products process. Feature selection and feature extraction are two methods which allow the most useful sensory features to be defined. 5. Process knowledge model (a) Design of experiments: Which design of experiments is required to model the process accurately enough? Experimental runs in defect free products for modelling purposes are both economically costly and time-consuming, so an effective design of experiments is mandatory to enable monitoring systems to be applied in industry. (b) AI technique: Which AI technique has to be applied to model the process? Monitoring systems require reliable models which are able to learn complex non-linear relationships between process performance variables and process variables in defect free products. An adequate selection of the AI technique is crucial to develop reliable defect free products models. This selection depends mainly on the number of experimental samples, learn complex non-linear relationships between process performance variables and process variables in defect free products. An adequate selection of the AI technique is crucial to develop reliable defect free products models

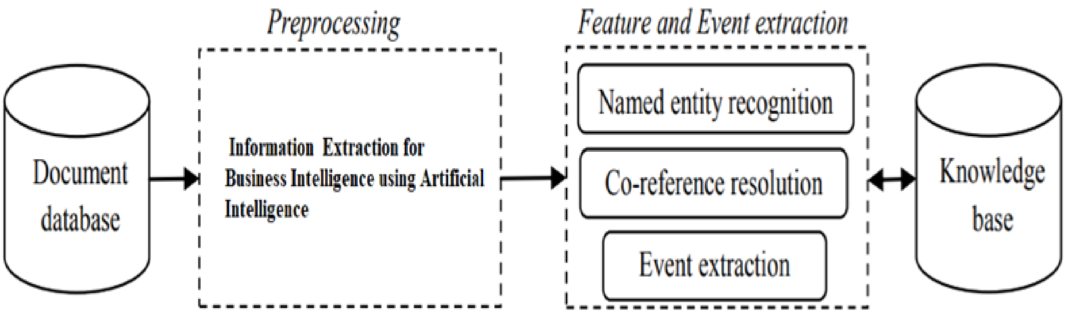


**Figure 1:** Working Of Proposed System

This selection depends mainly on the number of experimental samples, the stochastic nature of the process, the desired model accuracy, the explicit or implicit nature of the model and the previous knowledge of the process.The paper has reviewed: (1) the different sensor systems applied to the monitoring of defect free products processes, (2) the most effective signal processing techniques, (3) the frequent sensory features applied in modelling defect free products (4) the sensory feature extraction methods for using the relevant sensory information, (5) the DoE required to model a defect free products operation with minimum experimental data and (6) the main characteristics of several AI techniques to facilitate their application/selection.

## V. Working Of Defect Free Products Scheming Processes

The large number of sensor features reported in the literature for modelling and monitoring defect free products systems makes it necessary to find out which feature combinations are the most significant and reliable for aspecific monitoring purpose. Intuitively, it is difficult to estimate which features are more sensitive to part accuracy prediction or tool-wear diagnosis, as the effectiveness of the features is affected by various factors, such us machine-tool characteristics, material properties,

Lubrication, work holding, location of the sensors, signal-to-noise ratios of the data acquisition system, etc. Therefore, a systematic approach to reducing the number of features to be used provides valuable guidance for the successful development of reliable and robust defect free products monitoring systems. There are two methods for feature reduction: feature selection and feature extraction. The goal of feature selection methodologies is to find k of the d features that give the most information and to discard the other (d − k) features. On the other hand, feature extraction methodologies try to find a new set of k features that are a combination of the original d features. example of feature selection/extraction procedures. In general, the benefits of applying a feature selection/extraction methodology to develop monitoring systems can be defined as follows: – Reduced feature inputs tend to yield easier process knowledge models by means of less complex learning algorithms. – Simpler models are more robust on small datasets. – Simpler models have less variance; in other words, they vary less depending on the particulars of a sample, including noise, outliers, and so forth. – When data can be explained with fewer features, one gets a better idea about the process that underlies the data, which allows knowledge extraction. – When data can be represented in a few dimensions without loss of information, they can be plotted and analysed visually to determine structure and outliers.

Although AI techniques can be successfully applied to monitoring machining systems, a specific AI technique may be recommended according to the monitoring purpose, the experimental data set for modelling the process, the previous knowledge of the process and so forth. Hence, a general set of guidelines to select the most appropriate AI technique according to its advantages and drawbacks is proposed as follows: – ANN: applications where the purpose is not to extract knowledge, and there is no previous knowledge of the process (or if there is previous knowledge, this knowledge is not intended to be added to the model). Applications where high-accuracy prediction is required. Applications where there is no extrapolation and a good generalisation is required. Applications where the experimental data set is composed of a medium/high number of samples, since the data set is usually divided for training, testing and validating. Applications where only prediction or diagnosis is required and the inverse problem, such as the selection of cutting parameters to ensure a certain value of defect free products performance, is not considered. In general, ANNs are well-suited for accurate surface roughness prediction, cutting-tool flank wear prediction and cutting tool state diagnosis. – Fuzzy inference systems: applications where there is enough knowledge from the process and this knowledge is intended to be added into the model. Applications where the understanding of the process prevails over the accuracy of the model. Applications where extrapolation can occur and the general process behaviour is expected to be smooth. Applications where the experimental data set consists of a low/medium number of samples, since part of the model is developed using previous knowledge. Applications where the inverse problem has to be solved apart from specific variable prediction. In general, fuzzy inference systems are used for surface roughness prediction, cutting-tool flank wear prediction and cutting parameter selection for optimal surface roughness. – Adaptive neuro-fuzzy inference systems: applications where the aim is to add previous knowledge and also to extract hidden knowledge from experimental data in rule-form. Applications where the ability of extrapolation and generalisation is required. Applications with a moderate accuracy requirement. Applications where the experimental data set is composed of a medium number of samples. Applications where the inverse problem has to be solved. Since neuro-fuzzy systems are a hybridisation of ANN and fuzzy systems, the recommended applications are similar to both ANN and fuzzy applications. – BN: applications where the aim is to add previous knowledge and also to extract hidden knowledge from experimental data in the form of causal relationships and probabilities. Applications where low accuracy prediction but a high degree of reliability are required. Applications where the system that is modelled has a highly stochastic behaviour and the prediction reported by the model is given with an expected uncertainty level. Applications where the experimental data set is composed of a large/very large number of samples depending on the variable discretisation ranges and the expected accuracy. Applications where prediction/diagnosis and the inverse problem for cutting parameter selection are required. BN is recommended in highly stochastic defect free products processes for cutting-tool diagnosis, prediction of part accuracy and the selection of cutting parameters in order to meet part specifications

## VI. Conclusion

The above-presented outline of the basic AI methods and technologies obviously does not exhaust the topic. However, it is satisfactory as for the general understanding of the influence that these systems might have on contemporary organizations. The devoted to the presentation of the ways in which AI solutions can change management methods of companies, competing and building competitive advantages on the current and future markets. Integrated efforts of experts from technical, pharmaceutical and health care sector are desirable to achieve milestones in the field of big data analysis and artificial intelligence. With aid of Deep Learning and other high performance computing models Big Data and AI are instrumental and playing a keyrole in the Healthcare and Biomedical Sectors.

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