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DEVELOPMENT OF AN INFORMATION SYSTEM FOR AN OIL PRODUCING ENTERPISE

Asif Huseynov Etibar
Azerbaijan State Oil and Industry University

Abstract
The process of developing a study has been laid that covers the deep analysis of the entity's workflow, obstacles, and goals followed by the development of an informational system architecture. By applying sophisticated technologies like cloud computing, big data analytics, and IoT integration the system attempts to enhance the efficiency of oil and gas producing processes, including exploration scouting, drilling, extraction, refining, distribution and maintenance. Main functionalities of the system include real-time monitoring and prodution process control, predictive maintenance to render the downtimed small and resources' utilization critieria as enhanced, intelligent reservoir management for high production, supply chain orficiation for efficient resource distribution, and compliance for meeting industry regalations and standards.

Introduction
The world's economy is largely based on oil that is a nerve of transport, manufacturing and invisibility, and this is the surest evidence that all the sectors are dependent on the oil industry. With the increase in global population and industrialization, the demand of oil and its derivatives increasingly raises as it becomes the main source for driving the engines of economic motor. Due to this, most international oil corporations need to turned toward the technology of efficiency, sustainability, and profitability. In this light, the creation of information technology which would provide an efficient solution addressing the unique problems and unwieldy task of oil production becomes indispensable. It is about efficient control of all stages of the production of oil on a drilling rig by offering such solutions as exploration, drilling, extraction, and refining. Through implementing of advanced technology and data analytics and information management methodologies the oil &gas companies may gain totally new capabilities which will enable the country to face all the challenges of market changes, regulatory requirements, and environment constraints. As oil production ultimately evolve into sophisticated information system as opposed to a mere technological upgrade, it displays a fundamental power towards an adaptive, data-centric and sustainable energy production. The world in the process of replacing conventional energy sources with the cleaner and more effective ones, the oil companies that lead in innovation and utilize information technology will become the champions of energy.

Major challenges in oil production

Oil production, the backbone of the energy industry, despite the high quality and position, is posing some technical, environmental, economic and geopolitical challenges. These issues have profound consequences for oil enterprise operation and thus invention of alternative solutions to support sustainable and long term viability is very crucial.

1. Technical Challenges:

- Reservoir Complexity: Many oil reservoirs are situated in structures that are difficult to reach and expensive to get through because of their geological properties. Although improved oil recovery procedures can be necessary in many cases, to reach the unconventional resources - or that are left over.
- Declining Production Rates: The main reason for the decline in oil field production is that older oil fields tend to have decreasing production rates over time, which may need going for new reserves and involving more capital investment in advanced extraction techniques.
- High Operating Costs: The oil production must be financed with both huge initial investment outlays and recurring operating funds, which includes drilling, extraction, transport and refinement costs. The level of oil other commodities as a wildcard in the economics of production operations can severely affect the profitability of a business.

2. Environmental Challenges:

- Carbon Emissions: The emissions from oil production is a substantial welder of greenhouse gases that in the process of global warming and spoiling the environment is caused. The act of decreasing emissions and gradually shifting from non-renewable to clean energy sources grows in its responsibility for minimizing the environmental crisis.
- Water Usage and Pollution: When practising an oil extraction technique like oil and water flooding or hydraulic stirring (fracking), the available freshwater reserves may be diminished and the groundwater can be contaminated with pollutants that can be a threat for the eco-systems and health of people.

Analysis of existing information systems

Evaluation of the present digital system at the oil production phase needs an analysis of the system's functionality, its strengths, and weaknesses, and the possible future options for the development of the system itself. Such analysis cannot be overemphasized as the first step towards the identification of shortcomings, optimal process executions, as well as improved decision-making functions within oil-producing commercial ventures. Here are key aspects to consider:Here are key aspects to consider:

1. Evaluation of Current Systems:

Therefore, for safety reasons and to prevent the spread of disease, the production, transportation, distribution, and management of agri-food must be conducted under strict regulatory conditions.

- Evaluate the amount of robustness, ease of use, and adequacy of information systems that are spread over the equipment that pertains oil production at all stages from exploration to refining, transportation and distribution.
- We should clearly prioritize advantages and disadvantages in data utilization, automation of workflow, integration capabilities, and user interface.
- Assess if the existing system is powerful, reliable and safe enough to grow to support the developing needs of the organization as well as adjust the infrastructure to the changes in technologies and regulations.

2. Review of Technology Stack:

An agriculture sector dominated by local farmers, cooperatives, or small businesses may contribute to the development of strong local economies, creating employment opportunities and cultivating food security.

- Identify the individual devices and elements within the existing information systems that are used mainly e.g., databases, servers, networking devices, and software applications.

- Assessability of stack, stacking and its implemenntation, compliance with allowable practices and standards.
- Analyze the practicability and the economic efficiency in the renewable systems to take advantage of the new technologies such as cloud computing, big data analytics, Internet of Things (IoT) and artificial intelligence (AI).
3. Data Management and Integration:
- Analyze the way data is collected, worked on, kept, and processed using the current systems, including the structured and unstructured sources of the data like the seismic surveys, well logs, production records, and sensor data.
- Examine on the efficiency of data fusion methods within the organizational framework that aims to achieve data integration from multiple sources and develop an undivided view of entities' operations, assets and performance.
- Indicate data quality flaws, incapacity, and duplicity that be able of hampering correct decision-making and hindering the operations.

Designing an information system for oil production

Making an info system for the crude oil production requires construction of a multi-level structure that will be suitable for all requirements and challenges. Here's a brief overview of the key considerations in designing such a system:Here's a brief overview of the key considerations in designing such a system:
1. System Architecture: Create an expandable and adaptable infrastructure that unifies different elements in the system which include data gathering devices, processing components, analytics engines and user interfaces. The architecture should be capable holding data about real time data collection, storage, analysis and visualization so that the oilfield operators can take timely decision across the whole developments.
2. Functional Capabilities: Establish the functional requirements of the information system taking into account the specified operational activities related to oil production, i.e. exploration, drilling, extraction, refining, transportation, and distribution. Develop a software that contains asset management, production tracking, predictive/condition-based maintenance, supply chain optimization, and regulatory compliance to help businesses improve their operations and productivity.
3. Data Management: Make sure of the data maintenance excellence by strictly following the information quality, integrity and security provisions from the various sources, including devices, machines and operational databases. Develop the data integration, cleansing and normalization techniques in order to source diverse data sets and provide a universal view of whole operations for decision makers.

Potential benefits and outcomes

The development and implementation of an information system tailored for oil production can yield several potential benefits and outcomes:The development and implementation of an information system tailored for oil production can yield several potential benefits and outcomes:
1. Operational Efficiency: Smooth workflows, automated processes and information analytics in real-time improve performance of business oil-producers by allowing them to operate optimally, lower downtime, and raise total efficiency, respectively.
2. Cost Reduction: Organizations will be able to decrease their operating costs, improve asset utilization, and increase returns on investment by integrating their operations with sensors and analytics. These are done by identifying inefficiencies, optimizing resource allocation, and implementing predictive maintenance strategies.
3. Risk Mitigation: Improved monitoring capabilities, compliance management systems, as well as predictive analysis stand for the reduction of operational risks, maintaining regulatory compliance, and keeping environmental impact at a lower level. Such capabilities may help preserve the reputation and sustainability of the enterprise in the long term.

Finally, for a company with an information system built specially for oil production, the management of special activities can be improved greatly, which can be manifested in better operational performance, financial outcomes, risk control, and better sustainability showing a future commitment for the industry and its changing environment.

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MÜASİR DÖVRDƏ KOMPÜTER GÖRMƏ SİSTEMİNİN TƏTBİQİ SAHƏLƏRİ

SƏLMİ R. MƏHƏRAMOVA
Azərbaycan Dövlət İqtisad Universiteti (UNEC)

Xülasə
Müasir dövrdə kompüter görmə sistemləri rəqəmsal şəkilləri və videoları şərh etmək və təhlil etmək üçün insanın vizual sistemini təqlid edərək, maşınların vizual dünyanı necə qavradığını və anlamasında inqilab etdi. Bu transformativ texnologiya avtonom nəqliyyat vasitələrindən səhiyyə, pərakəndə satış, istehsal və digər sahələrə qədər müxtəlif sahələrdə tətbiqlər tapmışdır.Əsas olaraq, kompüter görmə alqoritmlər və dərin öyrənmə üsullarından istifadə edərək vizual məlumatlardan mənalı məlumatların çıxarılmasını nəzərdə tutur. Maşın öyrənməsi və neyron şəbəkələrinin gücündən istifadə edərək, bu sistemlər obyektləri, insanları, jestləri və mühitləri diqqətəlayiq dəqiqlik və sürətlə tanıya bilər.

Açar sözlər: kompüter görmə, identifikasiya, vizual dünya, dərin öyrənmə,vizuallaşdırma, rəqəmsal təhlil.

Giriş

Kompüter görmə, kompüterlərə rəqəmsal şəkillərdən və ya videolardan vizual dünyanı şərh etməyə və anlamağa imkan verən süni intellektin və kompüter elminin multidissiplinar sahəsidir. Əsasən, insanın vizual sisteminin vizual məlumatı qavramaq, təhlil etmək və şərh etmək qabiliyyətini təkrarlamaq məqsədi daşıyır.Əsas olaraq, kompüter görmə vizual məlumatlardan mənalı fikirlər və məlumat çıxarmaq üçün alqoritmlərin, modellərin və üsulların işlənməsini əhatə edir. Buraya obyektin tanınması, aşkarlanması, izlənilməsi, seqmentləşdirilməsi və səhnənin anlaşılması kimi tapşırıqlar daxildir.

Kompüter görmə texnikaları xüsusi tapşırıq və tətbiqdən asılı olaraq geniş şəkildə fərqlənə bilər. Ənənəvi yanaşmalar çox vaxt əl işi xüsusiyyətləri və dəstək vektor maşınları və ya qərar ağacları kimi klassik maşın öyrənmə alqoritmlərini əhatə edir. Bunun əksinə olaraq, müasir kompüter görmə sistemləri getdikcə daha çox dərin öyrənmə üsullarına, xüsusən də vizual məlumatların iyerarxik təsvirlərini birbaşa xam piksellərdən öyrənə bilən konvolyusiya neyron şəbəkələrinə (CNN) etibar edir.