AI-driven Performance Optimization: Empowering CIOs and Computer Companies through Proactive Monitoring

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Problem Statement:

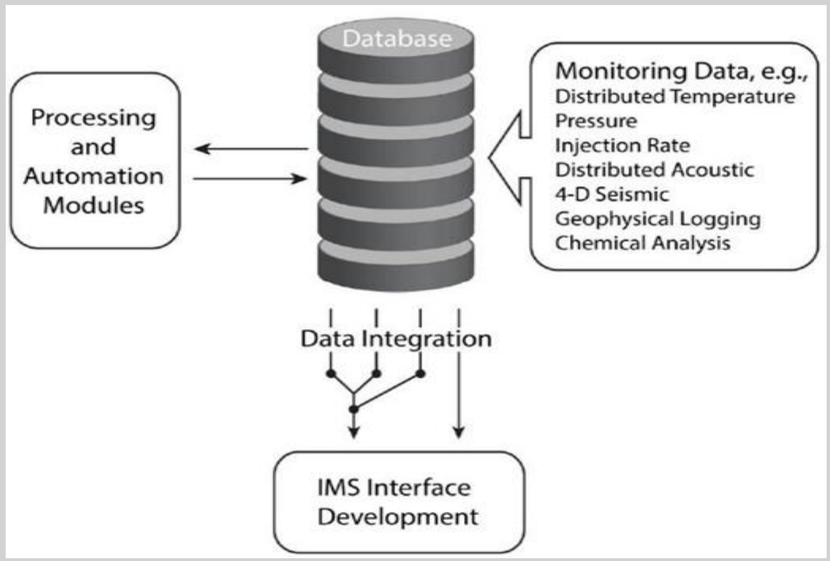
The rapid advancement of technology and increasing complexity of computer systems have created a need for efficient and proactive monitoring of key items by Chief Information Officers (CIOs) and computer companies. However, manual monitoring processes are time-consuming, prone to human error, and cannot effectively detect and respond to various issues such as threshold levels and equipment malfunctions (Delhi, 2020). There is a need for an AI-powered solution that can intelligently monitor and identify the key items that CIOs and computer companies should be monitoring, ensuring optimal performance, and minimizing downtime (Barros & Marques, 2022).

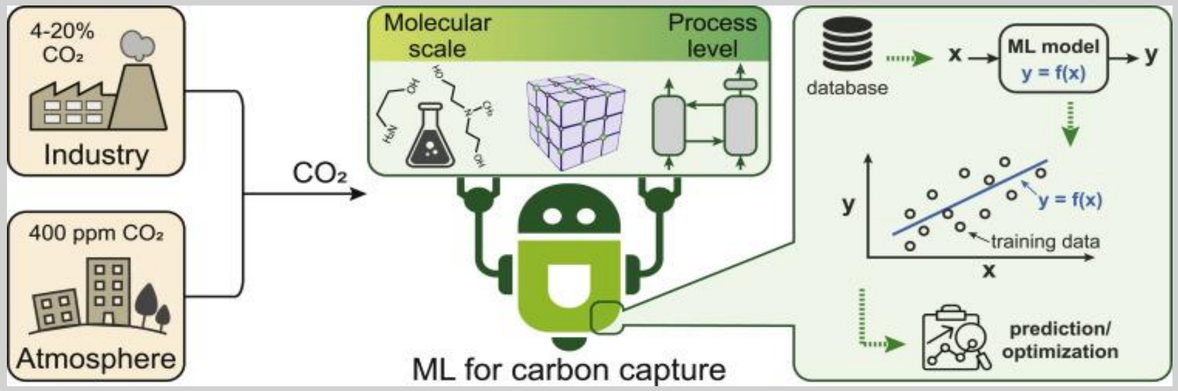
Purpose:

The purpose of this project is to develop an AI-based monitoring system that assists CIOs and computer companies in effectively monitoring the key items crucial to their operations (Delhi, 2020). By leveraging artificial intelligence, the system aims to automate the monitoring process, identify threshold levels, detect equipment malfunctions, and provide real-time notifications and insights to enable proactive management and timely decision-making (Barros & Marques, 2022).

Approach:

In conducting a comprehensive literature search to source the current and extant scholarship related to the study problem of AI-based solutions for proactive monitoring in the context of CIOs and computer companies, a systematic approach was employed. Multiple academic databases were utilized, including but not limited to PubMed, IEEE Xplore, ACM Digital Library, Scopus, and Google Scholar. A combination of keywords and key phrases was employed to cast a wide net and ensure the inclusivity of relevant literature. Key search terms included "AI-based monitoring," "proactive monitoring," "computer vision technology," "CIOs," "IT management," "technology-driven continuous monitoring," and "safety monitoring in construction sites," among others. The search strategy aimed to encompass scholarly articles, conference proceedings, research papers, and relevant grey literature. By reviewing the literature from diverse sources, this literature search strategy ensured that a comprehensive understanding of the current state of research and the context of AI-based solutions for proactive monitoring was achieved.





Discussion & Conclusion:

The research outlines the development of an Intelligent Monitoring System (IMS) tailored for carbon capture and storage projects. This system aims to collect real-time data, conduct site-specific analysis, and oversee injection control, integrating information from various monitoring networks to derive actionable insights. It emphasizes key components like data processing workflows, effective information delivery, and advanced visualization techniques to convert raw data into meaningful information. The research outlines two pivotal milestones: achieving advanced measurement and control systems capable of monitoring CO2 levels by 2020, aiming to enhance injection process efficiency, and by 2030, developing robust, high-resolution monitoring networks integrating atmospheric, near-surface, and subsurface data into reservoir simulations, leveraging autonomous measurement systems and advanced sensors. This initiative highlights the inefficiencies of manual monitoring methods due to their time-consuming nature and susceptibility to errors. To counter these challenges, an AI-based monitoring system is proposed to automate processes, detect breaches, and equipment malfunctions in real time, enabling proactive management and decision-making. Acknowledging the transformative potential of AI in monitoring, this research delves into the integration of data analysis and advanced visualization within the IMS. It sets a roadmap for the AI-driven IMS's role in optimizing computer system monitoring's efficiency, accuracy, and responsiveness, aligning with project objectives for enhanced performance and reduced downtime.

Path Forward:

Future research in the domain of Intelligent Monitoring Systems (IMS) for carbon capture and storage projects should prioritize real-world tests to evaluate the IMS's practicality and scalability. This involves conducting practical studies in actual carbon capture projects to understand how the IMS operates in diverse scenarios and its impact on improving carbon capture efficiency. Long-term studies monitoring the IMS's performance over time will further contribute to understanding its sustained effectiveness and its role in achieving environmental sustainability goals. Additionally, for future research, exploring the system's implementation in diverse tech environments and refining its algorithms could enhance its applicability. The study serves as an innovative step in addressing manual monitoring's shortcomings and underlines the importance of efficient monitoring. Future research recommendations emphasize exploring the system's implementation in varied tech environments and refining its algorithms for increased effectiveness.

References:

Barros, C A S., & Marques, R P. (2022, January 31). *Continuous Assurance for the Digital Transformation of Internal Auditing.* https://www.jisem-journal.com/download/continuous-assurance-for-the-digital-transformation-of-internal-auditing-11681.pdf

Delhi, V S K., Sankarlal, R., & Thomas, A. (2020, September 24). *Detection of Personal Protective Equipment (PPE) Compliance on Construction Site Using Computer Vision Based Deep Learning Techniques.* https://www.frontiersin.org/articles/10.3389/fbuil.2020.00136/full

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