Replacing Manual Process in Digital Transformation

The Case

Digital transformation or Industry 4.0 will truly benefit industries through improved efficiency and productivity, boosted innovation, better data management and insight generation, and enhanced business offerings. For the chemicals and advanced materials industry, research by the World Economic Forum suggests that the estimated cumulative economic value added from digital transformation for the period between 2016 and 2025 will range from approximately $310 billion to $550 billion.

However, copious amounts of manual work has made digital transformation costly, time and resource consuming. Not only that, such work requires a large capital investment upfront, making it difficult to achieve short term return on investment (ROI).

Digital twin, or digital asset management platform, needs to capture critical engineering and operational information for efficient asset management, maintenance program, and operational optimization. This information includes process design flow, equipment design data, operation parameters, material specifications, piping line tags, instrument design tags and specifications, and supplier/vendor information.

Most of these data uses document management system accumulated over decades, mostly archived in paper or rudimentary electronic form. As such, when building a digital twin or digital platform, valuable engineering data needs to be manually reviewed and then input into a digital twin or any digital asset management program, even for traditional asset management systems such as SAP. This does not include the clean-up of obsolete and conflicting data.

AI: At Least 2X faster, with 50% Cost Savings

Most, if not all, of this manual data transfer and consolidation can be replaced with the help of AI. Using the image/text recognition, natural language processing and machine learning capabilities of AI technology, engineering drawings, documents, and even 3D models such as scanned models can be digitized, allowing critical information from paper or PDF documents to be extracted. This allows users to identify and consolidate instances of conflicting information, and then digitally transfer data into a digital platform. This process

not only saves at least 50% of the cost of building a digital twin or digital platform, but can also be completed at least twice as quickly.

Intelligent Project Solutions is currently using AI technology to develop iENG Solutions, an AI application suite that digitizes engineering documents, including drawings, datasheet and documents, providing users with the ability to extract useful information as well as a proper organization of such information for data transfer.

The AI-driven workflow will be as follows:

1) Engineering and operation team identify all critical information needed as well as which engineering documents contain this information.
2) AI algorithm is trained to perform detection and recognition within engineering drawings such as PFDs and P&ID, engineering data sheets such as equipment and instrument datasheets, and other engineering documents such as standards and specifications;
3) A logical framework is then constructed to describe the relations and connections underlying the identified information, after which a relational database is built to provide proper organization of the extracted information.
4) Information is transferred to the digital platform.

In addition, all historical engineering documents can be recreated using a standard format– for example, a single set of P&ID symbols and a standard format for equipment datasheets. Vast amounts of engineering data can be easily searched, compared and even consolidated at the document content level. For example, searches can be performed using design parameters or equipment specifications, a crucial change when compared with today's document searches that can only be performed using file names and tags.

Imagine having the ability to:
1) Search all key information contained within any documents and drawings using equipment, line and, instrument tags rather than document names, and obtain search results within seconds;
2) Compare these key information (design parameters, materials specifications, etc..) crossing multiple sources, and highlight areas of conflicting information, and
3) Consolidate information based on rules of single source of truth.

AI technology is the future of knowledge consolidation and generative design.

Interested in working with our IPS team in developing the latest AI algorithms and models for your upcoming project? Work with us today!