Crude Unit Mass Balance Solution

The Crude Unit Mass Balance Solution uses advanced Industrial AI techniques to detect faulty sensors, reconcile measurements and fill in instrumentation gaps through soft sensors to report feed and product material flows more accurately.

Canvass AI's Mass Balance solution has been successfully used on a Crude Distillation Column by engineers to diagnose material loss, input corrected measurements into optimization tools, and improve feedstock intake and production. By using the solution in every-day process troubleshooting, engineers can improve unit yield performance while also improving their own efficiency.

Solution Benefits

For Engineers

Engineers save up to 40% of their time while solving complex troubleshooting and optimization problems by using the Mass Balance solution for early diagnosis and data reconciliation in their existing workflow. By using current and more accurate measurements engineers can make more confident decisions to improve yield, yield accounting and provide timely support for operations. The AI-based mass balancing monitoring tool integrates the experiential knowledge of the unit engineer in troubleshooting mass balance issues into a tool that both improves efficiency of the unit engineer and shortens the ramp up time for future incoming engineers to the unit.

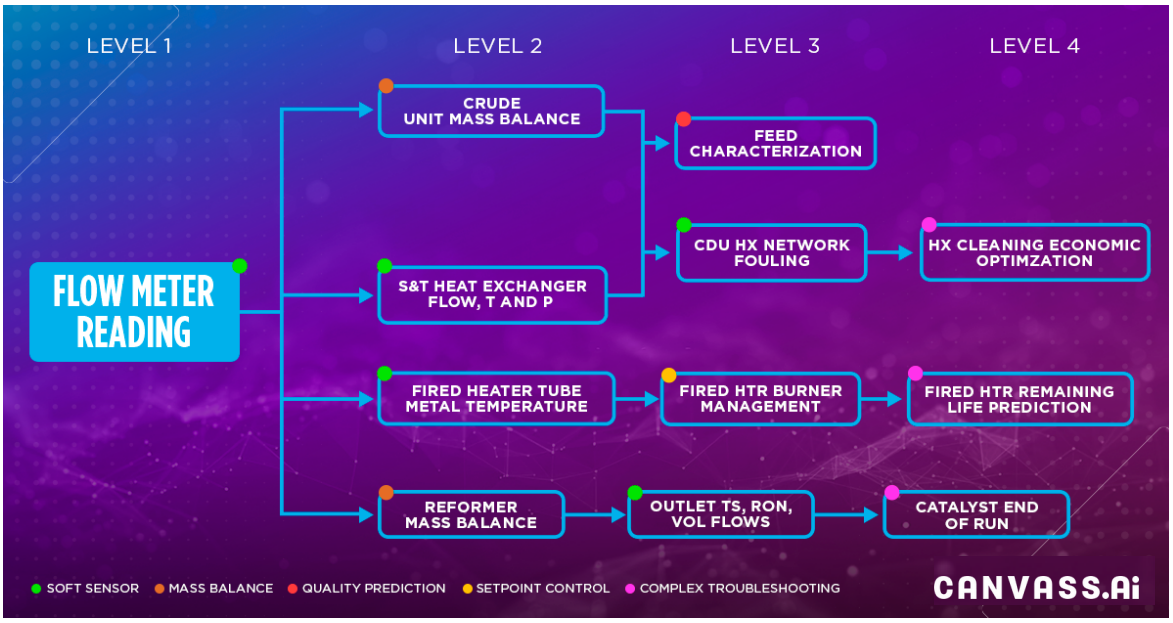
For The Refinery

An average refinery in the USA will generate $1M/Year in additional profits with only 0.1% improvement in feed intake through corrected mass balance measurements. The accurate and timely data informed guidance to operators from the Mass Balance solution will result in additional benefits such as better energy utilization, reduced emissions and improved yield.

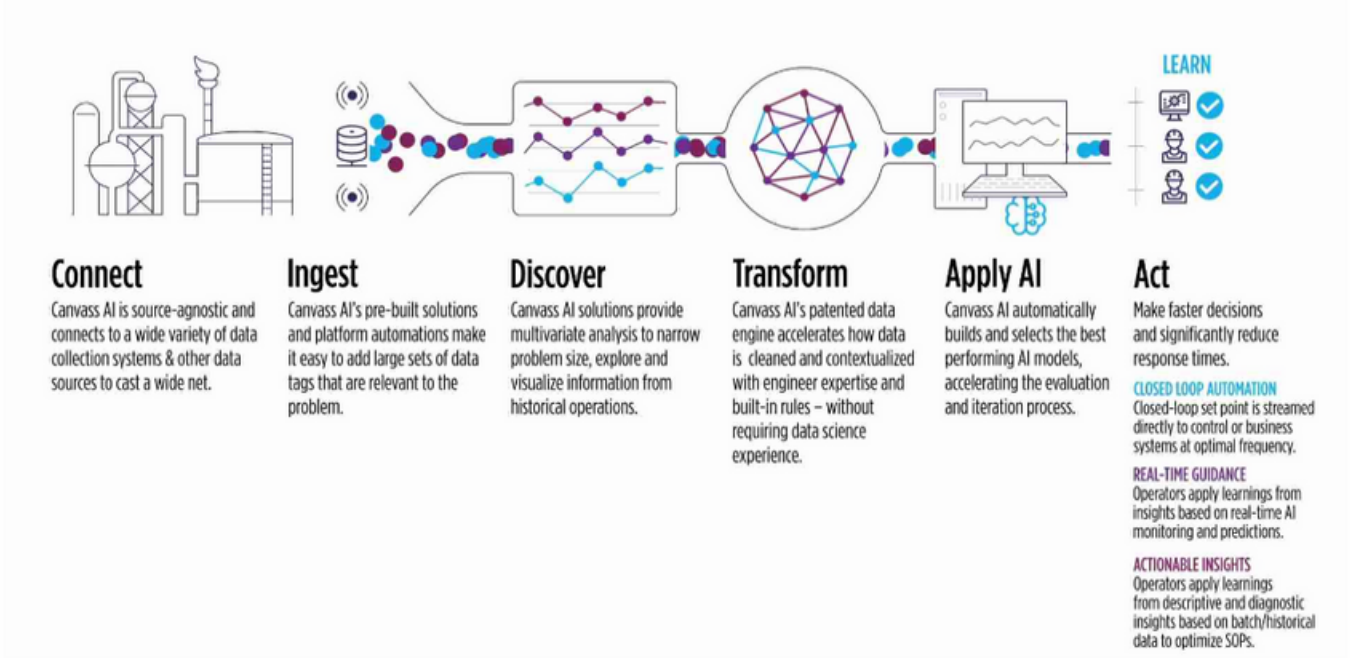
Solution Framework

Canvass AI Software is pre-packaged with AI solutions for commonly recurring industrial problems. Each solution, such as the Crude Unit Mass Balance solution, is a completely configurable module with guided workflows for industrial workforces to realize immediate value. Each solution integrates with others allowing organizations to start on small but important problems, creating immediate value before moving to the next, and generating transformational value through Industrial AI over a short time.

While every refinery's needs are unique, the Example Value Roadmap helps illustrate a typical journey.



How The Canvass AI Software Works



Solution Overview

01 STEP
Connect To Data

With the solution, users can connect to data historians and repositories, granting access to time series data from various sensors, such as flow, pressure, temperature, and specific gravity. Additionally, users have the option to include other data types, such as valve positions, ambient temperatures, and lab measurements (sulfur content, API, viscosity).

Once the desired data is selected, it is passed through the Canvass AI Data-Ready Wizard, which applies proprietary data cleaning techniques to eliminate noise and ensure the data accurately represents the process. At this stage, unit engineers have the option to further refine the data.

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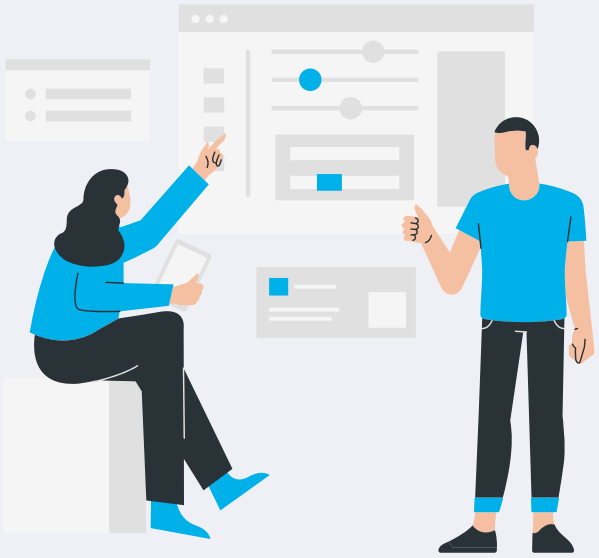
02 STEP
Contextualize the Data

To achieve more accurate results with mass balance solution, it is essential to provide the AI with proper context. In the case of the crude unit, this context includes timelines of "normal" operations under different crude mixes, identification of periods of maintenance and unit downtime, and other critical factors.

To identify streams with associated tags, unit engineers can leverage their knowledge of topology and suggest meaningful patterns in the data such as intermediate streams, mixers, and splitters.

A unique advantage of using AI is its ability to learn from a larger area of the process, including data from outside of the unit when available. This maximizes information redundancy and improves accuracy.

With Canvass AI software, unit engineers can easily improve the AI model using their experiential knowledge, ensuring the accuracy of the results.



03 STEP
Apply AI

To initiate model building, the engineer takes a few guided steps and clicks the "Start Training" button. Canvass AI's patented data processing capability understands the dynamic nature of the crude unit, allowing the solution to automatically build AI models that learn the patterns in the data for normal behavior under various operating modes. The model also learns from patterns during time periods when the mass is not balanced. The solution first determines if the mass is imbalanced across the crude unit, and if so, identifies which meters are reporting faulty readings.

Canvass AI's Explainable AI feature ensures model results are transparent for the engineer, facilitating diagnosis and increasing confidence in the solution.

For example, the engineer can easily visualize the relationships between different data types, such as feed API, viscosity, or cutoff temperatures, and the resulting product flow corrections. This transparency provides a deeper understanding of the processes and leads to more informed decision-making.

04 STEP
Better desicions, faster

Mass balance issues around the crude unit can result in sub-optimal production and unknown risks to operations. Traditional tools require engineers to spend days to weeks diagnosing and correcting the problem,

often relying on their experience to identify the source of the mass imbalance. For example, an engineer may need to review correlations between valve positions and volume flow, but this requires obtaining the right data, developing correlations under normal conditions, and analyzing any deviations that may explain the imbalance.

The Crude Unit Mass Balance solution streamlines this process by providing a narrowed-down, ranked list of streams and readings that are most likely to have caused the imbalance. AI model predictions offer corrected readings to ensure mass balance.

By using this solution, engineers can save over 80% of the time typically spent diagnosing and correcting the problem. The solution enhances the accuracy of measurements enabling the engineers to close mass balance gaps in current and future scenarios.

About Canvass AI

Canvass AI is a leading industrial AI software provider that puts industrial companies in control of their data, to make timely decisions, and achieve faster and sustainable outcomes. Some of the largest companies in the world use Canvass AI to empower their production teams for high performance decision making, to future-proof operations and drive net-zero targets.

Backed by Alphabet and Yamaha Motor Ventures, the Company has been recognized by CB Insights as one of the top 50 companies in the world making a difference in advanced manufacturing.

For more information visit

www.canvass.ai