Collaborative Mathematical Optimisation

BlendOpt

Paradyn

Integrated
Value-chain
Optimisation

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Combining machine intelligence with human expert knowledge across the mining value-chain

Make High-Quality Decisions

BlendOpt Value-chain Optimisation Platform

Mathematical optimisation is a powerful technique which can search many thousands of potential solutions to tough mining, metals and commodity value-chain optimisation problems that incorporate reserving, logistics, inventory management, processing decisions and grade control, while satisfying many hundreds or thousands of constraints - in the mining space, mathematically generated solutions to these problems must also satisfy different time-horizon objectives from day of operations to budget forecasts to life-of-mine considerations. The complexity of finding feasible and optimised solutions to these problems is analogous to finding a needle in a haystack.

There are a variety of techniques that can be employed to reduce the size of the space of possible solutions that needs to be searched, allowing mathematical optimisation to find solutions to such problems, but even with such techniques the generated solutions often appear unacceptable or strange to planners and schedulers who might make use of them, despite being "optimised" - this is perfectly understandable because mathematical optimisation techniques suffer from the limitation of not capturing the nuanced insight of human decision makers, so while appearing optimal these solutions are limited in their practical application. This is not just an issue of the mathematical model not capturing sufficient detail, but relates to the significant experience and knowledge human decision makers bring to a scheduling or planning solution which cannot be captured by any model.

High Quality Decisions with Collaborative Mathematical Optimisation (CMO)

Paradyn's BlendOpt application is engineered with technical solutions to address these challenges with the following three pillars:

- Leveraging the expertise of decision makers who understand their problem space
- Enabling synchronisation and communication between decision makers across silos
- Machine intelligence which collaborates with users to find optimised solutions which satisfy constraints, optimality, and acceptability for decision makers.

Local Knowledge of your Experts

The BlendOpt application incorporates the local knowledge of decision makers which enhances solution quality, and also communicates the rationale for suggested improvements to the schedule or plan so users can execute them rapidly with confidence - we call this Collaborative Optimisation.

Integrated Decision Making

Using end-to-end material tracking and traceability, BlendOpt communicates the rationale for up-stream and down-stream decisions so alignment can be achieved between silos and across multiple time-horizons - this addresses the challenged of synchronisation between silos so the rationale for high quality decisions can achieve rapid understandability across your value-chain from tactical to strategic planning.

Machine Intelligence

The BlendOpt application leverages the power of mathematical optimisation to find optimal and feasible solutions, but it goes beyond pure mathematical optimisation - it learns how to search for solutions that are acceptable to your end users by leveraging the unique aspect s of your particular value-chain problem and the needs of your human decision makers. Solutions are generated in the form of prescriptive analytics and dashboards which allow a planner to further refine their plans and assumptions within the application by trialling "what-if" scenarios that focus in on the aspects of the problem that matter to them, while satisfying feasibility, maximising profit and reducing costs for the organisation.

BlendOpt in Practice

The collaborative optimisation technology behind BlendOpt has delivered real value to our clients which you can read about in more detail on Paradyn's website. A snapshot of some of the outcomes provided to our clients includes:

- For a copper producer, the BlendOpt software application helped a mine to discover small adjustments in ROM stockpile definitions and stack/reclaim decisions with dramatic reductions in Mill feed variability and higher concentrate recovery.
- 30% reduction in quality targets violations and elimination of forecast rejection limits across 12-month and 5-year plans.
- Revenue improvement forecasts of over $24M per year due to changes in ROM stockyard capacity. 13% revenue uplift over existing Life-of-Mine plan through changes in production strategy.
- 3MT per annum production increase, improved margins, and consolidation of product portfolio resulting in lower operational complexity.

The BlendOpt Solution

Paradyn's BlendOpt value-chain platform powered by Collaborative Mathematical Optimisation (CMO) can help you:

- Satisfy constraints in your value-chain
- Optimise for any objective including tonnage, revenue, and cost
- Optimise and integrate operational, tactical and strategic planning from minutes to years
- Improve collaboration and synchronisation between planning and operations
- Publish reports to relevant stakeholders
- Reconcile forecast with actuals
- Optimise reserving, processing, blending and logistical decisions
- Product portfolio optimisation
- 'What-If' scenario analysis

Read our articles to learn about Paradyn's innovative value-chain optimisation technology and how it can help your operation.

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