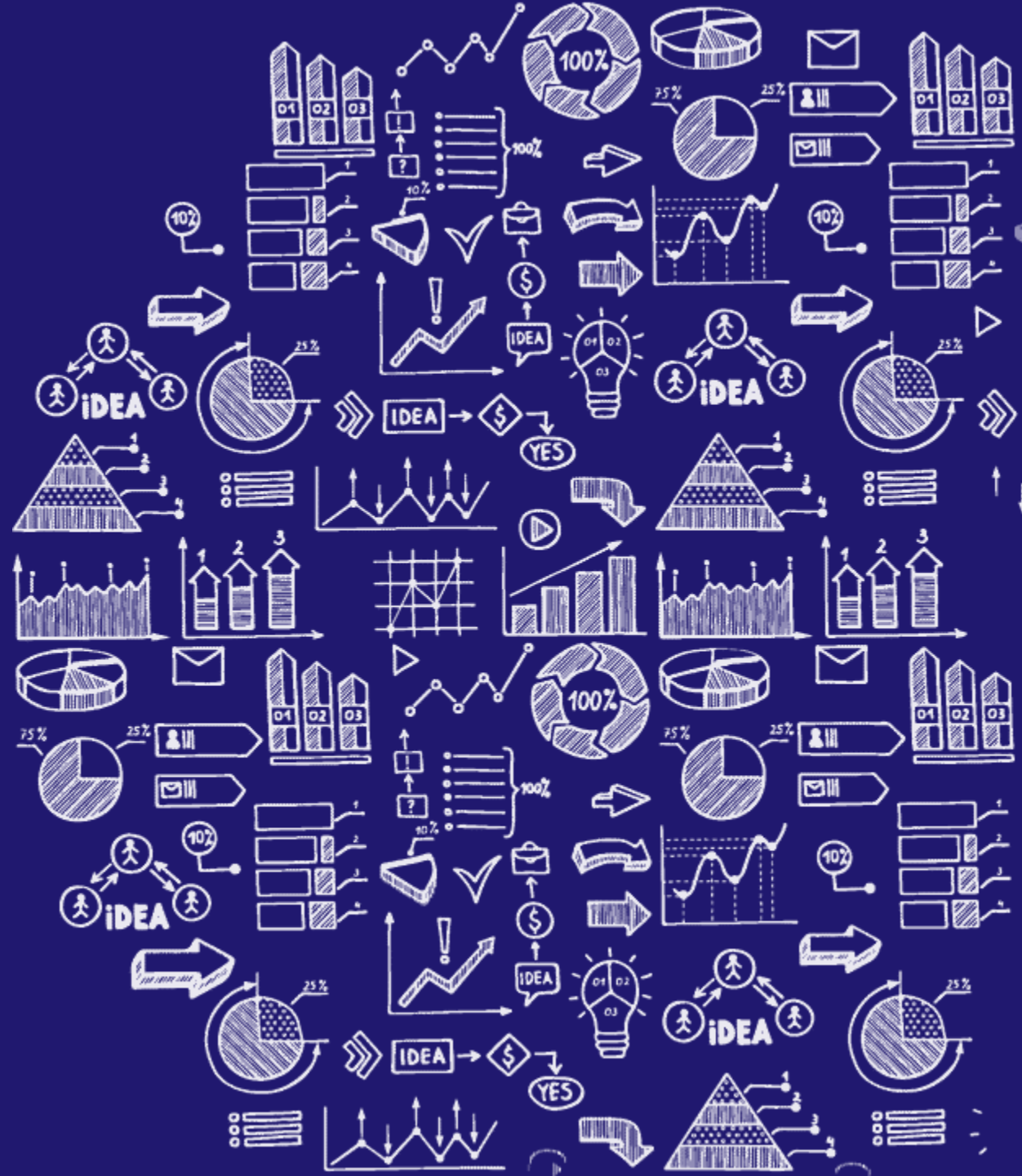
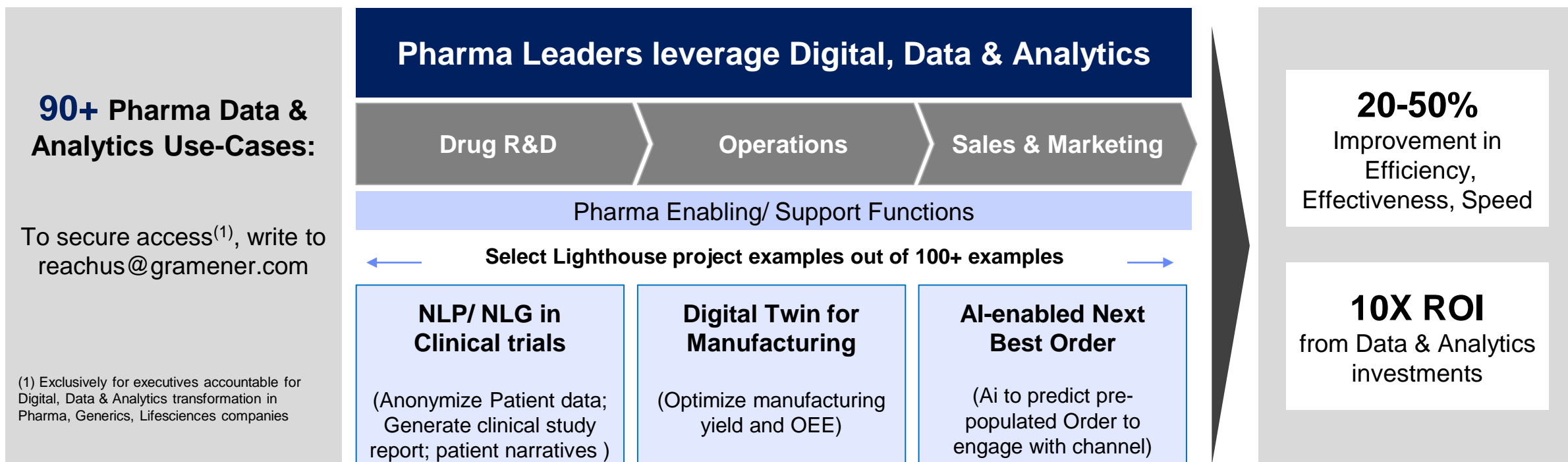


Case Study: Operations



Gramener's list of 90+ Pharma data & analytics use-cases, with several hands-on project experiences is a strong enabler to help accelerate your D&A efforts

90+ Pharma Data & Analytics Use-Cases to deliver +20% improvement at 10X ROI



Optimizing yield for Pharma Manufacturing



Problem

- Our client business objective was to **improve the yield quantity** of the Drug product manufacturing
- 10 process areas for different compounds were identified for improvement.



Approach

- Gramener used **Statistical Analysis** to understand patterns and identify important operational and material parameters.
- This was fed to **classification and regression models** to formulate driving variables ranges for consistent Golden batch yields

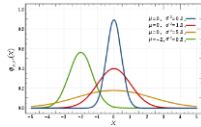


Outcome

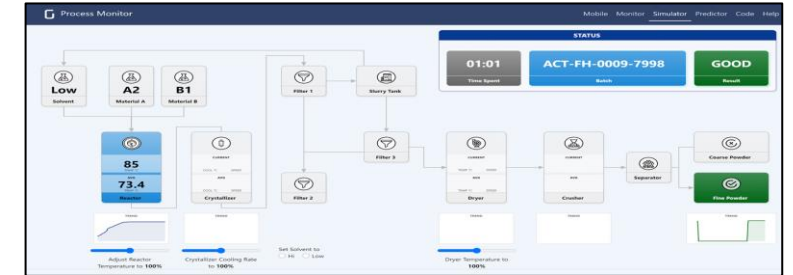
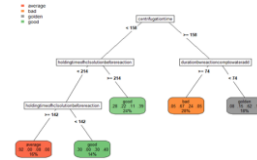
- Client was able to achieve a saving of over **2 Mn USD due to Golden batch yield improvements** across the 10 compounds
- **Golden Tunnel process monitoring application** was created to help the team monitor key yield parameters identified

Starting with 50 variables, 2-4 variables having maximum effect on batch quality and yield were identified along with their optimal values

- Statistical analysis & Exploratory Data Analysis (EDA) on variables
- Form initial hypothesis about root cause variables



- Advanced Machine learning based Classifiers like Random Forest & Gradient Boosted trees



-50 variables for each compound were collated

- Variables from equipment
- Steam distillation
 - Spray Rate
 - Compressors
 - Centrifuges etc
- Material parameters like
- Quantities
 - Concentrations
 - Quality

5-9 Key operational and material parameters identified

- Example variable importance & relationships
- Slower “first cooling phase temperature” reduction on Distillation duration
 - Centrifuge speed is more impactful on outcome variables than acid reaction holding time

2-4 variables which influence golden batches & their optimum values

- Example outputs
- Duration between reaction completion and water quenching should be 74 Mins for Golden batch yields
 - Centrifugation time should be ≥ 158 Mins

Golden batch outputs had 3-5% yield improvements

Golden Tunnel process monitoring helps the operator maintain suggested optimum values for key variables

Machine parameters optimization for Pharma Manufacturing



Problem

Our client business objective was to **predict** the quality of the **tablets** based on machine parameters. Subjectivity in parameter setting leads to

- Loss of ~10K+ rejected tablets per setting in each trial
- Wasted operator time in finding the right parameters
- Cost incurred in disposal of scrapped tablets



Approach

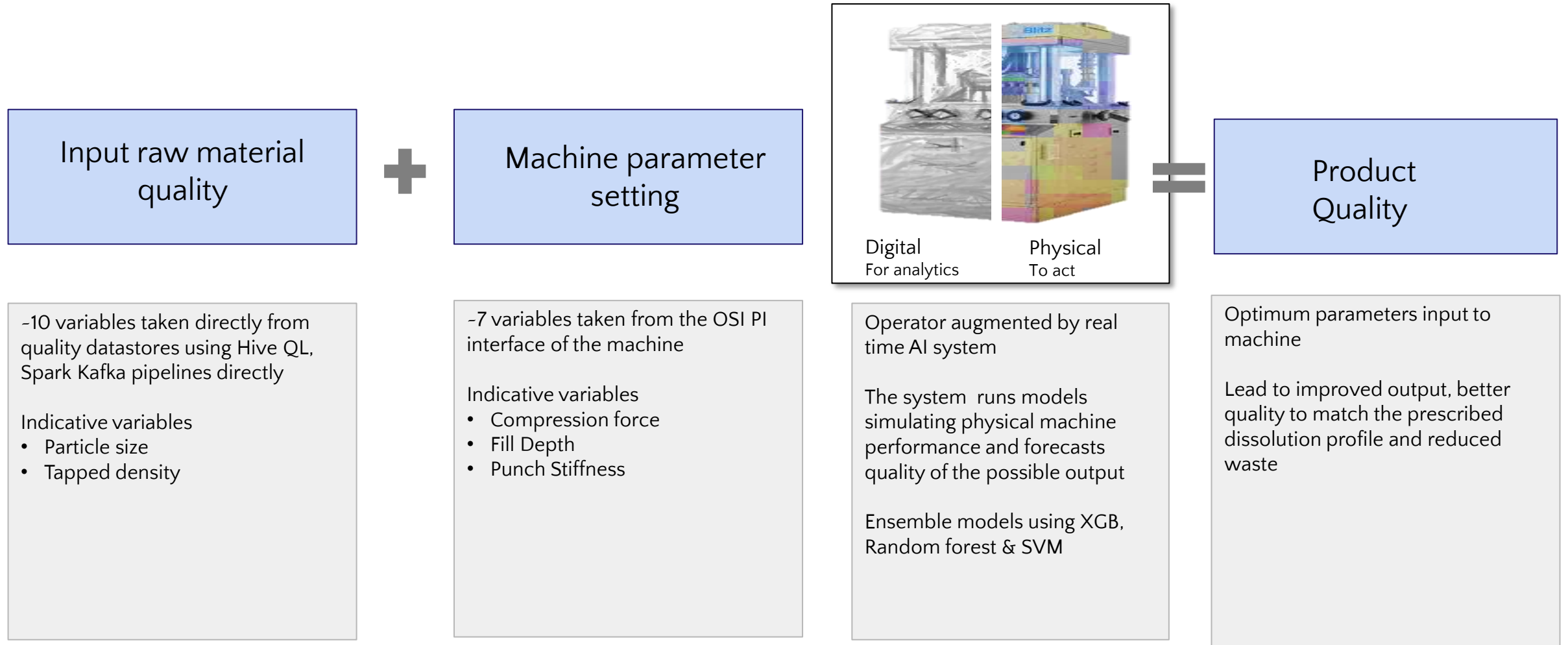
- Gramener used **classification models** (SVM, Random Forest, Decision Tree, Ada Boost, XG Boost) for higher predictive accuracies



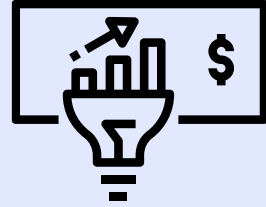
Outcome

- The operator uses the model every time when the compressor is setup to achieve tablet desired hardness, thickness and group weight
- **Operator set up time was cut down by 67% & there was an 900K USD savings from reduced wastage**

Modelling based on 10 variables regarding input raw material quality and 7 variables regarding machine parameter setting, impacting product quality



Reach out for a discovery session!



Talk to us to explore how Gramener can help you in your **journey to accelerate value realization in Lifesciences via Data & Analytics**

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