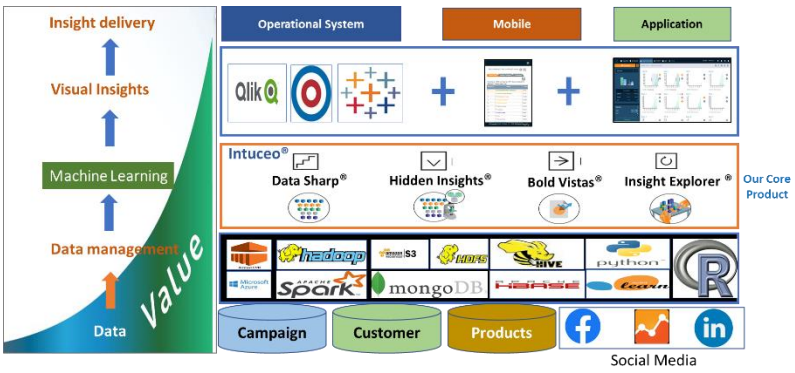
Intuceo | from data rich to insight rich

iCube Consulting Services India, is a technology company that provides solutions in machine learning based data analytics and application services with right talent and expertise that works for our customers.

Having offices in USA (Florida) and India (Bangalore & Hyderabad), we merge knowledge, technology and partnership while serving Fortune 1000 companies such as Johnson & Johnson, Janssen, Fiat Chrysler Automobiles, Lockheed-Martin, Pearson, Mahindra and many more.



Intuceo offers a self-service, cloud-based machine learning platform, **Intuceo-Ax,** that provides advanced analytics solutions using data science to build and deploy accurate machine learning models in a fraction of the time with a unique, easy-to-use workflow making data science accessible to all. Our team will work with you to address your data problems extracting data insights that yield business value.

With no infrastructure to build, no additional tools to buy, no data science skills to acquire and no expensive consultants to hire, you will be spending more time acting on insights rather than mining data. **Return on Investment** can be seen in weeks, rather than waiting for months and years.

Over 5+ years, we have successfully delivered end-to-end analytics solutions in Manufacturing & Automobile Industry; especially with CAE Meta modelling (CMM) platform used to expedite design/simulation cycles and optimization in the engineering design process where larger number of solver-based simulations are involved.

CAE Meta-Modeling (CMM) Platform based on Intuceo for Design Optimization

CAE Meta-Modelling is a workflow-based application that minimizes the samples (Design of Experiments), develops ***'digital twins'*** for simulation using surrogate models and uses multiple algorithms for generating the optimal solutions. CMM assists in understanding multidisciplinary attribute roles, finding correlations, performing impact analysis by executing the automatically-trained metamodels or carrying out full-scale design space exploration.

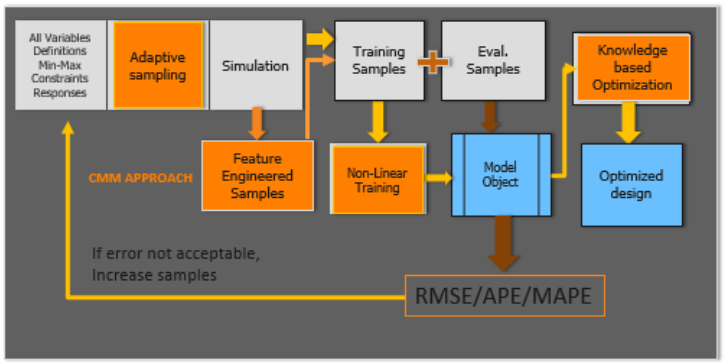


Fig - CMM application flowchart

Benefits of CMM:

- Lean & Robust models
- Convergence acceleration
- Least no. of samples
- Reduced compute costs
- Reduced design cycle time
- Quicker time-to-market
- Enhanced products
- >90% mean accuracy

Design cases executed:

- **Ride comfort - Noise, Vibration & Harshness (NVH) simulations:** Sheet gauge based analysis for BIW, instrument Panel and other sub systems/ scenarios
- **Durability - Stress analysis:** evaluate stress, fatigue & rigidity at multiple points
- **Safety - Crash analysis:** Max. Dash intrusion, time to zero and dozen others
- **Pedestrian hit**
- **Iron pellet production optimization**

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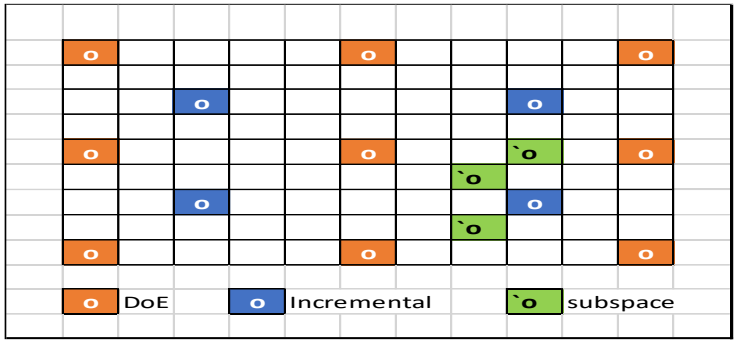
Design of Experiments (DoE) – Sampling: Traditional methods adopted in sampling require large number of samples to cover all design space, care must be taken to plan methods to reduce the sampling effort as algorithmic models perform best when the samples drawn represent full range of data or covers entire design space.

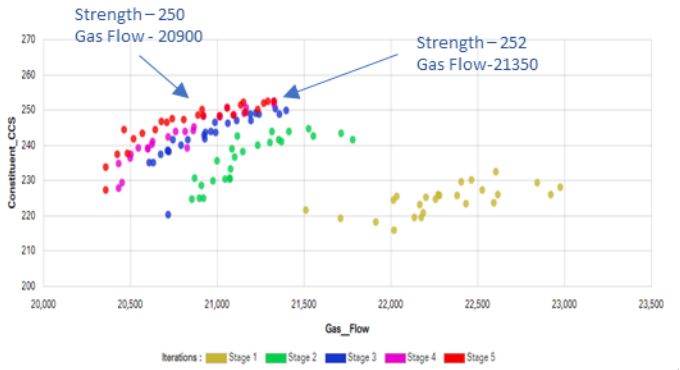


Metamodel: As the design of systems involves the complexity ranging from linear to highly non-linear, no single machine learning algorithm is a solution to find the relationships between design variables and responses. *Metamodel* is hence built which will have a set of tools that will build various models and auto selects best model for a given analysis type. *Surrogate modelling* is a machine learning technique that learns the relationship between the design variables and the response variables to build surrogate models.

These models predict the response values at untried points in the design space.

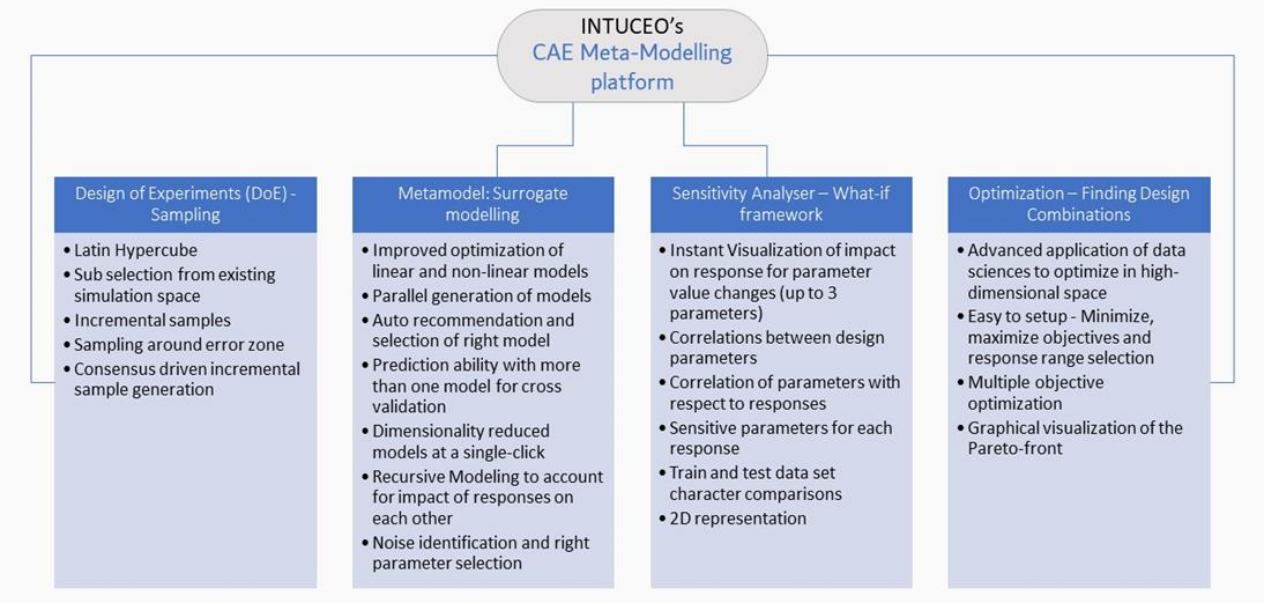
Sensitivity Analyser: attempts to determine the impact on the actual outcome with the changes in input values. By creating a given set of scenarios, the analyst can determine how changes in one variable(s) will impact the target. Through Evaluation tool, new predicted response values can be obtained for any number of changes in design variables.

Optimization: Gives data points nearby a selected baseline record that can result in response value range as specified. Aids in finding Design Combinations specifically optimized for multiple responses i.e. multi-objective optimization.



Output for Min. Gas flow and Max. Strength

Key functionality in a nutshell:



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