

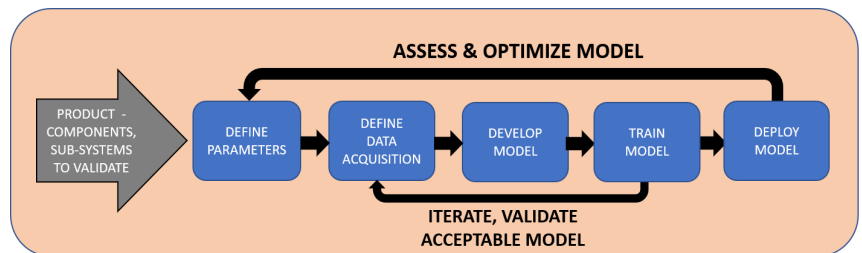


## Integrating Artificial Intelligence into Product Validation

The capability of validating product designs faster and with more predictability within the product development process is key to being able to release new product to the marketplace. Incorporating machine learning—which is the application of artificial intelligence for practical purposes is crucial to delivering better quality product. It is the process of using mathematical models of data to help computers learn, improve and solve problems based on the interaction with the product that leads to building knowledge. Incorporating this capability will realize the following benefits:

- ◆ **Lower Costs**—Eliminate manual effort in product validation, drastically lowering costs.
- ◆ **Improved Product Validation** - Ability to analyze larger volumes of information and being able to discover product failures early in the product development process.
- ◆ **Faster Time to Market** - Accelerated product validation that results in bringing quality products to market faster.

In machine learning, verification of the model is testing that your model meets the mathematical elements to deliver the correct build—description, specifications, and requirements. Validation determines that the model accurately responds to the real-world inputs in a manner that will solve the “capability needed” at hand. Creation of the database that is used to develop the algorithm, should ideally have representative data for all of the expected parameters that will be measured. The validation dataset is utilized to test and report on the performance of the algorithm. This dataset should contain all the expected parameter variations, abnormal conditions, and noise expected. This then creates the needed platform to execute the validation, learn from the results and continuously improve as it gains experience through testing.



In the world of product development, the scope of validation has now expanded to include, mechanical, electrical, hardware and software components, sub-systems and systems that make up the complete product. With this expanded scope, the need to first digitally design and analyze these components, sub-systems and systems is essential in improving quality and to deliver product to the market in a more efficient timeframe.

Digital prototyping, accompanied with artificial intelligence that drives design optimization is a critical capability that if designed and utilized properly will minimize rework and failures before any physical prototypes are created and tested. This does not mean that you should stop utilizing artificial intelligence in the physical prototype world. To get the full value of artificial intelligence, you need to continue its use into testing physical prototypes and production units that come off the production manufacturing line before releasing new product for sale to the market, and to ensure quality products are coming off the manufacturing line.

Incorporating artificial intelligence improves not only the validation cycle but when implemented with digital prototypes and designs, provides additional benefit, as it is faster and less costly to edit product digitally versus waiting for physical prototyping to initiate validation.

If you would like to discuss how to implement these capabilities within your product development process give us a call! We can discuss our experiences and knowledge in this area with you.

## Next Month: Rationalizing Bill of Material Integration between PLM and ERP