**Key Steps to Implementing AI to Accelerate Chemical Engineering Product and Process Development**

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**Extended Abstract (ten page maximum):**

The field of chemical engineering and product design and formulation is ripe for opportunity with AI applications using deep learning. As any good salesman will state, but how and where should a facility get started with the implementation of AI in product development?

In this talk the key functions of data in industry are discussed, then how those key applications of data can be managed and applied into deep learning algorithms to accelerate common challenges in both the Design and Development of chemical products, processes, and equipment. By reviewing the key features, and overall structure of Artificial Neural Networks (ANN), this research develops a system for cleaning and transforming datasets to well-structured information that can be used to run predictive algorithms (aka AI) to generate insights. The common pitfalls in implementing AI are demonstrated and explained logically, demonstrating how the data must be structured so that it may be consumed by an advanced algorithm and generate meaningful insights. Finally, the application of this set of methods is demonstrated through a product development cycle to demonstrate the capability to reduce time spent in the development phase and shorten the time to market.

Following a review of the ongoing applications for Deep Learning and ANN the primary finding is that the focus for industry development is implementation of AI, not the development of AI. This is well established and a variety of different algorithms were tested against Product Data. The crux of the implementation exposed the true challenge which is “piping” data at a velocity and ensuring that it has the proper context to feed the algorithm. In other words, today’s algorithms are ready to be scaled, but the scaling of the data to feed those algorithms will take longer than the actual scaling. This provides the next body of work, which was to develop an iterative framework for isolating and exposing data through hierarchical object based databases. The isolation of the algorithms and the ability to identify gaps such as data context provided the researchers with clearer insights on a system for designing object based data networks to feed the modeling system. The following work will outline the design and development of the object based data networks to feed the algorithm, and provide meaningful insights at the time when they are most valuable.