Paper: Personalized recommendation system based on product specification values.

Recommending in context of a user demand, which in other words, personalizing their space is a very good way to keep close relationships and raising loyalty with companies by offering differentiated service based on personalization function. Being able to relate to this function is the primary motivation of this paper.

The main objective of the paper was to create a web based application system running on a PC to recommend music to users, with a two way communication between them and the system. The researchers looked up on some collaborative companies who shared their product taxonomy table. The procedure uses a multi-attribute decision making to find the utility values of products in same product class of the companies. Based on that value, the system determines which are similar.

The researchers then did some prior research, and found advanced classification of Internet-based intelligent recommendation system, and they distinguish the recommendation methods into content-based filtering, collaborative filtering, and hybrid of which previous two methods are combined. And, cosine similarity, Naive Bayesian (NB) classifier, Pearson r correlation, etc. are being used as key similarity measure for recommendation. But they discovered some issues with them. The study then suggests after a brief analysis, a utility range-based product recommendation algorithm can be used for personalized recommendation by applying the different weights of spec by each customer. They apply Multi-criteria decision making (MCDM) and stock-keeping unit (SKU), and find out the utility values. In section 3.3, the paper evaluates them mathematically.

The process of similar product recommendation involves having a customer enter the relationship among the weights byproduct spec based on the five types of expressing the incomplete information and then it requires the assigning of the number of similar products based on recommendation.

The recommendation is based on 4 steps of solution providing.

1. Calculation of utility value by specification
2. Calculation of expected utility value by product
3. Calculation of similarity measure values between two products
4. Suggestion of ‘x’ number of similar products in order of similarity measure values

Section 5 of the paper involves with a proper testing mechanism of the application.

The researchers claimed, they achieved more improved accuracy and satisfaction level than previous recommendation method through user experiment using the system. And, the future works on this research can only be limiting the products specification values.

In my opinion, they could have been a bit more focused on similarity measure values, as the study says, specification value ranges in a wider variety, so this could be something they worked on further, except for spending a huge amount of time focusing on product value.

This research is going to be helpful in our cause as well. The finding of product utility value used some techniques that was previously unknown to me, and knowing how the product value is used to predict the outcome, is a must, given that our project is about product value, and at some stage, there might be a situation where we might have to simulate the result for testing the validity of the derived product values.

Paper: An approach to monitoring quality in manufacturing using supervised machine learning on product state data

Competitive markets demands higher, and the companies who can keep up with the demand, stays profitable. To know what the customers want, is the primary necessity. This is what motivated the research primarily, and the main objective of it was to determining product state values, which describes the value of a specific product to all sorts of customers in the market.

The researchers made some statements about product value, and defined them, before heading into their core methodology. Firstly, it uses cluster analysis and supervised machine learning. Having to cope with high complexity and high-dimensionality, conventional methods based on modelling cause effect relations are suspended. Being able to handle large sets of highly complex and high-dimensional data, a combination of Cluster Analysis and SVM is introduced as a possible way to achieve the goal of improved quality monitoring.

All the products are transformed into manufacturing program levels, then they are tracked by creating checkpoints. As the states of the products changes as a result of progressing through checkpoints, they determined the driving forces to the changes of product state. Figure 6 of the paper shows the Phases of process state monitoring using cluster analysis and supervised machine learning.

And finally, it was time to derive it with machine learning, to teach the computers. Thinking about over-fitting problems within this approach, it has to be considered that clustering is only used for generating the learning set complemented by the expert user, and SVM is basically very resistant against over-fitting.

There is the flaw though. The research has some assumptions. In the data requirement section, there are 4 assumptions. For the successful construction and use of a hybrid product process state monitoring system. The assumption is that the total manufacturing program is likely to exhibit pseudo-chaotic behavior in as much as each individual process will contribute to the high state dimensionality. Data collection should therefore try to include all parameters considered having any state influence. The practical problem scan thus easily render the proposed methodological approach impractical.

This work is pretty similar to our project idea also, and might be helpful during the times of working with SVM.