राष्ट्रीय फैशन टैक्नालॉजी संस्थान
NATIONAL INSTITUTE OF FASHION TECHNOLOGY
Ministry of Textiles, Govt. of India

NIFT 1

PRODUCTION UNCERTAINITIES MODELLING IN APPAREL MANUFACTURING USING BASYESIAN INFERENCE

PRABHAKAR S, SUHAIL ANWAR AND RAGHURAM JAYARAMAN

Asst. Prof. Prabhakar S, Prof. Suhail Anwar and Prof. Raghuram Jayaraman of Department of Fashion Technology, NIFT prepared this scenario for class discussion. This material is not intended to serve as an endorsement, source of primary data, or to show effective or inefficient handling of decision or business processes.

Copyright © 2018 by the National Institute of Fashion Technology, India. No part of the publication may be reproduced or transmitted in any form or by any means – electronic, mechanical, photocopying, recording, or otherwise (including internet) – without the permission of National Institute of Fashion Technology, India.

Vasudev Krishna was the General Manager (Operations) of ''Ultimate Apparel Makers'' (UAM)[1], a company which manufactures menswear garments for export markets. UAM specialized in manufacturing casual wear including tops and bottoms for men's clothing to various export markets such as USA, Europe, Africa and South America. They are one of the premium vendors in the competitive global sourcing market for the leading buying houses and have been fulfilling orders for over a decade, garnering great reputation.

However, since 2017, KOL International, a buyer with immense business prospects to UAM lost interest in executing orders of regular volumes and had reduced the order size considerably and started routing them to the competitors of UAM. Krishna was under constant pressure from the management who were critical of the sudden reduction of orders and raised grave concerns of their regular buyers moving away to engage with competitors.

Initially, Krishna assumed that orders were receding due to competitive pricing in the market. At this juncture, Amit who is the Head of Industrial Engineering Department, walked in to the office of Krishna with a file in hand to apprise him of the production status of the three UAM factories. Amit tabled a report to Krishna which has interesting insights that he had consolidated after a critical number crunching exercise on the production data collected for the previous year from these 03 factories which execute orders for multiple buyers.

Amit presented his analysis with available data collected through the standard formats used in the factory, formatted and tabulated in spreadsheet.

Factory Id	Productivity Percentage	Probability of Production	Percentage of Defects	Probability of Defects
UAM01	60	0.6	2%	0.02
UAM02	30	0.3	3%	0.03
UAM02	10	0.1	4%	0.04

Krishna became thoughtful after looking at the statement and his attention was drawn towards the production uncertainties , particularly the defects.

This is exactly what I need, exclaimed Krishna, but how to address these uncertainties that has led to a loyal international customer not placing regular orders and the challenge of winning the confidence of the buyer to get the order back.

Amit, a graduate from NIFT in Master of Fashion Technology with expertise in industrial engineering and Artificial Intelligence offered to solve the problem identified and rescue UAM from this situation of Uncertainty. Krishna was curious to understand the approach that Amit will adopt to solve this problem and

requested him to brief the manner in which Amit is planning to approach problem solving.
A through professional and good friend of Krishna, Amit started explaining the process he will adopt I solving this uncertainty. He recalled the Artificial Intelligence lectures delivered by Asst. Prof. Prabhakar, Prof. Suhail Anwar and Prof. Raghuram during his days at NIFT and decided to apply the Bayesian Inference to resolve the uncertainty.

Amit, designed a model that answered the uncertainty and enabled UAM not only to win back the confidence of KOL International but also the regular orders with increased volume.

Can you develop a suitable model for the above situation, helping Krishna to identify the following?

1. Find the probability of defects that were produced by Factory UAM03.
2. Using Bayesian Inference, help the GM(O) to ascertain the Factory which continues to produce defects increasingly.
3. Design a Bayesian Inference Model to apprise the Company Management of the root cause in the recent slump of receiving orders from KOL International
4. Based on the model designed, develop a proposal to address the uncertainty.