# *EAS 504*
# *ASSIGNMENT-7*

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**General Information**: -

The following Lecture was held by Mr. Anurag Bharadwaj, he currently works as professor in Northeastern University Silicon Valley and has worked as a Director in Ebay. He has done is Phd in Computer Sciences from University at Buffalo.

Base Questions: -

1.) **What are principal uses of data sciences in this domain?**

**Ans)** Following are principal uses of data science in this domain:

- Online payments use Data Science for understanding most valued point of sale.
- Retail companies use Data Science to understand user behavior trend by integrating their insights with the findings from companies like Pinterest. They also use data science techniques for categorization and understanding image data.
- Prediction of a product lifecycle is also done using data science techniques.
- Manufacturing the semi-conductor devices is automated using data science.
- Data Science is also used in inventory management for demand planning and price optimization.
- Data Science also has an application in improvising the shopping experience of retail customers.
- Data Science is also used in improving the customer support and maintain the trust of customer and safety of transactions, happening on day to day basis.

2.) **How are data and computing related methods used in the organizational workflow?**

**Ans)** Data and computing related methods are used in following ways in organizational workflow: -

- Search is one of the most important domains that heavily uses data science techniques like recommendation to make suggestions for e.g. in spell correction etc.
- Recommender Systems are used to identify the Intent of the purchase based on geography of a customer. For e.g. a customer located in a particular geography would be more biased towards buying a certain product.
- Machine Learning techniques are used for categorization of different statements.
- Deep Learning Algorithms are used in agriculture sector for sustainable farming.
- Natural Language Processing is used to create chatbots for customer support. This technique is further used to improve the knowledge base of chatbot and for Customer Support agent training.
- Amazon uses AI, machine learning and deep learning techniques to manage the inventory in warehouses. Robots use AI and Image processing techniques to automate the whole process of warehouse and inventory management.

3.) **What data science related skills and technologies are commonly used in this sector?**

**Ans)** The data science related skills and technologies commonly used in this sector are as follows: -

- Python, R, Spark, Weka, Machine Learning , Artificial Intelligence and Deep Learning Techniques.
- Recommender Systems , Graphical models for product recommendations
- Image processing for manufacturing semi-conductor devices and warehouse management.
- Natural Language Processing technique for text data (Spell Correction, Segmentation, Stemming, Annotation, Term Expansion etc), creation of chatbots.
- LSTM, time series analysis for any time series data.

**4.) What are the primary opportunities for growth?**

**Ans)** Speaker explained us about various areas where there are opportunities for growth. He explained that though companies use Natural Language Processing to create chatbots for customer support, much research is happening for a machine to empathize customer emotions using voice recognition and sentiment analysis. Machine would be able to understand whether a customer is angry or sad and would respond accordingly. This would result in better customer support. Another domain is self-driving car, where research is happening in 3 key areas i.e. understanding static information, understanding dynamic information, motion & learning. This would help improvise the driving experience. Companies has done some to improve the shopping experience of customers by investing in recommendations and search, but there is a lot of scope for improvement and companies are investing in research to introduce new areas of recommendation for better customer experience.

Other Questions with respect to this Lecture: -

**Ques.)** In addition, please discuss how data science plays a role in all aspects of the lifecycle of a retail product?

**Ans.)** Data Science plays a key role in life cycle of a retail product, this helps planner to do an effective pricing of a product and also helps them decide, whether/ where to stock the product.

Speaker gives an example of application of data science in life cycle of apple products. This helps company make important decision such as how much raw material is required, from where should company source raw materials, how much space is available to stock the goods based on consumption and shell life of a product. Another example that speaker gave is of lifecycle of cotton clothing, based on which company decides cost of raw material, logistics, packaging, marketing and storage requirements.

Please find an image below to have a visual understanding of a lifecycle of a retail product. Starting from sourcing the raw material, manufacturing, logistics, warehouse and inventory management and finally market reach, data science has application in almost all of the areas. It helps optimize whole supply chain by reducing cost in every domain of the lifecycle of a retail product.

# Lifecycle of a Retail Product