The Emerging Era of Data Science for the Wood Products Industries

2024 SLMA & SFPA Spring Meeting

SOUTHERN FOREST PRODUCTS ASSOCIATION

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SLMA Southeastern Lumber Manufacturers Association, Inc.

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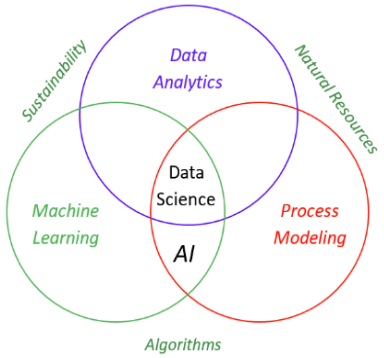


Part I - Context of Machine Learning

'There were 5 exabytes (one billion gigabytes) of information created between the dawn of civilization through 2003, but that much information is now created every 2 days'

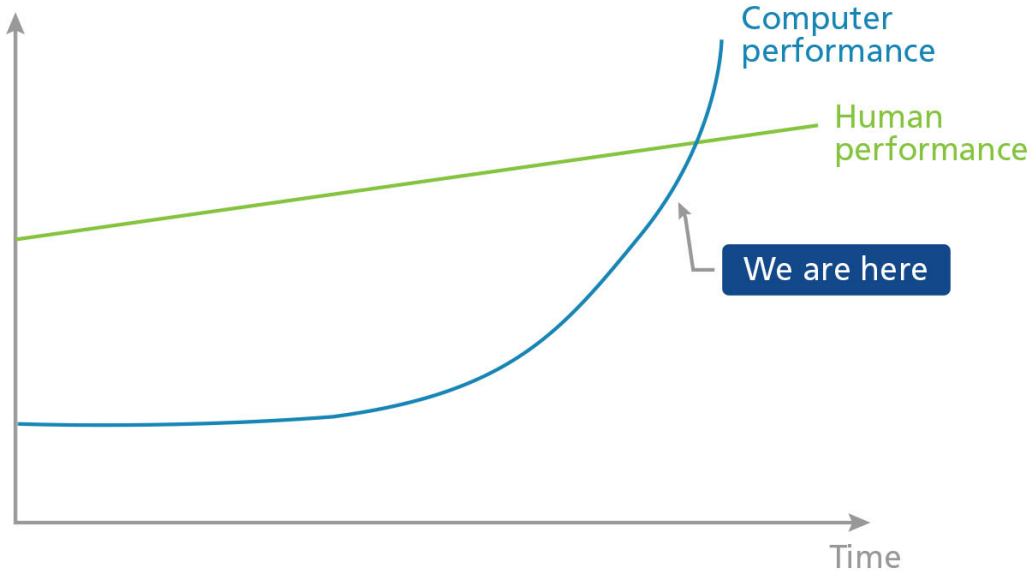
Eric Schmidt
Executive Chairman of Google

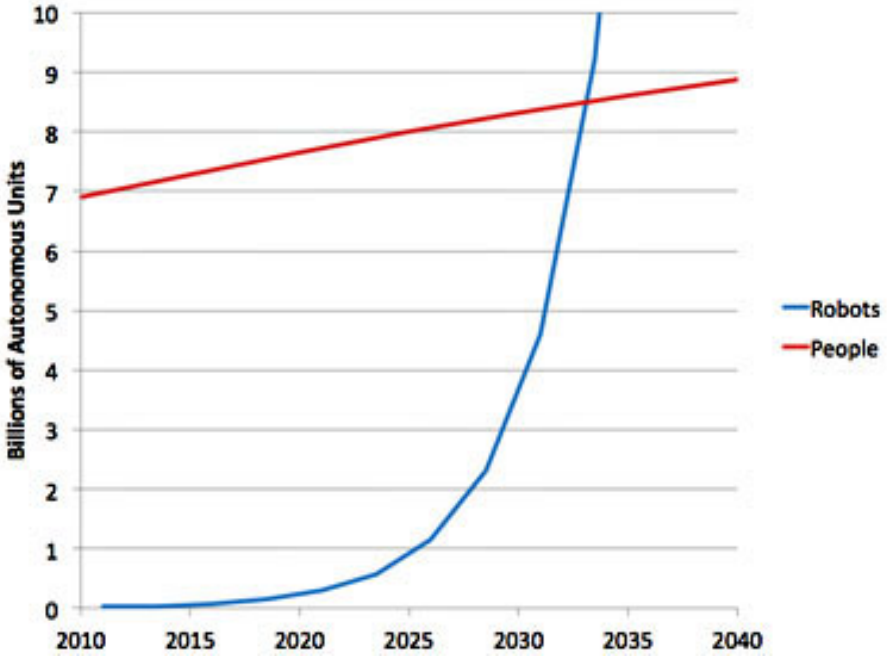
'The total data created every day in 2020 is estimated to be 2.5 EB, (according to FinancesOnline). And all the words ever spoke by human beings are said to be 5 EB'

AI Learning Rate

Machine learning vs. human learning

Computer performance may outpace human performance



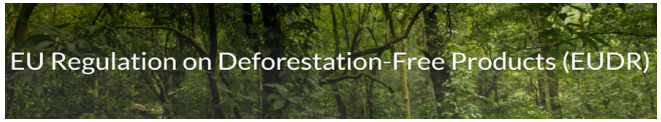


The Data Revolution – The Foundation for Machine Learning and AI

Business Perspective ……

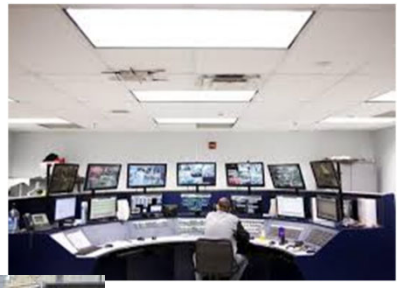
Industrial Perspective ……

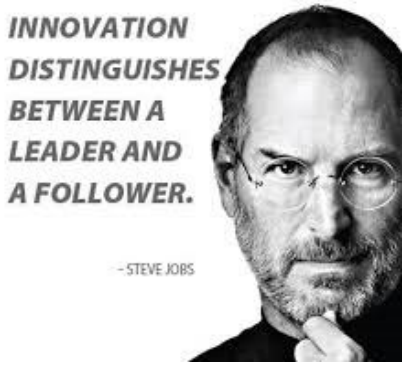
Sustainability Perspective ……



How do you improve and sustain competitiveness without 'Data Science and Machine Learning'?

"Failure is an option here. If things are not failing, you are not innovating enough."
-Elon Musk





Southern Yellow Pine Industry

Data Science is the New Tool!

- *Commodity-Based*
- *Drive Costs down by Throughput*
- *Maintaining Grade*
- *Try to Reduce Labor costs*

'Learning is not compulsory ... neither is survival'
W. Edwards Deming

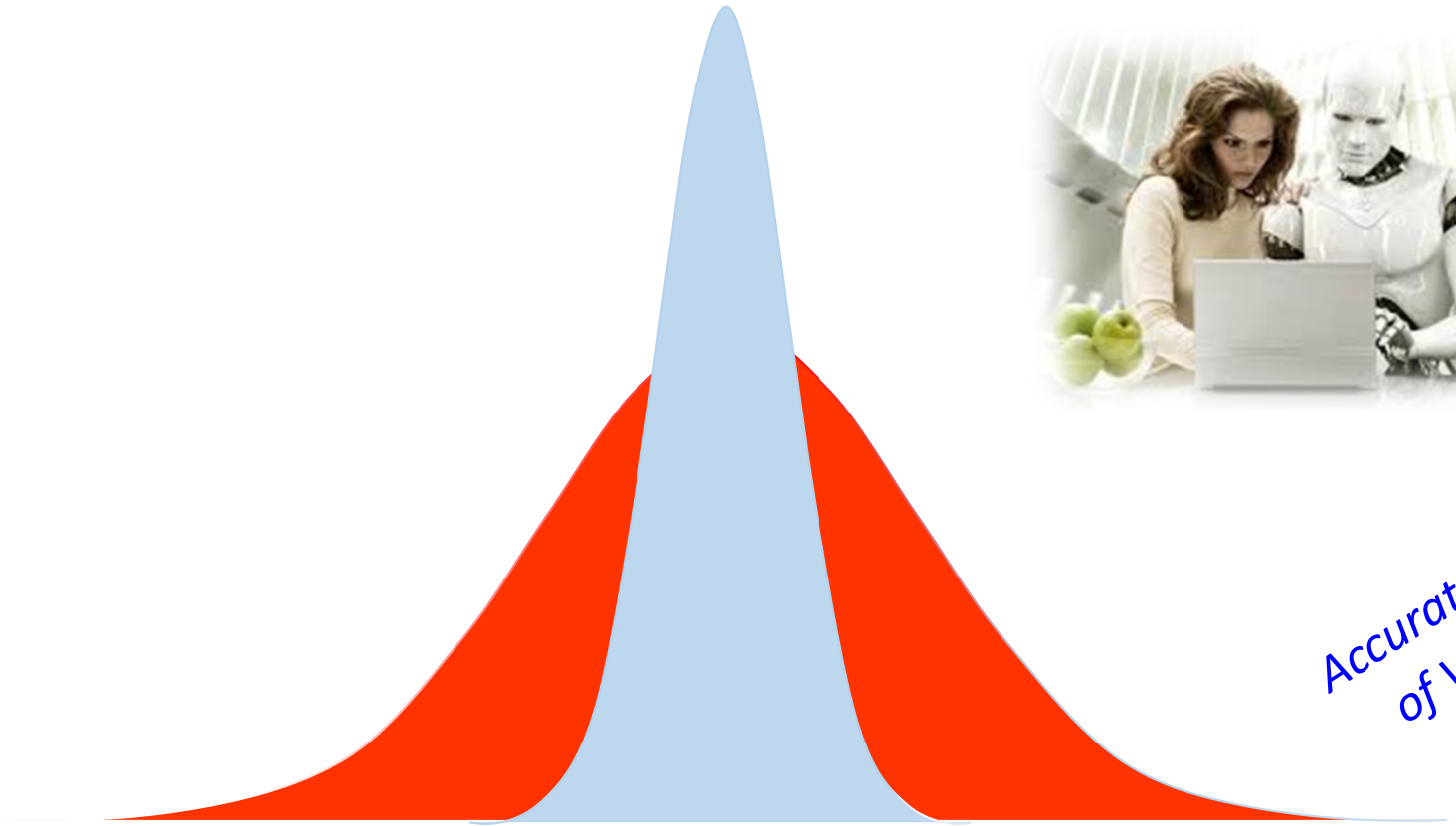
How will Your Company Sustain Its Competitiveness?

- *Speed Maximization*
- *Optimum Grade*
- *Automation*
- *Moisture Conisistency*
- *Etc.*

Are machines better than people, i.e., human error factor?

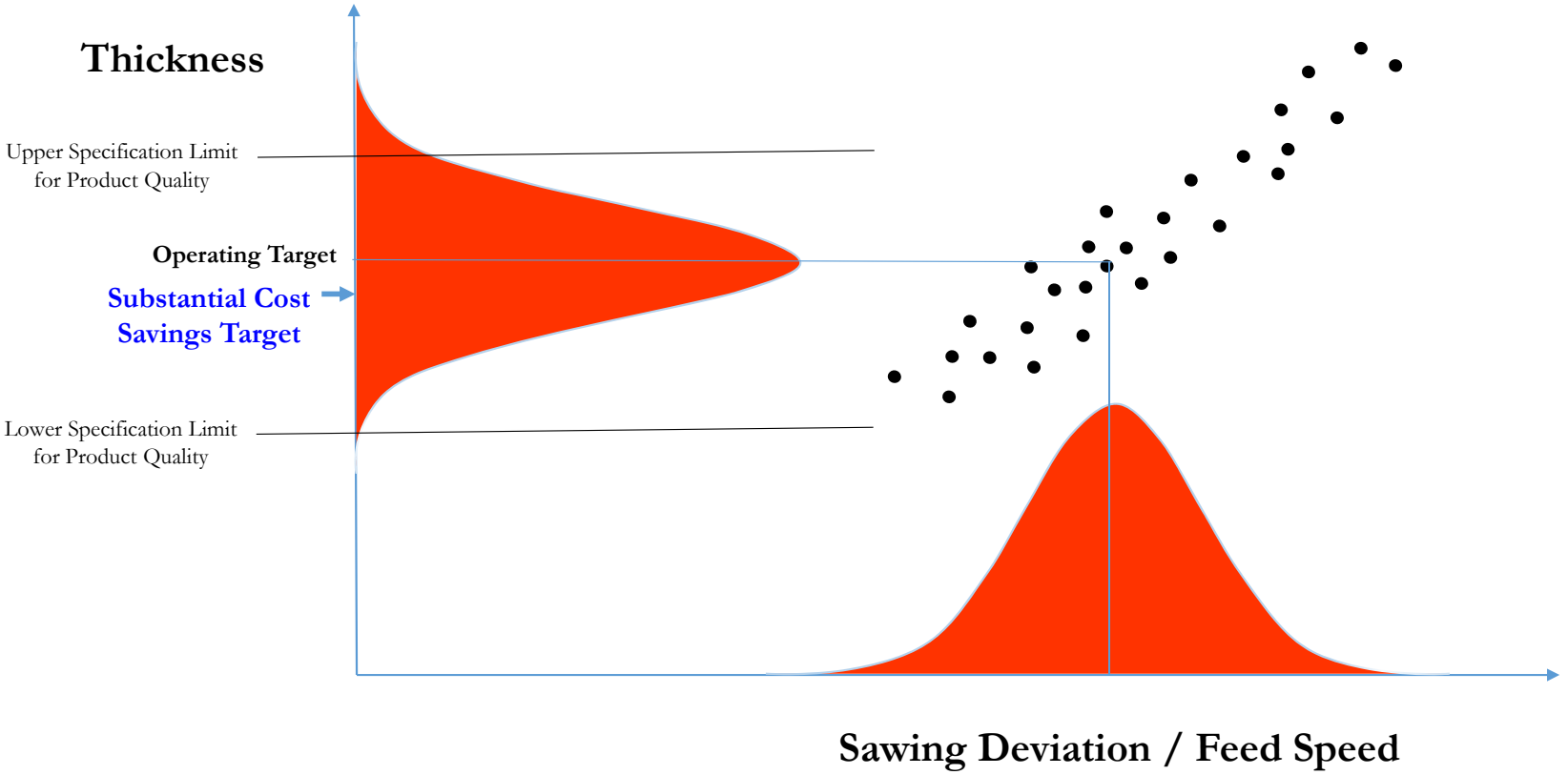
How will your organization learn?

Its All About Reducing Variation

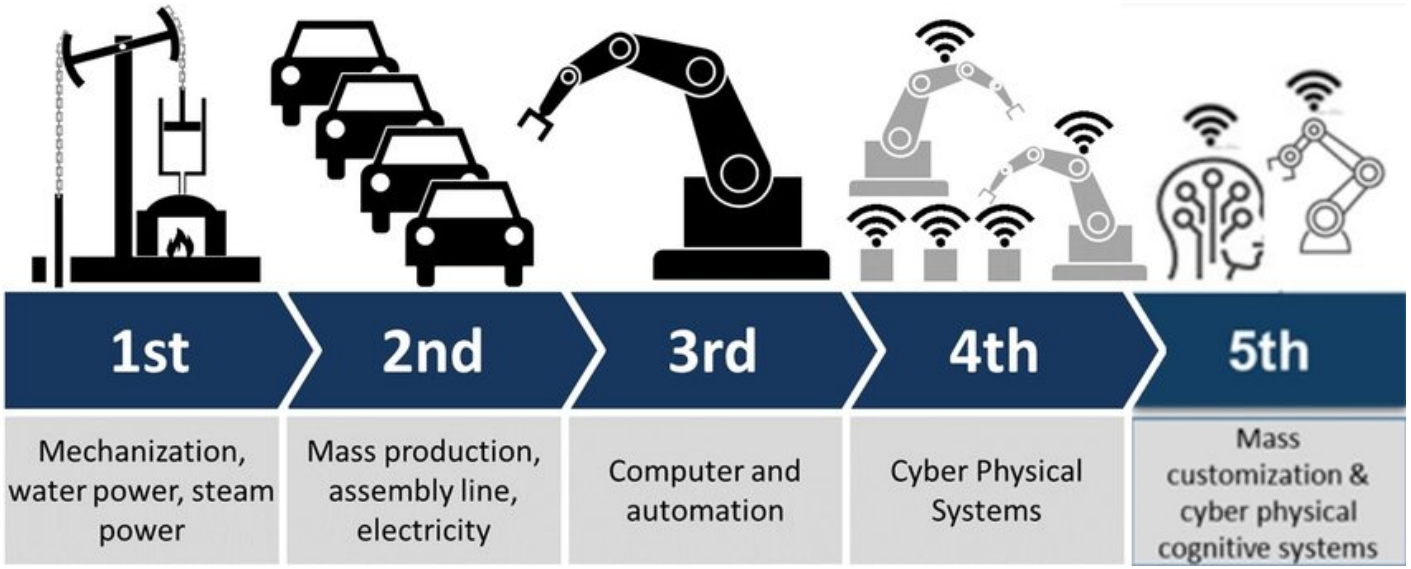


Accurately Diagnosing Sources of Variation in the Process

‘Variation’ Determines Process Operating Targets



The Industrial Revolution



Processing

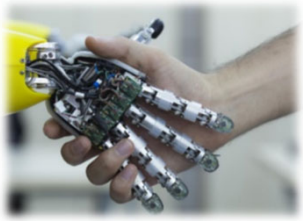
Automated Board Storage & Retrieval

You must be predictive!

Is the Human Able to 'Keep Up' with Comprehending/Interpreting Data Science, Machine Learning and AI?

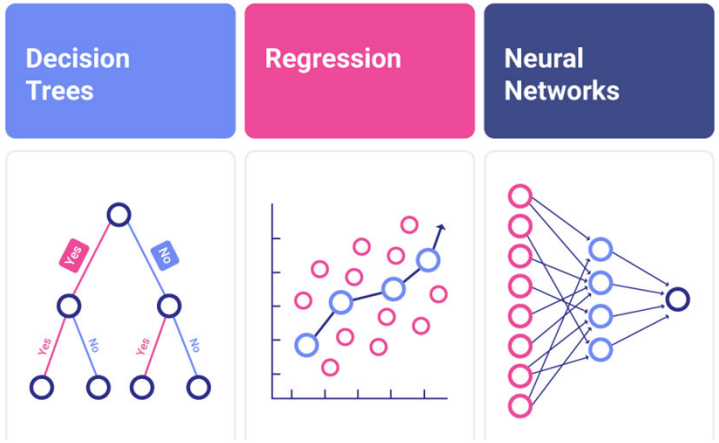
Operators ability to interpret output to make better decisions?

Training in Analytics – Is there a Gap?



Use Cases of Data Science in Manufacturing

- Predictive analytics:
  - The analysis of current data to use methods to predict and avoid problematic situations in advance.
  - The implementation of analytics identifies sources of variation and *interactions humans cannot see*.



Use Cases of Data Science in Manufacturing

- <u>Fault prediction and preventive maintenance:</u>

  - Prediction models are aimed at forecasting the moment when the equipment fails to perform the task; and to prevent these failures from happening.
  - Prediction concerning future troubles with the equipment, may avoid considerable delays and failures

Use Cases of Data Science in Manufacturing

- Robotization
  - Industrial robots largely contribute to improved quality of a product or service by reducing variation.
  - Every year, upgraded models come to the production floor to revolutionize the production lines, and manufacturing robots are more affordable than ever before.

Use Cases of Data Science in Manufacturing

- Computer Vision Applications:
  - Object identification and object detection and classification.
  - It is more common to rely on computer vision rather than on human vision.
  - Images are algorithmically compared to the standards to identify discrepancies.

Use Cases of Data Science in Sustainable Construction

- A.I. TIMBER: the Future of Sustainable Construction.
- *Smart Building Ecosystem:*
  - *IoT Sensors and Devices,*
  - *Integration,*
  - *Robust security,*
  - *building platform with robust analytics and machine learning capabilities.*

How will your learning evolve?