Digital Representation of Physical Systems for Machine Learning.

Essential Importance of Core Engineers in the Digital World.

Meeting ID : 787-4770-6350
Commencement : 7 pm to 8 pm , 23-04-2020(Saturday).

Reshinth Adithyan
Tata Consultancy Services.
reshinth.adith@outlook.com

Siddarth A
Tata Consultancy Services.
a.siddarth96@gmail.com

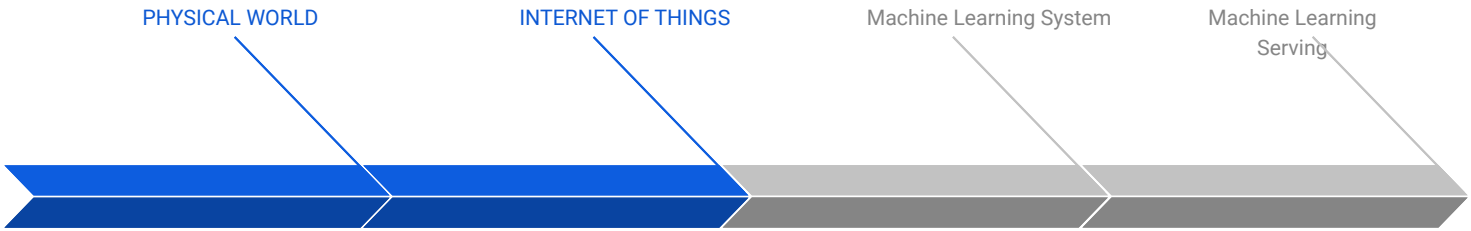
Machine Learning - Myth Busting

- Machine Learning is an **Horizontal** not a **Vertical**.
- Machine Learning is an extension to Lin. Algebra, Probability, Calculus and Statistics.
- Machine Learning belongs to the fields of ***Mathematics***, *Computer Science* and *Programming* acts as a Tool.
- Machine Learning is all about ***Mathematical Representation*** and ***Decision Making.***.

Beware of the Term Artificial Intelligence

- Never use **A.I.** use Machine Learning.
- Never use **Deep Learning**, use Neural Networks instead.

MACHINE LEARNING SYSTEM



System

The System, who is the subject to Analysis.

Sensor

Instrument used to convert the actions of the system into a consumable format.

Machine Learning Algorithm used

Trained with Historical Data.

Deployed Machine Learning Model

Fully Trained Machine Learning Model with Knowledge.

True Trends in Machine Learning.

Training an Agent to walk in an Environment.

Reference : https://ai.googleblog.com/2020/04/exploring-evolutionary-meta-learning-in.html

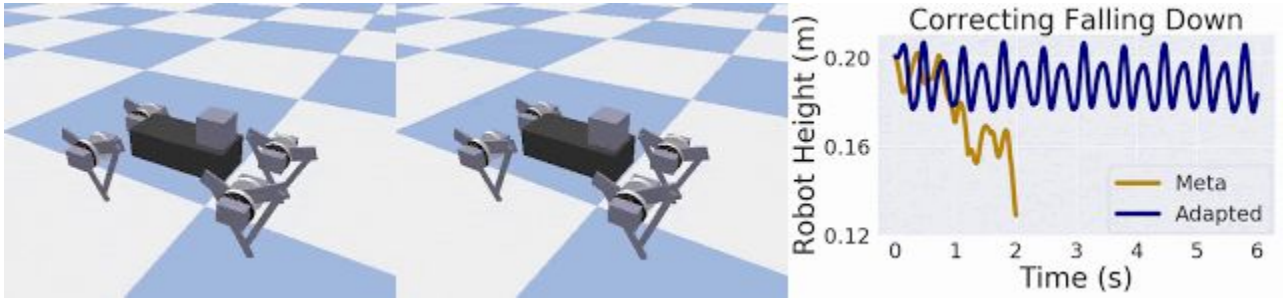
True Trends in Machine Learning.

Scrutinizing Gender Bias in Language Translation Systems

Reference : https://ai.googleblog.com/2020/04/a-scalable-approach-to-reducing-gender.html

How an ML System communicates with the World.

- Physical Systems are s***ystem of certain changes*** felt in the physical world.
- Machine Learning Models exists in a ***Digital World***.
- **Data** needs to be represented with no contextual loss into Digital World.
- **Internet of Things** sleek into the process of Communication.

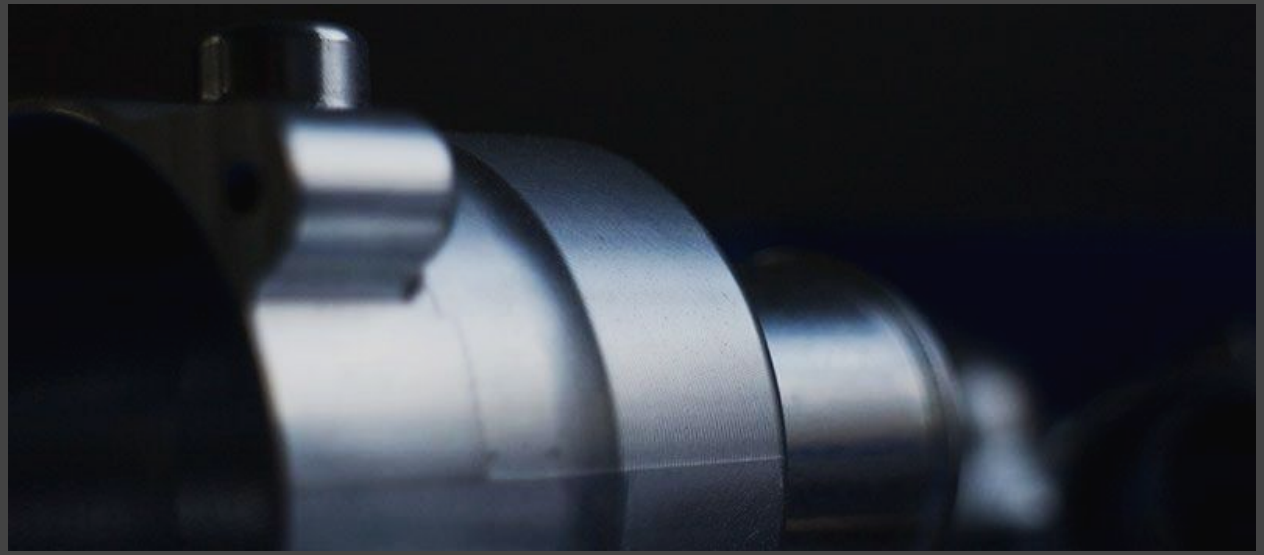


Digital Twin of the Robot, exploring some dynamic task.

Problems to solve

1. Accurate Representation to the Machine Learning Model.
2. Accurate Synthesis of the Data to extract all the information.
3. Optimizing the Model.
4. ***Interacting with the Environment - Digital Twin.***

Sample Use Case - Digital Twin in Supply Chain System with Lathe Machines.

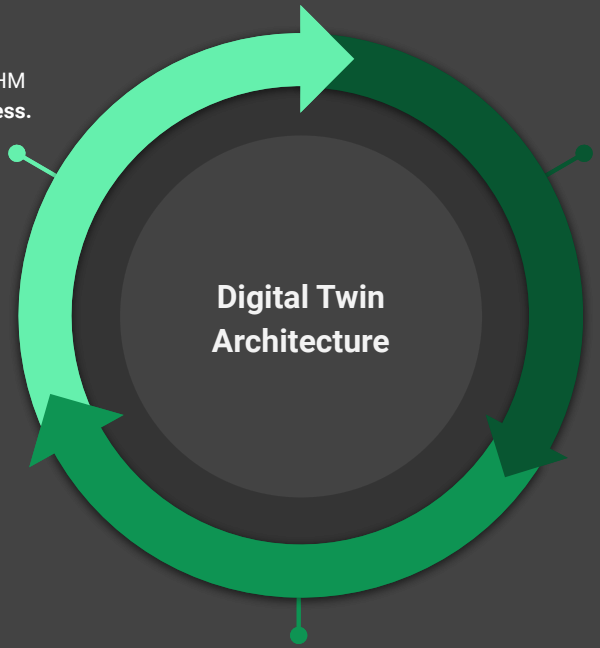


Understanding the Use Case

Block Diagram - Digital Twin of Manual Lathe

MACHINE LEARNING ALGORITHM

Analyzes and Optimizes the Process.



LATHE

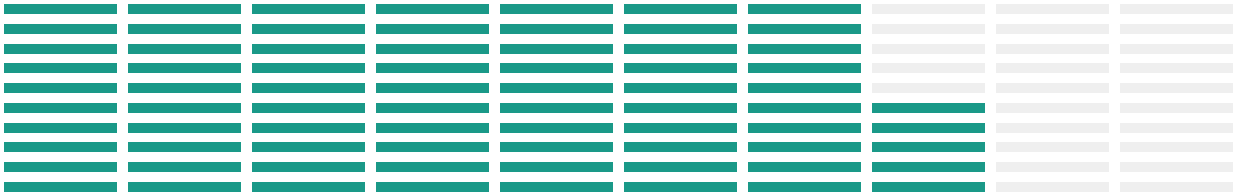
Sending Essential Informations.

THINGSPEAK

Collection of Digital Data.

Trend Analysis with Machine Learning Model

Trend 01



86%

Using Manual observation.

Trend 02

49%

Using the Machine Learning Model

Thank you.