

- Do you need Machine Learning for all applications?
- Does all businesses require Machine Learning as a necessary expertise?



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For Machine Learning Class Introduction
Target Audience: Sem 6 Students

Why Google defined a new discipline to help humans make decisions

Machine-learning systems are only as smart as their training data. So Google formalized the marshaling of hard and soft sciences that go into its decisions.

Cutting
Edge
Machine
Learning
Discipline:
Decision
Intelligence
Engineering



Source of this
Lecture

Google chief decision officer **Cassie Kozyrkov** [Photo: [Stephen McCarthy](#)/ RISE via Sportsfile/Flickr]

Business to Set Up

Making Ovens



- Get the materials to build the Oven?
- Use an existing oven?
- Build the Oven from scratch?

- Innovate: Alter an existing Recipe?
- When to make the bread?
- How much bread to make?

Making Bread



- Get the materials to bake the bread?
- Innovate: Make the Recipe from scratch?
- Use an existing recipe?

Imagine hiring a chef to build you an oven or an electrical engineer to bake bread for you.



When it comes to machine learning, that's the kind of mistake businesses make over and over.

Business: Restaurant / Bakery



Focus on

- “Using” existing kitchen appliances - not building one from scratch or “innovating” existing appliances
- Innovating existing recipes or building a new one from scratch



Business: Kitchen Appliances Manufacturer (E.g. Oven)

Focus on

- “Innovating” existing appliances to make them perform better
- Building a new one from scratch for a kitchen task hitherto left unfocused
- Certainly NOT innovating recipes (e.g. a new bread variant such as “masala bread”)



A Machine Learning Kitchen Analogy



Hire the right person for the right job to avoid



Business: Restaurant / Bakery-HIRE PEOPLE TO:

1. Figure out what's worth cooking / what the objectives are (*Decision-makers, Product managers*)
2. Who understand the suppliers and the customers (*Domain Experts and Social Scientists*)
3. Who can process ingredients at scale (*Data Engineers and Analysts*)
4. Who can try many different ingredient-appliance combinations quickly to generate potential recipes (**Applied ML Engineers**)
5. Who can check that the quality of the recipe is good enough to serve (*Statisticians*)
6. Who turn a potential recipe into millions of dishes served efficiently (*Software Engineers*)
7. Who keep the interdisciplinary team on track (*Project/Program Managers*)
8. Who ensure that your dishes stay top notch even if the delivery truck brings you a ton of potatoes instead of the rice you ordered (*Reliability Engineers*).

Applied ML Versus ML Research

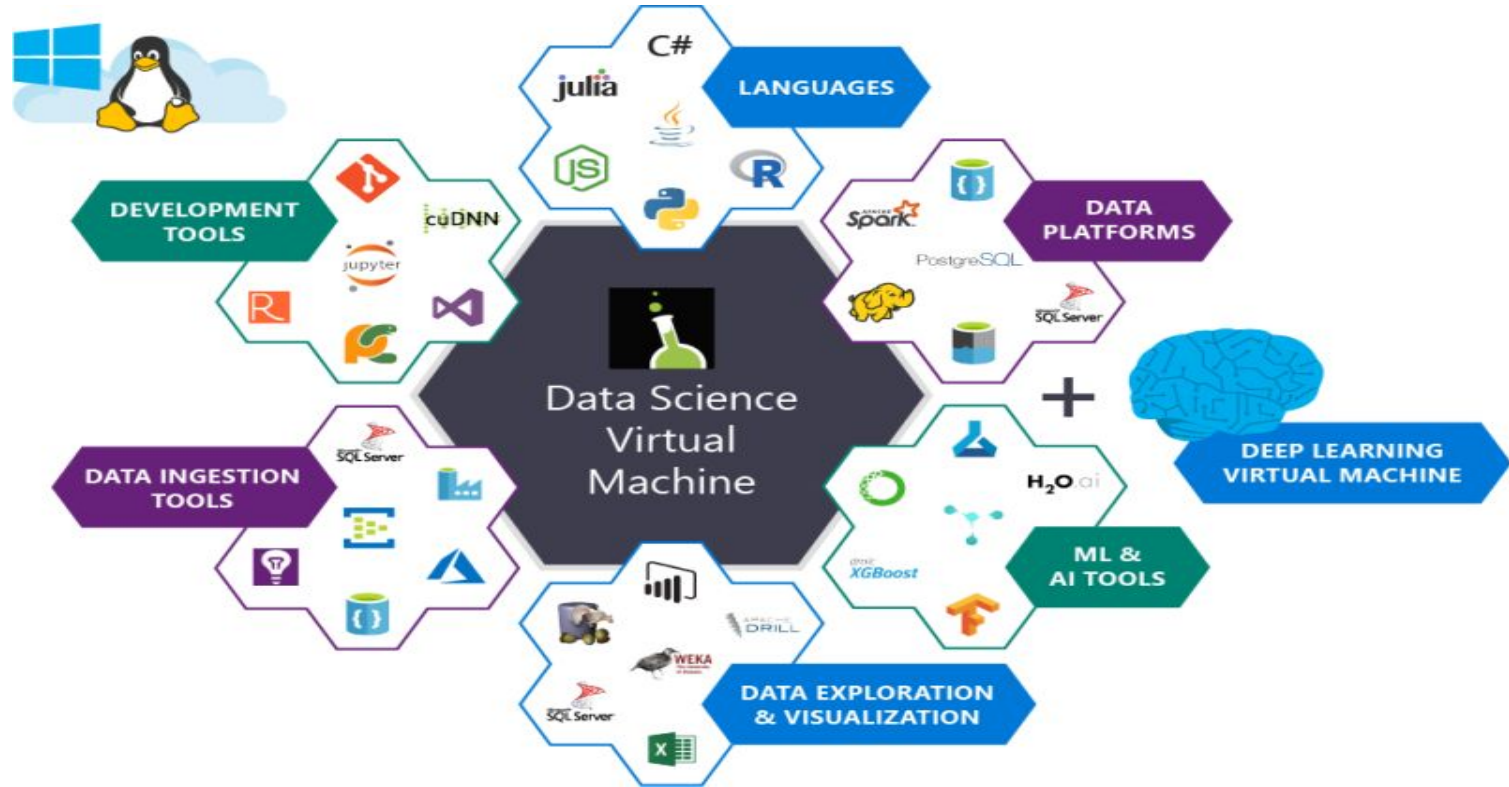
APPLIED ML = Use “Existing”

Tools to find a solution to the problem given.

(You will do this in your lab)

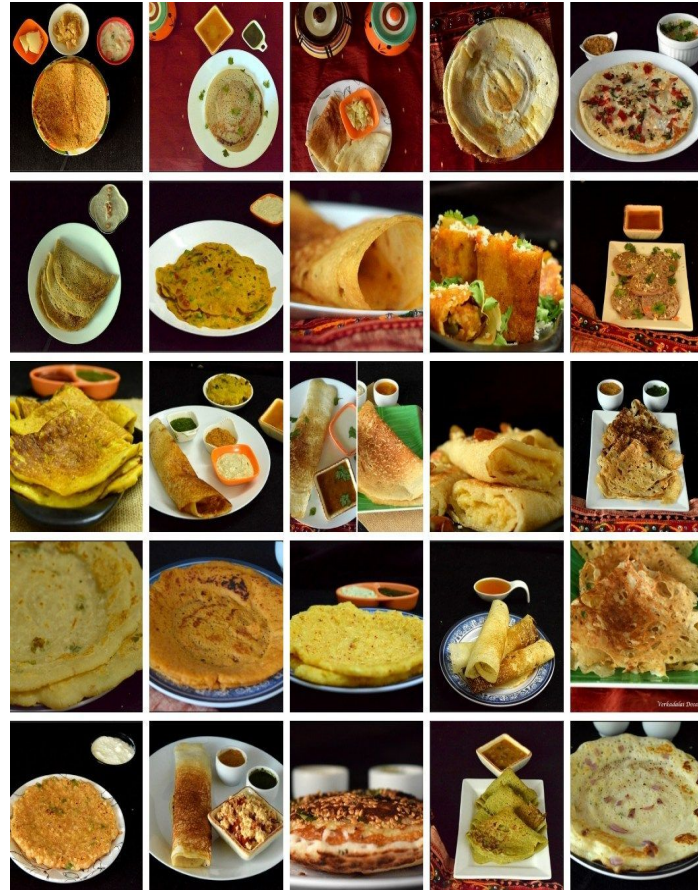
ML RESEARCH= “Make a new Tool / ML Library or find ways to enhance / optimize an existing tool” which Applied ML developers will use.

(You learn the fundas behind each ML Approach in your theory)



APPLIED ML ENGINEERS

Different Existing Kitchen Appliances
+
Different Existing Ingredients



What are these innovations?

Kitchen Appliances = **ML Research Outcome**

Kitchen Recipe = ML Model Outcome



Air Fryer



Methu Vada Maker



ID Vada Maker

Some Machine Learning Tools Used for Applied ML

Keras



Keras is an open source **neural network** library written in **Python**. It is capable of running on top of TensorFlow. It is designed to enable fast experimentation with **deep neural networks**.

TensorFlow



TensorFlow is an open-source software library for dataflow programming across a range of tasks. It is a symbolic math library that is used for **machine learning** applications like neural networks.

PyTorch



PyTorch is an open source **machine learning** library for Python, based on Torch. It is used for applications such as **natural language processing** and was developed by Facebook's AI research group.

NOTE the difference between the three - when to use what.

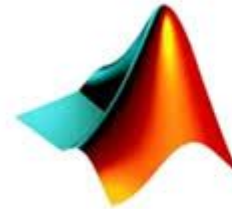
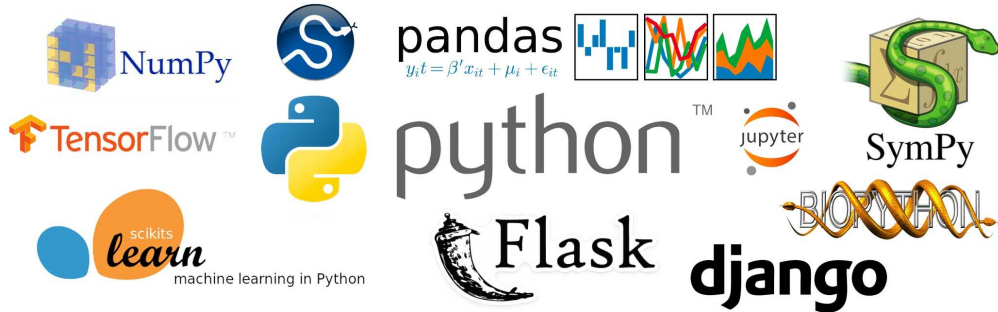


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MATLAB®

Source URLs:

1. [Introduction to Decision Intelligence](#)
2. [Why Google defined a new discipline to help humans make decisions](#)
3. [Why businesses fail at machine learning - By](#)
4. [Machine Learning in MATLAB - MATLAB & Simulink \(Task, Matlab App table\)](#)