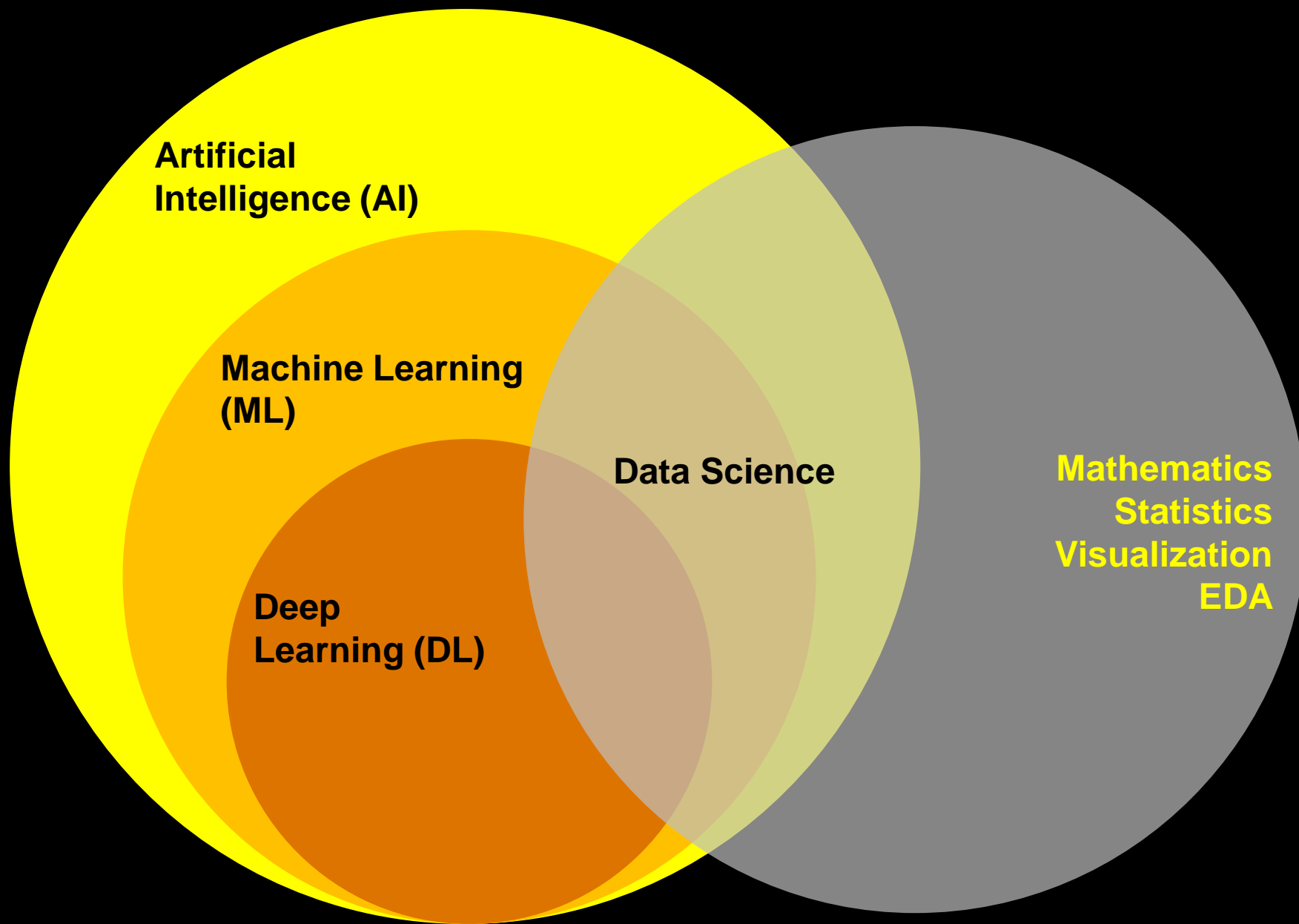


# Machine Learning Roadmap 2021

*(a machine-learning-flavoured-visual-iterative-  
living-mind-map/compass)*

*- Ask*



**Artificial  
Learning**

**v/s**

**Machine  
Learning**

**v/s**

**Deep  
Learning**

**v/s**

**Data  
Science**

# What is Machine Learning?

(It's **not** some magic that computer does)

(It's **neither** hard coded like CP)

(It will **never** be 100% accurate)

# Machine Learning is turning things (data) into numbers and **finding patterns** in those numbers.

The computer does this part.  
How???

**Mathematics**

*(Don't worry, we would cover a little on this later without making it crazy boring)*

Traditional  
programming



1. Cut vegetables
2. Season chicken
3. Preheat oven
4. Cook chicken for 30-minutes
5. Add vegetables



Starts with

Makes

Machine learning  
algorithm

Inputs



Output



1. Cut vegetables
2. Season chicken
3. Preheat oven
4. Cook chicken for 30-minutes
5. Add vegetables

Starts with

Figures out

# “Why use machine learning?”

Good reason: ~~Why not?~~

Better reason: Can you think of all the rules?

*(probably not)*

*(maybe not very simple)*

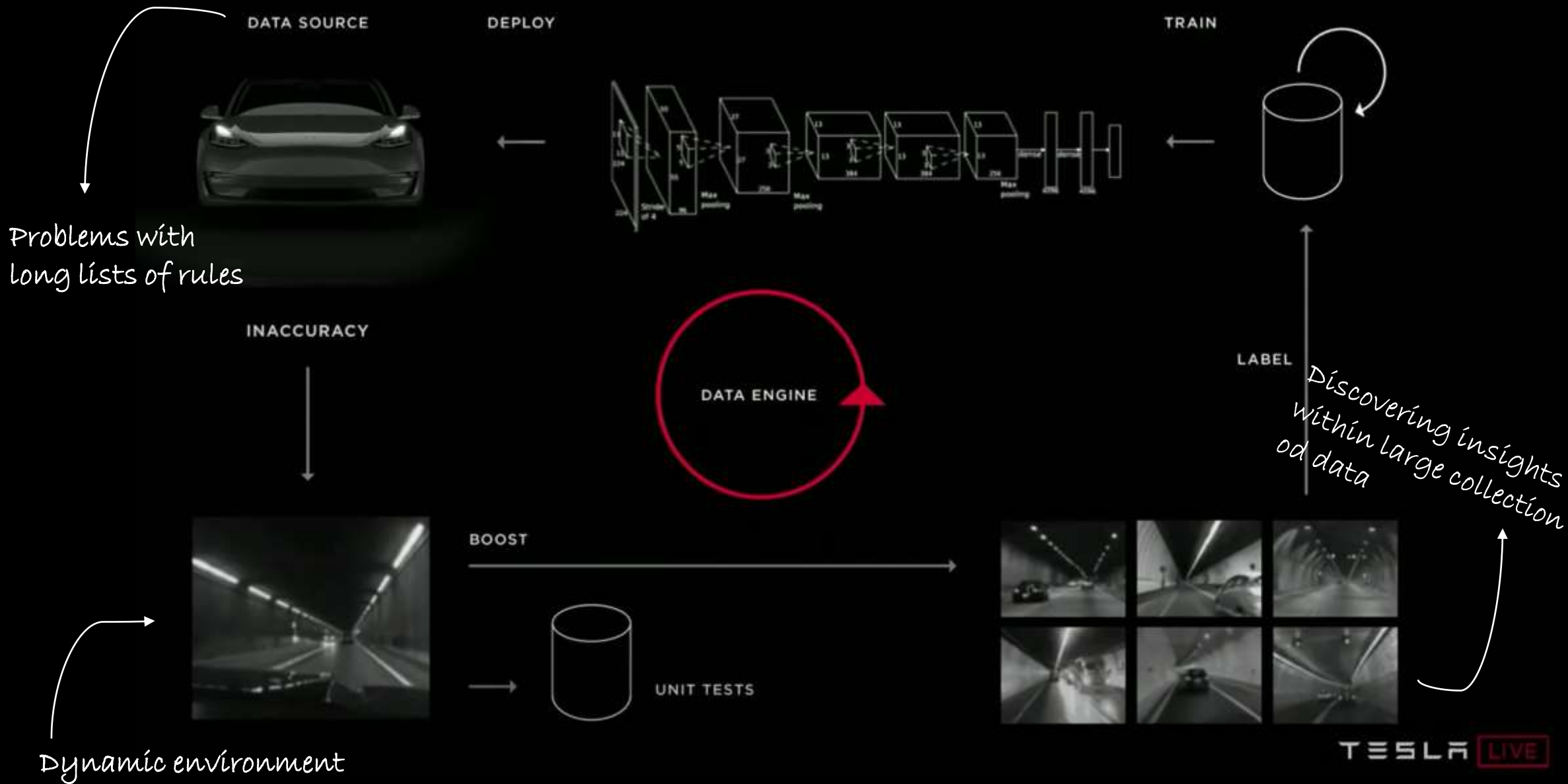
If you can build a **simple rule-based** system that doesn't require machine learning, do that.

*A wise (lazy) software engineer would always choose the simplest algorithm to go with.....*

# What machine learning is good for....?

- **Problems with long lists of rules** – when the traditional approach fails, machine learning may help.
- **Dynamic environments** – machine learning can adapt ('learn') to new scenarios.
- **Discovering insights within large collection of data** – can you imagine trying to go through every financial transaction OUTR has ever hand by hand....?









# What we're going to cover *(broadly)*

1. **Machine Learning Problems** – what does a machine learning problem look like?
2. **Machine Learning Process** – once you've found a problem, what steps might you take to solve it?
3. **Machine Learning Tools** – what should you use to build your solution?
4. **Machine Learning Mathematics** – what exactly is happening under the hood?
5. **Machine Learning Resources** – okay, this is cool, how can I learn all of this?

# Ready?

Okay, let's go.

# 1. Machine Learning Problems

100% cat	97% dog	14% dog 85% Elon Musk	100% Elon Musk
			
<pre>print(f'''cat: {   np.round(model.predict(cat),2) }''') cat: [[1. 0. 0.]</pre>	<pre>print(f'''dog: {   np.round(model.predict(dog),2) }''') dog: [[0.02 0.97 0.01]</pre>	<pre>print(f'''elon: {   np.round(model.predict(elon_with_disguise),2) }''') elon: [[0. 0.14 0.85]</pre>	<pre>print(f'''elon: {   np.round(model.predict(elon_without_disguise),2) }''') elon: [[0. 0. 1.]</pre>

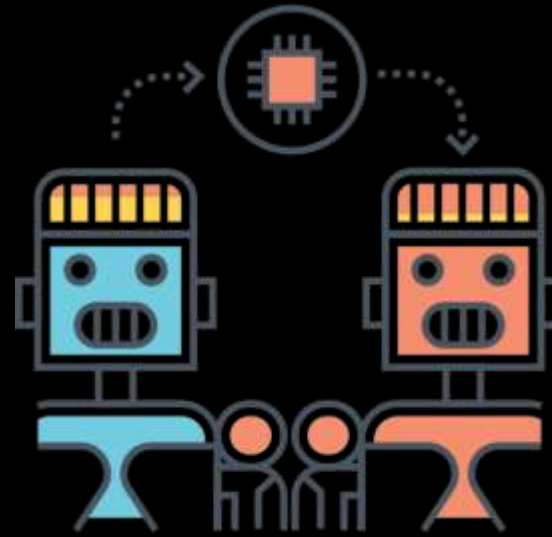
# Categories of Learning



**Supervised  
Learning**



**Unsupervised  
Learning**



**Transfer  
Learning**



**Reinforcement  
Learning**

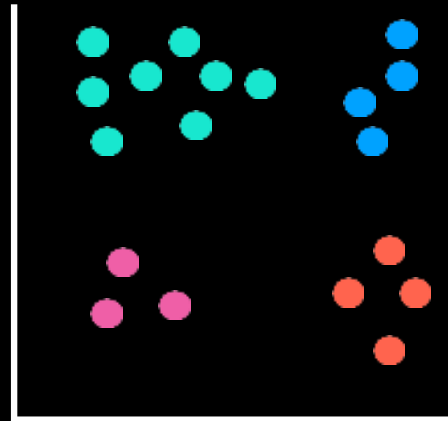
# Problem Domains



**Classification**



**Regression**

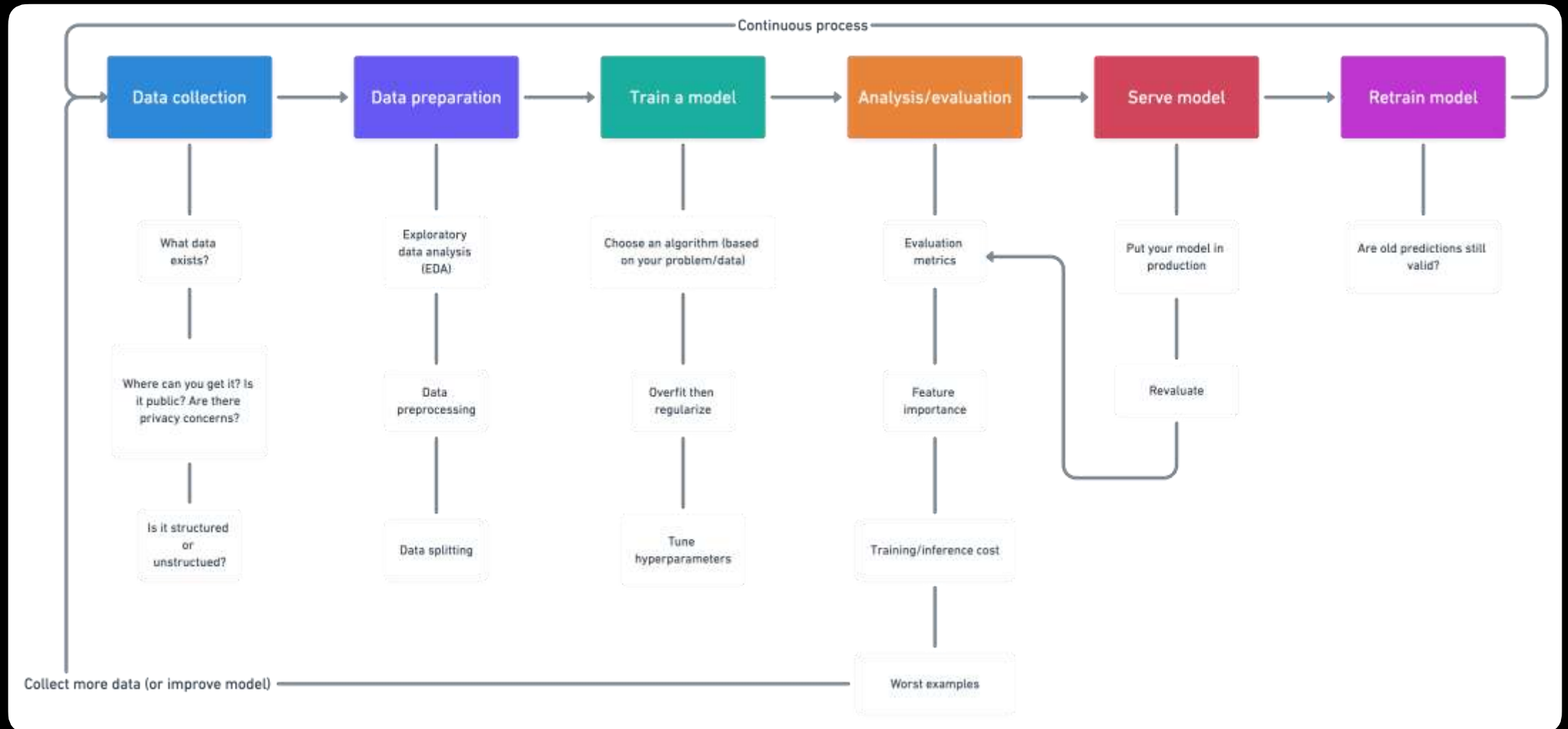


**Clustering**

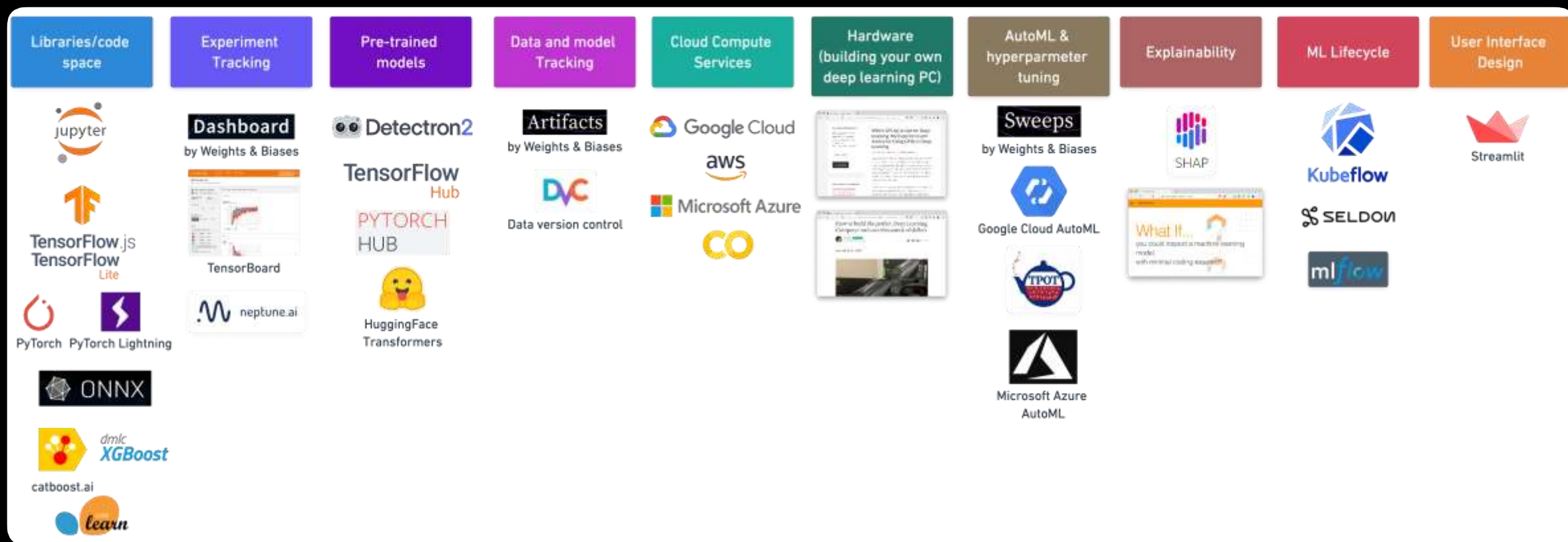
(dropped)		(most important)		
ID	Weight	Heartrate	Age	Heart Disease?
0	76	54	55	0
1	81	42	34	0
2	90	70	47	0
3	67	100	79	1

**Dimensionality Reduction**

# 2. Machine Learning Process



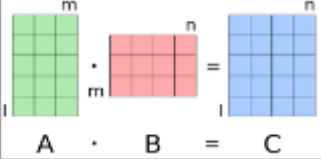

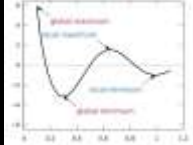
### 3. Machine Learning Tools





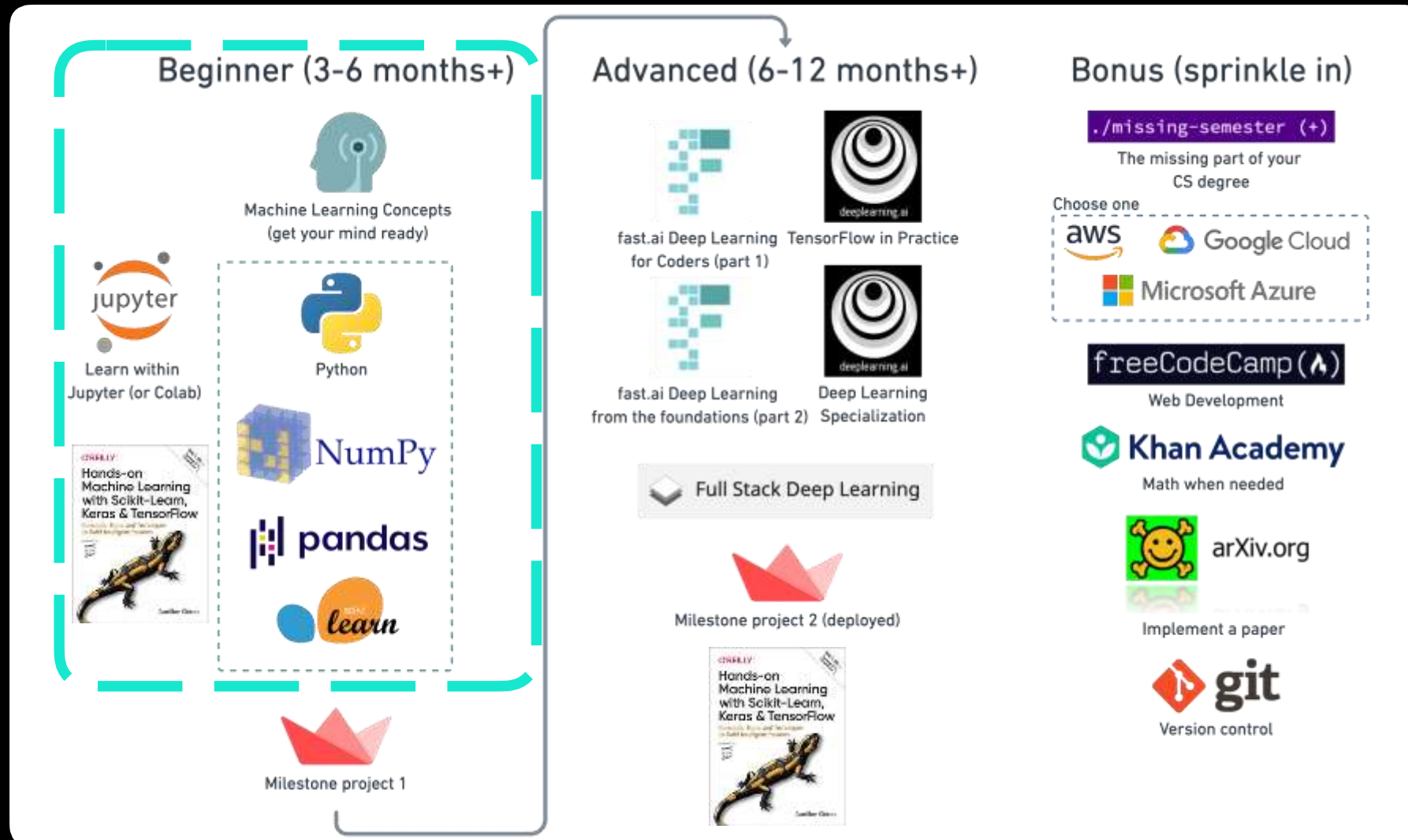
# 4. Machine Learning Mathematics

(some of the main ones)

Linear Algebra	$\begin{aligned}2x + y - z &= 8 \\ -3x - y + 2z &= -11 \\ -2x + y + 2z &= -3\end{aligned}$
Matrix Manipulation	
Multivariate Calculus	$f(x, y) = \frac{x^2 y}{x^4 + y^2}$
The Chain Rule	$\frac{d}{dx} [f(g(x))] = f'(g(x))g'(x)$
Probability + Distributions	
Optimization	

# 5. Machine Learning Resources

(where to start learning)

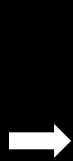


# Starting Through.....



3 Stars in [Python](#)

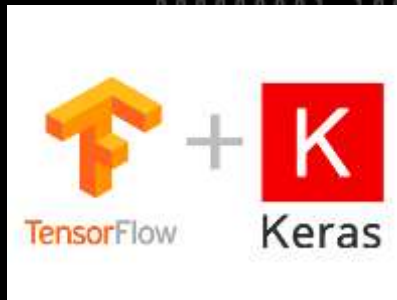
[Tensorflow 2.0](#) for building Neural Networks, Pre Processing Complex Data, and Result Analysis



[NumPy](#) for handling values and [Pandas](#) for handling DataFrames



[Matplotlib](#) to plot [graphs](#) and visualize figures and shapes



[Scikit Learn](#) to use the built in algorithms for Classification, Regression, Clustering, Dimensionality reduction, Model selection, Preprocessing

Keep (machine) learning  
Keep creating

# Contact Info:



<https://github.com/Ashindustry007>



<https://www.linkedin.com/in/ashishpanda007/>



<https://www.kaggle.com/ashishkumarpanda>



<https://wa.link/snuixy>