AI v/s ML v/s DL (RL)

Human + Model + Coding perspectives

About me

Mani Sarkar

[More about me (@theNeomatrix369)]

Freelance Software, Data, ML Engineer

Java / JVM

Cloud / Infra / DevOps

Polyglot developer

Code quality, testing, performance, DevOps, deep affinity for AI/ML/DL/NLP, NN...

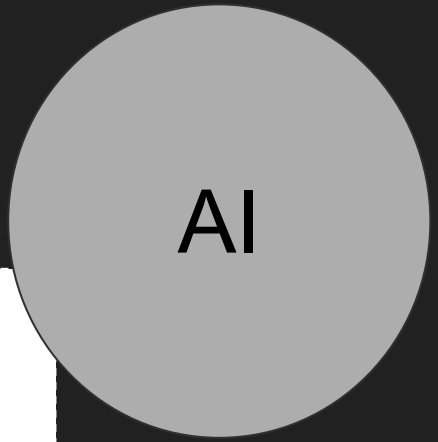
Java/JVM and Developer communities

Strengthening teams and helping them *accelerate*

JCP member, F/OSS projects: @graalvm @truffleruby, W&B

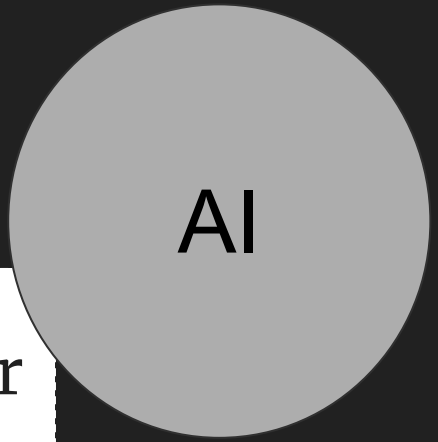
Java Champion, Oracle Groundbreaker Ambassador, Software Crafter, Blogger, Speaker

Artificial Intelligence (AI)



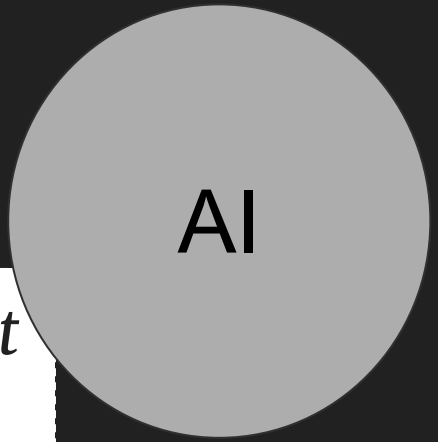
Traditional AI models or tries to model (simulate) human intelligence using computers (and software programs), and is manually put together by humans.

Artificial Intelligence (AI)



AI has an idea about the features (or data), only when manually added by humans. The model is the program written, with features (data) embedded in it.

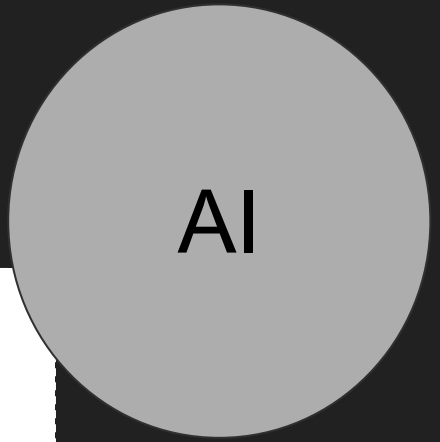
Artificial Intelligence (AI)



***Model is code and data**, manually put together by humans – code can become very complex (lots of nested `if` statements)*

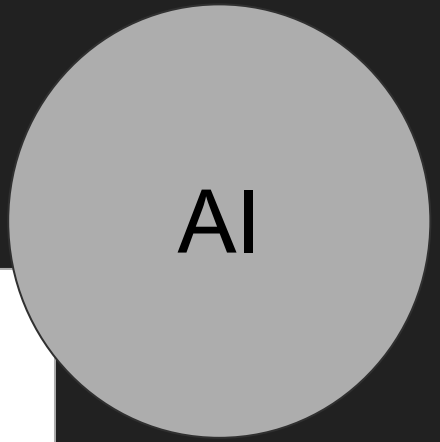
Code is static, manually generated, hence model is also static.

Artificial Intelligence (AI)



*The model **CANNOT** be layered or stacked. New data cannot be applied to old model without amending or rewriting the program.*

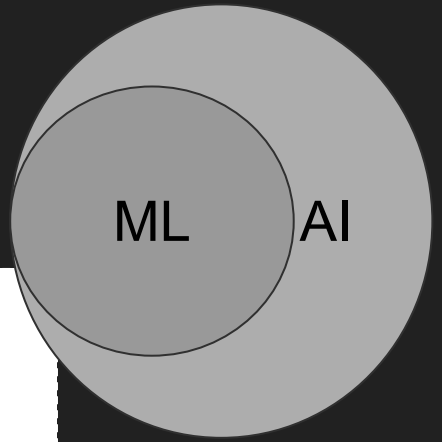
Artificial Intelligence (AI)



Code Example:

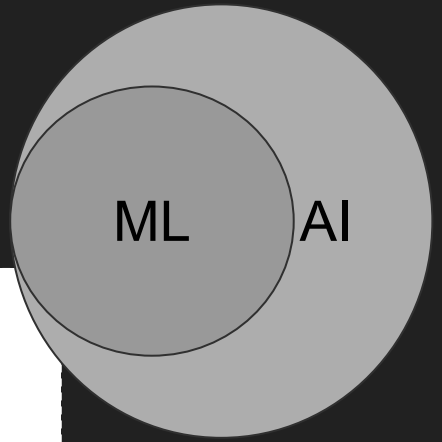
Eliza

Machine Learning (AI)



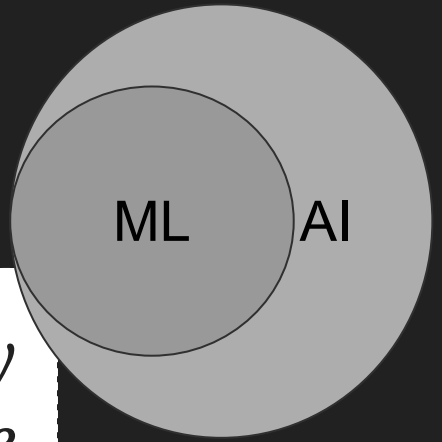
Machine learning is about computers being ***able*** to think and act with less human intervention.

Machine Learning (AI)



Machine learning can analyse data and use relationships (features), with the help of human intervention, build good / better models. More automated, less human intervention.

Machine Learning (AI)



***Model is code and data**, generated by a program, created by humans – code is extremely complex and lengthy.*

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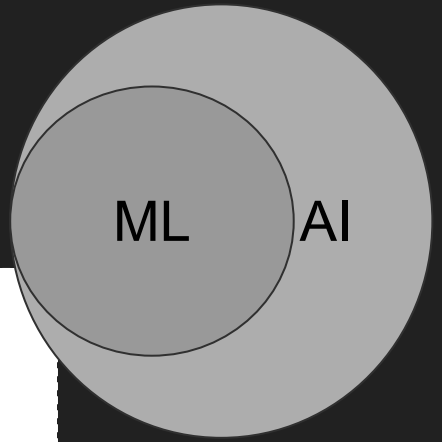
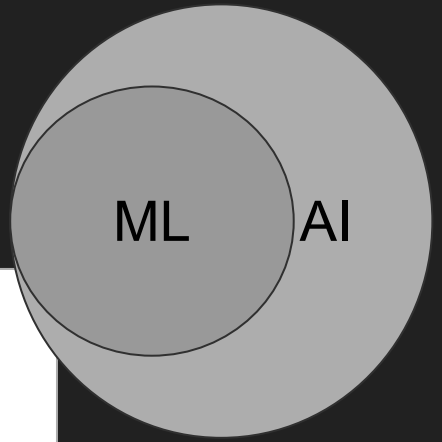
Machine Learning (AI)



*The model **CANNOT** be layered but **can** be stacked. Tricky to add new data on old model(s), would need retraining.*

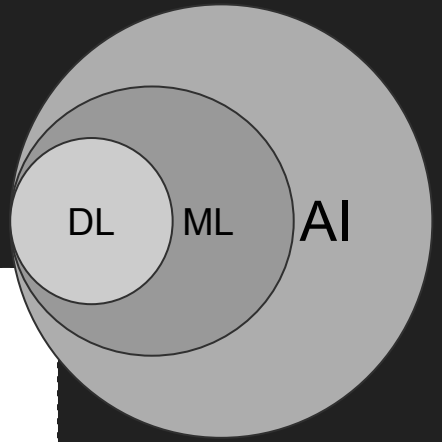
Machine Learning (AI)



Code Example:

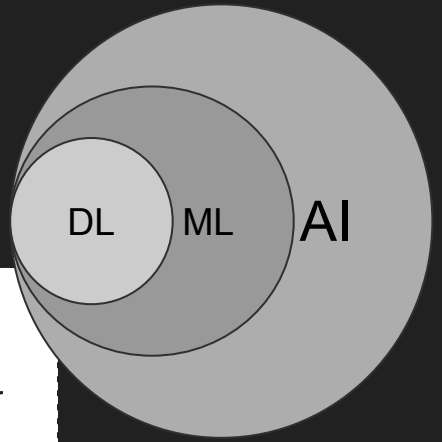
ML models on Kaggle

Deep Learning (DL)



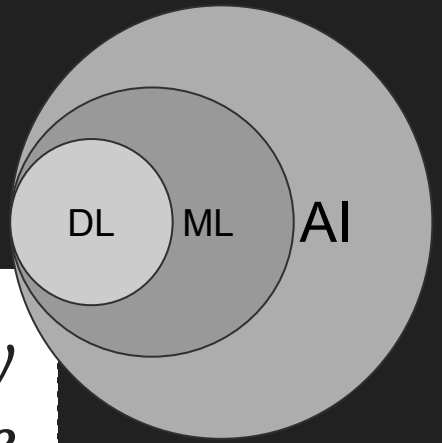
Deep learning is about computers learning to think using structures modeled on the human brain.

Deep Learning (DL)



Deep learning can analyse data and find relationships (features) automatically, with no human intervention (or with very little help), to build very accurate models.

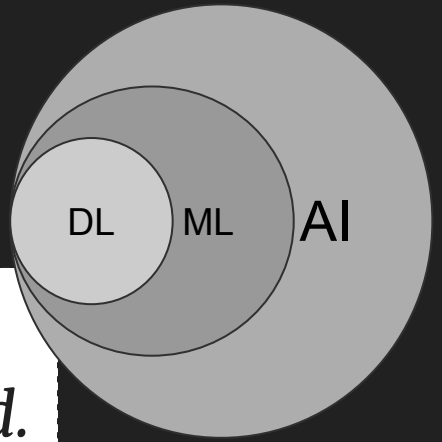
Deep Learning (DL)



***Model is code and data**, generated by a program, created by humans – code is extremely complex and lengthy.*

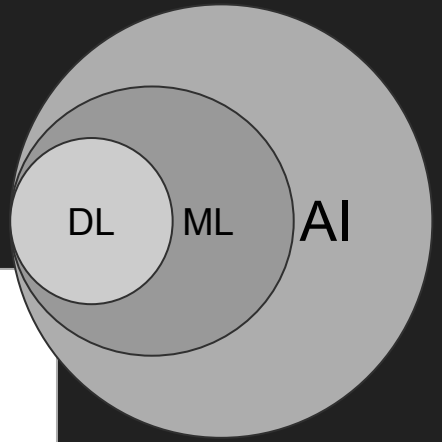
Code is static, manually generated, and hence the model is static.

Deep Learning (DL)



*The model **can be** layered **and** stacked. Hence new data can be applied on top of old model without retraining (transfer learning).*

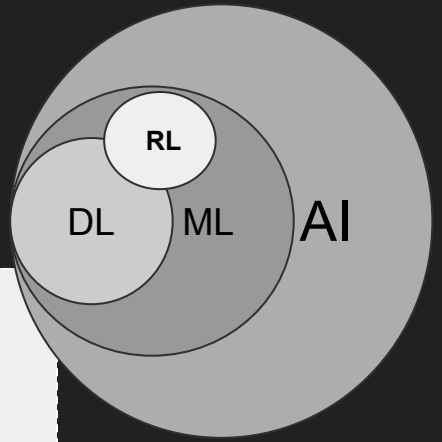
Deep Learning (DL)



Example:

DL models on Kaggle

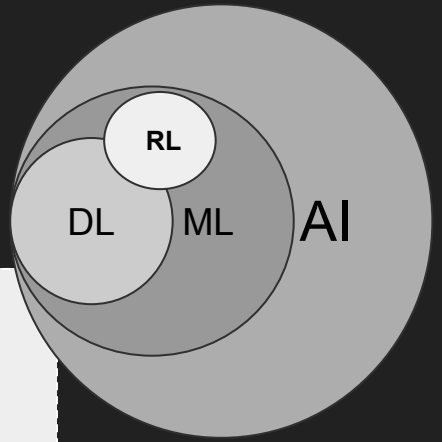
(Deep) Reinforcement Learning (RL)



A subset of ML/DL and is about computers being ***able*** to think and act with no human intervention, based on rules, rewards and end target(s).

https://en.wikipedia.org/wiki/Reinforcement_learning

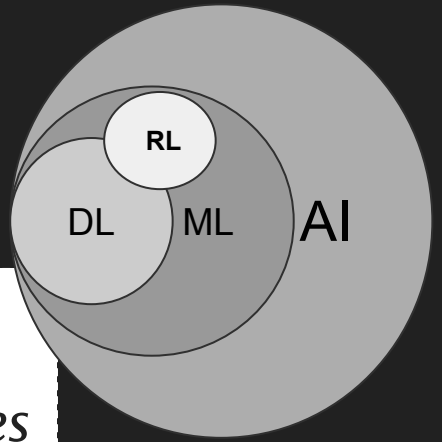
(Deep) Reinforcement Learning (RL)



It learns and evaluates data on the fly (from scratch), and builds the model automatically, driven by rules, rewards and end target(s) - with no human intervention.

https://en.wikipedia.org/wiki/Reinforcement_learning

(Deep) Reinforcement Learning (RL)

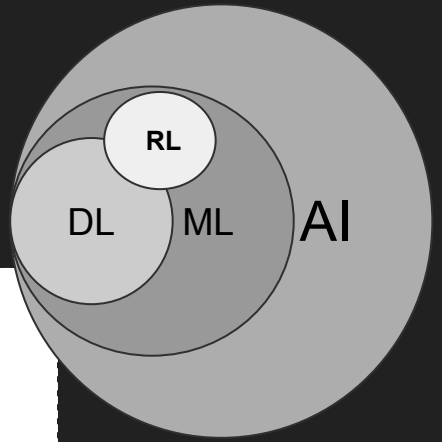


***Model is code and data**, initially created by humans which creates a program as it comes across new data - code can start simple but become extremely complex and lengthy.*

Code is dynamic, automatically generated, hence model is also dynamic.

https://en.wikipedia.org/wiki/Reinforcement_learning

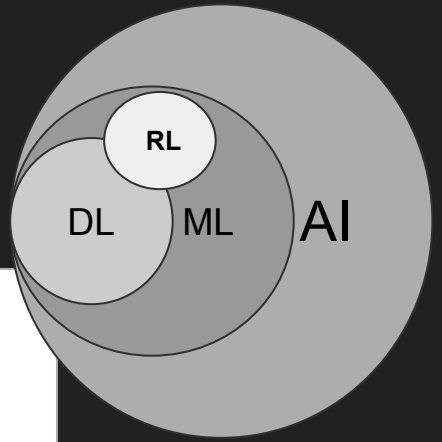
(Deep) Reinforcement Learning (RL)



*The model **can be** layered. Hence new data can be applied on top of existing model as it incrementally trains itself.*

https://en.wikipedia.org/wiki/Reinforcement_learning

(Deep) Reinforcement Learning (RL)



Code Example:

AlphaGo

https://en.wikipedia.org/wiki/Reinforcement_learning

Summary: what is …?

AI: humans write intelligent programs (embedded with features) ***(static)***

ML: humans use a program to create another program from transformed static data (features shown manually) – model ***(static)***

DL: humans use a program to create a program that learns about the transformed static data (finds features automatically) – model ***(static)***

RL: humans use a program to create a program that follows specific rules, rewards, and target(s) which leads to creation of another program by learning from real-time data (features) - model ***(dynamic)***

Questions & feedback

Please share your questions and feedback at

@theNeomatrix369

or on the video stream

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