Are things stable AI / Deep learning / Machine Learning?

Classroom rules

1. Hands-on in each with concepts discussions
2. 1 exclusive for theory / Maths
3. For each
   1. Notes
   2. Notebook / Code
   3. HW
4. PLEASE PLEASE.. keep putting all your questions in questions tab?
5. Feedback for each class
   1. Ratings:
   2. Comments: Questions..
6. Starting of class
   1. Summary
   2. Questions: remaining questions and comments

AI / Deep Learning is like a moving target

1. Cover all mostly important points
2. Learn new things on your own

Applications of AI

1. https://www.youtube.com/c/BBCClick/videos
2. https://towardsdatascience.com/mouse-movement-modelling-to-predict-online-fraud-873d90b201e2

<https://economictimes.indiatimes.com/tech/software/i-agree-with-the-a-and-not-the-i-of-artificial-intelligence-apple-cofounder-steve-wozniak/articleshow/63070006.cms?from=mdr>

History of AI

1. A logical calculus of the ideas immanent in nervous activity
2. <https://www.worldcat.org/title/frank-rosenblatt-publications/oclc/64057171>
3. Mark Minsky perceptrons
   1. <https://en.wikipedia.org/wiki/AI_winter>
4. Parallel Distributed Processing (PDP) model
5. https://en.wikipedia.org/wiki/Geoffrey\_Hinton

Artificial Neural Activity: Complex set of mathematical calculations (calculus and linear algebra).

Codified in form of frameworks by different organization

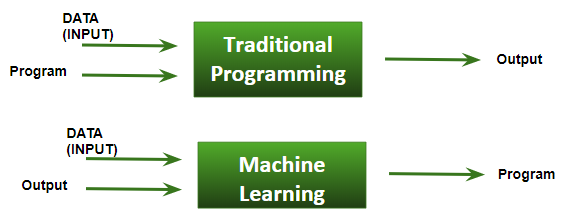
1. Theano – Stopped
2. Tensorflow - Google
3. PyTorch – Facebook
   1. fastai
4. MXNet - MS

Difference between rule based coding vs. Machine learning

|  |  |
| --- | --- |
| Coding | ML |
| If I’ve to find, a person is running, walking, jogging?   1. If speed < x then walking 2. elif x <= speed <= y, then jogging 3. else speed > y, then running   New set of rules required after code is failed. | I’ll figure out rule on my own. |

Features are identified by Machine itself in machine learning and then try to predict the activity.

1. Rule based – coding
2. ML – creating feature on my own
3. DL – features created my machine



<https://www.google.com/search?q=ml+vs+deep+learning&source=lnms&tbm=isch&sa=X&ved=2ahUKEwiZ1IiN3-30AhXDwzgGHSUCDj4Q_AUoAXoECAEQAw&biw=1440&bih=686&dpr=1#imgrc=SFDlyR7LSST7dM>

Explainable ai

MLOps: MLFlow, kubeflow – Databricks

## Class exercise problem

1)

|  |  |  |  |
| --- | --- | --- | --- |
| x | -1 | 0 | 1 |
| Y | -3 | -1 | 1 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x | -1 | 0 | 1 | 2 |
| Y | -3 | -1 | 1 | 3 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | -1 | 0 | 1 | 2 | 3 |
| Y | -3 | -1 | 1 | 3 | 5 |

Y = f(x) ?

Y = x, 2x , 2x+1, 2x-1

Y = 2x – 1 = (2\*-1) – 1 = -3

How it’s done:

1. Direction: As x inc., Y inc
2. Magnitude: Y inc by 2, X inc by 1
3. Y = 2x +/- 1
4. Y = 2x – 1

**Predict**: Y? If x is 20… Y = 39

Point of convergence

**What can I do to improve this model?**

1. Change optimizer
2. Feed more data points
3. Epochs
4. Complicated architecture

H.W:

1. Try replicate
2. Try improving
3. Questions

Concept -> Research paper (https://arxiv.org/abs/1412.6980)-> implemented (code) : https://paperswithcode.com/ -> Framework -> educators -> students

<https://www.youtube.com/watch?v=NlpS-DhayQA>

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | x | -1 | 0 | 1 | 2 | 3 |
|  |  | Y | -3 | -1 | 1 | 3 | 5 |
|  |  |  |  |  |  |  |  |
|  | Y = f(x) = ? | optimizer |  |  |  |  |  |
| Y' = x | Predicted | Y' | -1 | 0 | 1 | 2 | 3 |
|  | Actual | Y | -3 | -1 | 1 | 3 | 5 |
|  |  | diff | 2 | 1 | 0 | -1 | -2 |
|  |  |  |  |  |  |  |  |
|  | Y = f(x) = ? | optimizer |  |  |  |  |  |
| Y' = 2x | Predicted | Y' | -2 | 0 | 2 | 4 | 6 |
|  | Actual | Y | -3 | -1 | 1 | 3 | 5 |
|  |  | diff | 1 | 1 | 1 | 1 | 1 |
|  |  |  |  |  |  |  |  |
|  | Y = f(x) = ? | optimizer |  |  |  |  |  |
| Y' = 2x-1 | Predicted | Y' | -3 | -1 | 1 | 3 | 5 |
|  | Actual | Y | -3 | -1 | 1 | 3 | 5 |
|  |  | diff | 0 | 0 | 0 | 0 | 0 |