

Deep Dive Into AI, ML, DL

Date : 14-12-2020 | Speaker : Ayon Roy |
Event : Webinar by DSC Bennett University

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Hello Buddy!

I am **Ayon Roy**

B.Tech CSE (2017-2021)

Data Science Intern @ **Lulu International Exchange**, Abu Dhabi
(**World's Leading Financial Services Company**)

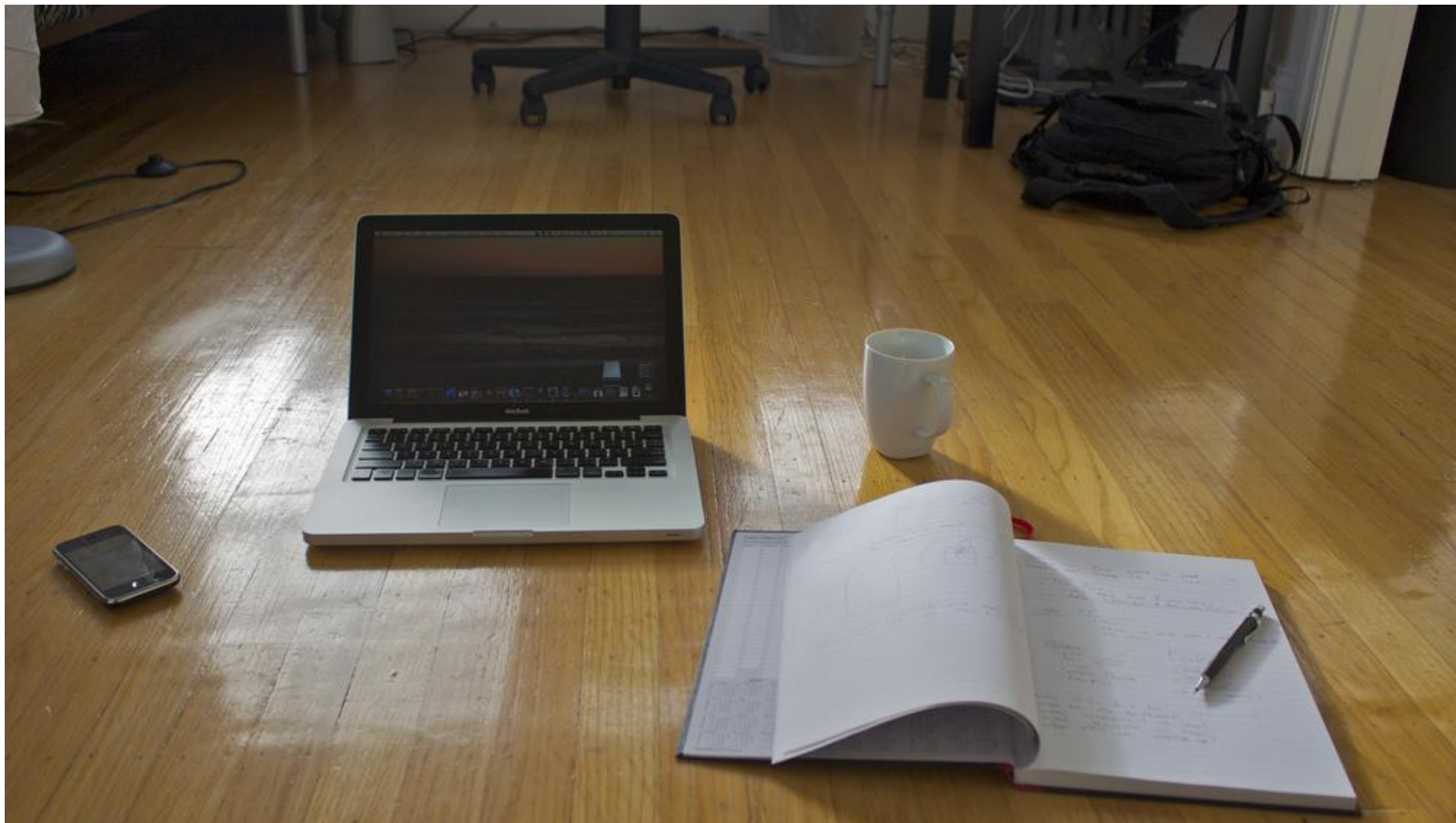
Brought **Kaggle Days Meetup** Community in India for the 1st time

If you haven't heard about me yet, you might have been living under the rocks. Wake up !!

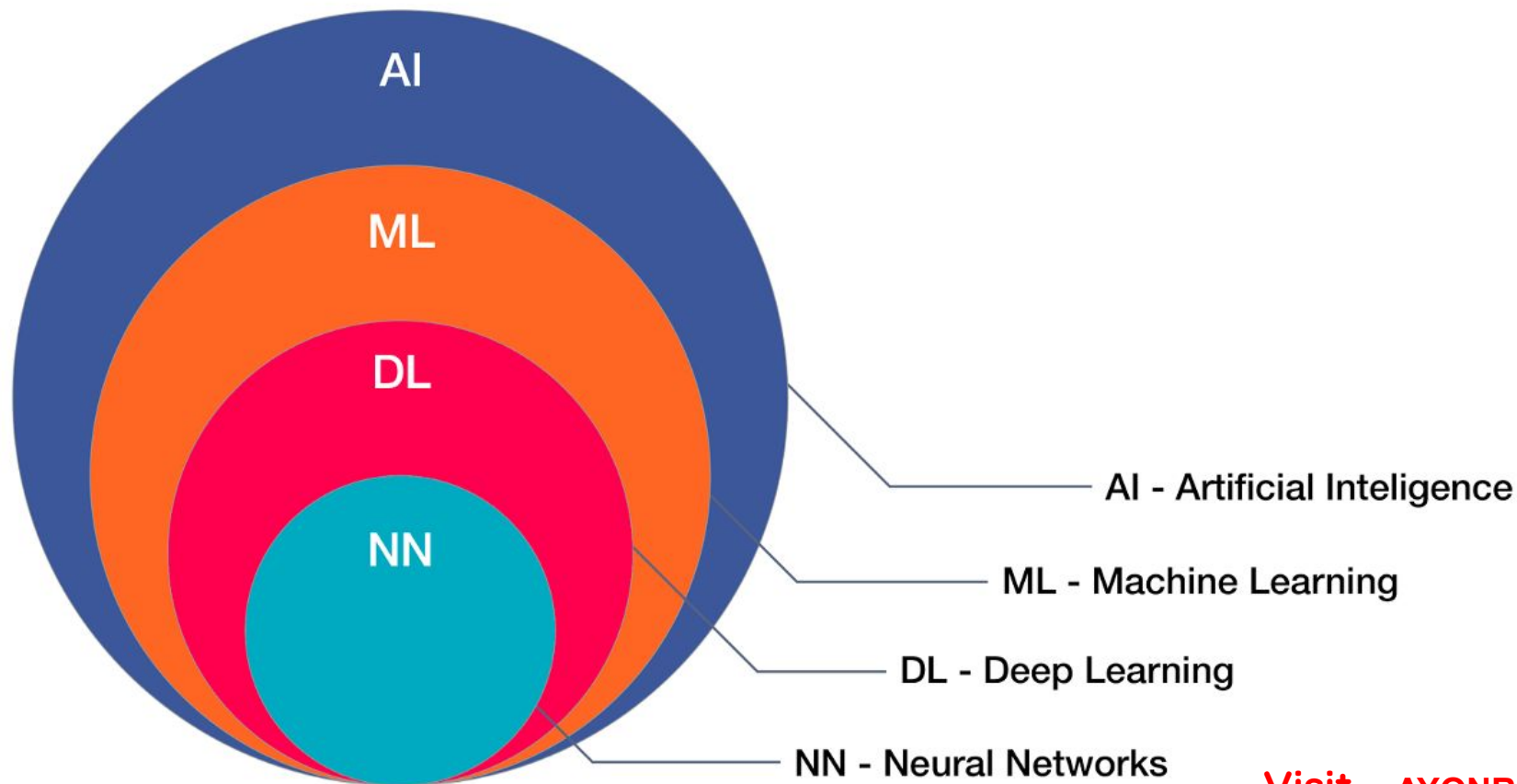
Agenda (14-12-2020)

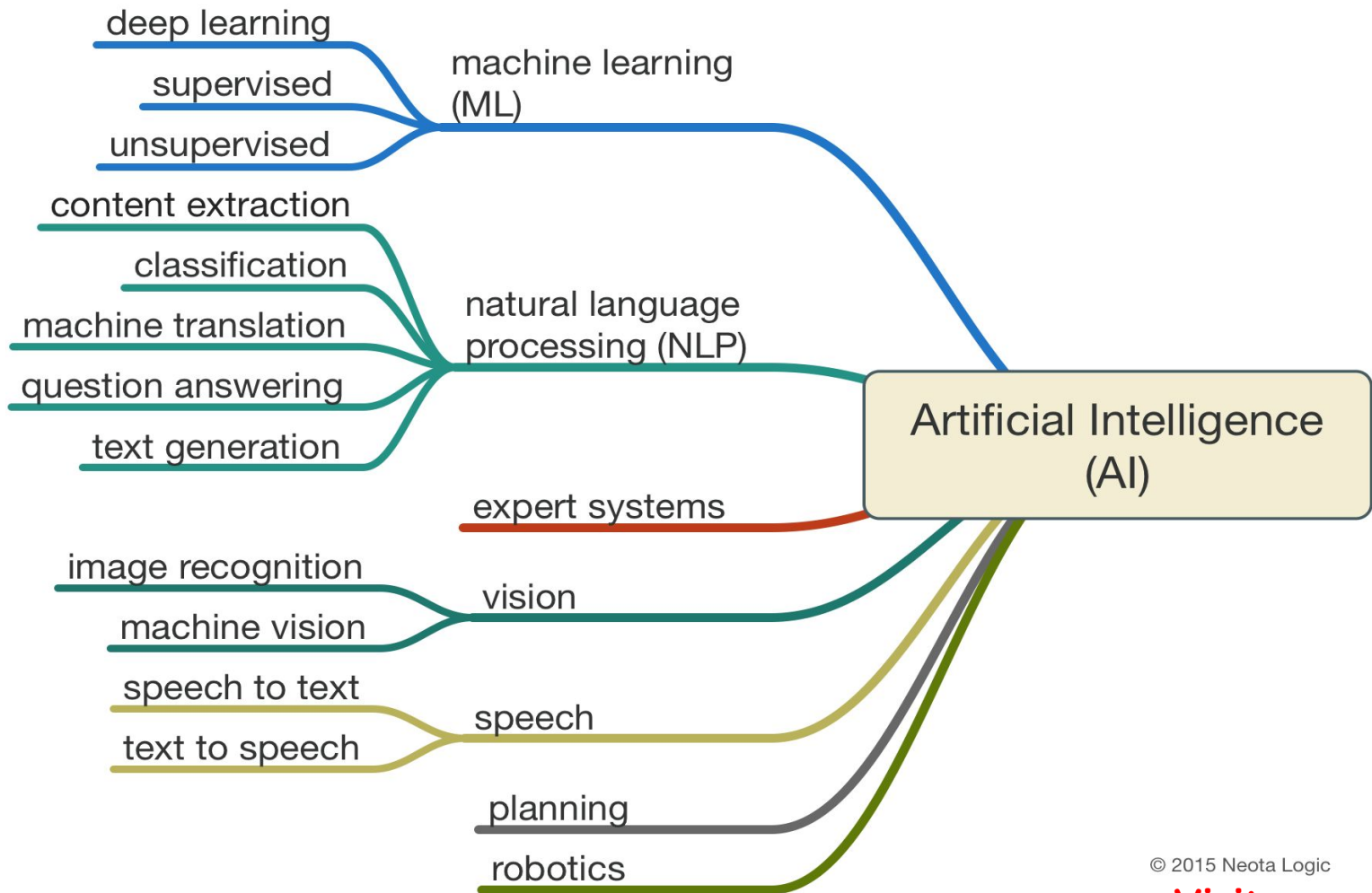
- Introduction to Artificial Intelligence, Machine Learning, Deep Learning
- How to start Machine Learning?
- How to do projects in ML?

All the Resource links for the discussion will be shared with you at the end of this webinar by me.



Graphical Representation of what we will discuss today





But why AI, ML, DL now ?

1. The sharp decrease in costs associated with data storage and processing.
2. The advent of the Internet economy and the explosion in mobile apps.
3. The abundance of open-source tools.
4. The development of a wealth of innovative ML and DL algorithms.
5. Availability of GPUs etc.

So, what is AI, ML, DL ?

Artificial Intelligence

A technique for incorporating human intelligence to machine

Machine Learning

ML is a subset of AI that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. ML is about learn from past to predict the future.

Deep Learning

DL is a subset of ML where artificial neural networks, algorithms inspired by the human brain, learn from large amounts of data.

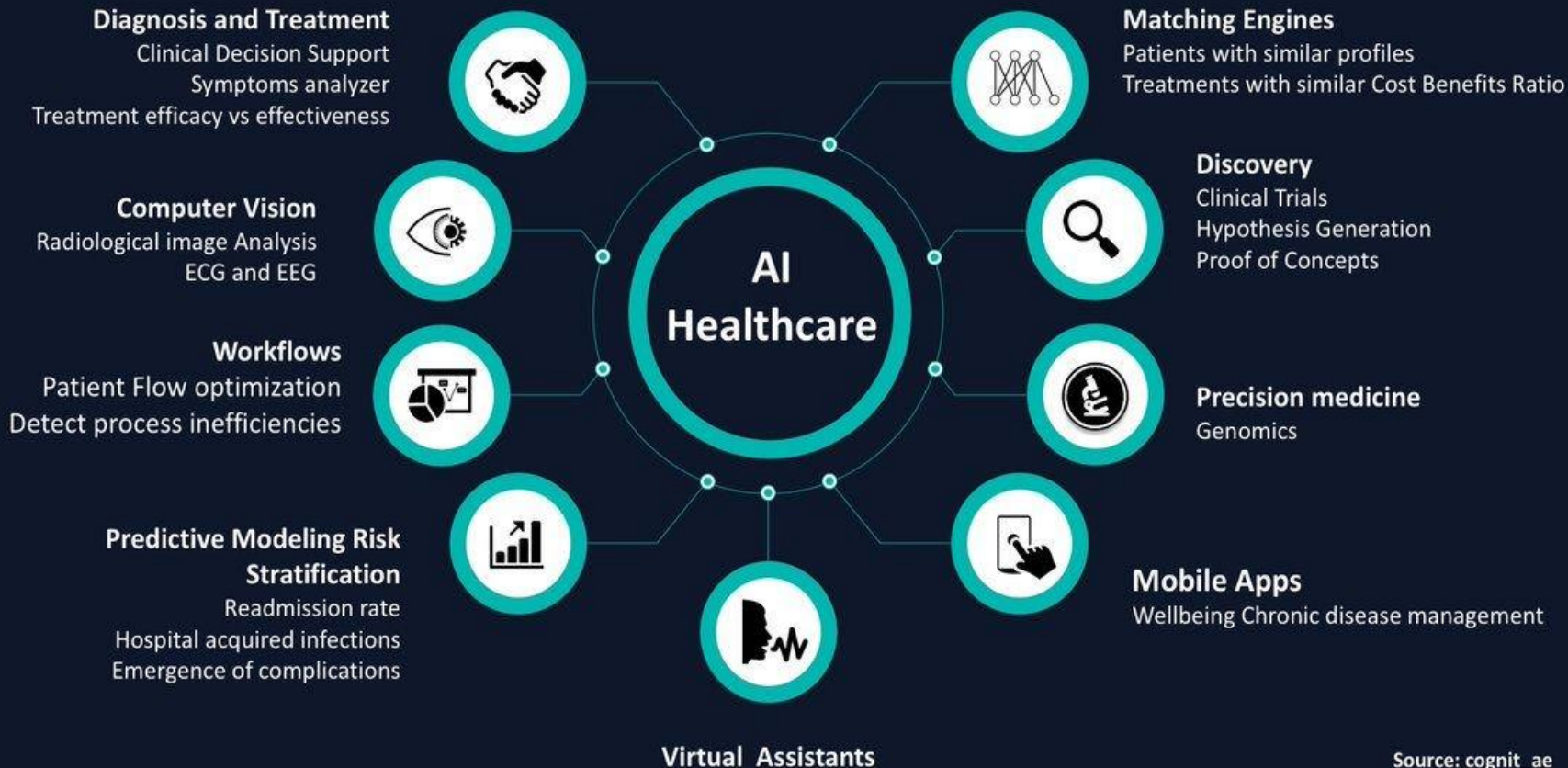
Defining Artificial Intelligence

AI is the *branch of computer science* tasked with the design and construction of **intelligent agents**.

An intelligent agent is in turn any agent that is (mostly):

- **autonomous** (able to perform tasks without *constant* guidance)
- **adaptable** (able to improve performance by learning from experience)
- **able to sense** and efficiently abstract features of its environment (perception)
- **able to act “rationally”** i.e it is moving towards maximizing a quantitative and objective utility function or performance measure.

Applications of Artificial Intelligence



Source: cognit_ae

Defining Machine Learning











An Approach to Achieve Artificial Intelligence

Subfield of AI that aims to teach computers the ability to do tasks with data, without explicit programming.

We can get AI without using machine learning, but this would require building millions of lines of codes with complex rules and decision-trees.

So instead of hard-coding software routines with specific instructions to accomplish a particular task, machine learning is a way of “training” an algorithm so that it can learn how.

Applications of Machine Learning

| APPLICATION | POTENTIAL ANNUAL VALUE BY 2026 | KEY DRIVERS FOR ADOPTION |
|------------------------------|--|---|
| Robot-assisted surgery |  \$40B | Technological advances in robotic solutions for more types of surgery |
| Virtual nursing assistants |  20 | Increasing pressure caused by medical labor shortage |
| Administrative workflow |  18 | Easier integration with existing technology infrastructure |
| Fraud detection |  17 | Need to address increasingly complex service and payment fraud attempts |
| Dosage error reduction |  16 | Prevalence of medical errors, which leads to tangible penalties |
| Connected machines |  14 | Proliferation of connected machines/devices |
| Clinical trial participation |  13 | Patent cliff; plethora of data; outcomes-driven approach |
| Preliminary diagnosis |  5 | Interoperability/data architecture to enhance accuracy |
| Automated image diagnosis |  3 | Storage capacity; greater trust in AI technology |
| Cybersecurity |  2 | Increase in breaches; pressure to protect health data |

Defining Deep Learning

A Technique for Implementing Machine Learning

Subfield of ML that uses specialized techniques involving multi-layer artificial neural networks.

In ML, data mostly passes through linear transformational algorithms to produce output. But in DL, data goes through multiple number of non-linear transformational algorithms like matrix transformation to obtain an output.

Other techniques to implement ML include decision tree learning, inductive logic programming, clustering, reinforcement learning, and Bayesian networks etc..

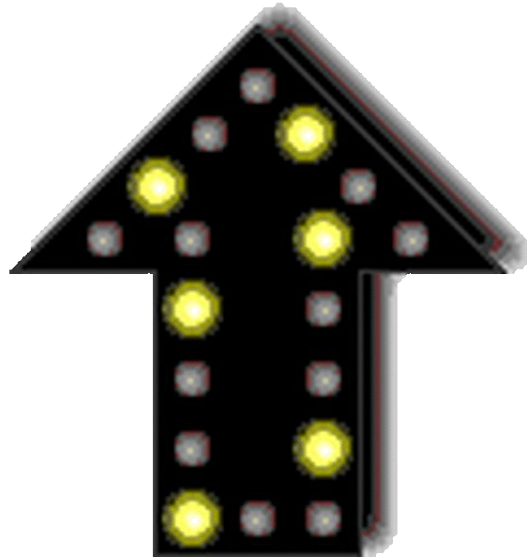
Limitations of AI / ML / DL

The human mind is subtle and extraordinary. You cannot tell a robot to be **creative**.

The main limitation is that the agents are typically only able to optimize their decisions and actions to achieve a singular goal.

Eg: A computer vision system that is able to detect melanoma from a skin photograph can be called intelligent but it is not capable of performing any other task that an intelligent person would do.

How to start Machine Learning



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Start with Maths for Machine Learning



But **why should I do Maths**
first for Machine Learning ?

- Week 1 : Linear Algebra [B] <https://www.khanacademy.org/math/linear-algebra>
- Week 2 : Calculus [B] <https://www.youtube.com/playlist?list=PLZHQObOWTQDMsr9K-rj53DwVRMYO3t5Yr> or <https://www.mathsisfun.com/calculus/> ; want theoretical notes , find it at <https://the-learning-machine.com/article/machine-learning/calculus> .
- Week 3 : Probability [B] <https://www.edx.org/course/introduction-probability-science-mitx-6-041x-2>
- Week 4 : Statistics [B] <http://alex.smola.org/teaching/cmu2013-10-701/stats.html>
- Algorithms (Only if you want to learn proper software development) [Highly optional]
This is an overview of what the students study as the subject Data Structures & Algorithm . So if you are fluent with this part , you can skip this !! <https://www.edx.org/course/algorithm-design-analysis-pennx-sd3x>

It's not
Fair!

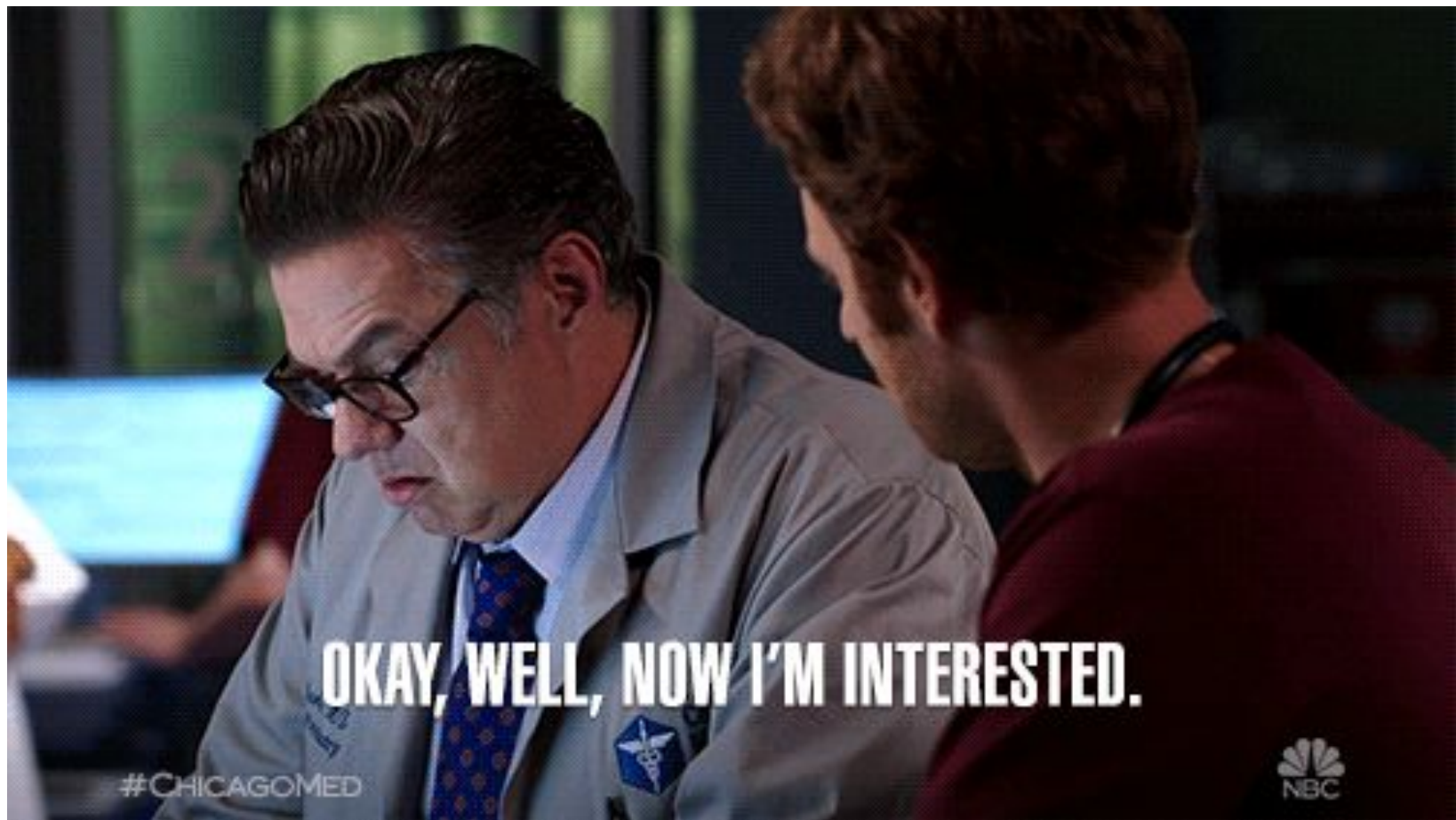


Start with Python
&
try to **implement** those
Mathematical Concepts



Have you been cheating on me?

**Start exploring Libraries
& then start Machine
Learning Courses**



OKAY, WELL, NOW I'M INTERESTED.

#CHICAGOMED



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-
- Introduction to python for data science [B] <https://www.datacamp.com/courses/intro-to-python-for-data-science>
 - Want to dive deeper into Data Visualization & Pre-Processing ? Look into Data Visualization & Pre-Processing section in miscellaneous resources . [Highly optional]
 - Want to explore the field of Deep Learning ? See the Deep Learning Section in miscellaneous resources . [Highly optional]
 - Want to explore the field of Natural Language Processing [NLP] ? See the Natural language Processing Section in miscellaneous resources . [Highly optional]
 - See how ML codes are written and made to work at - > <https://github.com/maykulkarni/Machine-Learning-Notebooks> or <https://github.com/GokuMohandas/practicalAI/blob/master/README.md> . [Highly optional]
 - Find useful resources here at <https://github.com/ujjwalkarn/Machine-Learning-Tutorials/blob/master/README.md> . [Highly optional]

Don't rush behind
completing Courses & add
them to Resume

**Understand the concepts
well before starting
Projects**



Now it's time
to start with
Projects

But

What projects to start with

?

- Beginners Section [B] : Brush your basic concepts and revise them to start doing projects

Titanic Dataset

Iris Dataset

Stock Price Prediction

Stores Sales Forecasting

Housing Price Prediction

Guide for Beginner Projects:

First of all see Below 2 videos to get an idea on how to make projects of Data Science and Machine Learning And then Move to Kaggle for Making your own project.Its is Good if you Make Minimum 2-3 Projects on your own.

- Titanic Survivor : <https://www.youtube.com/watch?v=fS70iptz-XU&t=>
- Credit Card Fraud Detection : <https://www.youtube.com/watch?v=gCWBFyFTxVU>

Intermediate & Advanced Section

- Learn libraries like Opencv , Tensorflow , SkLearn

1) Natural Language Processing : MNIST Handwritten Digit Classification , Twitter Sentiment Analysis

2) Email Spam Classifier

3) Fraud Detection System

4) Computer Vision : Face Recognition , Face Detection



Ayon Roy

Speaker 🍷 Let's talk ML, AI, Data Science, DL, Python 🍷 Catch me @ Hackat...

1w • 🌐



3 Major types of projects you should do if you are just diving into **#datascience**, **#machinelearning**, **#artificialintelligence**. Here are a few pointers :

For Exploratory Data Analysis (EDA) Projects -

Practice on the dataset at

- <https://lnkd.in/gztCfy3>
- <https://lnkd.in/gFasqNi>
- <https://lnkd.in/grvF-jc>
- <https://lnkd.in/gPxxf5y>
- <https://lnkd.in/gDKuhEf>
- https://lnkd.in/g_SRS7F

For Prediction Modelling Projects -

Practice on the dataset at

- <https://lnkd.in/gQh6SRZ>
- <https://lnkd.in/g5JfbeA>
- <https://lnkd.in/gPG6Wgf>
- <https://lnkd.in/gYBE6DY>

For Data Visualization Projects -

Practice on the dataset at

- <https://lnkd.in/gWZJ3TZ>
- <https://lnkd.in/gih7YDd>
- <https://lnkd.in/gcv2xar>

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" I am a beginner in AI,ML,Data Science & trying to do projects; but not succeeding as I get stuck more often "

Here is my way ahead if you are facing the same.

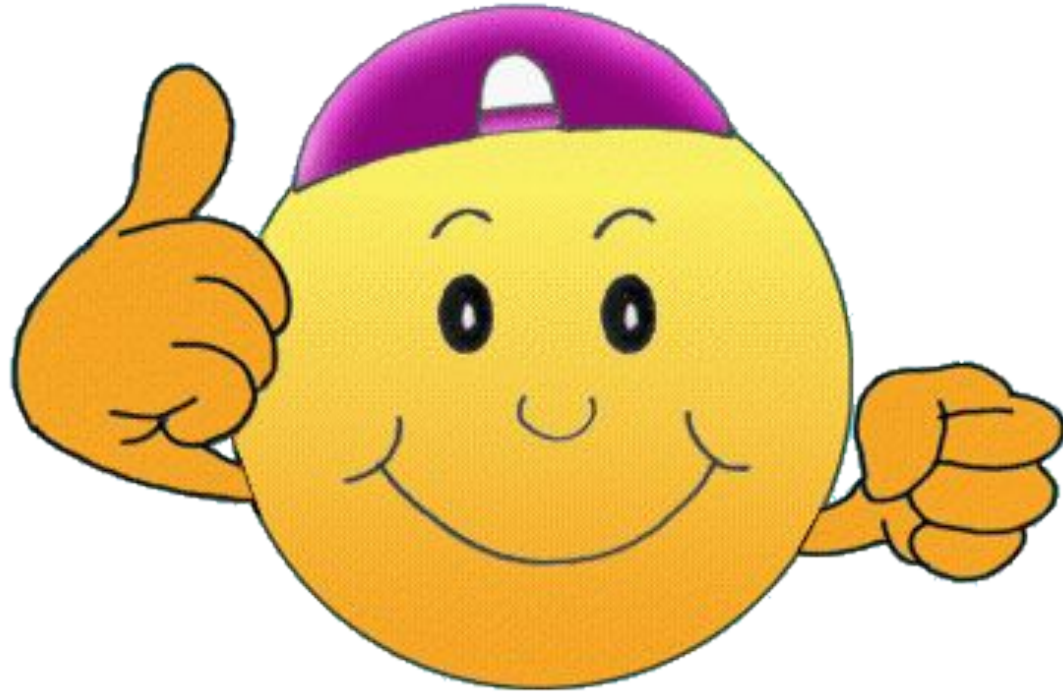
" Start Simple Projects & Be Motivated "

We all usually want to do the best projects & showcase them in our [resume](#) & hence sometimes end picking up a complex project at the first go. But do understand that while it's very normal to pick complex projects as a beginner, because we can't analyze the scale of project at first go. Picking up a complex project at a first sight may demotivate you as they have a lot of details, requires lot of studies to progress, thus a beginner ends up leaving the project midway & be traumatized. So start your journey with Simpler & Smaller projects as they require comparatively less details & can be achieved over a short period of time, thus helping us to stay motivated & keep doing projects. And as the learning in AI, [machinelearning](#), [datascience](#) never stops, so as we get motivated with completion of small projects; we learn & practice more while increasing the complexity of our upcoming projects. Still waiting to start ? Start today !! All the best !!

Get the resources at

1. <https://github.com/ayonroy2000/100DaysOfMLCode>
2. <https://blog.ayonroy.ml/2020/12/01/personalized-guide-by-ayon-roy>

GO FOR IT !



GOOD LUCK !

Let me answer your Questions now.

Finally, it's your time to speak.



Danke Schoen

Questions ? Any Feedbacks ? Did you like the talk?
Tell me about it.

If you think I can help you,
connect with me via

Email : ayon.roy2000@gmail.com

LinkedIn / Github / Telegram Username : [ayonroy2000](#)

Website : <https://AYONROY.ML/>