(Updating...)
This files summarizes some learning resources about ML/ DL/AI/ALML. Some sections here may have intersection, I mainly organize it according to the course I have taken.

Some recourses are from my course at NYU Tandon. Some are wonderful recourses on the internet.

1. Basic Knowledge

1.1 Linear Algebra

A short review: http://web.stanford.edu/class/cs246/handouts/CS246_LinAlg_review.pdf
Sandford summary of basic linear algebra: http://cs229.stanford.edu/section/cs229-linalg.pdf
Space understanding for Linear Algebra (from 3 blue 1 brown):
https://www.youtube.com/playlist?list=PLZHQObOWTQDPD3MizzM2xVFitgF8hE_ab&app=desktop
My note can be found here:

1.2 Probability

Stanford "Review of Probability Theory - Arian Maleki and Tome Do"http://cs229.stanford.edu/section/cs229-prob.pdf

2. Machine Learning

3. Algorithmic Machine Learning and Data Science

Wonderful courses:

CS168: The Modern Algorithmic Toolbox https://web.stanford.edu/class/cs168/index.html
CS246: Mining Massive Data Sets http://web.stanford.edu/class/cs246/

3.1 The Power of Randomness

https://www.cs.princeton.edu/courses/archive/fall18/cos521/Lectures/lec1.pdf	Typed notes for hashing - Christopher Musco
https://www.cs.princeton.edu/courses/archive/fall18/cos521/Lectures/lec10.pdf	Typed notes - Christopher Musco: Dimensionality reduction and the Johnson-Lindenstrauss Lemma
https://www.cs.princeton.edu/courses/archive/fall18/cos521/Lectures/lec12.pdf	Typed notes - Christopher Musco: Nearest Neighbor Search and Locality Sensitive Hashing

3.2 First Order Optimization

Reading:

Website	Description
https://www.offconvex.org/	diverse, theory-learning blog which discusses lots of problems and approaches in understanding the optimization of Non-convex problems
https://ee227c.github.io/notes/ee227c-notes.pdf	Course Notes for EE227C (Spring 2018): Convex Optimization and Approximation - Moritz Hardt's proofs of gradient descent convergence in all the regimes discussed in class.
https://arxiv.org/pdf/1909.05207.pdf	Introduction to Online Convex Optimization Elad Hazan's book,
https://arxiv.org/pdf/1405.4980.pdf	Convex Optimization: Algorithms and Complexity Sébastien Bubeck

Analyzing gradient descent and project gradient descent for convex problems
Online and stochastic gradient descent
Smoothness, strong convexity, conditioning
Preconditioning, acceleration, coordinate descent, non-convex optimization

3.3 Spectral Algorithms

https://www.cs.princeton.edu/courses/archive/fall18/cos521/Lectures/lec14.pdf	Typed notes - Christopher Musco: The Power Method and Spectral Methods for Graph Partitioning
http://web.stanford.edu/class/cs168/l/l11.pdf	Standford CS168: The Modern Algorithmic Toolbox Lectures #11: Spectral Graph Theory, I

3.5 Fourier Methods

4. Deep Learning

Open Course:

MIT Introduction to DeepLearning - Alexander Amini: http://introtodeeplearning.com/
Precise and short, covered all the topics, wonderful speaker

4.1 NLP

4.2 CV

4.3 Generative Model

4.4 Reinforcement Learning

good open course:
UC Berkeley CS 285 http://rail.eecs.berkeley.edu/deeprlcourse/ Many other good courses/books can be found under recourses tab.
https://www.youtube.com/playlist?list=PL_iWQOsE6TfURIIhCrlt-wj9ByIVpbfGc
RL Course by David Silver - https://www.youtube.com/watch?v=2pWv7GOvuf0&list=PLqYmG7hTraZBiG_XpjnPrSNw-1XQaM_gB

Blogs:	**description**
A (Long) Peek into Reinforcement Learning https://lilianweng.github.io/lil-log/2018/02/19/a-long-peek-into-reinforcement-learning.html#key-concepts	
Policy Gradient Algorithms https://lilianweng.github.io/lil-log/2018/04/08/policy-gradient-algorithms.html	

Papers and discussions:

writer	**paper**	**resource/review/explanation**	**description**
Alex	Deep Reinforcement Learning Doesn't Work Yet https://www.alexirpan.com/2018/02/14/rl-hard.html	https://zhuanlan.zhihu.com/p/33936457	some thing need to examine, for RL
David Pfau	Connecting Generative Adversarial Networks and Actor-Critic Methods https://arxiv.org/abs/1610.01945	https://www.zhihu.com/question/60167306	

5. Computer Vision

6. AI

UCB - CS88 Introduction to AI https://inst.eecs.berkeley.edu/~cs188/fa20/