**Day 2: Deep Learning**

Please Join the AEC - ML/DL Whatsapp group if you wish to stay updated: <https://chat.whatsapp.com/LeV7fMOdy1SIKCeqoLxqpU>, if you need more resources - you can let us know in the group. Also, we will keep sharing resources in the group.

 The workshop is over, it's self-learning time.

The codes discussed on Day 2 are available here - <https://colab.research.google.com/drive/1vzZCbtb_dbdF4hZ8PDfKgPTEpB_F-18P>

We discussed Intro to **TensorFlow** (<https://www.tensorflow.org/>), how graphs are being used in Deep Learning. We discussed **tensorboard**to visualize graphs. Deep Learning is basically based on Neural Networks, and we discussed how we have an input layer, hidden layers, and an output layer. We discussed, that every data (image, video, voice etc) is numeric. This is the Neural Network video (<https://youtu.be/bfmFfD2RIcg>) that we referenced. You can also, watch these 3 videos from 3blue1brown  -

(1)<https://youtu.be/aircAruvnKk>

(2)<https://youtu.be/IHZwWFHWa-w>

(3)<https://youtu.be/Ilg3gGewQ5U>

Amazing series of in-depth understanding.

We discussed various parameters to learn to understand a neural network, the most important ones are (and they are just a Google Search away):

- gradient descent (very important - <https://youtu.be/sDv4f4s2SB8> )

- loss function (binary cross-entropy, categorical cross-entropy)

- optimizer / adaptive learning rate (Adam, adagrad, adadelta, RMSProp etc)

- activation function (ReLU, sigmoid, tanh etc)

We then covered two neural networks for 2 amazing fields:

**1) Computer Vision**

We discussed **Convolutional Neural Networks (CNNs),**read these 3 blogs, you'll understand:

Part 1 - <https://adeshpande3.github.io/adeshpande3.github.io/A-Beginner's-Guide-To-Understanding-Convolutional-Neural-Networks/>

Part 2 - <https://adeshpande3.github.io/adeshpande3.github.io/A-Beginner's-Guide-To-Understanding-Convolutional-Neural-Networks-Part-2/>

Part 3 - <https://adeshpande3.github.io/adeshpande3.github.io/The-9-Deep-Learning-Papers-You-Need-To-Know-About.html>

Take the CNN course from Stanford - <http://cs231n.github.io/> ,  it's awesome and more in-depth. You'll find the video lectures on YouTube.

**2) Natural Language Processing**

We discussed **Recurrent Neural Networks ( RNN ),- RNNs have three structures:**

**1) Vanilla RNN**

**2) Long Short Term Memory (LSTM)**

**3) GRU**

LSTM s are used widely from Voice recognition in Google Voice assistants to stock prediction. Read this amazing blog here - <http://colah.github.io/posts/2015-08-Understanding-LSTMs/>. Take Stanford NLP course(<https://web.stanford.edu/class/cs224n/index.html>) to have a better understanding. You will find video lectures on Youtube.

**more field to explore - GANs (Generative Adversarial Networks), Reinforcement Learning.**

Follow @ Two Minute Paper ( <https://www.youtube.com/user/keeroyz> ) and stay updated with current research in Deep Learning. Watch Videos. Amazing!!

You can find amazing resources/links/courses in my AECSU post on Deep Learning/ML to learn on your own. Follow the post and you'll be in the center of Deep Learning -  <https://docs.google.com/document/d/1zRpgKSil5lLGQ7ZdGwoB5PCxu6sFDUIfjCBBSaxevzk/edit?usp=sharing> , Or else, you can find it in the group.

Fields of Computer Science discussed:

**1. AI/ML/Deep Learning**

Follow these two days email - Python + ML + DL.

**2. Software Engineering/ Competitive Programming/ Open-Source Development**

Software Engineering is learning the programming languages well - Python / C++ along with Data Structures and Algorithms. Any product based company interview -

> Data Structures + Algorithms

> Code in any language (mostly done in C++ due to its STL library - very powerful)

**Competitive Programming:**

Follow - Google technical guide ( <https://techdevguide.withgoogle.com/> )

After you get a decent amount of knowledge, you can start practicing problems from - <https://www.hackerrank.com/>, <https://www.codechef.com/>, <https://www.spoj.com/>, <https://leetcode.com/>, etc. Subhajit discussed a problem and you will find similar problems here. Keep practicing and learn to program. You need this for your job interviews/coding rounds to clear the first round of any company.

**Open Source Development:**

Git(<https://git-scm.com/>) and Github(<https://github.com/>) . I made an in-depth Youtube video on Gith and Github in Assamese - <https://youtu.be/v3SIwwPjUGU>, you can learn it by going through the video and you'll have a decent idea on how to do things. Google Summer of Code is based around Git/Github and choosing a project, Everyone open an account on Github.

**3. Security (Hacking) and Networking**

For Security (Hacking) and Networking, we referenced this repository - <https://github.com/SKKSaikia/NetwrkX>, I have amazing links and resources here.

For learning hacking, you need networking knowledge very strong. for networking "CCNA" certification exam is the entry step. The course syllabus is amazing. If you want to learn networking, search for CCNA in Udemy and you'll also find these courses as torrents.

**CCNA -> CCNP -> CCIE**

After learning Networking, you can shift to Hacking/Security

"**CEH**" , Certified Ethical Hacker is the premier hacking certification exam and the course syllabus is amazing. With all these done, you'll be a decent enough hacker. Search for CEH / Certified Ethical Hacker torrent and you're good to go. Pentester Academy is a good place to learn pentesting and I've put links in the attached repository link.

Operating Systems used for hacking are Linux based and we'll be using - Kali Linux / Parrot OS.

**4. Fullstack Development & App development**

In Full Stack development, we discussed development of websites and android/ios applications. In website development (web-developer), we referenced this repository - <https://github.com/SKKSaikia/WebWeb>, which details the resources that need to be followed for being a web developer. Web development is sub-divided into Fron-End development and Back-End development along with DevOps. In the link, you will find the details on what to learn for each. To keep it short:

**Front End Development:** How things look in a website (color, design, animation, structure) of a website, how visually attractive does it looks?

**Back End Development:** How things work behind the scenes. What happens when you submit a form, what happens in server-side etc.

**Dev-Ops:** How things are deployed on the internet and scaled for 1000 more users.

Check out this roadmap video - <https://youtu.be/UnTQVlqmDQ0> ( A very good overview video)

**For Android App Development**- Android Studio is the Software where applications are developed. Languages used chronologically are **Java -> Kotlin -> Dart**. Java and Kotlin are used for Android app development only and Swift is used for ios app development, but Dart can be used to write both ios and android applications. Dart is new and is being widely adopted.

**How to bring AI/Deep Learning to Mobile?** The pipeline followed is -

Thank You for attending the Workshop.

Regards,

Team - Explore ML, AEC

Links:

<https://www.youtube.com/watch?v=bfmFfD2RIcg&authuser=0>

<https://www.youtube.com/watch?v=aircAruvnKk&authuser=0>

<https://www.youtube.com/watch?v=IHZwWFHWa-w&authuser=0>

<https://www.youtube.com/watch?v=Ilg3gGewQ5U&authuser=0>

<https://www.youtube.com/watch?v=sDv4f4s2SB8&authuser=0>

<https://www.youtube.com/watch?v=v3SIwwPjUGU&authuser=0>

<https://www.youtube.com/watch?v=UnTQVlqmDQ0&authuser=0>

<https://docs.google.com/document/d/1zRpgKSil5lLGQ7ZdGwoB5PCxu6sFDUIfjCBBSaxevzk/edit?usp=gmail>