



A report on

**Faculty Development Program on
AI - ML and Teaching Methodologies**

Organized in association with

Commonwealth Educational Media Centre for Asia - CEMCA

New Delhi

&

Andhra Pradesh Information Technology Academy-APITA,

Vijayawada

Venue : GMR Institute of Technology, Rajam.

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1.ACKNOWLEDGEMENT

We earnestly acknowledge the immense contribution of Dr. Madhu Parhar, Director, Commonwealth Educational Media Centre for Asia (CEMCA), and Mr. Saurabh Mishra, Programme Officer (Skills) of Commonwealth Educational Media Centre for Asia (CEMCA), for conceptualizing and floating the highly need-based and demand-driven workshops for upgrading the capacity of the FDP and sensitization program in association with Mr. Anil Reddy, CEO of Andhra Pradesh Information Technology Academy (APITA) and Mr. Vishwanath, Director of Andhra Pradesh Information Technology Academy (APITA) for higher education faculties (engineering colleges) in GMR Institute of Technology, Rajam, Vizianagaram, Andhra Pradesh.

The excellent endeavour of CEMCA is expected to have a profound impact on the qualitative enhancement of the Professors, Lecturers, and HODs & Trainers of all the Engineering Colleges of AP with the different methodology of “AI ML and Teaching Methodologies ” with the Latest & Traditional, Easy for good, not good & mediocre participant’s perspective of both content & methodology.

It was a privilege for us to get the opportunity to contribute significantly to this value- driven and impact-oriented mission of CEMCA.

2.BACKGROUND

IT is possibly the fastest developing sector in the last few decades. Computers (in all shapes and sizes) and the Internet have acquired a very important role in most domains of our everyday life. In the same way, education is not imaginable anymore without a strong presence of teaching methodologies. Faculties have had

to adapt teaching methodologies throughout curriculum delivery to perform the dual task of providing formal, subject-based education and of encouraging pupils' personal development in a wider social and cultural context.

On one hand, formal education involves understanding concepts and processes. It aims at acquiring knowledge and skills to be able to apply what has been learned within each subject area and across subjects. On the other hand, pupils need to learn to describe, analyze, interpret, have a critical view, and apply their acquired knowledge and skills creatively and originally in a wide range of social, scientific, and cultural contexts.

Since the world of AI ML is changing so rapidly, an important goal is to provide hands-on experience to faculty to equip pupils with the basic knowledge and fundamental skills on one hand, and, on the other hand, to empower them to become independent and autonomous learners too. In this sense, faculty should acquire a range of skills that will allow them to continue learning and teaching with an improved Teaching-Learning Process.

3.MOTIVATION

AI ML:

Machine Learning is making the computer learn by studying data and statistics. Machine Learning is a step in-line direction of artificial intelligence (AI). Machine Learning is a program that analyses data and learns to predict the outcome. In this concern python programming is playing vital role to develop AI ML Applications.

Teaching Methods (ATM):

Innovative teaching methods have improved the learning process and strengthened governance and methods are designed to improve the quality of education along

with professors and student's involvement in the educational process. Method to enhance or expand upon the trainee's experience. One of the basic motives behind advanced teaching is to motivate students/trainees to actively take part in the learning process. When the level of interaction with trainees and peers increases, students gain knowledge that is practical and also, retain more information effectively from the classes.

This motivating the trainers/professors/lectures/students will make to understand and redeliver not only a subject or a technology but gives more accurate and more knowledge, data, statistics, case study with the current memory in the existing co related knowledge

4.INTRODUCTION

AI ML:

Artificial intelligence is considered to be the trending technology of the future. Already there are a number of applications made on it. Due to this, many companies and researchers are taking interest in it. But the main question that arises here is that in which programming language can these AI applications be developed? There are various programming languages like Lisp, Prolog, C++, Java and Python, which can be used for developing applications of AI. Among them, Python programming language gains a huge popularity.

Learning means the acquisition of knowledge or skills through study or experience. Based on this, we can define machine learning (ML) as follows - It may be defined as the field of computer science, more specifically an application of artificial intelligence, which provides computer systems the ability to learn with data and improve from experience without being explicitly programmed.

Basically, the main focus of machine learning is to allow the computers learn automatically without human intervention. Now the question arises that how such learning can be started and done? It can be started with the observations of data. The data can be some examples, instruction or some direct experiences too. Then on the basis of this input, machine makes better decision by looking for some patterns in data.

ADVANCED TEACHING METHODS (ATM):

Advanced Teaching Methods for any trainer in the session provides a comprehensive, critical approach to meeting the new challenges in the session. This program gathers together research on Advanced Teaching methods, principles, and content, and acts as a reference source for proven and innovative methods.

Advanced Teaching Methods for the trainers presents the style to teaching educational technology, design, and engineering. It also contains strategies for innovation by examining the what, why, and how of technology education.

The whole program is a nice balance between foundational and practical issues. It is quite an accomplishment to put together a comprehensive program such as this.

5.LEARNING OBJECTIVE

Upon completion of the training program, the faculty will be able to:

AI ML:

Machine learning is a type of artificial intelligence (AI) that provides computers with the ability to learn without being explicitly programmed. Machine learning focuses on the development of Computer Programs that can change when exposed to new data. In this workshop, we'll see the basics of Machine Learning,

and implementation of machine learning algorithm using python.

Upon completion of the training program, the faculty will be able to:

- Understand why python for AI ML
- Be familiar with the different AI ML algorithms – Supervised and Unsupervised
- Gain an overview on building applications using python for AI ML

Advanced Teaching Methodology - ATM

- Explain the principles of ANDRAGOGY viz. Adult Learning
- Enlighten learners regarding the features of the facilitation process
- Explain to learners the features of Facilitation that demarcate it from the Mixed traditional lecture method
- The Etymology of teaching techniques.
- Highlight the importance of Examples, Data, Statistics and History with JAM (Just a Minute) Facilitation Storytelling (Panchatantra), in online & Offline learning/ Teaching
- Explain different psychosocial interventions with ‘Panchatantra ‘that are deployed in real world.
- Make the learners illuminated with the beneficial aspects of different learning models, Remembering techniques, Corollaries important Vocabulary etc.
- Sensitization of learners with the different learning methods that are highly effective in online& Offline / Physical learning
- Administer practical exercises for fostering practice- teaching, with a goal-oriented approach.

6.DATE & TIME

S. No.	Course	Date	Time	Participants	Count
1	AI ML with Python	20 th June to 22 nd June 2022	09:30 AM	Higher Education Faculties from Andhra Pradesh	44
2	Advanced Teaching Methodology	23 rd and 24 th June 2022	to 05:00 PM		

7.PARTICIPANTS

44 faculties attended the program out of which 11 are Female and 33 are Male participants. Out of which 5 are Professors, 6 are Associate Professors, 28 are Assistant Professors, 4 are lecturers and 1 programmer attended the workshop conducted between 20th June to 24th June 2022 at GMR Institute of Technology, Rajam, Andhra Pradesh.

A Detailed List of Participants for workshops is attached in **Annexure – A**

8.TRAINING - AI ML and ATM

The Training was conducted in the college Auditorium/Lab. The methodology used was a live demonstration of AI-ML and ATM followed by hands-on practice by participants using the assignment questions provided by the resource person. The organizing team shared a WhatsApp group to interact, share information, answer queries, and submit feedback.

S. No.	Event	Time	Participants
1	Demonstration Sessions (Every day)	09:30 AM to 05:00 PM	Live
2	Interaction with Queries and Feedback	05:00 PM to 08:00 PM	WhatsApp

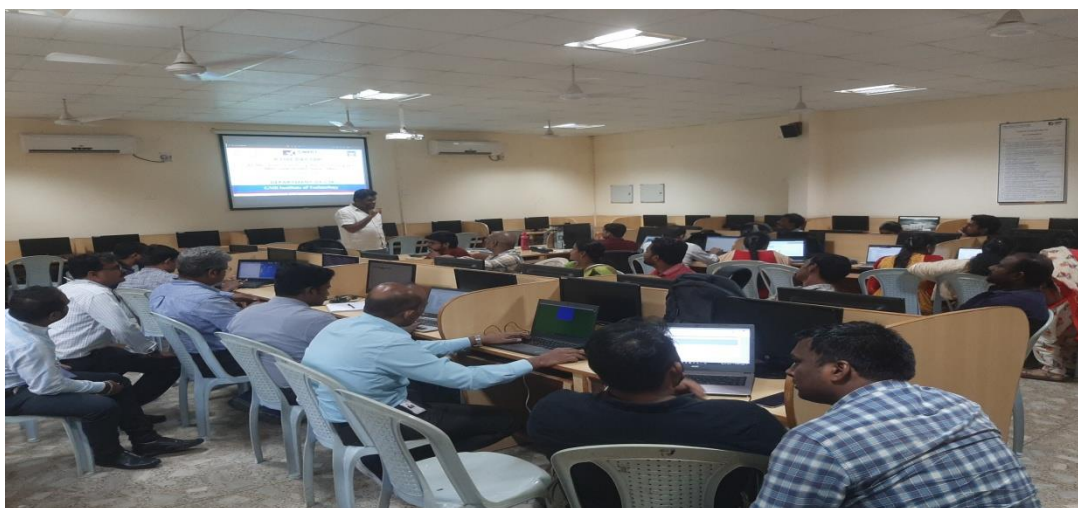


Fig: Live Demonstration on AI ML by Mr. Banoth Prasad



Fig: Live interaction on ATM by Mr. S. Dinakar Reddy

9.COURSE CONTENT & STRUCTURE

Day	Title	Session Objective	Session Outcome
1	<ul style="list-style-type: none"> Python Introduction 	<ul style="list-style-type: none"> Introduction to Python – Indentation, Python Variables, Python Data Types – Numbers, String Lists, Tuples, Sets and Dictionaries Python File Handling, Python String Formatting Working with Jupiter Notebook 	<ul style="list-style-type: none"> Python Introduction Python IDLE Installation Python Built in data types Working with Jupyter
	<ul style="list-style-type: none"> Python Packages – TK Inter Hands on Exercise 	<ul style="list-style-type: none"> Python tkinter - Widgets, Standard attributes, Geometry Management Python tkinter – Widgets - Labels, Buttons, Entry Field, Text Field, Check Buttons, List Box, Radio Buttons, Menu Exercise : <ul style="list-style-type: none"> Random Password Generator in Python Convert Text to Speech in Python 	<ul style="list-style-type: none"> Python Packages TK inter Exercise
	<ul style="list-style-type: none"> Python Packages –Pandas, Numpy 	<ul style="list-style-type: none"> Working with data pre-processing and data visualization using Python - Pandas Working with data pre-processing and data visualization using Python - Numpy Working with data pre-processing and data visualization using Python - Matplotlib 	<ul style="list-style-type: none"> Python Packages
2	<ul style="list-style-type: none"> Introduction to AI ML Tools for AI ML AI ML Algorithms 	<ul style="list-style-type: none"> Tools for AI ML – Detection of Covid-19 Project Supervised learning - Classification & Regression Tree Supervised learning - Naïve Baye’s. Unsupervised learning - K-Means Clustering 	<ul style="list-style-type: none"> Introduction to AI ML Tools for AI ML AI ML Algorithms

3	<ul style="list-style-type: none"> • Exploratory Data Analysis & NLTK • Project - Project Detect COVID-19 from Chest X-Rays by building a Simple Convolution Neural Network. 	<ul style="list-style-type: none"> • Exploratory Data Analysis & NLTK • Project Detect COVID-19 from Chest X-Rays by building a Simple Convolution Neural Network. • NLTK – Sentiment Analysis – Movie Review 	<ul style="list-style-type: none"> • Exploratory Data Analysis & NLTK
4	Teaching MethodologyPrinciples	<ul style="list-style-type: none"> • Principles of ANDRAGOGY • Beneficial Features of Observation & Facilitation • Learning Models that are relevant to classroom learning • JAM – just a minute • Importance of Communication • From the baselines of Bloom’s Taxonomy to ARCS 	<ul style="list-style-type: none"> • Dialogue-driven interaction • Role Play & JAM • Case Study, Compare & Contrast • Reading between the lines
5	Innovation Methodologyand Tool	<ul style="list-style-type: none"> • The world’s oldest Innovation Methodology of teaching “Panchatantra” to EdgarDale’s Model. • Tools & Methods for fostering participative & inductive learning • Importance of Mediocre. • Relevance of psychosocial interventions in the class, to ensure the psychological engagement of learners • Not to let down the last benchers • The Need for LST as a part of the regular curriculum. 	<ul style="list-style-type: none"> • Group Discussion • Motivational Stories • Motivational Interview • Constructive Feedback • Successful person’s Unsuccessful stories • Statistics, Data & History • Appreciative Inquiry & Assessment • Problem-solving through Design thinking

10. WORKSHOP PROCEEDINGS

Day – 1: 20th June 2022: Inaugural Session and Introduction AI ML

Inaugural Session:

The Training Programme began with the inaugural session. The inaugural session was graced by Dr.C.L.V.R.S.V.Prasad Professor and Principal – GMRIT, Dr.A.Venkata Ramana HOD - CSE Dept, GMRIT, B Prasad CEO/CO-Founder and Corporate Trainer and falicitator, Mr Vamshi Co-ordinator, APITA. Dr.C.L.V.R.S.V.Prasad in his inaugural address highlighted the importance of FDP for newly appointed faculties about the advanced teaching Methodologies in 21st century and made a note about the importance of AI-ML with Python.



Fig: Inaugural Session on day 1

Day – 1: 20th June 2022: Python Basics & Packages

Day – 1: Session 1: Python Basics

The third day session 1 started with

- Introduction to Python, Indentation, Python Variables, Python Data Types –

What is Python?

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

It is used for:

- web development (server-side),
- software development,
- mathematics,
- system scripting.

What can Python do?

- Python can be used on a server to create web applications.
- Python can be used alongside software to create workflows.
- Python can connect to database systems. It can also read and modify files.
- Python can be used to handle big data and perform complex mathematics.
- Python can be used for rapid prototyping, or for production-ready software development.

Why Python?

- Python works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc).
- Python has a simple syntax similar to the English language.
- Python has syntax that allows developers to write programs with fewer lines than some other programming languages.
- Python runs on an interpreter system, meaning that code can be executed as soon as it is written. This means that prototyping can be very quick.
- Python can be treated in a procedural way, an object-orientated way or a functional way.

Python Indentation

- Indentation refers to the spaces at the beginning of a code line.
- Where in other programming languages the indentation in code is for readability only, the indentation in Python is very important.
- Python uses indentation to indicate a block of code.

Example

```
if 5 > 2:
```

```
    print("Five is greater than two!")
```

Python will give you an error if you skip the indentation:

Comments

- Python has commenting capability for the purpose of in-code documentation.
- Comments start with a #, and Python will render the rest of the line as a comment:

Example

Comments in Python:

```
#This is a comment.
```

```
print("Hello, World!")
```

Python Variables

- In Python variables are created the moment you assign a value to it:

Example

Variables in Python:

```
x = 5
```

```
y = "Hello, World!"
```

Python has no command for declaring a variable.

Variable Names

A variable can have a short name (like x and y) or a more descriptive name (age, carname, total_volume). Rules for Python variables:

- A variable name must start with a letter or the underscore character
- A variable name cannot start with a number
- A variable name can only contain alpha-numeric characters and underscores (A-z, 0-9, and _)
- Variable names are case-sensitive (age, Age and AGE are three different variables)

Python Collections (Arrays)

There are four collection data types in the Python programming language:

- **List** is a collection which is ordered and changeable. Allows duplicate members.
- **Tuple** is a collection which is ordered and unchangeable. Allows duplicate members.
- **Set** is a collection which is unordered and unindexed. No duplicate members.
- **Dictionary** is a collection which is unordered, changeable and indexed. No duplicate members.

When choosing a collection type, it is useful to understand the properties of that type. Choosing the right type for a particular data set could mean retention of meaning, and, it could mean an increase in efficiency or security.

List

- Lists are used to store multiple items in a single variable.

- Lists are one of 4 built-in data types in Python used to store collections of data, the other 3 are Tuple, Set, and Dictionary, all with different qualities and usage.
- Lists are created using square brackets:

Example

Create a List:

```
thislist = ["apple", "banana", "cherry"]  
print(thislist)
```

Tuple

- Tuples are used to store multiple items in a single variable.
- Tuple is one of 4 built-in data types in Python used to store collections of data, the other 3 are List, Set, and Dictionary, all with different qualities and usage.
- A tuple is a collection which is ordered and unchangeable.
- Tuples are written with round brackets.

Example

Create a Tuple:

```
thistuple = ("apple", "banana", "cherry")  
print(thistuple)
```

Set

- Sets are used to store multiple items in a single variable.
- Set is one of 4 built-in data types in Python used to store collections of data, the other 3 are List, Tuple, and Dictionary, all with different qualities and usage.
- A set is a collection which is *unordered*, *unchangeable**, and *unindexed*.
- **Note:** Set *items* are unchangeable, but you can remove items and add new items.
- Sets are written with curly brackets.

Example

Create a Set:

```
thisset = {"apple", "banana", "cherry"}  
print(thisset)
```

Dictionary

- Dictionaries are used to store data values in key:value pairs.
- A dictionary is a collection which is ordered*, changeable and do not allow duplicates.
- As of Python version 3.7, dictionaries are *ordered*. In Python 3.6 and earlier, dictionaries are *unordered*.
- Dictionaries are written with curly brackets, and have keys and values:

Example

Create and print a dictionary:

```
thisdict = {  
    "brand": "Ford",  
    "model": "Mustang",  
    "year": 1964  
}  
print(thisdict)
```

Day – 1: Session 2: Python Packages

The third day session 2 started with

- Introduction to Python packages – Pandas and NumPy

Fundamental Python Libraries

- The Python community is one of the most active programming communities with a huge number of developed toolboxes.
- The most popular Python toolboxes for any data scientist are NumPy, SciPy, Pandas, and Scikit-Learn.

What is Pandas?

- Pandas is a Python library used for working with data sets.
- It has functions for analyzing, cleaning, exploring, and manipulating data.
- The name "Pandas" has a reference to both "Panel Data", and "Python Data Analysis" and was created by Wes McKinney in 2008.

Why Use Pandas?

- Pandas allows us to analyze big data and make conclusions based on statistical theories.
- Pandas can clean messy data sets, and make them readable and relevant.
- Relevant data is very important in data science.

Installation of Pandas

If you have Python and PIP already installed on a system, then installation of Pandas is very easy.

Install it using this command:

C:\Users\Your Name>pip install pandas

Example: Create DataFrame from List of Lists with Column Names & Index

```
import pandas as pd

#list of lists

data = [['a1', 'b1', 'c1'],
        ['a2', 'b2', 'c2'],
        ['a3', 'b3', 'c3']]

columns = ['C1', 'C2', 'C3']
index = ['R1', 'R2', 'R3']

df = pd.DataFrame(data, index, columns)
print(df)
```

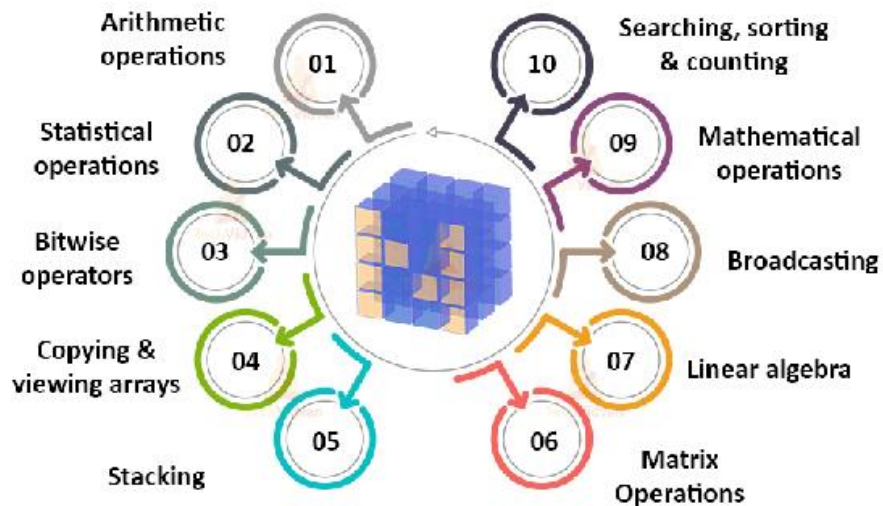
OUTPUT :

```
C1 C2 C3
R1 a1 b1 c1
R2 a2 b2 c2
R3 a3 b3 c3
```

What is NumPy?

- NumPy stands for Numerical Python.
- NumPy is a Python library used for working with arrays.
- It also has functions for working in domain of linear algebra, fourier transform, and matrices.
- NumPy was created in 2005 by Travis Oliphant. It is an open source project and we can use it freely.

Uses of NumPy



Installation of NumPy

If you have Python and PIP already installed on a system, then installation of NumPy is very easy.

Install it using this command:

C:\Users\Your Name>pip install numpy

If this command fails, then use a python distribution that already has NumPy installed like, Anaconda, Spyder etc.

Example :

Use a List to create a NumPy array:

```
import numpy
arr = numpy.array([1, 2, 3, 4, 5])
print(arr)
[1 2 3 4 5]
```

Day 1 – Objectives

- Participants gained knowledge on
 - Understanding concepts of python
 - Understanding concepts of python –Built in data types
 - Understanding concepts of python packages – Pandas and Numpy



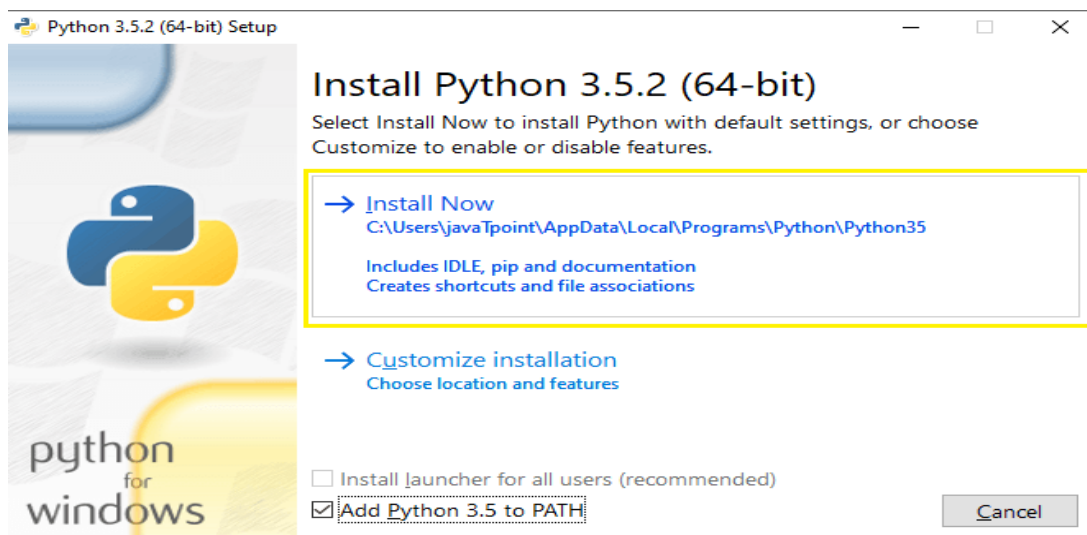
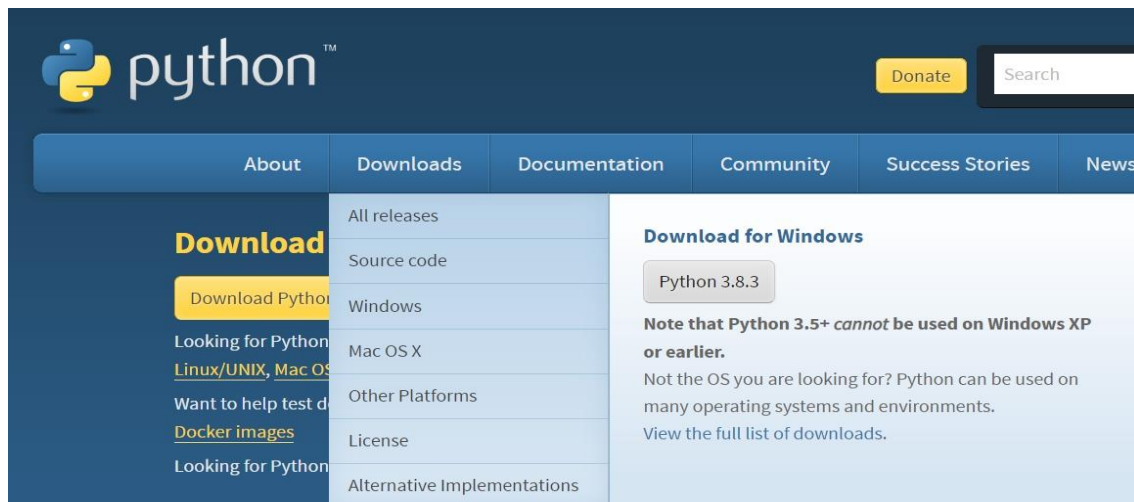
Day – 2: 21st June 2022: Tools for AI ML & AI ML Algorithms

Day – 2: Session 1: Tools for AI ML – Detection of Covid-19 Project

The 2nd day session 1 started with

- Bringing tools Python, PIP, Jupyter Notebook, Microsoft VC++, Tensorflow, CUDA and CUDA Tool kit

Installation of Python:



What is PIP?

PIP is a package manager for Python packages, or modules if you like.

```
C:\Users\UDDISH> pip --version
```

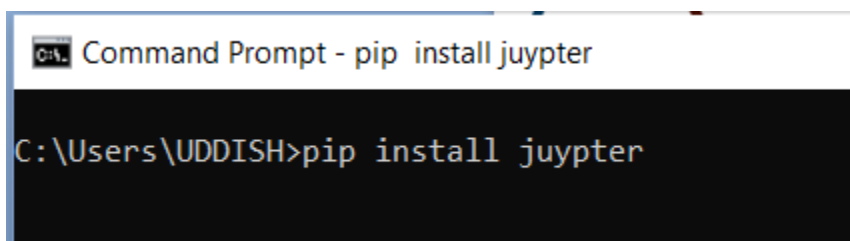
```
C:\Users\UDDISH>pip --version  
pip 20.0.2 from C:\Users\UDDISH\anaconda3\lib\site-packages\pip (python 3.7)
```

```
C:\Users\UDDISH> python -m pip install --upgrade pip --user
```

```
C:\Users\UDDISH>python -m pip install --upgrade pip --user  
Collecting pip  
  Using cached https://files.pythonhosted.org/packages/fe/ef/60d7ba03b5c44230  
3/pip-21.0.1-py3-none-any.whl  
Installing collected packages: pip  
Successfully installed pip-21.0.1
```

```
python.exe -m pip install --upgrade pip
```

Installing and Working of Jupyter Notebook using pip:



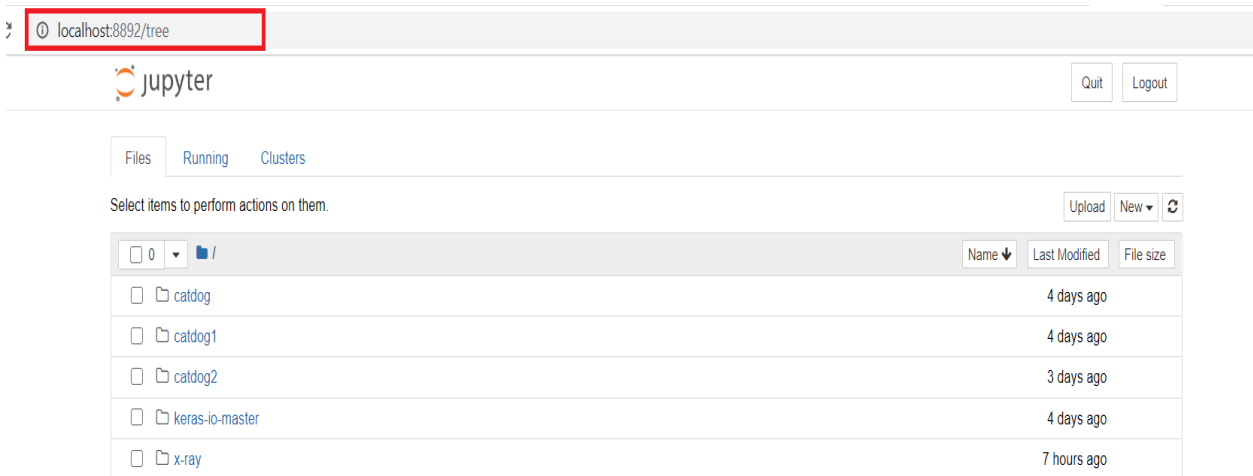
```
Command Prompt - pip install jupyter  
C:\Users\UDDISH>pip install jupyter
```

```
E:\jupyter>jupyter notebook
```

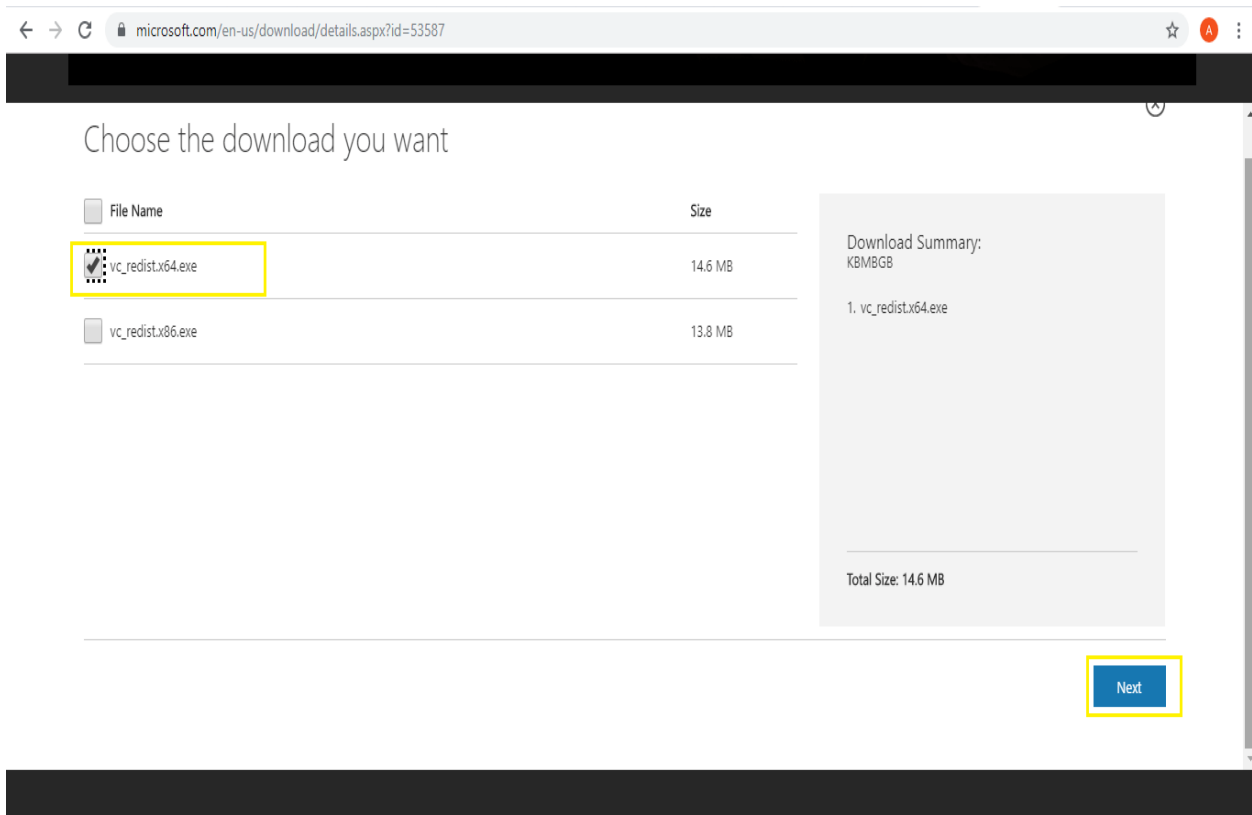
```
E:\jupyter>jupyter notebook
'jupyter' is not recognized as an internal or external command,
operable program or batch file.

E:\jupyter>jupyter notebook
[I 07:00:56.411 NotebookApp] The port 8888 is already in use, trying another port.
[I 07:00:56.412 NotebookApp] The port 8889 is already in use, trying another port.
[I 07:00:56.413 NotebookApp] The port 8890 is already in use, trying another port.
[I 07:00:56.413 NotebookApp] The port 8891 is already in use, trying another port.
[I 07:00:56.476 NotebookApp] JupyterLab extension loaded from C:\Users\UDDISH\anaconda3\lib\site-pack
[I 07:00:56.476 NotebookApp] JupyterLab application directory is C:\Users\UDDISH\anaconda3\share\jupy
[I 07:00:56.491 NotebookApp] Serving notebooks from local directory: E:\jupyter
[I 07:00:56.491 NotebookApp] The Jupyter Notebook is running at:
[I 07:00:56.491 NotebookApp] http://localhost:8892/?token=cbb24bfd0215c8c4db4d889cc8ff57e55d7ca5da02b
[I 07:00:56.492 NotebookApp] or http://127.0.0.1:8892/?token=cbb24bfd0215c8c4db4d889cc8ff57e55d7ca5d
[I 07:00:56.492 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to sh
[C 07:00:56.557 NotebookApp]

To access the notebook, open this file in a browser:
file:///C:/Users/UDDISH/AppData/Roaming/jupyter/runtime/nbserver-4432-open.html
Or copy and paste one of these URLs:
http://localhost:8892/?token=cbb24bfd0215c8c4db4d889cc8ff57e55d7ca5da02b60556
or http://127.0.0.1:8892/?token=cbb24bfd0215c8c4db4d889cc8ff57e55d7ca5da02b60556
```



Installing Microsoft Visual C++ 2015 Software:

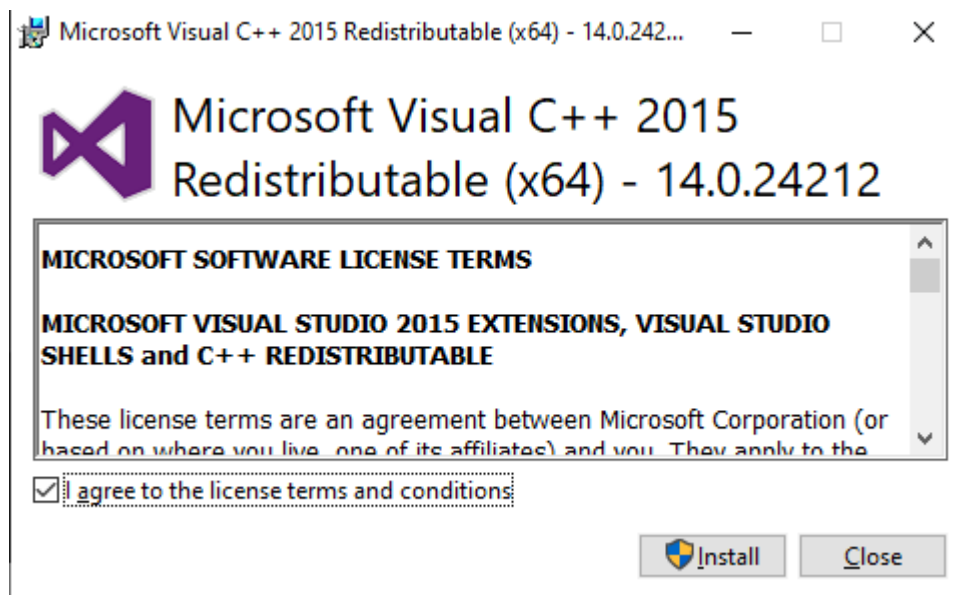


The screenshot shows a web browser window with the URL `microsoft.com/en-us/download/details.aspx?id=53587`. The page title is "Choose the download you want". It features a table with two columns: "File Name" and "Size". The first row is selected, showing "vc_redist.x64.exe" with a size of "14.6 MB". The second row is "vc_redist.x86.exe" with a size of "13.8 MB". To the right of the table is a "Download Summary" box containing the text "Download Summary: KBMBGB" and "1. vc_redist.x64.exe". Below the summary, it states "Total Size: 14.6 MB". A blue "Next" button is located at the bottom right of the page.

File Name	Size
<input checked="" type="checkbox"/> vc_redist.x64.exe	14.6 MB
<input type="checkbox"/> vc_redist.x86.exe	13.8 MB

Download Summary:
KBMBGB
1. vc_redist.x64.exe
Total Size: 14.6 MB

Next



The screenshot shows a Windows installation window titled "Microsoft Visual C++ 2015 Redistributable (x64) - 14.0.24212". The window displays the Microsoft logo and the product name. Below this is a scrollable text area containing the "MICROSOFT SOFTWARE LICENSE TERMS" and "MICROSOFT VISUAL STUDIO 2015 EXTENSIONS, VISUAL STUDIO SHELLS and C++ REDISTRIBUTABLE". The text states: "These license terms are an agreement between Microsoft Corporation (or based on where you live, one of its affiliates) and you. They apply to the". Below the text is a checkbox labeled "I agree to the license terms and conditions", which is checked. At the bottom right of the window are two buttons: "Install" and "Close".

Microsoft Visual C++ 2015 Redistributable (x64) - 14.0.24212

MICROSOFT SOFTWARE LICENSE TERMS

MICROSOFT VISUAL STUDIO 2015 EXTENSIONS, VISUAL STUDIO SHELLS and C++ REDISTRIBUTABLE

These license terms are an agreement between Microsoft Corporation (or based on where you live, one of its affiliates) and you. They apply to the

I agree to the license terms and conditions

Install Close

Installing and working of TensorFlow:

```
C:\Windows\system32>pip install tensorflow
```

```
C:\Windows\system32>import tensorflow
'import' is not recognized as an internal or external command,
operable program or batch file.

C:\Windows\system32>import tensorflow as tf
'import' is not recognized as an internal or external command,
operable program or batch file.

C:\Windows\system32>python
Python 3.7.0 (default, Jan 8 2020, 20:23:39) [MSC v.1916 64 bit (AMD64)] :: Anaconda, Inc. on win32

Warning:
This Python interpreter is in a conda environment, but the environment has
not been activated. Libraries may fail to load. To activate this environment
please see https://conda.io/activation

Type "help", "copyright", "credits" or "license" for more information.
>>> import tensorflow
2020-06-10 08:16:03.352617: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dy
>>>
>>> import tensorflow as tf
>>> msg = tf.constant('Hello, TensorFlow!')
2020-06-10 08:20:08.065738: W tensorflow/stream_executor/platform/default/dso_loader.cc:55] Could not load dynamic
2020-06-10 08:20:08.126256: E tensorflow/stream_executor/cuda/cuda_driver.cc:313] failed call to cuInit: UNKNOWN E
2020-06-10 08:20:08.728462: I tensorflow/stream_executor/cuda/cuda_diagnostics.cc:169] retrieving CUDA diagnostic
2020-06-10 08:20:08.732358: I tensorflow/stream_executor/cuda/cuda_diagnostics.cc:176] hostname: LAPTOP-8NMODJGK
2020-06-10 08:20:09.271133: I tensorflow/core/platform/cpu_feature_guard.cc:143] Your CPU supports instructions th
2020-06-10 08:20:10.734499: I tensorflow/compiler/xla/service/service.cc:168] XLA service 0x22d83e35580 initialize
2020-06-10 08:20:10.740576: I tensorflow/compiler/xla/service/service.cc:176] StreamExecutor device (0): Host, D
>>> tf.print(msg)
Hello, TensorFlow!
>>>
```

Installing CUDA:

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GEFORCE GAME READY DRIVER

Version: 446.14 WHQL
Release Date: 2020.5.27
Operating System: Windows 10 64-bit
Language: English (India)
File Size: 534.95 MB

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16: THE NEW

Day – 2: Session 2: AI ML Algorithms

The session 2 started with

- Introduction to Python, Indentation, Python Variables, Python Data Types – Numbers, String, Lists, Tuples, Sets and Dictionaries

Artificial Intelligence (AI)

According to the father of Artificial Intelligence, John McCarthy, it is “The science and engineering of making intelligent machines, especially intelligent computer programs”.

Artificial Intelligence is a way of making a computer, a computer-controlled robot, or a software think intelligently, in the similar manner the intelligent humans think. AI is accomplished by studying how human brain thinks and how humans learn, decide, and work while trying to solve a problem, and then using the outcomes of this study as a basis of developing intelligent software and systems.

While exploiting the power of the computer systems, the curiosity of human, lead him to wonder, “Can a machine think and behave like humans do?”

Thus, the development of AI started with the intention of creating similar intelligence in machines that we find and regard high in humans.

The Necessity of Learning AI

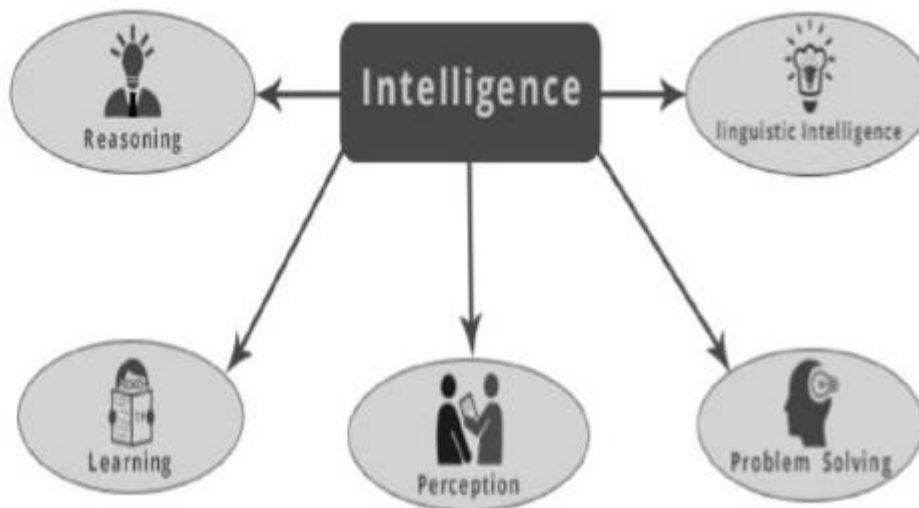
As we know that AI pursues creating the machines as intelligent as human beings. There are numerous reasons for us to study AI. The reasons are as follows –

- AI can learn through data
- AI can teach itself
- AI can respond in real time
- AI achieves accuracy
- AI can organize data to get most out of it
- Understanding Intelligence

What is Intelligence composed of?

The intelligence is intangible. It is composed of –

- Reasoning
- Learning
- Problem Solving
- Perception
- Linguistic Intelligence



What's Involved in AI

Artificial intelligence is a vast area of study. This field of study helps in finding solutions to real world problems.

Let us now see the different fields of study within AI –

- Machine Learning
- Logic
- Searching
- Artificial neural networks
- Genetic Algorithm
- Knowledge Representation

Application of AI

In this section, we will see the different fields supported by AI –

- Gaming
- Natural Language Processing
- Expert Systems
- Speech Recognition
- Handwriting Recognition
- Intelligent Robots

Machine Learning

Learning means the acquisition of knowledge or skills through study or experience. Based on this, we can define machine learning (ML) as follows –

It may be defined as the field of computer science, more specifically an application of artificial intelligence, which provides computer systems the ability to learn with data and improve from experience without being explicitly programmed.

Basically, the main focus of machine learning is to allow the computers learn automatically without human intervention. Now the question arises that how such

learning can be started and done? It can be started with the observations of data. The data can be some examples, instruction or some direct experiences too. Then on the basis of this input, machine makes better decision by looking for some patterns in data.

Types of Machine Learning (ML)

Machine Learning Algorithms helps computer system learn without being explicitly programmed. These algorithms are categorized into supervised or unsupervised. Let us now see a few algorithms –

Supervised machine learning algorithms

Mainly supervised learning problems can be divided into the following two kinds of problems –

- **Classification** – A problem is called classification problem when we have the categorized output such as “black”, “teaching”, “non-teaching”, etc.
- **Regression** – A problem is called regression problem when we have the real value output such as “distance”, “kilogram”, etc.

Decision tree, random forest, knn, logistic regression are the examples of supervised machine learning algorithms

Unsupervised machine learning algorithms

Unsupervised learning problems can be divided into the following two kinds of problem –

- **Clustering** – In clustering problems, we need to discover the inherent groupings in the data. For example, grouping customers by their purchasing behavior.

- **Association** – A problem is called association problem because such kinds of problem require discovering the rules that describe large portions of our data. For example, finding the customers who buy both **x** and **y**.

K-means for clustering, Apriori algorithm for association are the examples of unsupervised machine learning algorithms.

Most Common Machine Learning Algorithms

In this section, we will learn about the most common machine learning algorithms.

The algorithms are described below –

- Linear Regression
 - Simple linear regression .
 - Multiple linear regression
- Logistic Regression
- Decision Tree
- Support Vector Machine (SVM)
- Naïve Bayes
- K-Nearest Neighbors (KNN)
- K-Means Clustering
- Random Forest

Day 2 – Objectives

- Participants gained knowledge on
 - Understanding role of different tools used for AI ML
 - Understanding concepts of AI Algorithms
 - Understanding concepts of ML Algorithms



Day – 3: 22nd June 2022: Exploratory Data Analysis & NLTK

Day – 3: Session 1: Exploratory Data Analysis – Detection of Covid-19 Project

The session 1 started with

- Introduction to Exploratory Data Analysis – Detection of Covid-19 Project

Project Detect COVID-19 from Chest X-Rays by building a Simple Convolution Neural Network.

How do you distinguish “Cat” from a “Dog” ?

A FIW-INDIA ONLINE HACKATHON



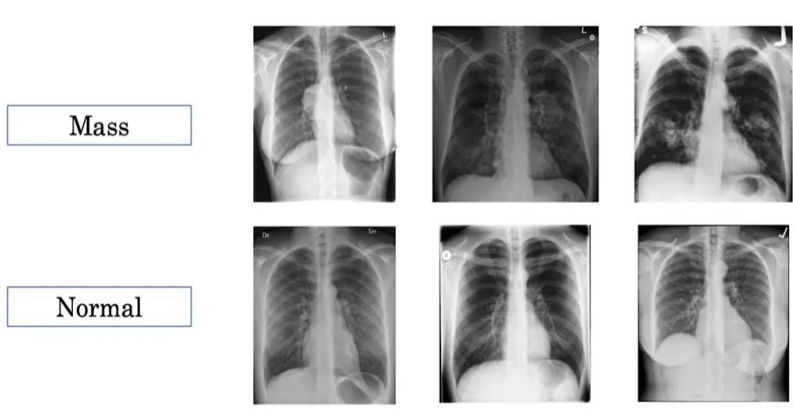
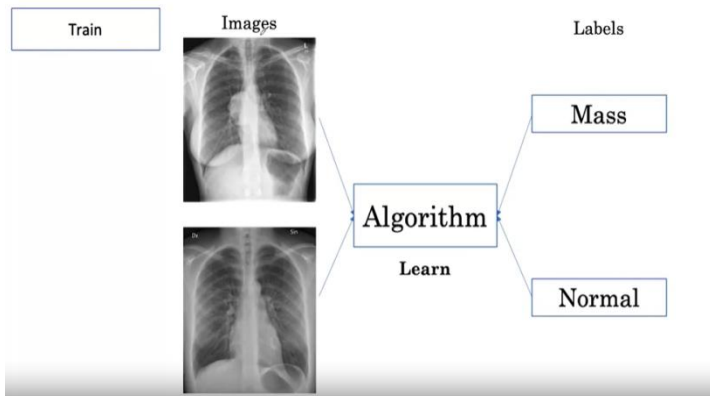
We will discuss how we can make your own **machine learning to successfully detect COVID-19 from Chest X-Rays by building a Simple Convolution Neural Network.**

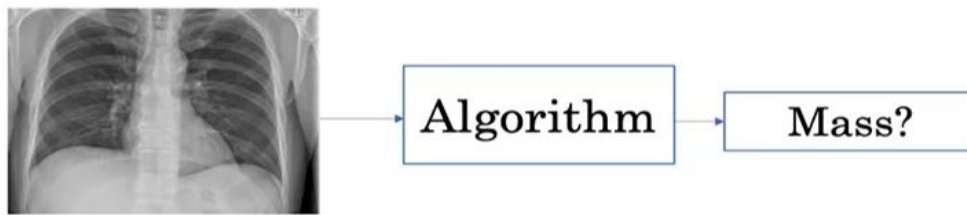
- Dataset Preparation
- Understanding the Dataset
- Building a CNN
- Model Training

Dataset Details ----- We will sample our dataset from the following.
Covid X-Ray Image Dataset <https://github.com/ieee8023/covid-chestxray-dataset>
for **positive cases.**

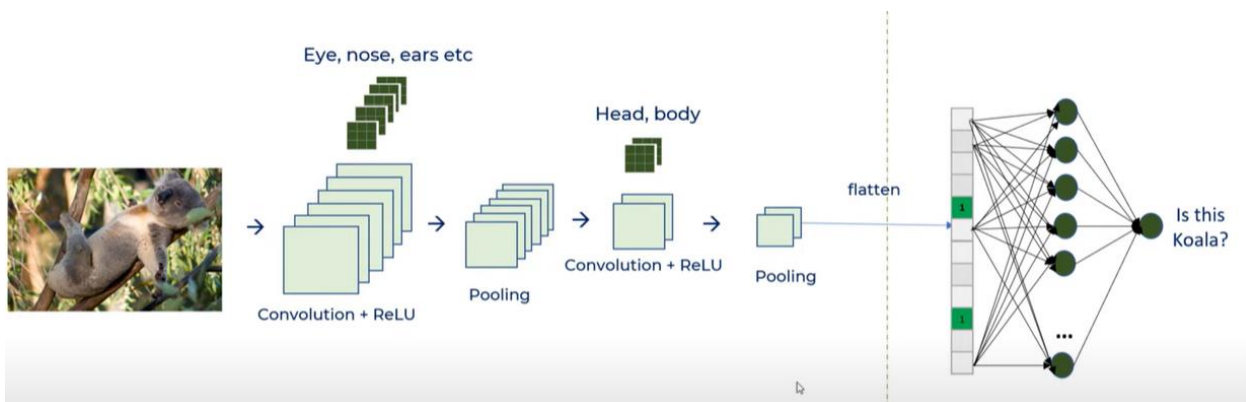
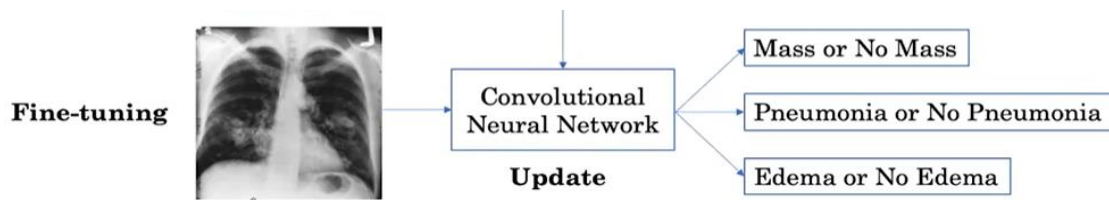
Kaggle X-Ray Chest Images - <https://www.kaggle.com/paultimothymooney/chest-xray-pneumonia> for **negative cases.**

Critical for detection
Of pneumonia, lung
cancer etc





deep learning algorithm
model
neural network
convolutional neural network



Day – 3: Session 2: NLTK – Sentiment Analysis – Movie Review

The fifth day session 2 started with

- Introduction to NLTK, Text Classification and Example discussed on Movie Review analysis using BOW Algorithm, TF Algorithm and Navie base Algorithm

NLTK Sentiment Analysis

- **NLTK = natural language toolkit**
- **pip install nltk**
- In today's area of internet and online services, data is generating at incredible speed and amount.
- Generally, Data analyst, engineer, and scientists are handling relational or tabular data.
- These tabular data columns have either numerical or categorical data.
- Generated data has a variety of structures such as text, image, audio, and video.
- Online activities such as articles, website text, blog posts, social media posts are generating unstructured textual data.
- Corporate and business need to analyze textual data to understand customer activities, opinion, and feedback to successfully derive their business.
- To compete with big textual data, text analytics is evolving at a faster rate than ever before.

Text Analytics has lots of applications in today's online world.

- By analyzing tweets on **Twitter**, we can find trending news and peoples reaction on a particular event.
- **Amazon** can understand user feedback or review on the specific product.
- **BookMyShow** can discover people's opinion about the movie.
- **Youtube** can also analyze and understand peoples viewpoints on a video.

Text Analytics and NLP:

Text Analytics:

- Text communication is one of the most popular forms of day to day conversation.

- We chat, message, tweet, share status, email, write blogs, share opinion and feedback in our daily routine.
- All of these activities are generating text in a significant amount, which is unstructured in nature.
- In this area of the online marketplace and social media, it is essential to analyze vast quantities of data, to understand people's opinion.

NLP :

- NLP enables the computer to interact with humans in a natural manner.
- It helps the computer to understand the human language and derive meaning from it.
- NLP is applicable in several problematic from speech recognition, language translation, classifying documents to information extraction.
- Analyzing movie review is one of the classic examples to demonstrate a simple NLP Bag-of-words model, on movie reviews.

Tokenization:

- Tokenization is the first step in text analytics.
- The process of breaking down a text paragraph into smaller chunks such as words or sentence is called Tokenization.
- Token is a single entity that is building blocks for sentence or paragraph.

Sentence Tokenization:

Sentence tokenizer breaks text paragraph into sentences.

```
text=""Hello Mr. UDDISH, how are you doing today? The weather is great, and city is awesome.
The sky is pinkish-blue. You shouldn't eat cardboard""
print(text)
```

Hello Mr. UDDISH, how are you doing today? The weather is great, and city is awesome.
The sky is pinkish-blue. You shouldn't eat cardboard

```
#from nltk.tokenize import sent_tokenize

text="""Hello Mr. UDDISH, how are you doing today? The weather is great, and city is
awesome.
The sky is pinkish-blue. You shouldn't eat cardboard"""

tokenized_text=sent_tokenize(text)
print(tokenized_text)
```

```
['Hello Mr. UDDISH, how are you doing today?', 'The weather is great, and
city is awesome.', 'The sky is pinkish-blue.', "You shouldn't eat cardboard"]
```

Word Tokenization:

- Word tokenizer breaks text paragraph into words.

```
#from nltk.tokenize import word_tokenize

tokenized_word=word_tokenize(text)
print(tokenized_word)
```

```
['Hello', 'Mr.', 'UDDISH', ',', 'how', 'are', 'you', 'doing', 'today', '?', 'The',
'weather', 'is', 'great', ',', 'and', 'city', 'is', 'awesome', '.', 'The', 'sky', 'is',
'pinkish-blue', '.', 'You', 'should', "n't", 'eat', 'cardboard']
```

Frequency Distribution

```
#from nltk.probability import FreqDist

fdist = FreqDist(tokenized_word)
print(fdist)
```

<FreqDist with 25 samples and 30 outcomes>

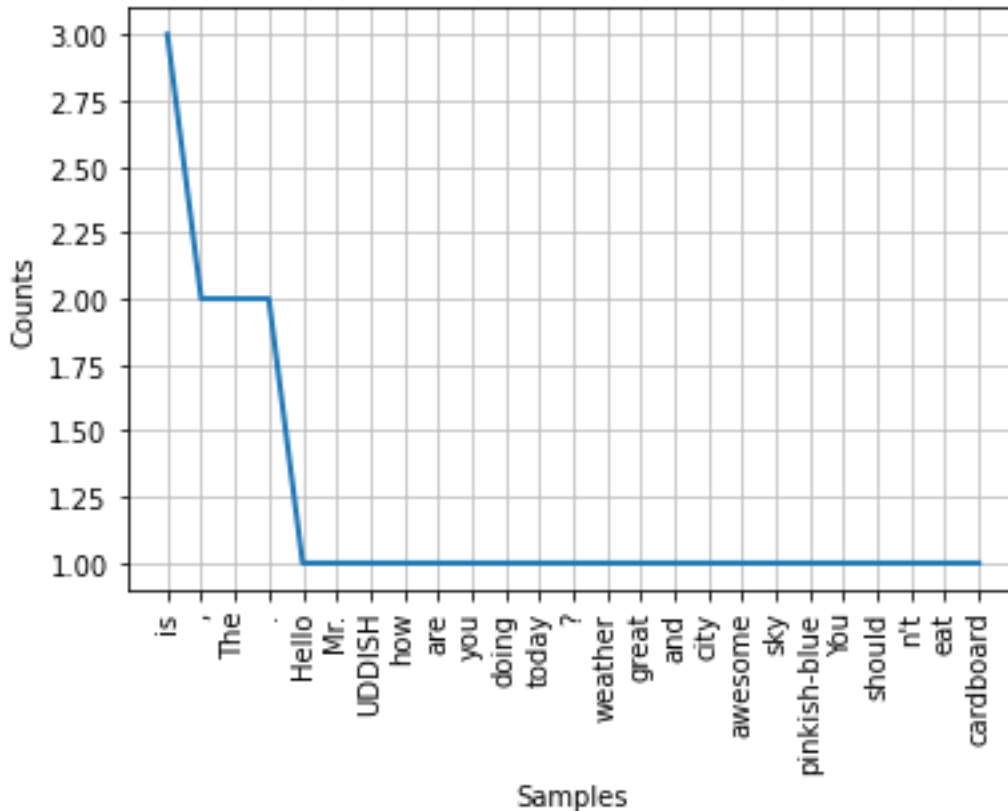
```
fdist.most_common(2)
```

```
[('is', 3), (',', 2)]
```

```
# Frequency Distribution Plot
```

```
# import matplotlib.pyplot as plt
```

```
fdist.plot(30,cumulative=False)
plt.show()
```



Sentiment Analysis

Analysis :

- Nowadays companies want to understand, what went wrong with their latest products?
- What users and the general public think about the latest feature?

You can quantify such information with reasonable accuracy using sentiment analysis.

Sentiment Analysis : Quantifying users content, idea, belief, and opinion is known as sentiment analysis.

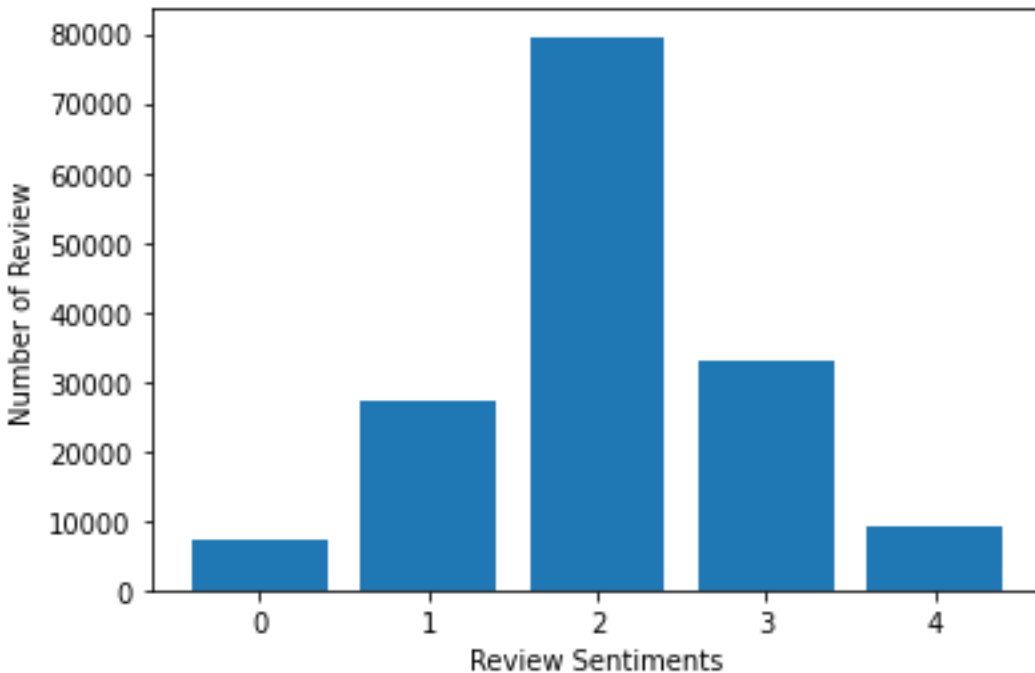
- User's online post, blogs, tweets, feedback of product helps business people to the target audience and innovate in products and services.
- Sentiment analysis helps in understanding people in a better and more accurate way. It is not only limited to marketing, but it can also be utilized in politics, research, and security.
- Human communication just not limited to words, it is more than words.
- Sentiments are combination words, tone, and writing style.

- As a data analyst, It is more important to understand our sentiments, what it really means?

There are mainly two approaches for performing sentiment analysis.

Lexicon-based: count number of positive and negative words in given text and the larger count will be the sentiment of text.

Machine learning based approach: Develop a classification model, which is trained using the pre-labeled dataset of positive, negative, and neutral.



Feature Generation using Bag of Words:

- In the Text Classification Problem, we have a set of texts and their respective labels.
- But we directly can't use text for our model.
- We need to **convert these text into some numbers or vectors of numbers.**

Bag-of-words model(BoW):

- Bag-of-words model(BoW) is the simplest way of extracting features from the text.

- BoW converts text into the **matrix** of occurrence of words within a document.
- This model concerns about whether given words occurred or not in the document.

TF-IDF (Term Frequency - Inverse Document Frequency):

- In Term Frequency(TF), you just count the number of words occurred in each document.
- The main issue with this Term Frequency is that it will give more weight to longer documents.
- Term frequency is basically the output of the BoW model.
- IDF(Inverse Document Frequency) measures the amount of information a given word provides across the document.
- IDF is the logarithmically scaled inverse ratio of the number of documents that contain the word and the total number of documents.

Split train and test set

To understand model performance, dividing the dataset into a training set and a test set is a good strategy.

Let's split dataset by using function **train_test_split()**

You need to pass basically 3 parameters features, target, and test_set size.

Additionally, you can use random_state to select records randomly.

```
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(text_counts, data['Sentiment'],
test_size=0.3, random_state=1)
```

Model Building and Evaluation

Let's build the Text Classification Model

- First, import the MultinomialNB module and create a Multinomial Naive Bayes classifier object using MultinomialNB() function.

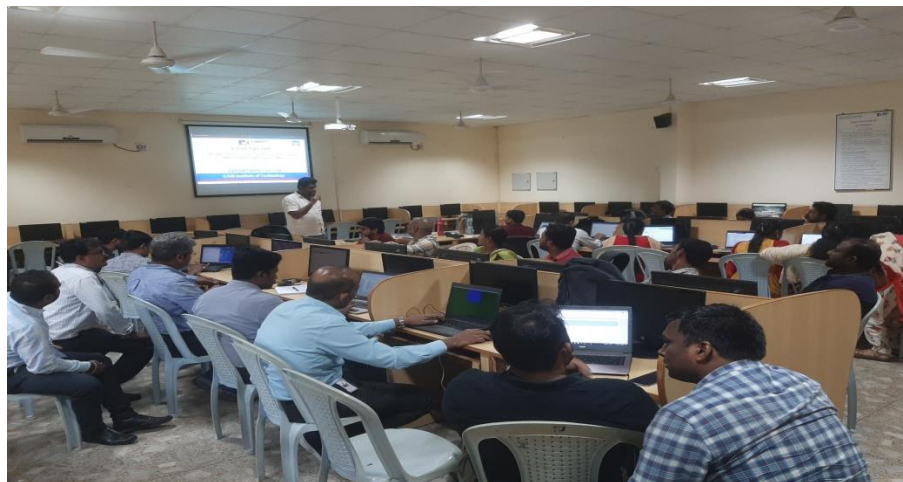
- Then, fit your model on a train set using fit() and perform prediction on the test set using predict().

```
from sklearn.naive_bayes import MultinomialNB
#Import scikit-learn metrics module for accuracy calculation
from sklearn import metrics
# Model Generation Using Multinomial Naive Bayes
clf = MultinomialNB().fit(X_train, y_train)
predicted= clf.predict(X_test)
print("MultinomialNB Accuracy:",metrics.accuracy_score(y_test, predicted))
```

MultinomialNB Accuracy: 0.6049169122986885

Day 3 – Objectives

- Participants gained knowledge on
 - Understanding concepts of Exploratory Data Analysis – Detection of Covid-19 Project
 - Understanding concepts of NLTK
 - Understanding concepts of Text Classification and
 - Example discussed on Movie Review analysis using BOW Algorithm, TF Algorithm and Navie base Algorithm



Day 4: 23rd June 2022: Session 1 and 2 ATM

After the ICE BREAKING sessions, the first topic was about Individualized Instruction Model By **Keller Plan**, Success Approximation Model By **Dr. Michael Allen** .The break was up with **Edgar Dale’s Model**- Giving Following Opportunity To Participants For 90% Retention

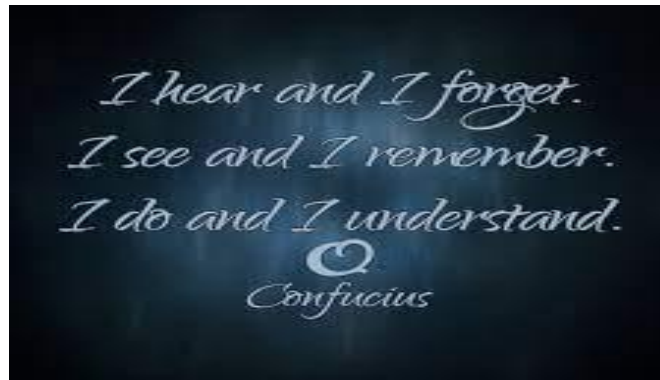
LEARNING MODELS EXPLAINED	MAIN THEME	OUTPUT OF EXPLANATION
BENJAMIN BLOOM’s COGNITIVE TAXONOMY	<p>This theory deals with the six levels of a learner’s cognition and understanding of a specific subject.</p> <p>The Facilitator affirmed that the level is very much subjected specific.</p> <p>A Learner/student who is in the higher level in one subject may be in the lowermost level of another subject</p>	The learners achieved conceptual clarity regarding the different Cognitive Levels of individuals in different subjects
ROBERT GAGNE’s Nine Steps of Instruction	<p>This model indicates that there are <i>nine types</i> of educational instructions arranged in a logical sequence.</p> <p>If an Educator follows the nine instructions in the structured logical sequence, then the learners will achieve the desired learning goal and transfer their learned inputs to others.</p>	The learners got apprised regarding the logical sequence of activities that are to be executed by a Trainer /Facilitator in a Learning Session for facilitating the learners in ensuring retention of the learned content and developing within them the ability to transfer the learned content to others
EDGAR DALE’s Model of retention of learning inputs	The model suggests that different types of academic activities lead to different levels of retention of learned inputs	The learners got apprised regarding the percentage of retention of learned inputs by the learners under the influence of various sorts of Teaching Activities

MAY & DOOB's Collaborative Learning Model	This learning model indicates that cooperation and collaboration among a group of learners can lead to the achievement of learning outcomes	The learners comprehended how the exchange of views, group discussion, task distribution, and the convergence of thoughts can play extremely significant roles in the learning process.
CHARLES REIGELUTH'S Elaboration Model	The model suggests that an Educator must present the learning materials in a sequential pattern viz. from the simplest level to the most complex level	The learners understood the significance of arranging and presenting the learning content through logical sequences
The Oldest Innovation of Teaching Methodology "Panchatantra" By - Vishnu Sharma.	This model is mainly concerned with the weak & mediocre / Average participants. First time in the history of "Gurukulas", this is introduced on the special request by the then King for his three sons.	Faculties were overwhelmed to know, listen and experience the relation and co-relation of connectivity to this present technologies and trends.

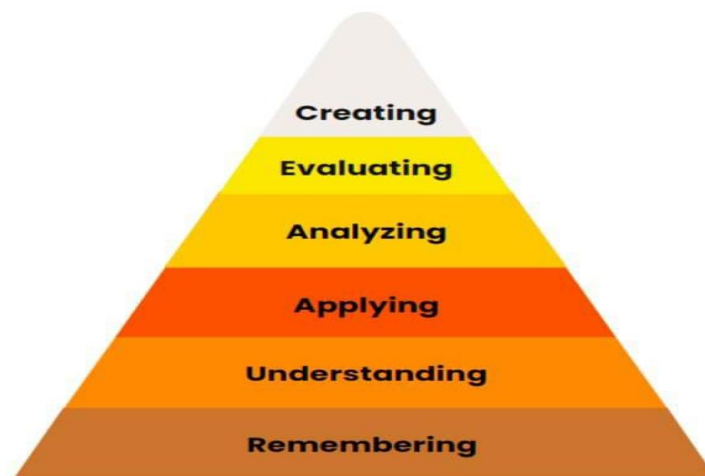
5 E's of effective teaching:



Passive v/s active learning:



BLOOM'S TAXONOMY:



Day 4 – Objectives

- Inauguration & Ice Breaking
- Introduction to Value Education – Andragogy
- Introduction to 21st Century skills
- Advanced Teaching Techniques/ Methods
- Robert Gagne's Nine Steps Of Instruction
- Benjamin Bloom's Cognitive Taxonomy
- Edgar Dale's Model Of Retention Of Learning Inputs

- What I am expecting to get & what I do
- Harmony In The Family And Society
- PANCHATANTHIRAM –Teaching Techniques
- May & Doob’s Collaborative Learning Model
- Pre Training Assessment- Discussion



Day 5: 24th June 2022: Session 1 and 2 ATM

LEARNING MODELS EXPLAINED	MAIN THEME	OUTPUT OF EXPLANATION
JOHN SWELLER'S Cognitive Load Model	<p>This model suggests that to ensure the retention of learning inputs in participants' long-term memory, the learning content should be delivered in a fragmented pattern, part by part.</p> <p>If a large volume of content is foisted upon the learners then the cognitive load will get enhanced to a large extent.</p> <p>Therefore, the learned inputs will not be retained in long-term memory.</p>	<p>The learners understood the significance of presenting a large volume of content in a fragmented pattern instead of continually imposing a huge volume of content upon the learners.</p>

JOHN KELLER'S ARCS MODEL	<p>This model reflects the linear sequence of four activities that are to be followed by educators to</p> <ul style="list-style-type: none"> • Draw the attention of the participants • Establish relevance of the learning materials to the prior knowledge or the occupational life of the participants • Build up the confidence of the learners • Satisfying the learners by the achieved learning outcome 	<p>The learners understood how to draw the attention of the participants, present relevant inputs to them, build up their confidence, the participants and satisfy the participants in learning sessions.</p>
JEROME BRUNER'S Discovery Model	<p>This model suggests that the Probing Inquiry from the Educator facilitates the participants to introspect and unleash their latent creativity and analytical competencies.</p>	<p>The learners to understand the significance of Inquiry-Based Instructions for the discovery of the hidden creative flair, insight, intuition as well as the analytical power of the participants, embedded within themselves</p>
HOWARD BURROWS' Problem Based Learning Model	<p>This model suggests that if the participants are provided with problems to solve rather than contents to memorize, then the creative and analytical competencies of the learners will get enhanced and unleashed.</p>	<p>The learners understood how problem-solving exercises can enhance critical thinking as well as creative thinking competency of the participant's</p>
MICHAEL ALLEN's Success Approximation Model (SAM)	<p>This model encourages participants centric learn. Here, primarily the prototype of the learning material and finally the prepared instructional material are evaluated by the participants.</p> <p>If the participants suggest any changes, then to ensure the ease of learning for the participants, the changes are engineered accordingly both at the prototype as well as at the final material.</p>	<p>The learners perceived the significance of the customization /re-engineering of the prototype of learning materials as well as the final learning material based on the feedback of the participants</p> <p>The learners understood the significance of Student-Centric Instructional Design.</p>
KELLER PLAN's Individualized Instructional Model	<p>This model is mainly concerned with the heterogeneity of the learners. Since each learner differs from other learners in the learning capacity, style pace, and approach, hence the instructional material should be designed based on the unique capacity, need style standard, and pace of each learner. Within an allotted time frame each learner learns individually in his/her way</p>	<p>The learners deciphered the importance of designing learning materials and determining the methodology of facilitating the participants based on the intellectual standard, learning style, and the learning pace of each student.</p>

<p>The Oldest of Innovation Teaching Methodology</p> <p>“Panchatantra”</p> <p>By - Vishnu Sharma.</p>	<p>This model is mainly concerned with the week & mediocre / Average participants. First time in the history of “Gurukulas”, this is introduced on the special request by the then King for his three sons.</p> <p>Panchatantra means Five Treatises/ chapters. Given learning capacity, style, pace, and approach, hence the instructional materials are all the stories about Animals, Birds & Plants/ Nature.</p> <p>This Method of teaching gives not only the knowledge to the students but also the new experience with each & every week student the guru faces every time.</p>	<p>The participants/ Shishyas for the imaginative thinking and stored in the permanent memories. Within an allotted time frame each learner learns individually in his perception like the Guru’s Version.</p> <p>This will be the best example of the “ Experience makes Man Perfect “</p>
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Day 5 – Objectives

- John Sweller’s Cognitive Load Model
- Values In Human-To-Human Relationship
- John Keller’s Arcs Model
- Innovation – Andragogy – Management
- 'Respect' – As The Right Evaluation
- 'Trust' – The Foundational Value In Relationship
- Jerome Bruner’s Discovery Model
- Howard Burrows’ Problem Based Learning Model
- Assessment result
- PANCHATANTHIRAM – Teaching Techniques
- What we got & how to do



11. CLOSING CEREMONY

The Training Programme concluded with the closing ceremony. The closing ceremony was graced by Dr.C.L.V.R.S.V.Prasad Professor and Principal – GMRIT, Dr.A.Venkata Ramana HOD - CSE Dept, GMRIT, B Prasad CEO/CO-Founder and Corporate Trainer and falicitator, Mr Vamshi Co-ordinator, APITA and S. Dinakar Reddy (Corporate Master Trainer & Facilitator, Mentor in Innovations & Entrepreneurship, Instructional Designer of LST and participants gave feedback on the FDP.



Fig: Group picture of participants on day3 on Closing Ceremony



Fig: Closing Ceremony on Day 5

12. Participant's List (Annexure – A)

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17	Mr. P. Ramu	Assistant Professor	CIVIL	MALE	Ramu.p@gmrit.edu.in	GMRIT
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