**IIT-HYDERABAD**

**AI WORKSHOP DAY-1 (08-04-2023)**

**MORNING SESSION:**

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C++ = object oriented

It is called c with classes.

Interpretor executes line by line.

Compiler executes complete code at a time.

Need for the programming – to communicate with computer.

**MECHANICS AND MACHINES:**

**Mechanics:** a branch of physics which studies the motion and the behaviour of physical objects under the influence of forces.

**Machines:** a machine is a device or a tool that used of performing a specific task.

Could be powered by electricity, fuel or human powered.

**SOFTWARE, ELECTRIONICS AND EMBEDDED SOFTWARE:**

**WHY SOFTWARE:**

FLEXIBLE AND ADAPTABLE.

Quick and cheap to improve and update.

More reliable and consistent.

Challenge with precession in machines.

**Software code:**

Software is a set of instructions laid out for interacting with the digital devices to perform a specific task.

Physical to logical.

**Electronics:**

The branch of physics and technology concerned with the design of circuit usimg transistors and microchips, and with the behaviour and movement of electrons ina semiconducti9r, conductor, vaccum or gas.

**PROGRAM** – set of instructions.

**PROTOCOL** – set of instructions to be followed in between machines to communicate.

**Embedded systems** – developed for a very specific purpose only.

**Computing devices** – on which software runs.

It can be standalone or multi interconnected units.

It could provide specific function or general functions.

**Every language has 3 parts(imp statements):**

Sequential – executed one after the other

Conditional

Iterative – repetitive statements

**AUTOMOBILES AND SOFTWARE:**

**NEED FOR SOFTWARE:**

Stringent emission requirements

Autonomous driving

OS in automobiles

**TRADITIONAL PROGRAMMING vs AI PROGRAMMING :**

|  |  |  |
| --- | --- | --- |
|  | **TRADITIONAL** | **AI PROGRAMMING** |
| INPUT | Requirements | Datasets |
| PROCESS | Algorithm is programmed | Existing algos are trained |
| OUTPUT | A program to produce desired results. | A ML model which predicts a probability 0f a object/value. |
| CERTAINITY | Of results. | Results are probable and predicted. |
| PROGRAM | A program is a set of instructions laid out to produce a desired result.  Instructions are programmatically laid out. Programming is manual process. | MODEL:  A model is a bunch of numbers which will used to compute the outcome. (math+algo)  The process of model training is created. Training a model is automated process. |
|  | Data->  Computer-> output  Program-> | MACHINE LEARNING:  Data->  Computer-> progam  Output-> |

AI is to simplify your job.

AI is not thinking capacity but an assessment kind of thing done based on experience.

AI is a way of programming but not a language and also not specifically sticked to one language.

**Datasets –** experiences

**Statistics –** measurement of experiences

**Mechanistic** – which can be measured

**Non-mechanistic** – which can’t be measured

**MACHINE LEARNING** – the processes that takes place in our brain is a simple ML.

**Ex:**

10 2 2 14

6 2 3 12

5 4 3 17

The above datasets depicts the combination of addition and multiplication of the numbers respectively.

-> ML is all about learning by experience analysis.

**-> 5 CORE ML STEPS:**

Data acquisition

Data Pre-processing

Training – choose algorithm

Testing/validating

Deployment

DATA

|

| (Data pre-processing)

|

ALGORITHM

| (training)

|

future i/p <------ H --------🡪 o/p

-> The future input will be unknown to you but fall under the dataset of the past required experience.

-> In AI nearest accurate results are acceptable but in traditional programming it is not accepted.

**LFW –** Labelled Faces in Wild (used in face recognition algorithm)

**DATA SCIENCE –** a science which deals with munging, cleaning, visualising and finding useful data samples I.e manipulating data.

**AI –** technique which enables a computing device to imitate human intelligence.

**ML –** statistical technique which enables a machine to improve by experience.

You’ve to do feature engineering to attain this.

Ex: kernel SVM, KNN…….

**DEEP LEARNING –** a ML algo which involves in using neural networks for solving the problems.

Ex: speech recognition, image recognition……….

Inspired by human brain structure and functioning.

**LLM – large language models**

Ex : chatgpt

**CLOUD PLATFORM –** Algorithms are deployed here i.e thrown into cloud storages.

Training and testing can also be done on cloud.

**CLOUD DEPLOYEMENT –** APIs of python are used.

**AFTERNOON SESSION:**

**PYTHON PROGRAMMING**

**First program using python (“hello world”):**

-> print(“hello world”)

**DEBUGGING:**

the process of identifying and removing errors from computer hardware or software.

It checks for the bugs in the code line by line.

**breakpoint():** Python breakpoint() function is a very helpful addition to the python debugging feature

**print(…):** it is a function that takes the values and other data which needs to be printed as a result.

1) help('print')

Help on built-in function print in module builtins:

print(...)

print(value, ..., sep=' ', end='\n', file=sys.stdout, flush=False)

Prints the values to a stream, or to sys.stdout by default.

Optional keyword arguments:

file: a file-like object (stream); defaults to the current sys.stdout.

sep: string inserted between values, default a space.

end: string appended after the last value, default a newline.

flush: whether to forcibly flush the stream.

2) print('hey','you')

hey you

3) print('hi','hello',sep="namaste",end='aadabh')

Hinamastehelloaadabh

4)print('Hello', 'World', sep = '----', end='||||||||||||')

print('hi there')

print('Good morning')

Hello----World||||||||||||hi there

Good morning

**DATA TYPES**

**OPERATORS:**

**Binary operator =** A Binary operator is an operator that operates on two operands to produce a new value (result).

**Unary operator =** are operators that act upon a single operand to produce a new value.

**Ternary operator =** The Python ternary operator (or conditional operator), tests if a condition is true or false and, depending on the outcome, returns the corresponding value — all in just one line of code.

**Arithmetic operators:**

Addition

Subtraction

Multiplication

Division

%

\*\*

Floor division (//)

**Assignment operators:**

=

+=

-=

\*=

/=

\*\*=

//=

%=

**Logical operators:**

And

Or

Not

**Comparison operators:**

>,>=,<=,<,==

**Bitwise operators:**

Operators that apply on each bit of the data.

Binary equivalence:

2 – 10 3 – 11

4 – 100 7 – 111

8 – 1000

128 – 10000000

256 – 100000000

255 – 11111111

&, |, ^, ~, <<, >> – bitwise operators

**Variable:** it is alias for memory location.

**Reference in c++:** A reference variable is an alias, that is, another name for an already existing variable. Once a reference is initialized with a variable, either the variable name or the reference name may be used to refer to the variable.

**CONTROL STATEMENTS:**

Loops are employed in Python to iterate over a section of code continually. Control statements are designed to serve the purpose of modifying a loop's execution from its default behaviour. Based on a condition, control statements are applied to alter how the loop executes.

We try to choose the path of execution with the help of these control statements.

-> If statement

-> Else statement

-> if else statement

-> if elif

-> nested if

-> Elif statement

**LOOP STATEMENTS:**

For

While

Do while

**BREAK STATEMENTS:**

Continue

Break