Exercises 1:

1. Artificial intelligence, commonly referred to as AI, is the process of imparting data, information, and human intelligence to machines. The main goal of Artificial Intelligence is to develop self-reliant machines that can think and act like humans. These machines can mimic human behavior and perform tasks by learning and problem-solving. Most of the AI systems simulate natural intelligence to solve complex problems.

2. Artificial Intelligence, Machine Learning, and Deep Learning have become the most talked-about technologies in today's commercial world as companies are using these innovations to build intelligent machines and applications. And although these terms are dominating business dialogues all over the world, many people have difficulty differentiating between them. This blog will help you gain a clear understanding of AI, machine learning, and deep learning and how they differ from one another.

Before jumping into the technicalities, let's look at what tech influencers, industry personalities, and authors have to say about these three concepts.

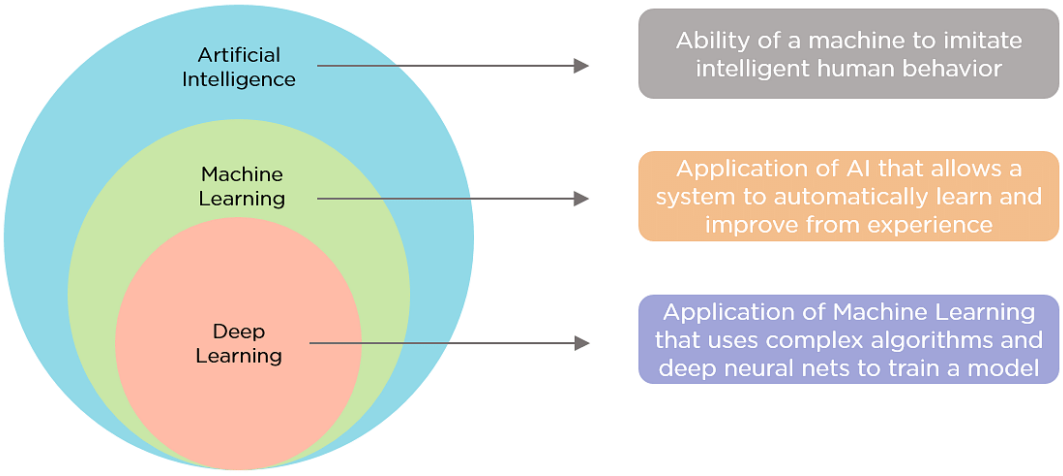
"AI doesn't have to be evil to destroy humanity – if AI has a goal and humanity just happens in the way, it will destroy humanity as a matter of course without even thinking about it, no hard feelings." – Elon Musk, Technology Entrepreneur, and Investor.

"Artificial Intelligence, deep learning, machine learning—whatever you're doing if you don't understand it—learn it. Because otherwise, you're going to be a dinosaur within 3 years." - Mark Cuban, American entrepreneur, and television personality.

"In deep learning, the algorithms we use now are versions of the algorithms we were developing in the 1980s, the 1990s. People were very optimistic about them, but it turns out they didn't work too well." - Geoffrey Hinton, Father of Deep Learning

The three terms are often used interchangeably, but they do not quite refer to the same things.

Here is an illustration designed to help us understand the fundamental differences between artificial intelligence, machine learning, and deep learning.



Artificial Intelligence is the concept of creating smart intelligent machines.

Machine Learning is a subset of artificial intelligence that helps you build AI-driven applications. Artificial intelligence, commonly referred to as AI, is the process of imparting data, information, and human intelligence to machines. The main goal of Artificial Intelligence is to develop self-reliant machines that can think and act like humans. These machines can mimic human behavior and perform tasks by learning and problem-solving. Most of the AI systems simulate natural intelligence to solve complex problems.

Deep Learning is a subset of machine learning that uses vast volumes of data and complex algorithms to train a model.

Now, let’s explore each of these technologies in detail.

3. Alexa and Bixby come to the top of our minds when one talks of using AI in developing smart homes. However, these applications of AI are not just limited to these Smart-voice assistants.

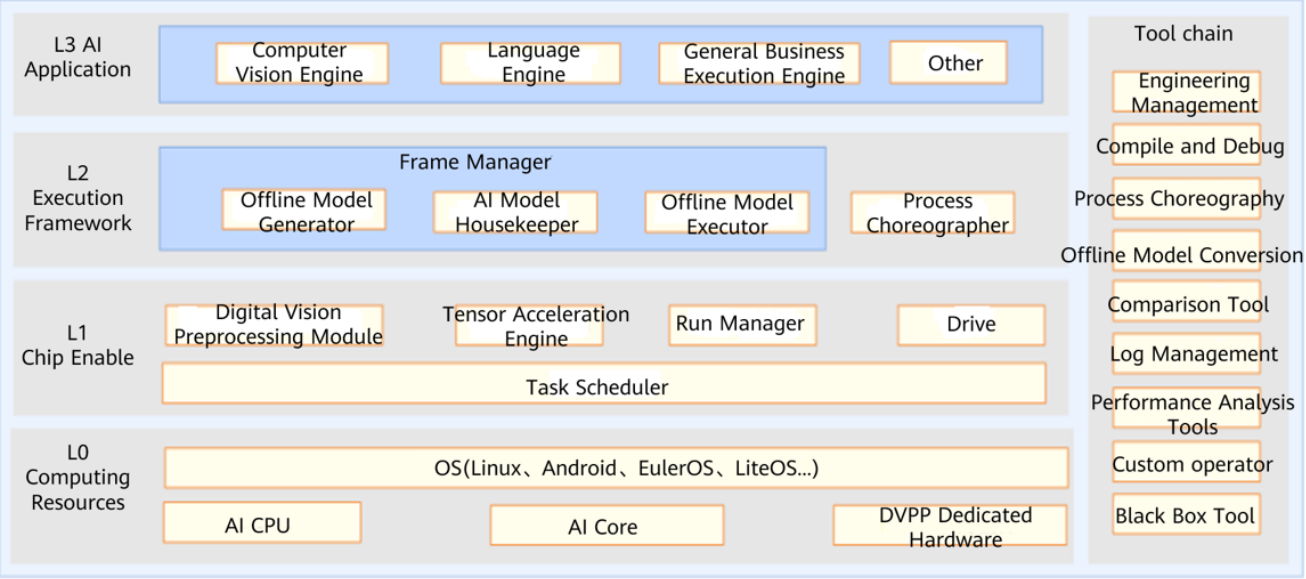
Thermostat devices that make use of AI to adjust the temperature automatically, AI applications that conserve energy by automatically switching on/off the lights based on human presence, smart speakers, apps that change the color of the light

based on the time of the day, etc. are few of the applications where AI is being used to make the homes smarter.

The AI being used is evolving, and more and more solutions are being developed that understand our behavior and function accordingly.

4. It is an application-level encapsulation layer that provides different processing algorithms for specific application fields. L3 provides various fields with computing and processing engines. It can directly use the framework scheduling capability provided by L2 to generate corresponding NNs and implement specific engine functions.

- Generic engine: provides the generic neural network inference capability.
- Computer vision engine: encapsulates video or image processing algorithms.
- Language and text engine: Encapsulates basic processing algorithms for voice and text data.



The software stack of the Ascend AI chip consists of four layers and an auxiliary toolchain. The four layers are the application enabling layer (L3), execution framework layer (L2), chip enabling layer (L1), and computing resource layer (L0). The toolchain provides auxiliary capabilities such as program development, compilation and commissioning, application process orchestration, log management, and profiling. The functions of the main components depend on each

other in the software stack. They carry data flows, computing flows, and control flows.

L2 execution framework layer: encapsulates the framework calling capability and offline model generation capability. After the application algorithm is developed and encapsulated into an engine at L3, L2 calls the appropriate deep learning framework, such as Caffe or TensorFlow, based on the features of the algorithm to obtain the neural network of the corresponding function, and generates an offline model through the framework manager. After L2 converts the original neural network model into an offline model that can be executed on Ascend AI chips, the offline model executor (OME) transfers the offline model to Layer 1 for task allocation.

L1 chip enabling layer: bridges the offline model to Ascend AI chips. L1 accelerates the offline model for different computing tasks via libraries. Nearest to the bottom-layer computing resources, L1 outputs operator-layer tasks to the hardware.

L0 computing resource layer: provides computing resources and executes specific computing tasks. It is the hardware computing basis of the Ascend AI chip.

The neural network software flow of Ascend AI processors is a bridge between the deep learning framework and Ascend AI chips. It realizes and executes a neural network application and integrates the following functional modules.

Process orchestrator: implements the neural network on Ascend AI chips, coordinates the whole process of effecting the neural network, and controls the loading and execution of offline models.

Digital vision pre-processing (DVPP) module: performs data processing and cleaning before input to meet format requirements for computing.

Tensor boosting engine (TBE): functions as a neural network operator factory that provides powerful computing operators for neural network models.

Framework manager: builds an original neural network model into a form supported by Ascend AI chips, and integrates the new model into Ascend AI chips to ensure efficient running of the neural network.

Runtime manager: provides various resource management paths for task delivery and allocation of the neural network.

5. I think in the future AI will replace a large number of workers in the manufacturing industry. AI will help assembly plants manufacture equipment quickly and with less time and money.