

To: Joint Artificial Intelligence Task Force  
From: Methodology-Technology Subcommittee  
Date: September 18, 2024  
RE: Initial List of Definitions

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The following is a list of initial definitions for consideration from the Methodology-Technology Subcommittee. The definitions are from a number of sources, including:

**[EU]** - from the European Union

**[NIST]** - from National Institute of Standards and Technology

**[HAL]** - from the Stanford Human-Centered Artificial Intelligence Institute

**[UNF]** – University of North Florida Office of Faculty Excellence

The definitions are currently being categorized into four main categories:

- General Software/System Concepts
- Artificial Intelligence Disciplines
- Artificial Intelligence Methodologies and Components
- Artificial Intelligence Application Concepts

This is a first cut at the categories and they deserve further consideration and review. The set of definitions are also currently incomplete and need further review and consideration. The definitions themselves are first cuts and are likely overly broad or too narrow. These are a starting point.

## General Software/System Concepts

**Algorithm:** A set of computational rules to be followed to solve a mathematical problem. More recently, the term has been adopted to refer to a process to be followed, often by a computer. [NIST]

**Software Component:** A modular unit of software that encapsulates specific functionality. [wikipedia]. Software components often are implementations of specific algorithms and can be reused across multiple software packages.

**Third-Party Software Component:** A reusable software component developed to be either freely distributed or sold by an entity other than the original vendor of a software package. [wikipedia slightly modified]

**Developer:** A general term that includes developers or manufacturers of systems, system components, or system services; systems integrators; vendors; and product resellers. Development of systems, components, or services can occur internally within organizations or through external entities. [NIST]

**Note:** Colorado SB 205 has overly specific definition

**Deployment:** Phase of a project in which a system is put into operation and customer issues are resolved. [NIST]

Note: can use some work

**Deployer:** A second party performing the deployment of software or system to a first-party customer.

Note: Colorado SB 205 has overly specific definition

**Autonomy:** A software system's level of independence from human involvement and ability to operate without human intervention. [EU]

Note: This is some left-over text we need to incorporate or get rid of.

[Different AI systems have different levels of autonomy.] An autonomous system has a set of learning, adaptive and analytical capabilities to respond to situations that were not pre-programmed or anticipated (i.e., decision-based responses) prior to system deployment. Autonomous or semi- autonomous AI systems can be characterized as "human-in-the-loop", "human- on-the-loop", or "human-out-of-the loop" systems depending on their level of meaningful involvement of human beings.

**Autonomous System:**

**Human-in-the-Loop:** A software system that requires human interaction [NIST]. Such a system would not be considered to have full autonomy.

Note: changed replaced "AI system" with "software system"

## Artificial Intelligence Disciplines

**Artificial Intelligence (AI):** A field of computer science that develops and studies algorithms, methods, and software systems for functions such as learning, problem solving, and pattern recognition, enabling them to perform tasks that normally require human intelligence. [cobbed together from various other definitions]

Note: definitely deserves scrutiny.

**Machine Learning (ML):** A subfield of AI that focuses on the development of algorithms, methods, and software systems that are capable of learning from data to perform a task without being explicitly programmed to perform that task. Learning refers to the process of optimizing model parameters through computational techniques such that the model's behaviour is optimized for the training task. [NIST]

**Deep Learning (DL):** A subfield of machine learning where artificial neural networks, algorithms inspired by the human brain, learn from large amounts of data. [UNF]

**Natural Language Processing (NLP):** A subfield of AI that focuses on enabling computers to understand, interpret, and generate human language. [UNF]

**Computer Vision (CV):** A subfield of AI that enables computers to interpret and understand visual data from the real world, aiming to provide and even surpass human vision capabilities with respect to speed and accuracy. [modified version of UNF]

**Data Science (DS):** An interdisciplinary field that uses scientific methods, processes, algorithms, and systems to extract knowledge and insights from structured and unstructured data. It combines aspects of mathematics, statistics, computer science, and domain expertise and frequently draws on tools and methods from AI. [UNF]

Note: modified by adding the last part about AI.

... more to come ???

## Artificial Intelligence Methodologies and Components

**Artificial Intelligence (AI) system:** a software system that includes one or more AI software components. AI systems are designed to operate with varying levels of autonomy. [modified/simplified version of NIST]

Note: didn't care for the original NIST definition

**Training Data:** data used for training an AI system through fitting the learnable parameters of its machine learning components [EU]

Note: modified to add the last part about machine learning components

**(AI or ML) Model:** The output of a machine learning algorithm when applied to training data. The model generally performs an input/output functionality corresponding to the task it was trained to perform.

**Classification Model (Classifier):** A type of AI model that predicts a classification of its input. An example is a model that predicts whether an input x-ray image contains a tumor, or a model that predicts whether an image contains a pedestrian or not.

**Generative Model:** A type of AI model that generates new data, such as images or text, that is intended to resemble data instances in the training data. Generative models can often be given inputs that control the generation, for example, providing a natural language prompt that describes properties of the desired image to be generated.

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**Supervised Learning:**

**Unsupervised Learning:**

**Reinforcement Learning:**

**Neural Network:**

**Rule-Based Systems (or Expert Systems):**

**Language Models:**

## Large Language Models:

### Chatbots:

... more to come ????

## Artificial Intelligence Application Concepts

Bias

Hallucination

Error Rate

Deepfake

... more to come ????

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Below are left over content that can be integrated above or removed.

### Definitions from the European Union

**Deepfake** means AI-generated or manipulated image, audio or video content that resembles existing persons, objects, places, entities or events and would falsely appear to a person to be authentic or truthful;

### Definitions from NIST

SEE ALGORITHMIC-DATA BIAS

**Bias:** A systematic error. In the context of fairness, we are concerned with unwanted bias that places privileged groups at systematic advantage and unprivileged groups at systematic disadvantage.

ALGORITHMIC OR DATA BIAS MAY BE THE MORE APPROPRIATE TERM(S) TO BE USED.

**Chatbot:** Conversational agent that dialogues with its user (for example: empathic robots available to patients, or automated conversation services in customer relations).

**Deepfake:** AI-generated or manipulated image, audio or video content that resembles existing persons, objects, places or other entities or events and would falsely appear to a person to be authentic or truthful.

**Large Language Model (LLM):** a class of language models that use deep-learning algorithms and are trained on extremely large textual datasets that can be multiple terabytes in size. LLMs can be classed into two types: generative or discriminatory.

Generative LLMs are models that output text, such as the answer to a question or even writing an essay on a specific topic. They are typically unsupervised or semi-supervised learning models that predict what the response is for a given task. Discriminatory LLMs are supervised learning models that usually focus on classifying text, such as determining whether a text was made by a human or AI. Classes of models: Generative model-discriminative model

**Language Model:** A language model is an approximative description that captures patterns and regularities present in natural language and is used for making assumptions on previously unseen language fragments.

**Training Data:** A dataset from which a model is learned.