What is AI?

“At its simplest form, artificial intelligence is a field, which combines computer science and robust datasets, to enable problem-solving. These disciplines are comprised of *AI algorithms* which seek to create expert systems which make predictions or classifications based on input data.” (IBM).

Throughout this guidance AI will be referred to generally as AI technology due to the differing terminology utilized, depending on the stage of the research or project as well as the intentions of the technology.

Some technologies may be an algorithm foundation for a mobile application or software while others may be a chatbot that intervenes or interacts with participants. Below are various **terminologies** that have been used to describe AI technologies in research protocols.

Chatbot	Conversational Agent	Artificial Intelligence	Algorithm
	Software	Application	

AI technology may be developed using different sub-fields and learning **methodologies**, including the following:

- Machine Learning (AI/ML)
  - Deep Learning
  - Unsupervised Learning
  - Reinforcement Learning
- Natural Language Processing (NLP)
- Other

Generative AI (GenAI) systems, such as ChatGPT, fall under the broad category of machine learning. Generative artificial intelligence (GenAI) describes algorithms that can be used to create new content, including audio, code, images, text, simulations, and videos. This is done with accessing large volumes of prior examples. These prior examples, data collectively called training sets or training data, can be provided by the GenAI user or provided by others, with or without their explicit awareness or consent.

AI technology may have different **purposes** such as

- Prediction Model (Risk prediction, etc.)

- Mining text records
- Automation
- Record abstraction
- Biometric Recognition (face, voice, etc.)
- Content creation

AI technology may have different **adaptivity** capabilities. Some AI may be adaptive and learn in real time, while others may be locked. For example, ChatGPT utilizes user conversations to improve future versions of the model.

Use of AI technology in research protocols may fall in different **phases**. These include:
- Model development
- Proof of Concept (POC): POC is meant to illustrate a concept in a "almost real" environment but does not get deployed into the real-world (this includes training, validation, and testing)
- Pilot: Real-world project uses technology in protected environment but NOT for use in real-world production.
- Real-World Pilot: Application with human participants may run in parallel with the training and re-training of a model.

AI technology may play multiple different **roles** in research studies, including:
- Inform: the decision is made (and confirmed) without the technology, but the technology can support the decision.
- Drive: the technology is intended for use as an autonomous system, alerting the user of identified risk, etc.
- Efficiency: the technology is intended to complete tasks for researchers, administrative staff, and other users such as collecting and collating information, writing short computer programs, or filling in paragraph bodies from thesis statements

References & Resources

- IBM. (no date). What is artificial intelligence? https://www.ibm.com/topics/artificial-intelligence