**Deep Learning and Machine Learning**

1. **Overview**

* Artificial Intelligence and Data Science
* Generative AI and Data Science
* Neural Networks and Deep Learning
* Applications of Machine Learning
* Regression
* Exploring Data using IBM Cloud Gallery
* Summary
* Glossary

1. **Artificial Intelligence and Data Science**
2. **Generative AI and Data Science**

* Is a subset of AI
* Is used to produce new data that replicates underlying features of original data rather than analyzing existing data.
* Models: Generative Adversarial Networks (GANs), Variational auto-encoders (VAEs)
* Applications:
  + Natural Language Processing
  + Healthcare
  + Art and Design (Not acceptable by social norms)
  + Gaming (Boring)
  + Fashion and Retail (again, not acceptable)
* Synthetic data:
  + Building data models takes a lot of data
  + Data sets may not have enough data to build a model
  + Generative AI makes data augmentation possible
  + Creates data with similar properties
  + Use this synthetic data for model training and testing

1. **Neural Network and Deep Learning**

* Mimics biological neural networks
* Neural Network were abandoned for some time because they were computationally expensive => Deep Learning is a new solution
* Use cases of Deep Learning:
  + Speech recognition
  + …
* How to start: Linear Algebra

1. **Applications of Machine Learning**

* Recommendation System
* Classification
* Cluster Analysis
* Business Analytics
* Fintech
* Retails
* Fraud detections

Note: You don’t need to know how to make them, but you need to know how they can be used, and what their meanings are.

1. **Regression**

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1. **Exploring Data using IBM Cloud Gallery**

[Link](https://author-ide.skills.network/render?token=eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJtZF9pbnN0cnVjdGlvbnNfdXJsIjoiaHR0cHM6Ly9jZi1jb3Vyc2VzLWRhdGEuczMudXMuY2xvdWQtb2JqZWN0LXN0b3JhZ2UuYXBwZG9tYWluLmNsb3VkL0lCTURldmVsb3BlclNraWxsc05ldHdvcmstRFMwMTAxRU4tU2tpbGxzTmV0d29yay9sYWJzL01vZHVsZSUyMDIvV2F0c29uX0dhbGxlcnkubWQiLCJ0b29sX3R5cGUiOiJpbnN0cnVjdGlvbmFsLWxhYiIsImFkbWluIjpmYWxzZSwiaWF0IjoxNzE0NjU0Njc2fQ.JX8yWQEG9paCiYLZlOapdZNxJVpNiAbE52HQ-JnjqD4)

1. **Summary**

* AI: a branch of computer science, is the development of systems that mimic tasks associated with human intelligence
* Generative AI: a subset of AI, that focuses on new data production, mimics content created by humans. Generative AI can generate new data to use when training and testing a model.
* Machine Learning: a subset of AI, using computer algorithms to analyze and make predictions. Analysis happens without the need of explicit programming.
* Deep Learning: a subset of Machine Learning, that simulates human decision-making using neural networks. Neural Networks:
  + Collection of computing units called neurons
  + Design inspired by how neurons in the brain behave.
* ML algorithms applications:
  + Make predictions
  + Make recommendations
* Regression: Identifies correlation between inputs and outpus.

1. **Glossary**

[Link](https://author-ide.skills.network/render?token=eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJtZF9pbnN0cnVjdGlvbnNfdXJsIjoiaHR0cHM6Ly9jZi1jb3Vyc2VzLWRhdGEuczMudXMuY2xvdWQtb2JqZWN0LXN0b3JhZ2UuYXBwZG9tYWluLmNsb3VkL0lCTVNraWxsc05ldHdvcmstRFMwMTAxRU4tQ291cnNlcmEvbGFicy8yMDA0NTcuMDY5X0wxTTJfR2xvc3NhcnkubWQiLCJ0b29sX3R5cGUiOiJpbnN0cnVjdGlvbmFsLWxhYiIsImFkbWluIjpmYWxzZSwiaWF0IjoxNzExNTYyNjU4fQ.aKmGFYvMKlhYIgJJ-kwnCaWeEwKB3adFSfCUww5O9ts)