Multi-Task Learning and Meta Learning -A brief survey

Multi-task learning (MTL) is a subfield of machine learning in which multiple tasks are simultaneously learned by a shared model. Such approaches offer advantages like improved data efficiency, reduced overfitting through shared representations, and fast learning by leveraging auxiliary information.
A large portion of the MTL literature is devoted to the design of multi-task neural network architectures. There are many different factors to consider when creating a shared architecture, such as the portion of the model's parameters that will be shared between tasks, and how to parameterize and combine task-specific and shared modules

1. Architectures for Computer Vision
2. Architectures for Natural Language Processing
3. Architectures for Reinforcement Learning
4. Multi-Modal Architectures
5. Learned Architectures
6. Conditional Architectures

Meta-learning provides an alternative paradigm where a machine learning model gains experience over multiple learning episodes – often covering a distribution of related tasks – and uses this experience to improve its future learning performance. This 'learning-to-learn' can lead to a variety of benefits such as data and compute efficiency, and it is better aligned with human and animal learning , where learning strategies improve both on a lifetime and evolutionary timescale.