**1. Multimodal Machine Learning Complete Course**

**- Video Lectures:**

- [CMU Multicomp Lab Tutorial]((https:/cmu-multicomp-lab.github.io/mmml-tutorial/schedule/))

- [Multimodal Machine Learning YouTube Playlist](https://youtube.com/playlist?list=PL-Fhd_vrvisMYs8A5j7sj8YW1wHhoJSmW&si=Jwkko_Er33ugg-Q7)

**- Research Papers:**

- [Awesome Multimodal ML GitHub Repository](https://github.com/pliang279/awesome-multimodal-ml?tab=readme-ov-file%23survey-papers)

**2. Representation**

**- Articles:**

- [Understanding Contrastive Learning](https://freedium.cfd/https:/towardsdatascience.com/understanding-contrastive-learning-d5b19fd96607)

- [17 Types of Similarity and Dissimilarity Measures](https://towardsdatascience.com/17-types-of-similarity-and-dissimilarity-measures-used-in-data-science-3eb914d2681?gi=6b9965e1d342)

**3. Alignment**

**- Research Paper:**

- [CLAP: Learning Audio Concepts From Natural Language Supervision](https://arxiv.org/abs/2206.04769)

**4. Reasoning**

**- Video Lectures:**

- [Attention Mechanisms Overview](https://youtu.be/OxCpWwDCDFQ?si=PGaSfRpuuAvxQnap)

- [Understanding KQV Matrices](https://youtu.be/UPtG_38Oq8o?si=MNvJTAhvgCu-2ws6)

**5. Generation**

**- Video Lectures:**

- [Attention Mechanisms Overview](https://youtu.be/OxCpWwDCDFQ?si=PGaSfRpuuAvxQnap)

- [Transformer Model Architecture](https://youtu.be/qaWMOYf4ri8?si=aVpdTJFX73wkQJqR)