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| Pattern Recognition | |
| **SOURCE: 01** | **Pattern Recognition and Machine Learning** |
| 01 | [Introduction](https://www.youtube.com/watch?v=DcWiJam7cGc&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=1&pp=iAQB) |
| 02 | [Polynomial Curve Fitting](https://www.youtube.com/watch?v=9HzpKVaKo-k&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=2&pp=iAQB) |
| 03 | [Probability Theory](https://www.youtube.com/watch?v=NqXirmIWS7s&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=3&pp=iAQB) |
| 04 | [Probability Densities](https://www.youtube.com/watch?v=1tNKZH2VW8Q&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=4&pp=iAQB) |
| 05 | [Expectation and Covariance](https://www.youtube.com/watch?v=xEa57gjkhbY&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=5&pp=iAQB) |
| 06 | [Bayesian Probabilities](https://www.youtube.com/watch?v=GrEzgnMcJ_s&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=6&pp=iAQB) |
| 07 | [The Gaussian Distribution](https://www.youtube.com/watch?v=3pmpTADXJ8s&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=7&pp=iAQB) |
| 08 | [Curve Fitting Re-visited](https://www.youtube.com/watch?v=TRwAzuuhecc&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=8&pp=iAQB) |
| 09 | [Bayesian Curve Fitting](https://www.youtube.com/watch?v=y0-K9oCWMvs&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=9&pp=iAQB) |
| 10 | [Model Selection](https://www.youtube.com/watch?v=bbt-QvK7m9U&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=10&pp=iAQB) |
| 11 | [The Curse of Dimensionality](https://www.youtube.com/watch?v=TR2bA-T-ac8&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=11&pp=iAQB) |
| 12 | [Decision Theory](https://www.youtube.com/watch?v=0_18TPzNQn8&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=12&pp=iAQB) |
| 13 | [Minimizing the Misclassification Rate](https://www.youtube.com/watch?v=1F1w-Epb9Mg&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=13&pp=iAQB) |
| 14 | [Minimizing the Expected Loss](https://www.youtube.com/watch?v=lNVJ6nskaAE&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=14&pp=iAQB) |
| 15 | [The Reject Option](https://www.youtube.com/watch?v=GFr7qwDw35U&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=15&pp=iAQB) |
| 16 | [Inference and Decision](https://www.youtube.com/watch?v=RF89ZRPY6NE&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=16&pp=iAQB) |
| 17 | [Loss Functions for Regression](https://www.youtube.com/watch?v=8CoNoy7pbMg&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=17&pp=iAQB) |
| 18 | [Information Theory Part-1 – Entropy is Average Surprise](https://www.youtube.com/watch?v=co7AuELzaG4&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=18&pp=iAQB) |
| 19 | [Information Theory Part-3 – Differential Entropy](https://www.youtube.com/watch?v=pEbmc73Sr9w&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=19&pp=iAQB) |
| 20 | [Differential Entropy of the Gaussian – Exercise 1.35](https://www.youtube.com/watch?v=1crOEVlM42M&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=20&pp=iAQB) |
| 21 | [Information Theory Part-4 – Maximum Entropy Distributions](https://www.youtube.com/watch?v=4X7eutF-870&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=21&pp=iAQB) |
| 22 | [Information Theory Part 5 – Maximum Entropy Showdown](https://www.youtube.com/watch?v=iCuDn3_Vhgs&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=22&pp=iAQB) |
| 23 | [Information Theory Part 6 – Conditional Entropy](https://www.youtube.com/watch?v=jlf81oD-3nw&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=23&pp=iAQB) |
| 24 | [Convexity and Jensen’s Inequality](https://www.youtube.com/watch?v=Jsq4YGqKOVA&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=24&pp=iAQB) |
| 25 | [Relative Entropy and Mutual Information](https://www.youtube.com/watch?v=lyR4Twm4_W0&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=25&pp=iAQB) |
| 26 | [Proof of the Non-Negativity of the Kullback-Leibler Divergence](https://www.youtube.com/watch?v=ZBuv9cEbZ-g&list=PLWMBgIqOUbrlvf4osKxJyZ7kMbSuIPEyO&index=26&pp=iAQB) |

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| Natural Language Processing (NLP) | |
| **SOURCE:01** | **Natural Language Processing** |
| 01 | [Introduction](https://www.youtube.com/watch?v=R-AG4-qZs1A&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=1&pp=iAQB) |
| 02 | [Why NLP is Booming Right Now](https://www.youtube.com/watch?v=3y2-IaBeIs0&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=2&pp=iAQB) |
| 03 | [Regex For NLP](https://www.youtube.com/watch?v=lK9gx4q_vfI&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=3&pp=iAQB) |
| 04 | [Three Category of Techniques for NLP](https://www.youtube.com/watch?v=nknYY32RGXQ&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=4&pp=iAQB) |
| 05 | [NLP Tasks](https://www.youtube.com/watch?v=In7jB8TUGPA&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=5&pp=iAQB) |
| 06 | [NLP Pipeline](https://www.youtube.com/watch?v=S3EId9uatxI&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=6&pp=iAQB) |
| 07 | [Spacy vs NLTK](https://www.youtube.com/watch?v=h2kBNEShsiE&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=7&pp=iAQB) |
| 08 | [Tokenization in Spacy](https://www.youtube.com/watch?v=_lR3RjvYvF4&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=8&pp=iAQB) |
| 09 | [Language Processing Pipeline in Spacy](https://www.youtube.com/watch?v=hKK59rfpXL0&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=9&pp=iAQB) |
| 10 | [Stemming and Lemmatization](https://www.youtube.com/watch?v=HHAilAC3cXw&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=10&pp=iAQB) |
| 11 | [Part of Speech POS Tagging](https://www.youtube.com/watch?v=gdHWoQWZGkk&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=11&pp=iAQB) |
| 12 | [Named Entity Recognition (NER)](https://www.youtube.com/watch?v=2XUhKpH0p4M&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=12&pp=iAQB) |
| 13 | [Text Representation Basics](https://www.youtube.com/watch?v=_3ahmI5vpKY&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=13&pp=iAQB) |
| 14 | [Text Representation: Labe and One Hot Encoding](https://www.youtube.com/watch?v=2d8iP2_cS-U&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=14&pp=iAQB) |
| 15 | [Text Representation Using Bag Of Words (BOW)](https://www.youtube.com/watch?v=Yt1Sw6yWjlw&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=15&pp=iAQB) |
| 16 | [Stop Words: NLP Tutorial For Beginners](https://www.youtube.com/watch?v=vUPAOU2NPls&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=16&pp=iAQB) |
| 17 | [Text Representation Using Bag of N-Grams](https://www.youtube.com/watch?v=nZromH6F7R0&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=17&pp=iAQB) |
| 18 | [Text Representation Using TF-IDF](https://www.youtube.com/watch?v=ATK6fm3cYfI&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=18&pp=iAQB) |
| 19 | [Text Representation Using Work Embedding](https://www.youtube.com/watch?v=Do8cVbx-HOs&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=19&pp=iAQB) |
| 20 | [Word Vectors in Spacy Overview](https://www.youtube.com/watch?v=vyohzuTkty8&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=20&pp=iAQB) |
| 21 | [News Classification Using Spacy](https://www.youtube.com/watch?v=ibi5hvw6f3g&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=21&pp=iAQB) |
| 22 | [Word Vectors in Gensim Overview](https://www.youtube.com/watch?v=0r2NJdalzDw&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=22&pp=iAQB) |
| 23 | [News Classification Using Gensim](https://www.youtube.com/watch?v=ZrgVlfNduj8&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=23&pp=iAQB) |
| 24 | [FastText Tutorial | Train Custom Word Vectors in FastText](https://www.youtube.com/watch?v=Br-Ozg9D4mc&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=24&pp=iAQB) |
| 25 | [FastText Tutorial | Text Classification Using FastText](https://www.youtube.com/watch?v=Cq_pbQYO3M8&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=25&pp=iAQB) |
| 26 | [Introduction to Chatbots](https://www.youtube.com/watch?v=ZeoqOybAzdc&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=26&pp=iAQB) |
| 27 | [End-to-End NLP Project | Build a Chat-bot in Dialog-flow](https://www.youtube.com/watch?v=2e5pQqBvGco&list=PLeo1K3hjS3uuvuAXhYjV2lMEShq2UYSwX&index=27&pp=iAQB) |
| Audio Signal Processing | |
| **SOURCE: 01** | **Audio Signal Processing for Machine Learning** |
| 01 | [Audio Signal Processing for Machine Learning](https://www.youtube.com/watch?v=iCwMQJnKk2c&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=1&pp=iAQB) |
| 02 | [Sound and Waveforms](https://www.youtube.com/watch?v=bnHHVo3j124&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=2&pp=iAQB) |
| 03 | [Intensity, Loudness, and Timbre](https://www.youtube.com/watch?v=Jkoysm1fHUw&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=3&pp=iAQB) |
| 04 | [Understanding Audio Signals for Machine Learning](https://www.youtube.com/watch?v=daB9naGBVv4&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=4&pp=iAQB) |
| 05 | [Types of Audio Features](https://www.youtube.com/watch?v=ZZ9u1vUtcIA&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=5&pp=iAQB) |
| 06 | [How to Extract Audio Features](https://www.youtube.com/watch?v=8A-W1xk7qs8&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=6&pp=iAQB) |
| 07 | [Understanding Time Domain Audio Features](https://www.youtube.com/watch?v=SRrQ_v-OOSg&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=7&pp=iAQB) |
| 08 | [Extracting the Amplitude Envelope Feature from Scratch](https://www.youtube.com/watch?v=rlypsap6Wow&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=8&pp=iAQB) |
| 09 | [How to Extract Root-Mean Square Energy and Zero-Crossing Rate From Audio](https://www.youtube.com/watch?v=EycaSbIRx-0&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=9&pp=iAQB) |
| 10 | [Demystifying The Fourier Transform: The Intuition](https://www.youtube.com/watch?v=XQ45IgG6rJ4&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=10&pp=iAQB) |
| 11 | [Complex Numbers for Audio Signal Processing](https://www.youtube.com/watch?v=DgF4m0AWCgA&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=11&pp=iAQB) |
| 12 | [Defining The Fourier Transform with Complex Numbers](https://www.youtube.com/watch?v=KxRmbtJWUzI&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=12&pp=iAQB) |
| 13 | [Discrete Fourier Transform Explained Easily](https://www.youtube.com/watch?v=ZUi_jdOyxIQ&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=13&pp=iAQB) |
| 14 | [How to Extract the Fourier Transform with Python](https://www.youtube.com/watch?v=R-5uxKTRjzM&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=14&pp=iAQB) |
| 15 | [Sort-Time Fourier Transform Explained Easily](https://www.youtube.com/watch?v=-Yxj3yfvY-4&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=15&pp=iAQB) |
| 16 | [How to Extract Spectrograms Form Audio with Python](https://www.youtube.com/watch?v=3gzI4Z2OFgY&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=16&pp=iAQB) |
| 17 | [Mel Spectrograms Explained Easily](https://www.youtube.com/watch?v=9GHCiiDLHQ4&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=17&pp=iAQB) |
| 18 | [Extracting Mel Spectrograms with Python](https://www.youtube.com/watch?v=TdnVE5m3o_0&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=18&pp=iAQB) |
| 19 | [Mel-Frequency Cepstral Coefficients Explained Easily](https://www.youtube.com/watch?v=4_SH2nfbQZ8&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=19&pp=iAQB) |
| 20 | [Extracting Mel-Frequency Cepstral Coefficients with Python](https://www.youtube.com/watch?v=WJI-17MNpdE&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=20&pp=iAQB) |
| 21 | [Frequency –Domain Audio Features](https://www.youtube.com/watch?v=3-bjAoAxQ9o&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=21&pp=iAQB) |
| 22 | [Implementing Band Energy Ration in Python from Scratch](https://www.youtube.com/watch?v=8UJ8ZDR7yUs&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=22&pp=iAQB) |
| 23 | [Extracting Spectral Centroid and Bandwidth with Python](https://www.youtube.com/watch?v=j6NTatoi928&list=PL-wATfeyAMNqIee7cH3q1bh4QJFAaeNv0&index=23&pp=iAQB) |
| **SOURCE: 02** | **Deep Learning for Audio Classification** |
| 01 | [DSP Background – Deep Learning for Audio Classification](https://www.youtube.com/watch?v=Z7YM-HAz-IY&list=PLhA3b2k8R3t2Ng1WW_7MiXeh1pfQJQi_P&index=1&pp=iAQB) |
| 02 | [Loading Data](https://www.youtube.com/watch?v=-GddLd2_0ok&list=PLhA3b2k8R3t2Ng1WW_7MiXeh1pfQJQi_P&index=2&pp=iAQB) |
| 03 | [Plotting and Cleaning](https://www.youtube.com/watch?v=mUXkj1BKYk0&list=PLhA3b2k8R3t2Ng1WW_7MiXeh1pfQJQi_P&index=3&pp=iAQB) |
| 04 | [Model Preparation](https://www.youtube.com/watch?v=rFt-3J0brE8&list=PLhA3b2k8R3t2Ng1WW_7MiXeh1pfQJQi_P&index=4&pp=iAQB) |
| 05 | [Convolutional Neural Network](https://www.youtube.com/watch?v=_nOu_CHogWw&list=PLhA3b2k8R3t2Ng1WW_7MiXeh1pfQJQi_P&index=5&pp=iAQB) |
| 06 | [Recurrent Neural Network](https://www.youtube.com/watch?v=Lq1rnT-MOos&list=PLhA3b2k8R3t2Ng1WW_7MiXeh1pfQJQi_P&index=6&pp=iAQB) |
| 07 | [Saving Data and Models](https://www.youtube.com/watch?v=H-X9vpARvhI&list=PLhA3b2k8R3t2Ng1WW_7MiXeh1pfQJQi_P&index=7&pp=iAQB) |
| 08 | [Predictions](https://www.youtube.com/watch?v=gfhx4dr6gJQ&list=PLhA3b2k8R3t2Ng1WW_7MiXeh1pfQJQi_P&index=8&pp=iAQB) |