Human Computer Interaction (HCI)	
PART: 01	
	Introduction of Human Computer Interaction (HCI)
	Goals of Human Computer Interaction
	Benefits and Functionalities of Human Computer Interaction | Good and Poor Design
	Components of Human Computer Interaction with Examples
	Multidisciplinary Fields in Human Computer Interaction
	User Centered Design (UCD) Process with Examples
	Principles of Human Computer Interaction with Example
	Input Output Channel in Human Computer Interaction with Examples
	Human Memory | Encoding and Retrieval Working | Model of Memory with Example
	Sensory Memory (Iconic, Echoic and Haptic Memory) with Example
	Long Term Memory (Episodic and Semantic Memory) with Example
	Type 3: Short Tem Memory with Examples
	General Factors Affecting on Human Memory with Examples
	Human Emotions with Examples | Emotions Recognitions
	Human Errors | Types | Sources | safety with Examples
	Individual Differences with Examples
	Thinking and Reasoning | Deductive | Inductive | Abductive Reasoning with Examples
	Problem Solving (Gestalt, Problem Space and Analogy Theory) Types with Examples
	Psychology, Design and Career Goals in Human Computer Interaction
	Interaction in Human Computer Interaction | Interaction Goals, Scope, Design
	Models of Interaction Framework (Abowed and Beale's Model) with Example
	Donald Norman's Model (Execution and Evaluation Loop Framework) with Example
	Ergonomics with Examples | Ergonomics vs Human Factors
	Interaction Styles Part-1 (Command Line Natural Language, Menu, Queries)
	Interaction Styles Part-2 (Form Fills, Spreadsheets, Point)
	WIMP (Windows, Icons, Menus and Pointers) Interface with Examples
	Paradigms of Interaction with Examples
	Interactivity and Context of Interactions with Examples
	Users Experience and Elements of User Experience with Example
	Career / Future in Human Computer Interaction Field
	Design and Interaction Design Process | Golden Rules and Frameworks
	HCI in Software Design Process (Models and Life Cycle)
	User Focus, Scenarios, Navigation Design, Screen Design and Layouts in HCI
	Prototyping Techniques with Examples Part-1
	Type of Prototyping Techniques (Low, Medium and High Fidelity) with Example Part-2
	Rapid Prototyping (online and Offline) Technique with Example Part-3
	Wire-Framing Technique with Examples
	Model-View-Controller (MVC) Working with Examples
	Principles That Supports Usability | Design Standards and Design Guide Lines
	Shneiderman's 8 Golden Rules with Examples

	Norman's 7 Principles | Nielsen's 10 Heuristic Design Principles with Examples
	User Interface Management System | The Seeheim Model | The PAC Model
	Evaluation Techniques | Evaluation Criteria with Examples
	Goal and Task Hierarchies Model | Linguistic Model | Physical and Device Model
	Hierarchical Task Analysis (HTA) Model with Examples
	Diagrammatic Dialog Design Notations | Computer Mediated Communication
	Identify and Observer Bad Designs
	The Jugad: To Identify Creative Things
	Feedback and Constraints (Identify Products Offering Feedback and Constraint)
	Create Paper Based Prototype and Wire Frame Using Software | Figma
	Evaluation of Interface (Evaluate Products as Per Shneiderman's 8 Golden Rules)
	Human Computer Interaction Research and Project Ideas

Artificial Intelligence	
PART: 01	
	Artificial Intelligence Syllabus and Analysis
	What is Artificial Intelligence | Lear AI with Real Life Examples
	What is State Space Search | Introduction to Problem Solving
	Uninformed vs Informed Search with Example
	Breadth First Search with Example | Uninformed Search
	Depth First Search (DFS) with Example | Uninformed Search
	Bidirectional Search Algorithm with Real Life Example
	8-Puzzle Problem without Heuristic
	What is Heuristic in AI | Why we use Heuristic | How to Calculate Heuristic
	How to Solve 8-Puzzle Problem with Heuristic (Informed Search)
	Generate and Test Search with Real Life Example
	Best First Search Algorithm | How It Works | Pros and Cons
	Beam Search Algorithm | Heuristic Search Techniques
	Hill Climbing Algorithm with Real Live Examples
	A* Algorithm with Examples
	How to Proof A* Admissible | Underestimation and Overestimation of A*
	AO* Algorithm with Example
	Introduction to Game Playing Algorithm with Example
	Minimax Algorithm in Game Playing
	Alpha Beta Pruning with Example
	Knowledge Representation and Reasoning | Logic, Semantic Net, Frames Etc
	Propositional Logic in Artificial Intelligence | Knowledge Representation
	Introduction to Intelligent Agents and Their Types with Examples

	Simple Reflex Agent with Example
	Model Based Reflex Agent with Real Live Example
	Goal Based Agents with Real Life Example
	Utility Based Agents with Real Live Examples
	Fuzzy Logic with Examples
	Various Operations in Fuzzy Logic with Examples
	Introduction to Neural Networks with Examples
	Natural Language Processing | NLP with Demo and Example
	Supervised, Unsupervised and Reinforcement Learning
	Genetic Algorithm | Simplest Explanation with Real Life Example
	What is Constraint Satisfaction | Constraint Satisfaction Problem (CSP) with Example
	How Constraint Satisfaction Algorithm Works | Explained with Interesting Example
	Branch and Bound Algorithm with Examples | Easiest Explanation of B&B with Examples
	0/1 Knapsack Using Branch and Bound with Examples
	Reasoning Under Uncertainty
	When There is Uncertainty
	Informed vs Uninformed vs Adversarial Search with Examples
	Propositional Logic
	Predicate Logic
	How to Write First Order / Predicate Logic
	Negation of Quantifiers | Predicate Logic | Logic with Certainty
	Bayes Theorem and Total Probability with Examples
	Bayesian Network with Examples | Easiest Explanation
	Likelihood Weight Sampling | Inference Through Sampling | Uncertainty
	Rejection sampling | Probabilistic Inference | Sampling
	Probabilistic Inference | Sampling
	Bayesian Network Numerical Example
	Understand Artificial Neural Networks form Basics with Examples | Components | Work
	Token & Parameters in Llama3 META Models | 8B & 70B Parameters Model | GPT Model

Machine Learning	
PART: 01	
	Introduction to Data Science & ML & Roadmap
	Supervised Learning Algorithms
	Introduction to Regression with Real Life Examples
	Linear Regression with Real Life Examples and Calculations | Easiest Explanation
	Logistic Regression with Simplest and Easiest Example
	Linear Regression vs Logistic Regression | Supervised Learning

	kNN Classification with Real Life Example | Movie Imdb Example | Supervised Learning
	Naïve Bayes Classification Full Explanation with Examples
	Introduction to Decision Tree with Real Life Examples
	Decision Tree | ID3 Algorithm with Examples and Calculations
	Conditional Probability with Easiest Explanations and Example
	Introduction to Ensemble Learning with Real Life Examples
	K-Mean Clustering with Numerical Example | Unsupervised Learning
	Hierarchical Clustering | Agglomerative vs Divisive with Examples
	Single Linkage clustering | Agglomerative Clustering | Hierarchical Clustering
	Complete Linkage | Clustering with Example | Clustering in Unsupervised Learning
	K-medoids Clustering with Numerical Example
	Random Forest in Machine Learning
	kNN for Classified and Regression with Easiest Explanation
	Mean, Median, Mode with Real Life Examples
	Standard Deviation and Variance with Examples
	Bagging / Bootstrap Aggregating with Examples
	Supervised vs Unsupervised Learning with Real Life Examples
	Python Code for Mean, Median, Mode, SD< Variance and Range
	How Weights are Increased in Boosting| Ensemble Learning
	BAGGING vs BOOSTING vs STACKING in Ensemble Learning
	Bayes Theorem and Total Probability with Examples
	Cross Validation in Machine Learning with Examples
	Pearson's Correlation Coefficient | Supervised Learning | Data Science and ML
	kNN (k Nearest Neighbor) Numerical Examples | Supervised Learning
	Decision Tree Example | Calculate Entropy, Information Gain | Supervised Learning
	Single Linkage Clustering Example | Unsupervised Learning
	Token and Parameters in Llama3 META Models | 8B and 70B Parameters Model | GPT
	What is Data Preprocessing and Data Clearing | Various Techniques with Examples
	How to Deal with Missing Values in Dataset | Data Processing and Clearing, Imputation
	kNN Imputation with Examples | Data Preprocessing and Data Clearing
	Fit() and Transfer() Method | Data Preprocessing
	Feature Extraction in Data Preprocessing
PART: 01	**Pattern Recognition and Machine Learning**
	Introduction
	Polynomial Curve Fitting
	Probability Theory
	Probability Densities
	Expectation and Covariance
	Bayesian Probabilities
	The Gaussian Distribution
	Curve Fitting Re-visited
	Bayesian Curve Fitting
	Model Selection

	The Curse of Dimensionality
	Decision Theory
	Minimizing the Misclassification Rate
	Minimizing the Expected Loss
	The Reject Option
	Inference and Decision
	Loss Functions for Regression
	Information Theory Part-1 – Entropy is Average Surprise
	Information Theory Part-3 – Differential Entropy
	Differential Entropy of the Gaussian – Exercise 1.35
	Information Theory Part-4 – Maximum Entropy Distributions
	Information Theory Part 5 – Maximum Entropy Showdown
	Information Theory Part 6 – Conditional Entropy
	Convexity and Jensen's Inequality
	Relative Entropy and Mutual Information
	Proof of the Non-Negativity of the Kullback-Leibler Divergence

Natural Language Processing (NLP)	
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	Introduction
	Why NLP is Booming Right Now
	Regex For NLP
	Three Category of Techniques for NLP
	NLP Tasks
	NLP Pipeline
	Spacy vs NLTK
	Tokenization in Spacy
	Language Processing Pipeline in Spacy
	Stemming and Lemmatization
	Part of Speech POS Tagging
	Named Entity Recognition (NER)
	Text Representation Basics
	Text Representation: Labe and One Hot Encoding
	Text Representation Using Bag Of Words (BOW)
	Stop Words: NLP Tutorial For Beginners
	Text Representation Using Bag of N-Grams
	Text Representation Using TF-IDF
	Text Representation Using Work Embedding
	Word Vectors in Spacy Overview
	News Classification Using Spacy

	Word Vectors in Gensim Overview
	News Classification Using Gensim
	FastText Tutorial | Train Custom Word Vectors in FastText
	FastText Tutorial | Text Classification Using FastText
	Introduction to Chatbots
	End-to-End NLP Project | Build a Chat-bot in Dialog-flow

Deep Learning (MIT 6.S191)	
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	MIT Introduction to Deep Learning
	Recurrent Neural Networks, Transformers, and Attention
	Convolutional Neural Networks
	Deep Generative Modeling
	Reinforcement Learning
	Language Models and New Frontiers
	Google Generative AI for Media
	Building AI Models in the Wild
	Introduction to Deep Learning (2023)
	Recurrent Neural Networks, Transformers, and Attention
	Convolutional Neural Networks
	Deep Generative Modeling
	Robust and Trustworthy Deep Learning
	Reinforcement Learning
	Deep Learning New Frontiers
	Text-to-Image Generation
	The Modern Era of Statistics
	The Future of Robot Learning
	Introduction to Deep Learning (2022)
	Recurrent Neural Networks and Transformers
	Convolutional Neural Networks
	Deep Generative Modeling
	Reinforcement Learning
	Deep Learning New Frontiers
	LiDAR for Autonomous Driving
	Automatic Speech Recognition
	AI for Science
	Uncertainty in Deep Learning
	Introduction to Deep Learning (2021)
	Recurrent Neural Networks
	Convolutional Neural Networks

	Deep Generative Modeling
	Reinforcement Learning
	Deep Learning New Frontiers
	Evidential Deep Learning and Uncertainty
	AI Bias and Fairness
	Deep CPCFG for Information Extraction
	Taming Dataset Bias via Domain Adaptation
	Towards AI for 3D Content Creation
	AI in Healthcare
	Introduction to Deep Learning (2020)
	Recurrent Neural Networks
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	Deep Generative Modeling
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	Deep Learning New Frontiers
	Neuro-symbolic AI
	Generalizable Autonomy for Robot Manipulation
	Neural Rendering
	Machine Learning for Scent
	Introduction to Deep Learning (2019)
	Recurrent Neural Networks
	Convolutional Neural Networks
	Deep Generative Modeling
	Deep Reinforcement Learning
	Deep Learning Limitations and New Frontiers
	Visualization for Machine Learning (Google Brain)
	Biologically Inspired Neural Networks (IBM)
	Image Domain Transfer (NVIDIA)
	Introduction to Deep Learning (2018)
	Sequence Modeling with Neural Networks
	Convolutional Neural Networks
	Deep Generative Modeling
	Deep Reinforcement Learning
	Deep Learning Limitations and New Frontiers
	Issues in Image Classification
	Faster ML Development with TensorFlow
	Deep Learning – A Personal Perspective
	Beyond Deep Learning: Learning and Reasoning
	Computer Vision Meets Social Networks

PART: 01	**Audio Signal Processing for Machine Learning**
	Audio Signal Processing for Machine Learning
	Sound and Waveforms
	Intensity, Loudness, and Timbre
	Understanding Audio Signals for Machine Learning
	Types of Audio Features
	How to Extract Audio Features
	Understanding Time Domain Audio Features
	Extracting the Amplitude Envelope Feature from Scratch
	How to Extract Root-Mean Square Energy and Zero-Crossing Rate From Audio
	Demystifying The Fourier Transform: The Intuition
	Complex Numbers for Audio Signal Processing
	Defining The Fourier Transform with Complex Numbers
	Discrete Fourier Transform Explained Easily
	How to Extract the Fourier Transform with Python
	Sort-Time Fourier Transform Explained Easily
	How to Extract Spectrograms Form Audio with Python
	Mel Spectrograms Explained Easily
	Extracting Mel Spectrograms with Python
	Mel-Frequency Cepstral Coefficients Explained Easily
	Extracting Mel-Frequency Cepstral Coefficients with Python
	Frequency –Domain Audio Features
	Implementing Band Energy Ration in Python from Scratch
	Extracting Spectral Centroid and Bandwidth with Python
PART: 01	**Deep Learning for Audio Classification**
	DSP Background – Deep Learning for Audio Classification
	Loading Data
	Plotting and Cleaning
	Model Preparation
	Convolutional Neural Network
	Recurrent Neural Network
	Saving Data and Models
	Predictions