19EID233: AI TOOLS (Common to all)

L T P C 2 0 2 3 Unit I: **Introduction to Artificial Intelligence Basics of AI. Applications of AI.** Advanced search, Constraint satisfaction problems, Knowledge representation & reasoning, Non-standard logics, Uncertain and probabilistic reasoning **Conceptual introduction to Machine Learning: Introduction to Neural Networks,** **Supervised, Unsupervised, and Semi-Supervised Learning, Deep Learning,** Reinforcement Learning, Linear Regression. Conceptual introduction to Natural Language Processing: **Natural language Understanding, Sentiment Analysis**, Segmentation and recognition. Conceptual introduction to Speech Recognition & Synthesis: Speech Fundamentals, Speech Analysis, Speech Modelling, Speech Recognition, Speech Synthesis, Text-to-Speech Conceptual introduction to Image Processing & Computer Vision: Introduction to Image processing, Image Noise, Removal of Noise from Images, Color Enhancement, Segmentation, Edge Detection, Optical Character Recognition, Feature Detection & Recognition

Textbook: ● Stuart J. Russell and Peter Norvig, Artificial Intelligence A Modern Approach

Unit II: BOT Technologies and Virtual Assistants: **Chatbots: Introduction to a Chatbot**, Architecture of a Chatbot. NLP in the cloud, NL Interface, How to Build a Chatbot, Transformative user experience of chatbots, Designing elements of a chatbot, Best practices for chatbot development. NLP components. NLP wrapper to chatbots. Audiobots and Musicbots. Virtual Assistants: Architecture of a Virtual Assistant.

References: ● Build an AI Assistant with Wolfram Alpha and Wikipedia in Python. https://medium.com/@salisuwy/build-an-ai-assistant-with-wolfram-alpha-and-wikipediain-python-d9bc8ac838fe ● Tom Markiewicz & Josh Zheng, Getting started with Artificial Intelligence, Published by O’Reilly Media,2017

Unit III: Image Processing & Computer Vision : Image - Definition and Tagging. Classification of images. Tagging. Image formation, Deep Learning algorithms for Object detection & Recognition. Face recognition, Instance recognition, Feature detection and matching, Segmentation, Recognition Databases and test sets Applications -- Feature extraction, Shape identification. Fane detection,. Applications: Automation, Agriculture[Crop and Soil Monitoring, Grading farm produce, Predictive Analytics], Retail and Retail Security[Amazon Go], Autonomous vehicles,

References: ● Joseph Howse, Prateek Joshi, Michael Beyeler - Opencv\_ Computer Vision Projects with Python-Packt Publishing (2016)

● Tom Markiewicz & Josh Zheng,Getting started with Artificial Intelligence, Published by O’Reilly

Unit IV: Reinforcement Learning Introduction to Reinforcement Learning, Game Playing [ Deep Blue in Chess, IBM Watson in Jeopardy, Google’s Deep Mind in AlphaGo ], Agents and Environment, Action-Value Function, Deep Reinforced Learning Applications :Robotics, Gaming, Diagnostic systems, Virtual Assistants

References: ● Stuart J. Russell and Peter Norvig Artificial Intelligence A Modern Approach

Unit V: Smart Applications Smart Manufacturing, Smart Agriculture, Smart Healthcare, Smart Education, Smart Grids, Smart Transportation and Autonomous Vehicles, Smart Homes, Smart Cities. I Textbooks: 1. Tom Markiewicz & Josh Zheng,Getting started with Artificial Intelligence