**060010706 : Artificial Intelligence** **5 Years Integrated M.Sc.(IT)-7th Semester**

| UNIT | Sub Unit | No. of Lecture (s) | Topics | Reference Chapter/ Additional Reading | Teaching Methodology | Evaluation Parameters |
|---|---|---|---|---|---|---|
| **1. Introduction to Artificial Intelligence-[5 Hours]** | | | | | | |
| | 1.1 | 1 | General Discussion and Intelligent Systems and Artificial Intelligence | SK#1, Page No.1-6 | Chalk Talk | Quiz-1 on 28/7/2014 Unit-Test-1 on 5/8/2014+ Internal |
| | 1.2 | 1 | Components of Artificial Intelligence Program | SK#1, Page No.6-7 | Chalk Talk + Comprehensive reading from book | |
| | 1.3 | 1 | Foundations of Artificial Intelligence | SK#1, Page No.7-8 | Chalk Talk+ Video Demonstration | |
| | 1.4 | 2 | Sub-areas of Artificial Intelligence | SK#1, Page No.8-16 http://freevideolectures.com/Course/2272/Artificial-Intelligence | Chalk Talk + Comprehensive Reading from book | |
| **2. Knowledge Representation-[9 Hours]** | | | | | | |
| | 2.1 | 1 | Introduction | SK#7, Page No.231-235 | Case + Video Demonstration PowerPoint Presentation + | Unit Test-1, + SCP Presentation by Students+ Internal |
| | 2.2 | | Approaches: Relational Knowledge, Knowledge Represented as logic, Procedural Knowledge | | | |
| | 2.3 | 2 | Knowledge Representation using Semantic Network | SK#7, Page No.234-236 http://aitopics.org/topic/semantic-networks http://people.duke.edu/~mccann/mwb/15semnet.htm | PowerPoint Presentation +Chalk talk+ Comprehensive reading | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 2.4 | 1 | Inheritance in Semantic Net | SK#7, Page No.236-238 http://freevideolectures.com/Course/2272/Artificial-Intelligence/11 | | |
| | 2.5 | 4 | Extended Semantic Network for Knowledge Representation: Inference Rules, Deduction in Extended Semantic Networks, Examples and Implementation. | SK#7, Page No.238-254 | PowerPoint Presentation + Chalk Talk + Demonstration of FLORA-2 | |
| **3. Expert Systems-10** | | | | | | |
| | 3.1 | 1 | Introduction | SK#8, Page No.264-265 | PowerPoint Presentation + Students' Participation through discussion | Quiz-2 + SCP Presentation by Students+ Internal |
| | 3.2 | 1 | Phases in Building Expert Systems : Knowledge Engineering and Representation | SK#8, Page No.265-268 | PowerPoint Presentation | |
| | 3.3 | 2 | Architecture: Knowledge Base, Inference Engine, Knowledge Acquisition, Case History, User Interfaces, Explanation Module and Special Interfaces | SK#8, Page No.269-273 | PowerPoint Presentation + Chalk Talk + Video + Student's participation+ Case study http://freevideolectures.com/Course/2272/Artificial-Intelligence/16 | |
| | 3.4 | 2 | Expert Systems: Characteristics, Evaluation, Advantages, Disadvantages. | SK#8, Page No.274-277 | | |
| | 3.5 | 1 | Rule-based Expert Systems | SK#8, Page No.277-284 | | |
| | 3.6 | 1 | Blackboard Systems | SK#8, Page No.285-290 | Power Point Presentation | |
| | 3.7 | 2 | Truth Maintenance Systems | SK#8, Page No.290-299 | | |
| **4. Machine Learning Paradigms-10** | | | | | | |
| | 4.1 | 1 | Introduction | SK#11, Page No.410-411 | PowerPoint Presentation + | Unit Test-2 + SCP |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 4.2 | 2 | Learning: Components, Rote Learning, Learning by Advice, Parameter Adjustment, Macro-Operators, Analogy | SK#11, Page No.411-414 | Chalk Talk | Presentation by Students+ Internal |
| | 4.3 | 1 | Supervised and Unsupervised Learning | SK#11, Page No.415-418 | | |
| | 4.4 | 1 | Inductive and Deductive Learning | SK#11, Page No.418-423 | | |
| | 4.5 | 2 | Clustering | SK#11, Page No.423-425 | | |
| | 4.6 | 2 | Support Vector Machines | SK#11, Page No.426-430 http://www.support-vector-machines.org/ http://www.support-vector.net/ www.statsoft.com/textbook/support-vector-machines | PowerPoint Presentation + Chalk Talk +SCP Presentation | |
| | 4.7 | 1 | Case-Based Reasoning and Learning | SK#11, Page No.431-441 | | |
| **5. Intelligent Agents-8** | | | | | | |
| | 5.1 | 1 | Agent: Introduction, Classification | SK#14, Page No.510-511 http://freevideolectures.com/Course/2272/Artificial-Intelligence/2 | PowerPoint Presentation + Chalk Talk +Demonstration of Ecolab and Flora-2 | Presentation by Students+ Internal |
| | 5.2 | | Agent and Software Programs | SK#14, Page No.511-512 | | |
| | 5.3 | 2 | Working of an Agent | SK#14, Page No.517-520 | | |
| | 5.4 | 2 | Single and Multi Agent Systems | SK#14, Page No.520-523 | | |
| | 5.5 | 2 | Architecture of Intelligent Agents: Logic-based, Reactive, Belief-Desire-Intention, Layered | SK#14, Page No.523-527 | PowerPoint Presentation + Students' Participation + Video Demonstration | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 5.6 | 1 | Multi-Agent Application | SK#14, Page No.534-538 | | |
| **6. Advanced Knowledge Representation Techniques-6** | | | | | | |
| | 6.1 | 1 | Conceptual Dependency Theory: Primitive Actions, Category, Rules for Conceptual Dependency and its Representation, Usefulness, Parsing, Inferences associated with Primitive Act | SK#15, Page No.542-560 | PowerPoint Presentation + Chalk Talk + Video Demonstration of Flora-2 | Internal |
| | 6.2 | 1 | Script Structure | SK#15, Page No.561-563 | | |
| | 6.3 | 2 | Case Grammars | SK#15, Page No.565-570 | | |
| | 6.4 | 2 | Semantic Web | SK#15, Page No.570-574 | | |

## Course Objectives and Course Outcomes Mapping:

To understand the basics of artificial intelligence, its techniques and applications: CO1,CO2 ,CO3,CO4

To recognize and solve computational problems using knowledge management and expert systems: CO2, CO3, CO5

## Course Units and Course Outcomes Mapping:

| Unit No. | Unit | Course Outcome | | | | |
|---|---|---|---|---|---|---|
| | | CO1 | CO2 | CO3 | CO4 | CO5 |
| 1 | Introduction to Artificial Intelligence | ✓ | | | | |
| 2 | Knowledge Representation | ✓ | ✓ | | | ✓ |
| 3 | Expert Systems | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | Machine-Learning Paradigms | ✓ | | ✓ | | ✓ |
| 5 | Intelligent Agent | ✓ | | ✓ | ✓ | ✓ |
| 6 | Advanced Knowledge Representation Techniques | ✓ | ✓ | | | ✓ |

## Course Outcomes with Programme Outcomes Mapping

| Course Outcomes | Programme Outcomes | | | | | |
|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
| CO1 | ✓ | | ✓ | ✓ | ✓ | |
| CO2 | | | ✓ | ✓ | ✓ | |
| CO3 | ✓ | | | ✓ | ✓ | ✓ |
| CO4 | | | | | ✓ | |
| CO5 | ✓ | | | | ✓ | ✓ |

## Computing Environment:

| | | |
|---|---|---|
| | ❖ | A student must have the following computing environment on his/her laptop:<br>➢ Knowledge Representation and Reasoning System: FLORA2<br>➢ Agent Based Modeling Tool: ECO LAB |

## Modes of Transaction (Delivery):

| | | |
|---|---|---|
| | ❖ | Lecture method comprising of chalk and talk and comprehensive reading from the Text book shall be followed for almost 40 hours.<br>Additionally as and when required, discussion method supplemented with various appropriate audio-visual aids, videos shall be used for Unit 2,3,4,5. |
| | ❖ | Comprehensive exercises would be solved, presented and demonstrated by the students for Unit 2(2.3 & 2.5), Unit 3(3.5,3.6 & 3.7), Unit 4(4.6) & 5(5.4). |
| | ❖ | Case study shall be used to teach in-depth view of unit 1, 3 and 5. |

## Activities/Practicum:

| | | |
|---|---|---|
| | The following activities shall be carried out by the students. | |
| | ❖ | Study of recent trends in Machine Learning, Expert System and Intelligent Agent in discuss in the clas |
| | The following activities shall be carried out by the teacher. | |
| | ❖ | Demonstration of FLORA2 and ECO LAB tools. |
| | ❖ | Demonstration of support vector machine using ECO LAB. |

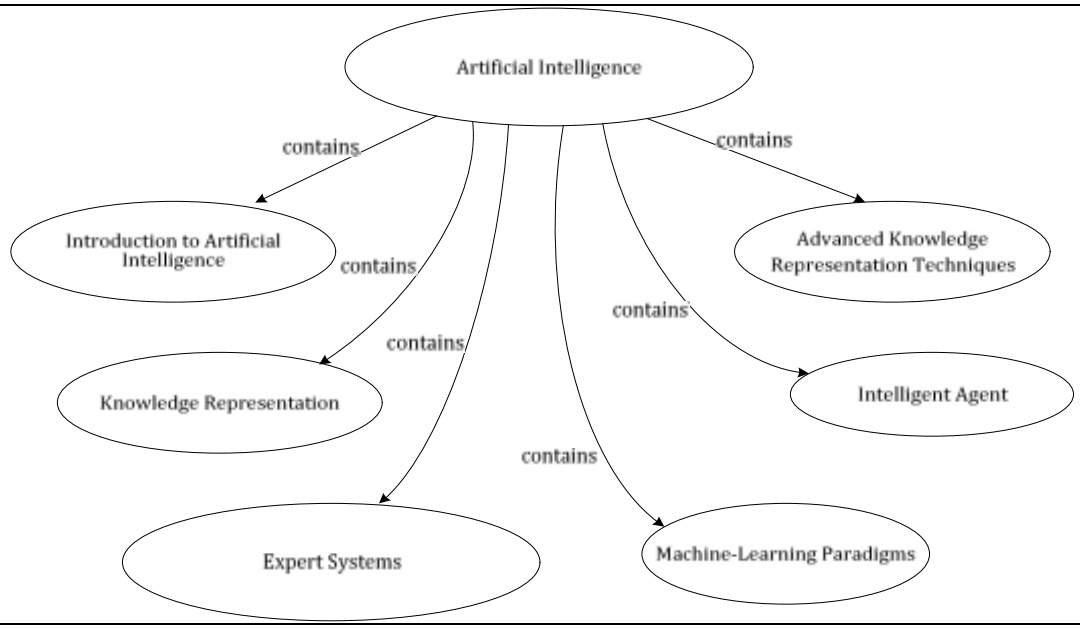
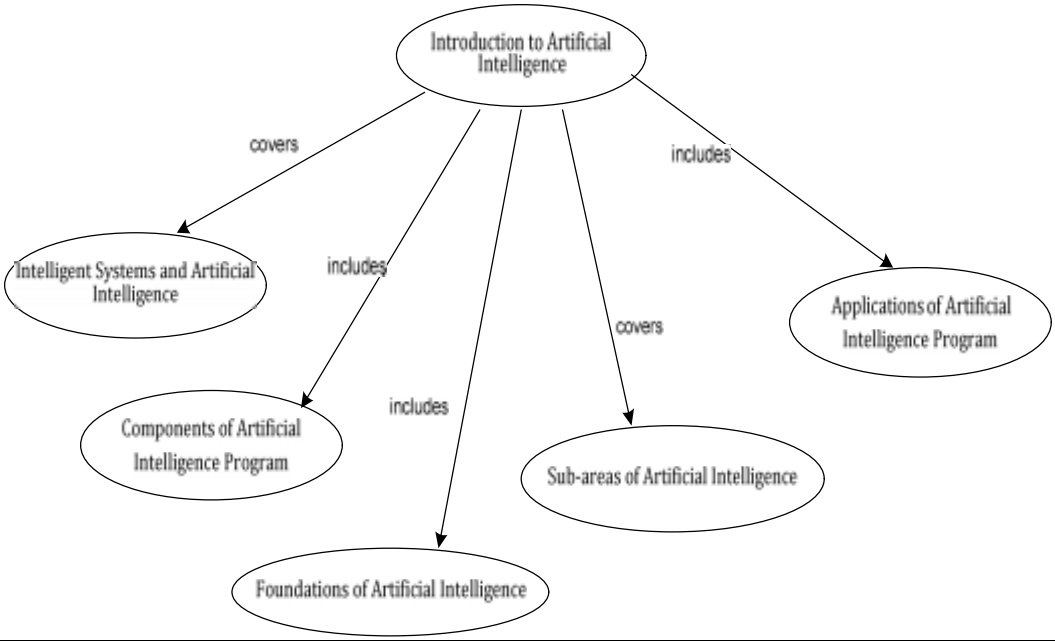
## Text Book:

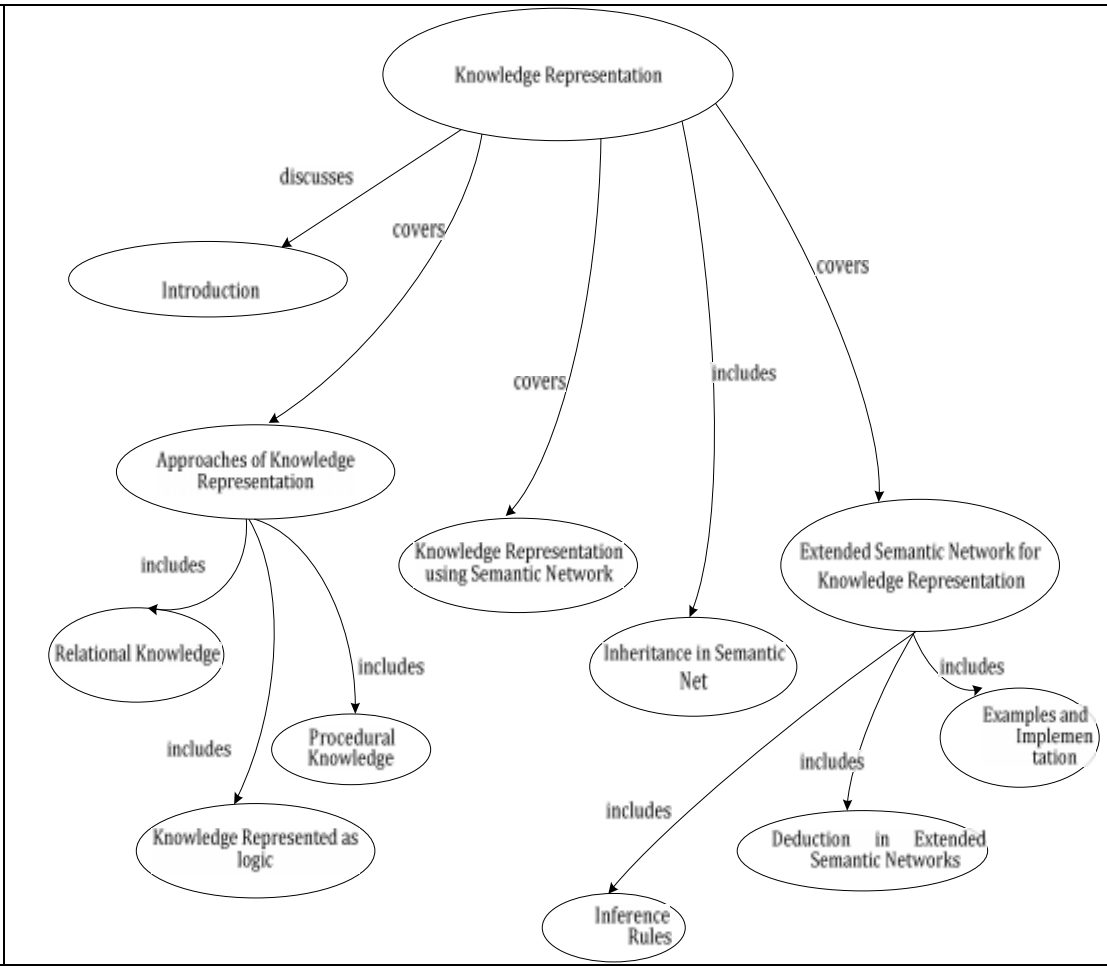
| | | |
|---|---|---|
| | 1. | Kaushik Saroj - Artificial Intelligence – Cengage |

## Reference Books:

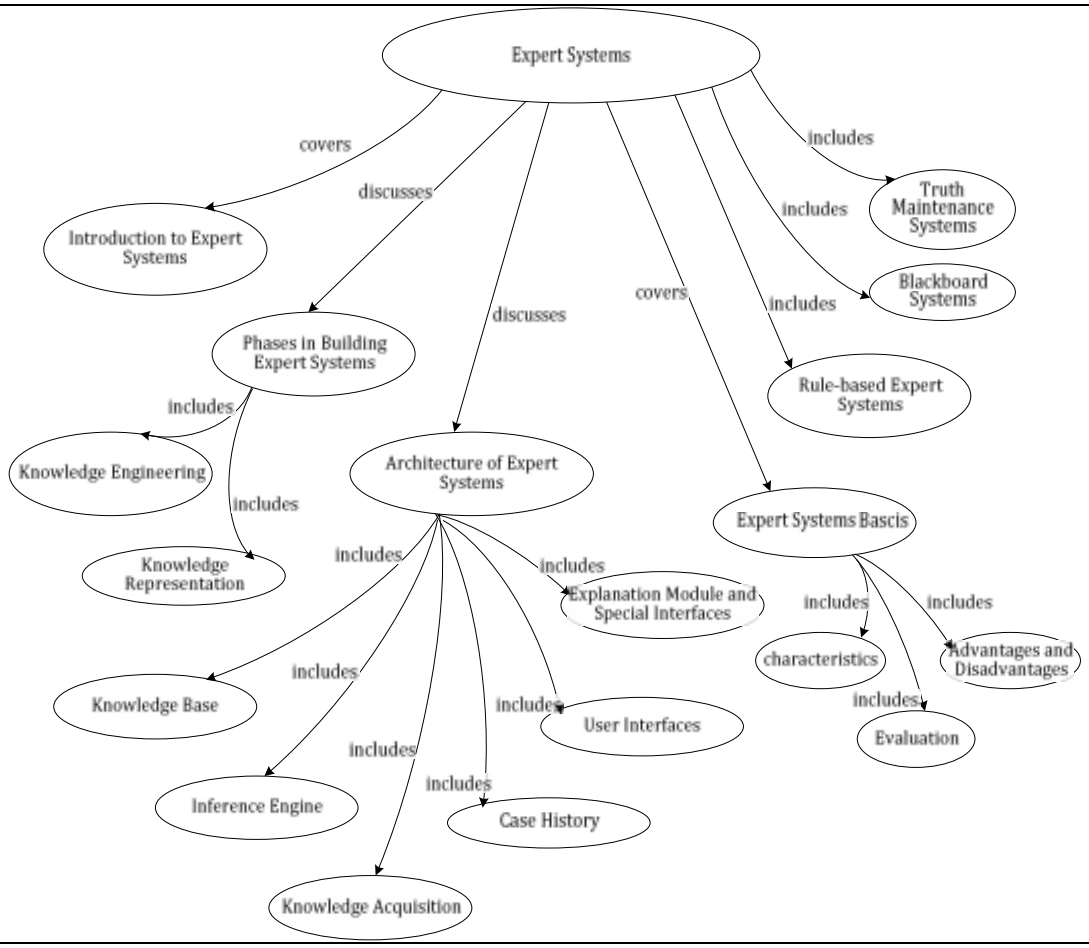
| | | |
|---|---|---|
| | 1. | Mishra R.B. - Artificial intelligence - PHI |
| | 2. | Akerkar Rajendra - Introduction to Artificial Intelligence - PHI |
| | 3. | N.P.Padhy – Artificial Intelligence and Intelligent Systems –Oxford University Press India |
| | 4. | http://artint.info/online.html<br>http://artint.info/online.html<br>http://www.support-vector-machines.org/<br>http://www.support-vector.net/<br>www.statsoft.com/textbook/support-vector-machines |

## Concept Map:

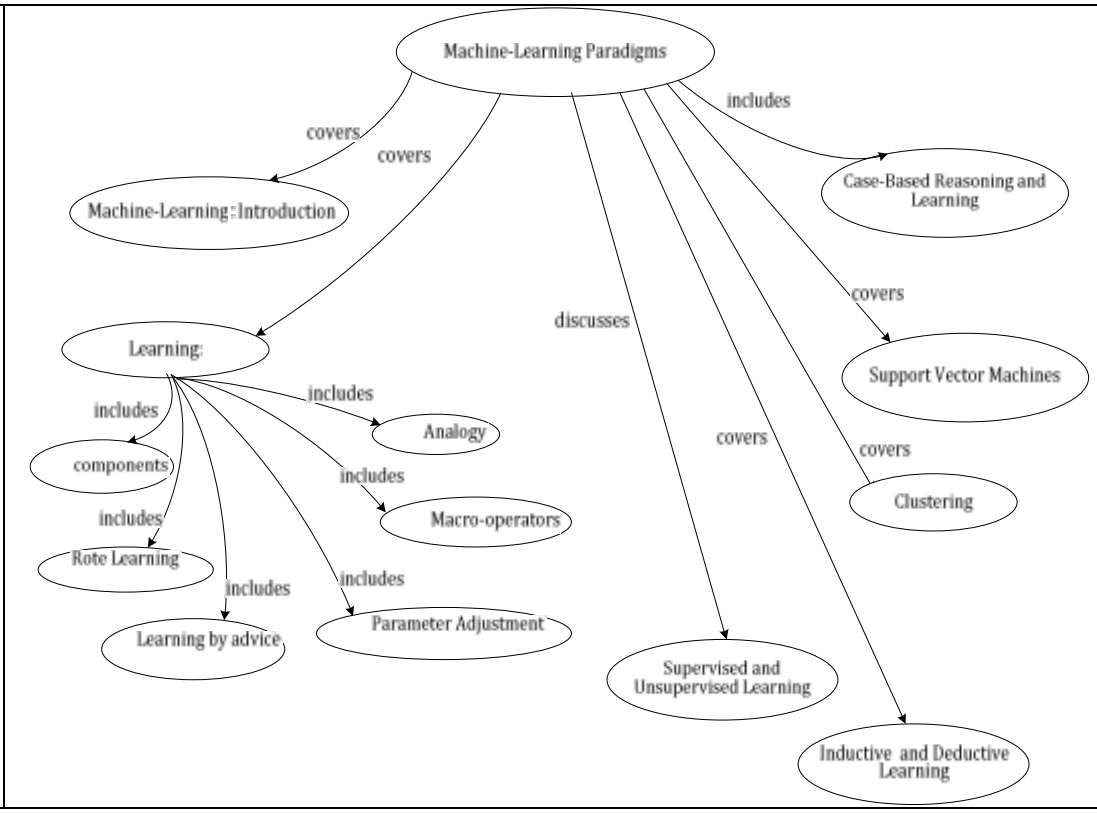
| | |
|---|---|
| | It is a hierarchical / tree based representation of all topics covered under the course. This gives direct / indirect relationship /association among topics as well as subtopics. |
| | Artificial Intelligence |
| |  |
| | Unit-1: Introduction to Artificial Intelligence |
| |  |
| | Unit-2: Knowledge Representation |



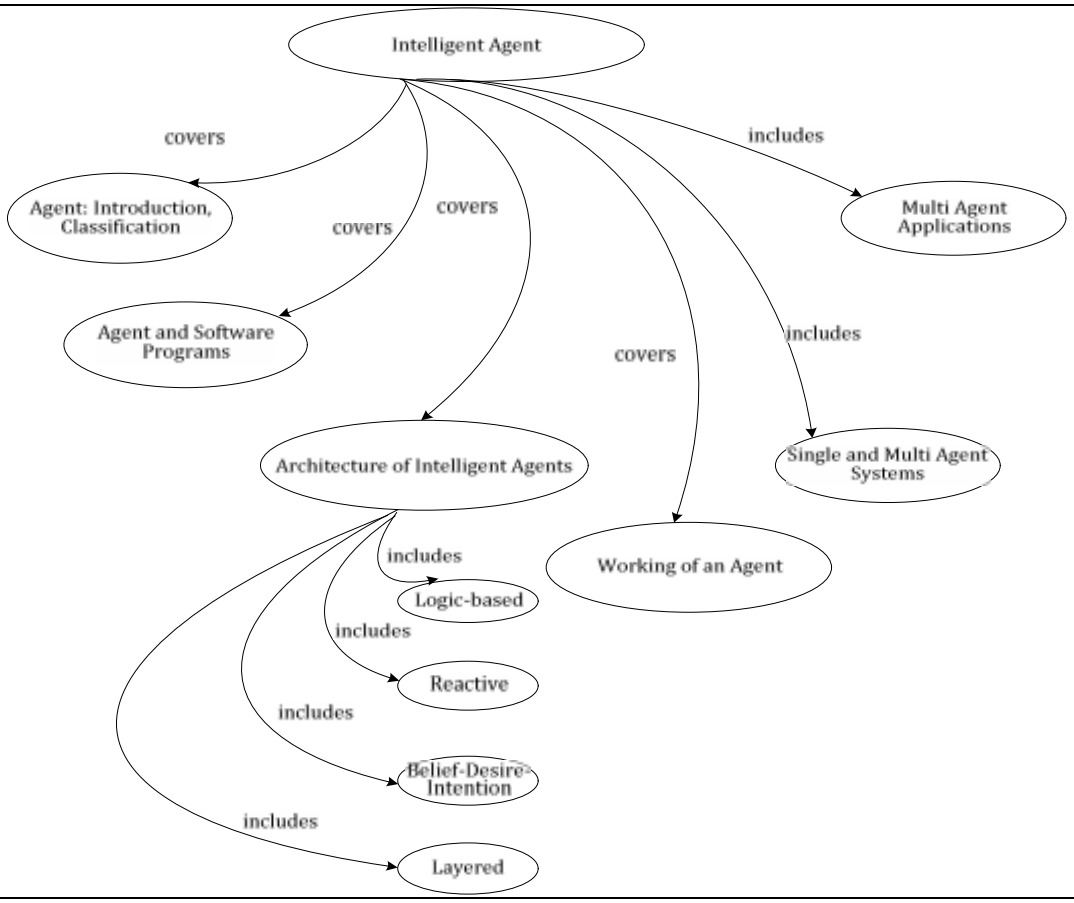

Unit-3: Expert Systems



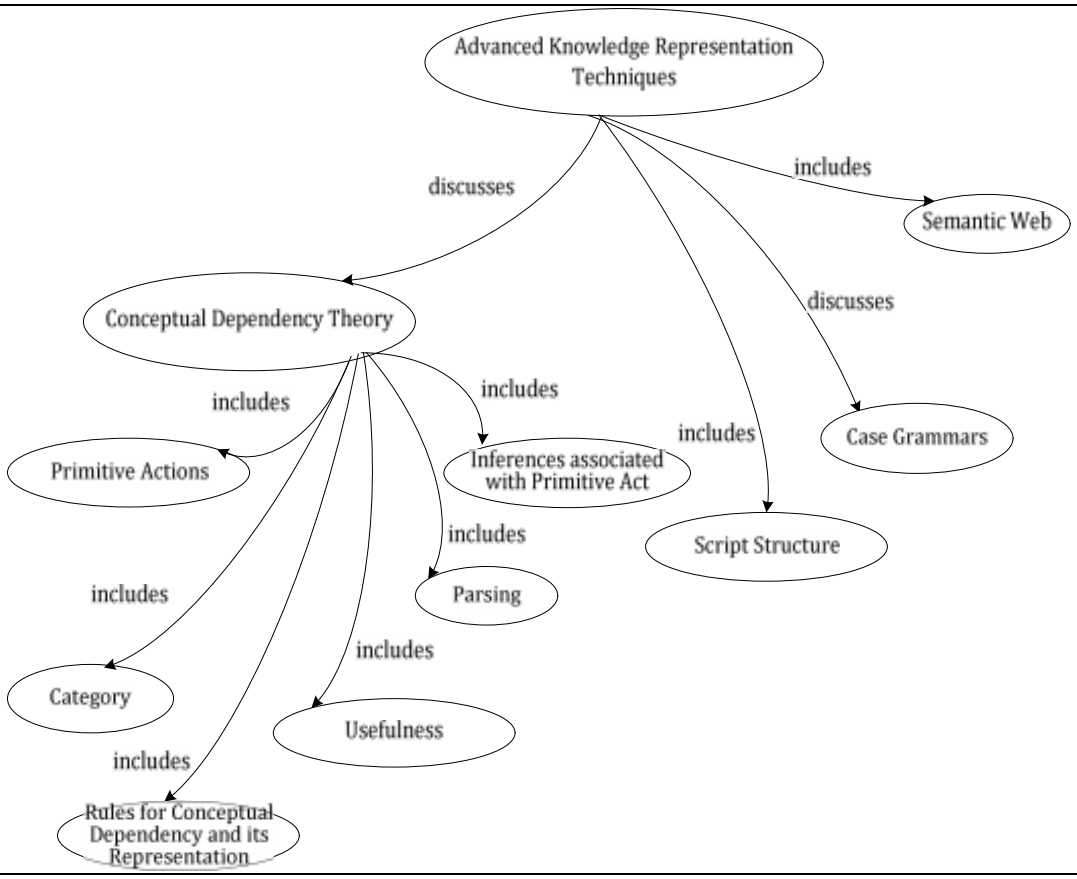

| | | |
|---|---|---|
| | Unit-4: Machine-Learning Paradigms | |




Unit-5: Intelligent Agent




Unit-6: Advanced Knowledge Representation Techniques


Advanced Knowledge Representation Techniques
discusses
includes
Semantic Web
discusses
Conceptual Dependency Theory
includes
includes
Primitive Actions
Inferences associated with Primitive Act
includes
Case Grammars
Script Structure
includes
Parsing
includes
includes
Category
Usefulness
includes
Rules for Conceptual Dependency and its Representation