Agent Based Intelligent Tutoring System

- Knowledge Indexing
  - metadata

- Student Modeling
  - cognitive states
  - preferences

- Automatic Curriculum Generation
Frames must be indexed to let ABITS know what each frame is about and how it can be used during the learning process.
Metadata

- Is information about an object
- Its main goal is to locate resources on a computer or a computer network

IEEE LTSC LOM CATEGORIES

<table>
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<th>General</th>
<th>Life Cycle</th>
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Taxonomies

- General
  - Idea

... CONCEPTS

TAXONOMY RELATIONS

- IS REQUIRED BY
- REQUIRES
- IS PART OF
- HAS PART
- IS RELATED TO
**Addition**

**Subtraction**

**Multiplication**

**Division**

**Basic Operations**

- **IRB**
- **HP**
- **Multiplication**
- **Addition**
- **Subtraction**

(IsRequiredBy [Addition] [Multiplication])
(IsRequiredBy [Addition] [Subtraction])
(IsRequiredBy [Multiplication] [Division])
(HasPart [Basic Operations] [Division] [Multiplication] [Addition] [Subtraction])

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**Student Modeling**

- **COGNITIVE STATE**
  - Represents the knowledge degree of every domain concept reached by a student
  - Is composed by a list of couples concept, fuzzy evaluation

**ABITS Evaluation Agent**

ABITS Evaluation Agent is dealt with the evaluation of the student COGNITIVE STATE
PREFERENCES
- Represent all information about student perceptive capabilities
- Is composed by a list of couples category, fuzzy evaluation

ABITS Affective Agent is dealt with the evaluation of the student PREFERENCES
Preferences

- FORMAT
  - Text, Image, Slide, Hypertext, Video Clip, Sound Clip, Simulation, Virtual Reality
- APPROACH
  - Inductive, Deductive, Explorative
- INTERACTIVITY LEVEL
  - Very Low, Low, Medium, High, Very High
- SEMANTIC DENSITY
  - Very Low, Low, Medium, High, Very High
- DIFFICULTY
  - Very Low, Low, Medium, High, Very High

Preferences Calculation

- SOCRA TENON
- Spooler Agent
- Affective Agent
- DATA BASE
- **CURRICULUM**
  - Is a sequence of Learning Objects (lessons and exercises) covering a specific set of “Learning Goals”
  - May contain also Milestones (ABITS calls)

ABITS Pedagogical Agent is dealt with the automatic curriculum generation for a specific student
Course Management System

ABITS

USER + Web Browser

Metadata Authoring Tool

Pages Feedback

Course Management System

Events

ABITS Calls

ABITS Data Base

CMS Data Base

Users

Courses

Knowledge Library

Course Material

Metadata

ABITS

Learner Models

Log

Why a Multi Agent System?

- Concurrency
- Workload Scalability
- Functional Scalability
- Cooperation
- Robustness
SOCRATENON can call ABITS in two ways:

- By direct method invocation (updateCS, updatePrefs and updateCurr)
- By raising a “Course Event”

ABITS EVENTS

- ENTER COURSE (Session, Course, Time)
- BEFORE FRUITION (Session, LearningObject, Time)
- AFTER FRUITION (Session, TestResult, Time)
- MILESTONE REACHED (Session, MilestoneKind, Time)
- LEAVE COURSE (Session, Time)