TEACHING ARTIFICIAL INTELLIGENCE IN ITALIAN UNIVERSITIES

MARCO CADOLI · DANILO CARIZZI

Dipartimento di Informatica e Sistemistica – Università degli Studi di Roma "La Sapienza"

1 Introduction

Italy has almost 80 Universities and a comparable number of Schools/Departments of Computer Science and Engineering[1]. The Italian Association for Artificial Intelligence (AI*IA) has hundreds of members, many of them working in academia. It is therefore conceivable that many AI courses are offered from Italian universities, but how many of them? How many students attend an AI course each year? Is AI taught only at the undergraduate level?

The purpose of this paper is to give an answer to such (and other) questions. We present the results of a survey about teaching AI in Italian universities. The survey has been done by sending a questionnaire by email to the mailing list of the AI*IA, and storing responses in a database. The results are encouraging, and show that teaching AI is very active, involving dozens of universities, teachers, and courses. More than three thousand students attend a course in AI every year.

In what follows we present the methodology that has been used for collecting data (the questions, the recipients, ...), and eplain how the answers have been collected and the results obtained. Some comments conclude the paper.

2 Methodology

The questionnaire, originally written in Italian, contained seventeen questions, and is shown in Figure 1[2].

The questionnaire has been sent to the mailing list of AI*IA, which reaches all members of the Association. The accompanying message asked each recipient to pass the questionnaire to any interested colleague. The recipients had about one month to fill the form and to send it back.

We received answers from about **45 people**, many answers containing more than one form. Some non-members

---

[1] Data taken from the `sito.cineca.it` portal of the Italian Ministry of Education, University, and Research – MIUR.

[2] Undergraduate translates the Italian *Laurea*, and graduate translates the Italian *Laurea specialistica*.

of the mailing list sent forms. Some forms were incomplete, missing data about, e.g., number of students.

3 Results

For facilitating data processing, the answers were stored in a relational database. The conceptual schema of the database is shown in Figure 2.

We ran a number of SQL queries, reported in the following along with answers.

Number of cities in which AI courses are offered: 17.

Number of universities in which AI courses are offered: 19.

Number of AI courses offered: 73.

> **"Pure" AI:** 42.
> **"Some" AI contents:** 31.

Number of curricula involved: 45.

> **Undergraduate:** 17.
> **Graduate:** 22.
> **Master:** 2.
> **PhD:** 4.

Number of teachers involved: 58.

Most frequent course names, with occurrences:

> Artificial Intelligence: 20.
> Robotics: 3.
> Automated Learning: 2.
> Automated Reasoning: 2.
> Knowledge Engineering: 2.
> Foundations of Artificial Intelligence: 2.

Names of schools in which AI courses are offered:

```
*  _____  *
 [AI*IA]     Associazione Italiana per l'Intelligenza Artificiale     [AI*IA]

                "TEACHING AI IN ITALIAN UNIVERSITIES" FORM
*  _____  *

 1. UNIVERSITY:
 2. SCHOOL/DEPARTMENT:
 3. CURRICULUM (UNDERGRADUATE, GRADUATE, MASTER, PhD):
 4. NAME OF THE CURRICULUM:
 5. IS THERE AN "AI TRACK" IN THE CURRICULUM (y/n)?:
 6. NAME OF THE COURSE (Italian and English):
 7. LAST ACADEMIC YEAR IN WHICH THE COURSE HAS BEEN OFFERED:
 8. YEARS SINCE THE START OF THE COURSE:
 9. HOURS OF TEACHING IN CLASS FOR THE COURSE:
10. CREDITS FOR THE COURSE:
11. TEACHER OF THE COURSE:
12. AVERAGE NUMBER OF STUDENTS ENROLLED IN THE COURSE:
13. "PURE AI" COURSE (y/n)?:
14. "SOME AI CONTENTS" COURSE (y/n)?:
15. (if last answer was "y"):
     COURSE KEYWORDS (5/10):
     HOURS DEVOTED TO AI TOPICS:
16. BOOKS USED:
17. COMMENTS (optional):


===============================================================================
PLEASE FILL ONE FORM FOR EACH COURSE
SEND THE FILLED FORM TO: rcra@dis.uniroma1.it
NOT LATER THAN FEBRUARY 24, 2006
===============================================================================
```

Figure 1: The questionnaire distributed by email.

Engineering.

Information Engineering.

Mathematical, Phisical, and Natural Sciences.

Computer Science.

Information Science.

Informatics Science and Technology.

Computational Logic.

Literature and Philosophy.

Philosophy.

Business.

Universities and Schools with "Curriculum with AI track":

Bolzano/Bozen, Computer Science.

Pavia, Engineering.

Milan "Bicocca", Mathematical, Phisical, and Natural Sciences.

Milan Polytechnic, Computer Engineering.

Palermo, Engineering.

Rome "La Sapienza", Engineering.

Average number of credits for each course: 5.4.

Average number of hours in class for each course: 46.6.

For "some AI contents" courses: 42.3.

"AI hours" for "some AI contents" courses: 25.2.

Average number of years since the course started: 4.0.

Average number of students: 43.7.

Most popular textbooks, with number of courses:

[3]: 25.

[1]: 5.

[2]: 3.

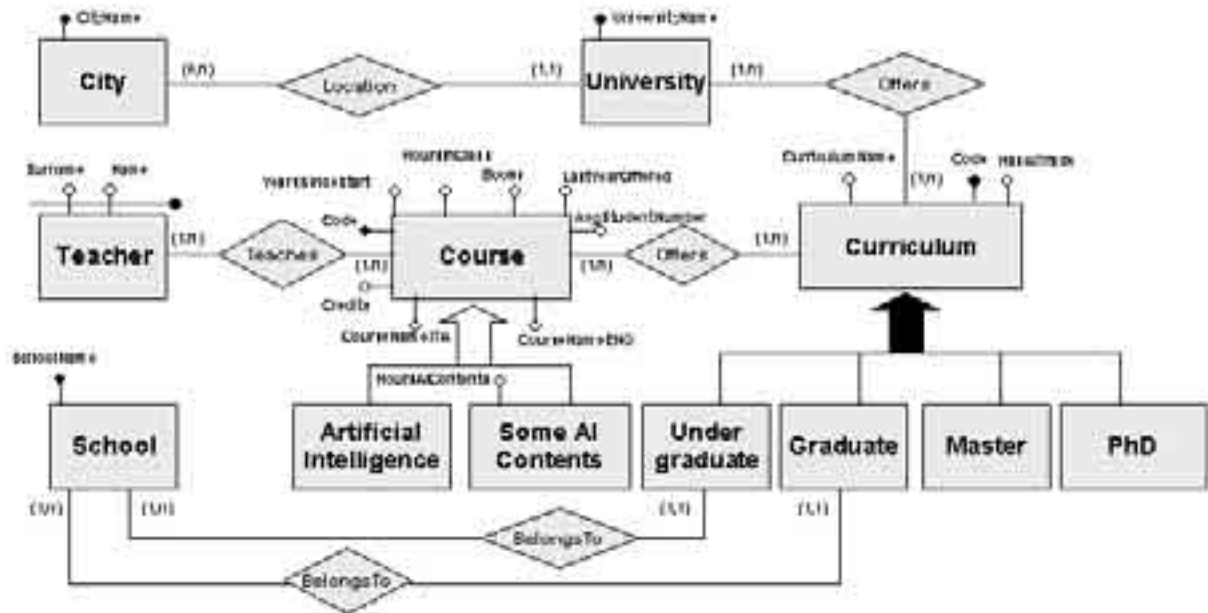**Figure 2**: **Entity-Relationship schema for the database.**

4   Conclusions

This paper illustrates the results of a survey on teching AI in Italian universities done among members of the AI*IA. We solicited (and received) data from non-members as well.

The results of the survey show that AI is taught in one Italian university out of four (19 total), that every involved university has three AI teachers, offers an average of two "pure AI" courses and 1.5 courses with AI contents. Typically, AI topics cover half of the latter kind of courses. The courses are typical of the Italian university: about 50 hours in class and 5 credits. AI courses are given at all education levels (undergraduate/graduate/master/PhD), and concentrate at the graduate (*Laurea Specialistica*) level. AI courses are offered, as expected, from Engineering and Science schools, but also from Philosophy and Business. AI teaching is young, the average number of years since a course is offered being 4. AI courses tend to be popular, enrolling more than 40 students on average. Summing up, more than three thousand students attend an AI course each year.

REFERENCES

[1] **Luca Console**, **Evelina Lamma**, **Paola Mello**, **and Michela Milano**. *Programmazione Logica e Prolog*. **UTET, second edition,** 1997.

[2] **Nils J. Nilsson**. *Intelligenza artiꞓciale*. **Apogeo, 2001.**

[3] **Stuart J. Russell and Peter Norvig**. *Intelligenza artiꞓciale. Un approccio moderno*. **Pearson Education Italia, second edition,** 2005.