

Teaching Statement

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Teaching Experience

Teaching has been a significant part of my graduate student experiences which I enjoyed. All together, in my graduate student years, I have been a TA (teaching assistant) for 2 courses, a lecturer and instructor in 5 different undergraduate or graduate courses or tutorials, an advisor for students in Mathematical Contests in Modeling (MCM) for 6 times, an organizer of 2 seminars, a guest lecturer in 3 different seminars, and a mentor for 18 undergraduate students.

I was the TA for the graduate course of *Artificial Intelligence* (CS 572) at Iowa State University in fall 2002. My work included weekly recitation, grading homeworks and examinations, maintaining course homepage and holding office hours. I independently developed solutions for all homeworks. Before homework or laboratory assignments, I gave help sessions with supplement materials on selected topics for students to get a broad understanding on those topics.

I was the TA for the undergraduate course of Neural Network at Hefei University of Technology for three semesters from 1999 to 2001. I helped students in implementing several neural network algorithms in their laboratory assignments. In fall 2000, I developed and taught a series tutorial (including 5 lectures) for a class of about 20 junior graduate students in the Computer and Information Department. This course was designed to help students to gain broad knowledge on neural computation and begin to conduct original research in this area.

I have served as the mentor for 2 undergraduate students at Iowa State University and 16 undergraduate students at Hefei University of Technology. My task was to help senior undergraduate students to conduct original research in a 3-month period with topics from semantic web, image processing, neural network and intelligent agents. Many of my efforts were aimed for students, in addition to gaining knowledge on the particular projects, to broaden their horizon of computer science and learn some of the most challenging research topics and cutting-edge technologies. Five students I mentored won department Excellent Undergraduate Papers (awarded to < 20% students) and two of them finally published their work in a journal or an international conference.

In summer and fall 2007 (and planned for spring 2008), I have become the organizer and instructor for the seminar, *Semantic Web and Web Service*, in the Department of Computer Science at Iowa State University. The seminar is designed with balanced lectures given by the instructor and presentations by the students. I am fully engaged with teaching activities, including designing course material, constructing the syllabus, and the design of an experimental seminar homepage using semantic web techniques.

Teaching Philosophy

One of the major reasons for me to choose the academic career is that this profession will offer me a great opportunity to help students becoming successful individuals in the society – not only through the dissemination of knowledge, but also through the interactive communication between the teacher and the students, through the training of self-instruction skills to meet the challenge from the ever-changing world, and through the cultivation of interest on the taught topics.

Interactive communication matters. I never think teaching is the sole process of lecturing. Instead, it is a challenging yet also enjoyable process of interactive communication. In many situations, I would like to regard it as the cooperation between students and me. Both sides are rewarded from the process. I have obtained much better understanding on AI and neural network from my teaching experience than what I learnt as a student, in part due to many of the good questions from the students. As a MCM advisor or an undergraduate mentor, I always made myself a friend of my students, which helped to develop mutual understanding and trust between students and me. When solving problems with students, we made progress through an interactive process of

trials and errors. Such an approach was welcomed by students and quite successful. Some students told me that they got more hands-on experiences in three months with me than that from previous semesters combined. Many students remained being my friends after years.

Teaching a man to fish is more useful than giving the man a fish. Teaching is much more than simply letting students knowing the materials in textbooks. The most important lesson one can learn is *how* to learn. That is especially critical in developing a computer science course, as this field evolves so fast that what a student learned in the freshman year may have already been outdated when the student graduates. My experience with the semantic web seminar in two semesters proves the importance of this principle. As an emerging field, many contents in textbooks are often updated or corrected by recently published papers. In addition to explaining the basic materials on semantic web, I found it is quite useful to give devoted lectures on “how to update your knowledge”, by showing students various extra information sources about semantic web, and how to find and utilize such sources independently in the future. I also encouraged and gave advice for students to enrich their knowledge in the process of incorporating what they learned in the seminar into their other course work (e.g., projects) and research. I believe that good instruction rests on fostering self-instruction and finding questions rather than answers.

Interest is the best teacher. A good instructor should cultivate students the interests on the taught topics. In my teaching and mentoring experiences on computer science, I tried to show students how rich this realm is and how exciting it can be with discoveries from this field. I also tried to present practical results from the subject to show its applicability to solving concrete and real-world problems. For example, for the semantic web seminar, I developed a homepage for the seminar powered by semantic wiki, on which the students can play with many semantic web techniques to organize their own everyday research activities, e.g., meeting, literature search, and project organization, etc. I believe it is far more important for the students to realize that “oh, it really helps” than simply presenting the subject, since the former approach will inspire each student's desire to learn and to explore, rather than only being a receiver of knowledge.

Teaching Interests

Given a faculty appointment, I would like to teach *programming courses* (in C++, Java or Matlab), *introductory computer science courses* (such as data structure, computer algorithms, and database principles), as well as advanced courses which are more closely related to my research, including the following courses:

- **Semantic Web.** The course will cover the syntax and semantics of RDF, RDFS, and OWL. Students will also learn the knowledge presentation formalisms behind those languages, such as frame-logics and description logics. The later sections of the course will introduce some advanced topics such as meta-modeling, semantic web with database, and modular ontologies. Students will also get the general picture of the semantic web landscape by literature reading and presentations on selected papers from recent major conferences. Students will get hands-on experience with semantic web tools, such as ontology builders and reasoners.
- **Artificial Intelligence and Machine Learning.** I would like to teach AI at both graduate level and undergraduate level. The course will emphasize fundamental problems in designing intelligent systems. Topics will include searching algorithms, knowledge representation and reasoning, planning, representing and reasoning with uncertain knowledge, decision-making, machine learning and knowledge acquisition, genetic algorithms, and basic multi-agent systems. Students will participate in projects to develop applications using the synthesis of learnt algorithms.
- **Neural Networks.** The course will cover major models of neural computation including both supervised and unsupervised learning methods. Advanced topics will include neural network applications in time series forecasting, optimization, pattern recognition and classification. Students will use Matlab to implement several algorithms.