

Massachusetts Institute of Technology

16.412J/6.834J Intelligent Embedded Systems

Problem Set #1

Due: in class Wed, 9/18/02

Background

The purpose of this problem set is twofold. First, it will help me to get a sense of what kinds of intelligent embedded systems you are particularly interested in, and the types of reasoning methods you would like to learn more about. Second, it will help you to think about the topic of the advanced lecture you will present, to think about the project you will pursue, and to think about the advanced reasoning methods you will want to learn to support these two objectives.

Each of you joins this course with a different background. Some of you will not know much about the kinds of methods you would like to explore, or what methods are available in the research literature. Others will have something very specific in mind. Both are equally okay. I simply want to understand where your thinking currently lies. If you have difficulty reading the papers you select for this problem set, don't worry. The readings should become much easier as you delve into the technical material of the course.

Also note that parts B-E do not commit you to a project; they are thought exercises. You will have the first part of the course to think much more about your project, as you become informed by a series of basic methods during the next ten lectures. The purpose of this question is to get you to think, from day one, about what you would like to accomplish in this course, and to keep this in mind as you attend future lectures.

Finally, please go the extra mile on this exercise. I expect you to push your thinking, creativity, and literature investigation beyond the obvious.

Part A: Topics of Fascination

Please list at least five topics in reasoning applied to embedded systems that you would like to learn more about. Please be as specific and as current as possible. To familiarize your self with the major topics of reasoning, skim over the Russell and Norvig text, looking at the beginning and ends of the chapters. Next use the web to explore advanced aspects of these topics in further detail. You might want to try sites like www.aaai.org, which includes an archive of AI topics, or the online journal, www.jair.org. These are just a few of the online resources available. You might also want to use the web to follow the trail of some of the authors referenced by Russell and Norvig. Most authors post their papers on the web.

Part B: Your Intelligent Embedded System

Describe your dream scenario for an intelligent embedded system you would like to invent. It could be anything that strikes your fancy. For example, it could be a colony of rovers exploring Mars, an intelligent kitchen that is expert in the culinary arts, a micro robot navigating space station, a nano-tech mousetrap, or some other clever device. Describe the system, its composition, and scenarios in which it would act intelligently.

Part C: Making your Embedded System Intelligent

Pick **one** form of reasoning that you feel is the most important for making your system act capably. Argue why this aspect is particularly important. Describe this capability as precisely as possible.

Part D: Researching a Critical Reasoning Method

Explore this form of reasoning in greater detail. Identify two papers on this topic that were published within the last five years. In addition to the web, I suggest you familiarize yourself with the LCS (Lab for Computer Science)