

CS570 Artificial Intelligence

Midterm Presentation

Overview:

Now that you have completed your literature review, you should have a fairly solid and broad understanding of the specific research area that you have chosen for your project topic. In particular, you should understand in considerable detail what the main targets or goals are for research in the area, what the main techniques are that are being explored (and the pros and cons of each), what the leading ongoing projects are in the area that can concretely illustrate the various concepts/approaches being explored, and how far along the area is overall. In short, you should be ready to give a complete, educated report on your chosen research area to your colleagues.

In fact, giving this sort of “survey talk” is a very common occurrence in graduate studies. You will almost certainly be asked to give such a talk once you have developed your thesis research area, and it is quite common for even established researchers to have such a talk on hand to explain and present their research area to a general audience.

Strategy for giving a survey talk

Before we jump to outlining the structure of a survey talk (or any talk, for that matter), it's worth taking some time to think carefully about what overall *strategy* you'll take as you develop the talk. This is a matter of thinking carefully about what you're trying to accomplish with the talk, given the nature of the presentation and the audience. Think about this as making sure you pick the right tool for the job. If you are hunting gazelles, you don't want to bring a rifle for hunting elephants...and vice versa!

There are three elements to think about in designing a talk:

Story (story, story!). This is the most important element of *any* talk you give, regardless of context or audience. The best presentations tell an engaging story that hooks the audience with a compelling “problem/challenge” at the beginning, and then goes on to progressively and coherently tell the story of how that problem was or is being solved. Think about a really good documentary film you've watched and you'll realize what is meant here. You can't just start dumping facts on your audience, you have to organize your information into a fascinating story.

Audience. The same topic will be presented quite differently to different audiences. If you're talking to fellow researchers deeply immersed in your area, you'll present information very differently than if you were talking in front of a high school class interested in the topic. For this survey talk, your audience is the undergraduate AI class. This means “somewhat tech-savvy” in a general computing sense...but not familiar with the sophisticated details (e.g. advanced math/statistical techniques or algorithms etc.). So you won't need to explain general programming concepts, but may have to give brief intros to those missing concepts as necessary.

Content/ Technical Detail. This basically follows from the Audience consideration. Ask yourself *what this audience wants to learn* from your talk. In a survey talk, the goal is

more to give a broad overview of the area, key projects and techniques, the current state of the field, and future prospects/expectations. In addition, this audience is probably less interested in minutia of algorithms and techniques, and more interested in general approaches and cool pictures from sample projects...as well as hearing where this is going in the future. A good talk will be full of info...but also entertaining.

With these strategic thoughts in mind, it's time to put together your presentation.

Outline of a survey talk

The overall goal of a survey talk is (duh!) to *survey* the area that you have chosen. At the end, you audience should have a satisfying and complete idea of what your area is about, what the major challenges are, how these challenges are being approached (including some concrete projects/examples), and what future outcomes are likely. Your presentation should be tailored to meet this list of expectations perfectly, wrapping it all into a coherent storyline. Here are the major sections:

1. **Frame the big picture.** Don't start your talk by diving right into your area. Let's take an example: suppose your research area is *dynamic real-time planning approaches for robotic cars*. You would never start a survey talk by jumping right in with "Hello, my name is Jack and I'm talking today about dynamic planning for robotic cars". You need to start much more broadly, by *motivating* this entire line of research with something the audience can connect to; something the audience understands and has direct experience with. If you fail here, you're whole talk will not connect...the audience just won't care!
So you'd start more broadly: talk about how much we depend on private and commercial transportation (give some numbers!), how modern transport systems have numerous problems (overloaded, accident rates, inefficiencies, whatever...give some numbers!), and how we're headed for more trouble in the future. Then introduce the overall concept of self-driving cars as one solution to this problem; bullet out some specific potential advantages.
2. **Problem Statement.** Now that you have the overall context and vision for a beautiful AI-enhanced future in place, you need to introduce "the problem/challenge". This is like the *plot* to your story, the whole reason you're telling it. For our example, you'd essentially move to "Self-driving cars are a real possibility, but of course there are still many many technical challenges to tackle, both mechanically and in terms of the "brains" required for a safe ride. One of the main challenges is how to plan a route in a highly dynamic world in which traffic conditions, accidents, and input from the passenger can be continuously changing what constitutes the "optimal" route for the vehicle to take". See what I mean? You've just introduced your particular research area as key piece of solving this overall problem that the audience really cares about. Now you'd go on to explain the challenges involved in the problem in more detail. Pick the overall problem apart into whatever main elements a solution would have to address; bullet these out clearly so that we all understand what a solution would look like.
3. **Approaches and Projects.** Here comes the meaty content of the talk! Now that we all understand the problem and what a solution would look like, you're ready to get on with your survey. As you (hopefully) did in your literature review, you will

digest and differentiate all of the projects you found into some two or three different categories or approaches. This is the key value of a survey paper or talk...and this careful analysis is why some survey papers are much better than others that treat exactly the same area. Introduce your dimensions of difference (framework), carefully explaining each dimension. This might also be where you briefly explain any math/stats/computational techniques that are relevant for your analysis. With the framework established, now place some key research projects you explored on that framework, and briefly explain each one, focusing on how it is representative of its place within the analytical framework. Keep it fun here: add pictures, graphics, etc. related to the projects as you explain them.

4. **Discussion: what does it all mean?** Having laid out the “research terrain” and what’s on it (the framework and projects), you will need to digest this for us. What are the pros and cons of the different projects/approaches? Which ones show the most promise and why? Which techniques are the most interesting and why? What do you think are gaps and open areas that haven’t been explored well at this point? This then gets you to the next vital topic...
5. **Your proposed research project.** Here you introduce us to what you are going to do as a research project. As we said, this could mean implementing or otherwise exploring a small piece of an existing project/technique or whatever. If you’ve done a good job up to now, the audience will immediately see that this is an interesting project and how it fits in with extending your knowledge of what you learned in surveying the field. Be sure to include the timeline of specific milestones/deliverables that you’ll produce.
6. **Conclusion.** Every talk needs a strong conclusion. Reach back to remind the audience of the big picture (e.g. the promise of self-driving cars, in our example), and the specific problem that you are investigating. Review your proposed project and bullet out a few specific questions you hope to answer with it. Finish by promising them a report on the outcomes in your final presentation in May.

Practice makes perfect.

You may think that you’re a great extemporaneous speaker and that you know the area so well now, that you can just talk fluidly through your presentation without any further effort. You are wrong, believe me. It is absolutely essential that you practice your talk before you try to give it. As you work your way through it, you’ll find yourself tongue-tied as many things occur to you about each slide, and you struggle with how to explain various points. That’s why you are practicing! You don’t need a complete script, but talk through it enough times that you are telling a fluid story. If you feel funny talking to yourself, make your significant other, your pet, or your stuffed animal listen to you! Think of this talk as a sales pitch: you are trying to *sell* the audience on your topic and on your research project. Make them *want* to hear the results that you are promising them in May!