Problem Solving in Computer Science
Course Notes - Lecture 23 (June 7, 2005)

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1 Groups Presentations

1.1 First Group (*presented by Alex*)

They are using Piglet, which solved almost all the problems of building an occupency grid and finding a path. They noted that the review article presented the previous week only considered the case where the robots had a GPS, which isn't the case in the project setting. They were able to get Piglet to run with Webots 5.0.3 on a machine which is similar to mtcserver, but are also working in parallel on their own implementation called *Columbus*.

Tom asks whose code works on mtcserver. Abishek says that his group noticed synchronization problems on mtcserver too, and that they have abandonned the backtracking because of this. Grégory notes that synchronization works on his desktop machine (Linux), but the group hasn't tried it on mtcserver. Tom concludes that we need to stick to mtcserver.

The first group will present a modified version of Piglet on Thursday. They have implemented a way to detect the center of mass of an obstacle and implemented it in Columbus. They intend to add that part to Piglet, whose image processing routine is based on hard coded constants.

They raise the question of the color schemes (which was discussed by e-mail over the past few days) again, claiming that grey ground plus grey walls doesn't work. Tom notes that the third team was strongly against changing the scheme and that such a late change needs unanimous approval. Marc says that his team is neutral, but notes that having grey ground and grey walls also happens often in a real setting. The color scheme will not be changed.

1.2 Second Group (*presented by Grégory T.*)

They are working on an exploration component for their subsumption architecture. It consists of analyzing the amount of ground (ie. white space) at the bottom of each camera image and use it's distribution to determine where the robot will go: the direction will mostly be towards the area where

the obstacles are the farthest away, but there is a certain probability for the robot to explore other areas, like lateral holes in the wall, which can also be noticed using this method.

1.3 Third Group (*presented by Abishek*)

They tried using backtracking for two weeks and tried to incorporate the issue of missing synchronization. They where unable to get the backtracking to work on both their local machines and mtcserver. They gave up on backtracking and are implementing a controller which does random exploration.

Tom notes that the second group, whose backtracking relies on the synchronization, is at risk of having their controller not working well for the competition since backtracking seems not to work on mtcserver.

2 How to have a bad career

Tom presents David Patterson's talk on *How to Have a Bad Career in Research/Academia* (also look here for Prof. Patterson's other non-technical talks). Below are some of the remarks Tom made in addition to the information mentioned on the slides.

- Grades do matter in undergraduate years (since they are considered when applying for a PhD position)
- In CS, people often do short post-docs or even get faculty positions righr after finishing their PhD. In other sciences, postdocs are usually longer. It would therefore be logical to have longer PhD periods than the current three years at EPFL.
- There are two criteria for getting a job: the quality of the research and the letters of recomendation, not the course grades. It is important to find the right people to write a letter of recommendation. Going to conferences is usefull, as an outside letter, even if less informative, is very positive.
- Go to the main conferences, learn which are the hot topics, talk to people.
- It is worth investing time into producing the best papers and presentations: a conference talk might be the only shot one has to convince the experts in the field; not using these 25 minutes well might mean missing the opportunity of a lifetime.
- Research is not a nine to five job. It gets worse as faculty member.

- When working towards a deadline, organize your time, get sleep, exercise... It is better to work concentrated for 10 hours than for 24 without concentration.
- Conferences where the deadline gets extended are usually not having enough submissions and are not the best conferences. Well regarded conferences have deadlines by the second (eg. 23:59:59 Samoa time).
- Looking at the final goal (eg. of a PhD project) gives the impression that the amount of work is enormous, which leads to procrastination. It is important to subdivide the work and focus on the next paper (3 months) for example.
- Measure how you spend your time. This can lead to surprises (eg. spending 3 hours on e-mail) and helps taking conscious decisions to adjust.
- Managing time gets harder as a professor, as it becomes necessary to mutliplex between projects.
- Taking chance on hard topics is easy when one has tenure, but else of high risk, specially in theory. It is important to be able to decide early (like 3 months) that something has failed, not invest two years to conclude that it doesn't work.
- As a PhD student, it is important to work on something which can be separated into manageable chunks, but also to work on something more substantial than only incrementing somebody else's work.
- Up to the Masters, you learn what your taught. As a PhD student, it's up to you to decide what to learn.
- Try to explain what your doing to somebody else. Explaining makes it easier to realize the oddities of one's thinking than living in ones own mind.
- There is a problem in computer science about publications which show solutions to a problem formulation which is not applicable to an actual need.
- Computer science has not adopted the scientific method from other sciences and has thus not grown into a science. One should strive for doing it the right way.
- It always takes time to understand what somebody else is doing, but if it is close to one's own field, it is really necessary to take that time.
- Bad idea: distribute the ideas over six papers (Least Publishable Unit), as somebody might read all six papers and notice it.

- Job talks are given to the whole computer science department, not a specialized audience; it is necessary to adapt.
- Mutlidisciplinary work with people from other areas provides new points of view and new ideas.

3 Additional Meeting

Following up on the discovery that synchronization with Webots 5.0.3 on Linux only works when runing it locally and not when connecting remotely to a machine, a meeting of all groups was hold in Nir's office on Tueday, June 6th at 5pm. The groups decided to still run the competition on mtcserver even though there won't be synchronization. The competition will take place in Nir's officeon Thursday, June 8th at 11am.