6.UAT: Review of PrevProj Recording

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As I was initially preparing my presentation, I was haunted by Tony's remark that like every good story, a presentation must have a beginning, middle and an end. It also must have a cohesive theme as its foundation. However, while distilling the 28-page presentation I gave on the topic of Lattice Gases (LG) in 18.354,[1] I found myself neglecting these considerations. Instead, I reverted to my previous assumption that a presentation is "good" if an impression had been made on the audience that a significant amount of work was addressed and that I was generally competent on the topic. Overall, I felt that my PrevProj assignment had major shortcomings, namely:

1. Failure to come up with a theme that was engaging for my audience, and failure to adhere to that theme throughout the talk;
2. Ineffectual description of the problem background;
3. Inability to give the impression that I had made a contribution to this area.

I have organized my evaluation along the structure of the presentation, i.e. I treat each of the slides in sequence. Also, I address the general topic of delivery and future improvements at the end.

1 "Introduction"

The title of my presentation is "Unphysical Models for Physical Flow," rather than the more specific (and the original) title of "Lattice Gas Simulations." This somewhat more grandiose name is a result of 6.UAT's insistence that the presentation have a cohesive theme. Hence, in my talk, I wanted very much to state more than: "I implemented a numerical simulation for the bulk motion of particles."

Finding a "message" required me to re-examine my motivation for taking on the lattice gas project. As remarked in the presentation, I built my simulation around the ability to construct non-standard configurations of the lattice network. This was done so that I could probe for the large scale fluid effects, such as formations of vortices and boundary layers that arise in specific geometries. I attempted to capitalize on this, by making this my "central theme." Furthermore, I attempted to heighten the novelty of my investigation by emphasizing the artificial nature of the LG model, which makes it an unlikely candidate to reproduce the correct physics of fluid flow.

With this intent, one of the very first items I discussed in the presentation was my interest in reproducing real physics from a simplified toy model. Already at the title slide, I managed to emphasize this point, although at the cost of beginning the talk with a substantial diagram.

[1] If curious, the original presentation is here: http://web.mit.edu/kimt/www/18.354/project/18354presentation.pdf

However, in retrospect, I feel that this gambit was ineffective. For instance, as I enter this discussion, I have to excuse myself: "I will describe what the lattice gas is in a moment..." In watching my own performance, this indicates that the order of presentation was poor. My claim would have been better appreciated *after* I had explained the basics of the LG simulation. As a concrete example of this claim, recall that the model selects six special directions in its implementation; however, the large scale flow does not show signs of this underlying asymmetry. This is not an obvious result, and indicates that at some "size," the toy model can become more realistic. However, the novelty of this outcome can only be appreciated after having discussed the grid structure of the lattice gas method.

Finally, I also found that the message is simply not as compelling as I had originally hoped. It seems to be a curiosity at best, not a pressing problem that needed to be addressed. *A project dealing with the latter would have made a more appropriate PrevProj talk.* Watching my own introduction to the presentation, I would not have been impressed by the theme. Personally this was a major disappointment.

2 "Context"

I then proceed to describe other motivations for studying fluid mechanics. Although I made the point earlier that the lattice gas is a tool in fluid mechanics, the motivations given here have only an indirect connection to LG. The discussion of the coffee cup, the reactor, and weather modeling seem tangential at best to the project at hand. Especially in relation to the final two slides, it's unclear what the relevance of the LG is to these "motivations."

A more appropriate "context" slide would have dealt strictly with the sheer difficulty of fluid simulations. I could have spoken about the difficulties in obtaining numerical solutions to the differential equations that model fluid motion, or more about the naive point particle model that quickly becomes intractable for larger numbers. After all, the LG model is useful because it's a cheap starting point for doing fluid mechanics. *The problem it solves is computational complexity.* I should have focused on this aspect, rather than trying to make a case for why we study fluid mechanics in the first place.

3 "The Lattice Gas Approach"

In this slide, I finally discuss the basics of LG. I felt that I did an adequate job giving the definitions, without diving into excessive or formal detail.

A major omission on my part, however, was that I did not make reference to the slide title. As per the PrevProj rubric, I had intended this slide to give a basic description of the *traditional* lattice gas simulation. Hence, the title reads: the *"old"* FPH rules. Unfortunately, during my presentation I completely neglected the title, and failed to establish that this was the state of the LG simulations prior to my own work. As I did not emphasize this background, it was subsequently unclear that my implementation included personal innovations that reflected my own goals (i.e. the reproduction of specific fluid patterns at various geometries). The omission was very obvious to me when I was asked, post-presentation, what my contribution to the field was. I was also asked what "FPH" stood for, reflecting my introduction of jargon without supporting commentary.[2]

[2]By the way, FPH stands for Frisch, Hasslacher, Pomeau. They are pioneers of the LG technique.

4 "Project Results"

Here, I again did not refer to the slide title. Doing so would have pointed out that the features under discussion were my *own* innovations, building on top of the existing FPH standard.

During the post-presentation discussion, I was complimented on my usage of graphics on this slide. In particular, Alan remarked that the left illustration concretely explained a claim ("Ability to dynamically modify and shape the node network") that could have been otherwise vague or misunderstood. In addition, I interacted with the items on the slide extensively through hand guestures. This is evident when I noted that the ability to shape networks (left illustration) led to experiments such as the dispersion of flow against a pin-head obstacle. (Right illustration.)

On the other hand, the contents of the bullet points could be improved. It wasn't necessary, for example, to note that my application could simulate two differently colored particles. Both the slide and I mention this feature explicitly, and even add that I wanted to study diffusion. However, there was no talk of diffusion at all until this point! Furthermore, even on *this* slide, I do not feature a screenshot of my application that demonstrates the two colored particles. Altogether, the comment was completely irrelevant to the presentation.

In the ensuing discussion, it was also noted that I ended the talk on a disappointing note. I admitted that my simulations were not of the scale in which the sought-after physical effects were evident. The suggestion given to me was to discuss the negative results orally, rather than leaving it as the final, concluding statement of the entire presentation.

5 Delivery and Future Improvements

I was quite surprised at the rapid pace of my speech. As a viewer, I felt that there was not enough time given to process the information that was being presented. During the talk, when I had noticed my quickening pace, I had personally excused myself on the grounds that faster speech implied more content and indicated knowledgeability. In watching my own presentation for the first time, I instead noted that I was simply not giving sufficient breaks for ideas to sink in.

With regards to my oral performance in the future, I will consciously limit my pace. I will also experiment with pauses, to invite the audience to consider what I think are the important points of the talk.

During the presentation, I was quite nervous and paced around the small presentation area extensively. However, this did not seem to be too distracting. (Watching the video with the sound off convinced me of this.) On the other hand, I noticed a strange half-hop that I occasionally perform (for instance, around 1:50-1:54), which I will definitely try to suppress in the future.

After evaluating my own performance, I have the following goals for the future:

- **Consider the choice of topic and message more carefully. Instead of opting to give as much information as possible, identify a theme that the *particular audience* will be attuned to. And, during the talk, maintain a tight focus on that idea. (That is, no diffusion out of nowhere.)**
- **Proceed at a regular, comfortable pace. Experiment with "dramatic" pauses.**
- **No hopping.**