Weekly Status Report – Niles Guo Aug 26, 2017

This week's activity:

1. Spent most of the time this week in EPP orientation activities, from Camp EPP on Monday/Tuesday, and then orientation activities rest of the week. Met the current cohort and other EPP students.
2. In what time I had, I reorganized some of my thoughts about the taxonomy work. Tried to formalize some of goals of the taxonomy, to see what the finished result could look like.
3. After reading through more research papers, instead of a single tree-structure, I believe a more suitable structure would have several top level nodes, similar to a structure presented here by Baladi et al.[1]:

Autonomy	Collision detection			
	Gravity			
	Kinematics			
	Behaviors			
Interaction	Environmental Interaction	Responsiveness	Bandwidth	
			Latency	Computation
				Network
			Reliability	
			Consistency (b/w users)	
		Range		
		Mapping	Natural	
			Arbitrary	
		Scalability	Upwards	
			Sideways	
			Downwards	
			Hardware	
			Software	
		Remote Manipulation		
		Persistence		
	Social Interaction	Gaze direction		
		Facial Expression		
		Body Gestures		
Presence	Vividness	Representation	Visual	
			Auditory	
			Kinesthetic	
		Resolution		
	Consistency	Across all senses		
	Personal Perspective	First		
		Second		
		Third		

[1] Baladi, Miranda, Henry Vitali, Georges Fadel, Joshua Summers, and Andrew Duchowski. "A taxonomy for the design and evaluation of networked virtual environments: its application to collaborative design." *International Journal on Interactive Design and Manufacturing* 2, no. 1 (2008): 17-32.

While this was applied to networked virtual environments and collaborative environments, this type of structure could add more nuance and differentiation than a strict top-down hierarchy.

Issues/Agenda for next meeting

1. Present some more of the taxonomy work for another iteration review.
2. I want to quickly talk and set some goals during the semester given the course work that I have, just to make sure I'm still making progress on research while I'm taking classes instead of letting that slide off my radar.

Next week's activity:

1. Classes will start, and will spend most of my time to get reacquainted with course work.
2. Will spend at least 6-12 hours to get another iteration of the taxonomy for feedback.

Journal Article Review

Gregory, R. and Keeney, R. L. (2017), A Practical Approach to Address Uncertainty in Stakeholder Deliberations. Risk Analysis, 37: 487–501. doi:10.1111/risa.12638

Addressing uncertainty is an important element in the CADS work, and one that is often difficult to quantify and address. Unlike other frameworks like RDM, uncertainty is not just introduced through the change in system/scenario parameters (and explicitly defined), but they can be introduced through the process of expert and stakeholder elicitation. It is then important for us to understand how this uncertainty can be both quantified, and presented in a way that allows them to understand the consequences of these uncertainty.

This paper takes a practical approach to try to address this issue. The authors believe the traditional ways of presenting the information with either an end-points + best estimate approach, or show the ends of the distribution at an arbitrary confidence interval (90% for example), do not allow experts and stakeholders to better process this information. Instead, they propose that by creating and presenting a supplemental table of certainty equivalent (CE) scenarios, a "probabilistic description of an uncertain consequence is a sure amount such that the decision maker is indifferent between that probabilistic description of the possible consequences and the sure occurrence of the CE", it can create a more accessible way for experts and stakeholders to better understand the uncertainty of their scenarios. While this method is not new, and has been widely applied in economics, this is a new approach in multi-criteria decision making applications.

The use of stated preference to create the CEs is something that we can incorporate in our CADS process. However, given the involved nature of the process (asking each individual expert for their preferences could take a long time), it might be something we consider in the design

phase of the model. Furthermore, since it uses the stated preference technique, the associated drawbacks of that method will still apply here.