Program Overview

8:00 am – 5:00 pm	Pre-conference workshop: Beyond Brain-Machine Interface	Room 201 A & B
Noon – 4:00 pm	Exhibitor Setup	Exhibit Hall B
Noon – 4:00 pm	Registration Open	Lobby

Day 1: Monday, June 21, 2010

7:00 am – 6:00 pm	Registration Open	Lobby
7:00 am – 9:00 am	Poster and Exhibits Setup	Exhibit Hall B
7:00 am – 9:00 am	Continental Breakfast	2nd Floor Lobby
7:45 am – 9:00 am	DBS Consortium Meeting	Room 202 B & C
9:00 am – Noon	Morning Sessions	Grand Ballroom
11:30 am – Noon	Poster Blitz	Grand Ballroom
Noon – 2:00 pm	Lunch on your own. Posters and Exhibits open	Exhibit Hall B
1:00 pm – 2:00 pm	Poster Session 1 (all presenters please be by your posters	Exhibit Hall B
2:00 pm – 5:30 pm	Afternoon Session	Grand Ballroom
3:30 pm – 4:00 pm	Afternoon Break in Posters, Exhibit Area	Exhibit Hall B
5:30 pm – 7:00 pm	Welcome Mixer in Posters, Exhibit Area	Exhibit Hall B

Day 2: Tuesday, June 22, 2010

7:00 am – 4:30 pm	Registration Open	Lobby
7:00 am – 8:30 am	Continental Breakfast	Exhibit Hall B
7:30 am – 8:30 am	Breakout Sessions	Room 201 A & B Room 202 A, B & C
8:30 am – Noon	Morning Session	Grand Ballroom
10:00 am – 10:30 am	Morning Break in Posters, Exhibits Area	Exhibit Hall B
Noon – 12:30 pm	Poster Blitz	Grand Ballroom
12:30 pm – 2:30 pm	Lunch on your own. Exhibits and Posters open	Exhibit Hall B
1:30 pm -2:30 pm	Poster Session 2 (all presenters please be by your posters)	Exhibit Hall B
2:30 pm – 4:00 pm	Afternoon Session	Grand Ballroom
4:00 pm – 5:00 pm	Special Session for Students	Rooms 202 A, B & C
7:00 pm – 10:00 pm	Aquarium of the Pacific Event	Aquarium of the Pacific

Day 3: Wednesday, June 23, 2010

7:00 am – 1:00 pm	Registration Open	Lobby
7:00 am – 8:30 am	Continental Breakfast	Exhibit Hall B
7:30 am – 8:30 am	Special Session: Future of NIC	Room 202 A, B & C
8:30 am – 12:30 pm	Morning Session	Grand Ballroom
10:00 am – 10:30 am	Morning Session	Exhibit Hall B
12:30 pm – 2:00 pm	Box Lunch Provided	Exhibit Hall B
12:30 pm – 2:00 pm	Breakout Sessions	Room 201 A & B Room 202 A, B & C
2:00 pm	Posters and Exhibits Area Closes to Attendees	
2:00 pm – 6:00 pm	Poster and Exhibit take down	Exhibit Hall B
2:00 pm – 5:30 pm	Afternoon Session	
3:30 pm – 4:00 pm	Afternoon Break in 2nd Floor Lobby	Exhibit Hall B
5:30 pm	Meeting Adjourned – Thank you for your participation	

Waveform Stability and Neural Decoder Performance Across 7 Weeks

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Recent work in brain machine interfaces has demonstrated substantial improvements in performance compared to initial demonstrations. Currently, experiments are usually conducted by collecting training data every day, and using that data to build the neural decoder for that day. This assumes that there are changes in neural waveforms, and possible changes in neural tuning across days. However, these effects have not yet been fully quantified. Toward that end, one monkey was run on a standard center-out reaching task while neural data was recorded from a 96-channel "Utah" array for 39 out of 45 days. Between task sessions, wireless data was obtained from a subset of channels using HermesC, a wireless recording system for freely moving primates (Chestek et al, IEEE TNSRE, 2009). While 86% of the electrodes had a single unit on at least one day, substantial changes in waveforms were observed such that only 1 out of 96 electrodes had a stable single unit on all days. For the subset of neurons that could be tracked for some number of days, tuning curves were highly correlated, averaging $R = 0.99$. However, only a small number of units were visible more than half the time. Offline neural decodes were performed using a discrete classifier to compare performance across time. We found a small decrease in performance from using an (incorrect) spike-sorting model from a different day (-5.4%), or from using threshold crossings (-5.3%) rather than fully spike-sorted data. However, we found a dramatic decline in performance when the neural decoder was not retrained daily, reaching 50% of the initial performance value by days 3-8. With threshold crossings, the performance drop could be reduced to 26% (rather than 56%) by setting the threshold to match the average firing rate across days. Shifting the emphasis from fully spike-sorted data to threshold crossings, it may be possible to demonstrate high performance from cortical arrays for longer periods of time than previously supposed. In fact, high-speed prosthetics experiments have been performed using threshold crossings on this same array 2.25 years after implantation, with better speed and accuracy than previous studies (Gilja et al, this conference).

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