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	

An Online, Closed-loop Testing Platform for Neural Prosthetic Systems

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By translating neural activity into useful behavioral commands, neural prosthetic systems seek to improve the lives of severely disabled people. There are many challenges in developing such a system, but all neural prosthetic systems share in common a decode algorithm. Decode algorithms, which map neural activity into physical commands such as kinematic parameters to control a robotic arm, are typically applied offline to neural activity previously gathered from a healthy animal (e.g., nonhuman primate), and the decoded arm reach is then compared to the true movement that corresponded to the recorded neural activity. However, this offline testing almost certainly neglects important features of a real neural prosthesis. Truly understanding decode performance requires the human learning machine (the brain and motor plant) to be in closed-loop with the decode algorithm. It remains unexplored the extent to which the subject can, for a particular decode algorithm or parameter choice, engage feedback mechanisms, learning and adaptation, and other control strategies to improve decode performance. Closed-loop testing may suggest different algorithmic choices than offline analyses. Here we ask the previously unaddressed research question: can a healthy human subject, using a prosthetic device driven by synthetic neural activity, inform the choices made in prosthetic decode algorithms? As a first demonstration of this approach, we use such a system to optimize decode performance based on a key parameter of a current state-of-the-art decode algorithm - the bin width of a Kalman filter. We first show that offline and online analyses do indeed suggest different parameter choices. Second, we show with animal experiments that the Online Prosthesis Simulator (OPS) provides an acurate proxy to real neural control. We hypothesize that this novel testing approach will allow rapid and lower-cost testing of many algorithmic choices and will be a better proxy to clinical use than offline data analyses.

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