Brain Computer Interface Hackathon – 2016

Call for Participation

Be a Part of the World's Largest Brain Hackathon!

What's a Hackathon? Hackathons are brainstorming and collaborative marathons designed to rapidly produce working prototypes. Conventional hackathons typically bring developers and technologists together over 24, 36, 48 or more hours to cram and build solutions that they can present.

Who Can Participate? Anyone! Both SMC2016 attendees and non-SMC2016 attendees with interests in BMI, BCI, robotics, AR, VR, machine learning, sensors, human-machine interface systems, control, signal processing, big data, haptics, rehabilitation, and similar areas. You do not have to be a BMI expert to participate on a team! Interdisciplinary teams with a combination of BMI and non-BMI skills are often successful in building solutions and producing working prototypes.

How to Participate? To participate, please register online [http://goo.gl/forms/BaQJkQ0g2eVPPdYf2]. You can participate individually or by joining a team. More detailed information to follow when the event gets near.

Why do a Brain Hackathon? The brain hackathon provides an environment for innovation and entrepreneurship. By putting creative minds from multiple disciplines together for a short period of time, we have the opportunity to discover and uncover possibilities for using BCI-related hardware and software not readily thought of. Hacks and innovation developed from hackathons have great potential for commercialization.

HACKATHON

GENERAL INFORMATION

Date: October 8 & 9, 2016

Cost: Free

Place: INTERCONTINENTAL BUDAPEST, Apáczai Csere J. u. 2-14.1052 Budapest HUNGARY

Register: http://goo.gl/forms/BaQJkQ0g2eVPPdYf2

Participants:

- Individual or Team (each up to 5 persons)
- Maximum participants: 130 individuals/26 teams
- IEEE members will be given priority

Objectives:

- To learn State-of-the-Art Brain Technology Platforms
- To learn more about Brain Computer Interfaces, including those incorporating AR/VR, and develop creative applications.
- To participate in the World's largest Brain Hackathon

Scope:

- Integration of neurotechnology with the Internet of Things (IoT)
- Closed-loop cognitive games (including Virtual/Augmented Reality, VR/AR
- Sensor to Cloud Communications and Advanced AI for Analysis
- Active control of robotic devices using BMI

Awards: Over **$8,000** in prizes in cash and hardware prizes, including at least $5000 in Vizzario/VSP Brain Hackathon Prizes, a $1000 IEEE Brain Initiative Brain Hackathon Prize, a $1000 IEEE SMC Brain Hackathon Prize, and a $1000 Qusp Prize.

Sponsors:

Institutions:

- IEEE SMC, IEEE Brain Initiative

Industry Volunteers:

- Vizzario (organizer, management and equipment)
- Qusp (management and equipment)
- Hardware/software manufacturers (equipment and funding)

AGENDA

DAY 1, OCTOBER 8	
9:00 am – 11:00 am	Introduction and BCI technology overview, short talk by Industry Entrepreneur
11:00 am – Noon	Submission of Project Title (Individual or Team)
Noon – 1:00 pm	Lunch
1:00 pm – 6:00 pm	Hacking
6:00 pm – 7:00 pm	Dinner
7:00 pm – 7:30 pm	Q&A
7:30 pm – 10:00 pm	Hacking, continued, mingling with Social, (open for sponsorship by manufacturers)

DAY 2, OCTOBER 9	
9:00 am – Noon	Hacking
Noon – 1:00 pm	Lunch
1:00 pm – 2:00 pm	Hacking, continued
2:00 pm – 3:30 pm	Project demos and expert panel evaluation
3:30 pm – 4:00 pm	Awards Presentation
6:30 pm - 9:00 pm	Winners have projects on display/demos at SMC reception

DAY 3, OCTOBER 10	
Noon – 5:30 pm	Winners have projects on display/demos at SMC BMI Workshop

PREPARATION FOR THE HACKATHON

Please follow the suggested recommendations:

- Register online (free)
- Pick team to join
- Plan project
- Learn about BCI systems used (see table below)

HARDWARE CHOICES THAT MAY BE AVAILABLE
EEG
Emotiv (Epoch [14 ch], Insight [5 ch])
OpenBCI (Ultracortex [8 ch])
NeuroSky (MindWave Mobile [1 ch])
Melon (Daqri)
InteraXon (Muse [4 ch])
inME (EXG 8 inputs [3 to 128 ch])
Cognionics (Quick-20 Mobile [21 ch])
Wearable Sensing (DS-24 [20 ch])
Neuroelectrics (Enobio [21 ch])
Brain Rhythm Inc
EMG
Thalmic Myo (EMG)
VR/AR
Oculus Rift (VR)
HTC Vive (VR)

SOFTWARE CHOICES THAT MAY BE AVAILABLE
Vizzario SDEP (Python, Java)
NeuroPype CE (Python)
BCILAB (Matlab)
NeuroScale Cloud BCI Platform (Multi-platform)
Lab Streaming Layer (Multi-platform)
iOS
Android
Oculus SDK
HTC Vive StreamVR SDK
AWS Managed Services
Google Cloud Platform (GCP)

PREPARATION FOR THE HACKATHON (cont'd)

Vizzario's platform and equipment at the Budapest Hackathon will be focused on Vision and its role in the Brain-Machine Interface. Specifically, we will be exploring techniques to derive insights from the unique relationship between the eye and brain. These techniques will involve the use of Vizzario's Sensory Data Exchange Platform (SDEP), Virtual Reality Headsets and Virtual Reality SDKs.

Software and NeuroScale cloud APIs provided by Qusp will enable participants to rapidly explore integration of neurotechnology into mobile, PC, and web-based apps and games (including AR/VR), robotic systems, and the Internet of Things.

In addition, please note:

- Hardware access will be limited and will be on a first come first serve basis. Participants are strongly encouraged to bring their own preferred hardware as well.
- NeuroPype, free community edition available on-line
- NeuroScale cloud access free for Hackathon participants
- Tutorials of Vizzario SDEP, NeuroPype, LSL, OculusSDK, HTC Vive SDK, AWS, GCP, and BCILab available on-line and summary talk given at beginning of the Hackathon.
- Sample data sets for each hardware device available 2 weeks in advance.
- Platform instructor's assistance standby during Hackathon

ACTIVITY DESCRIPTION

The Hackathon will begin with a summary talk about various BCI platforms (several are open source). Participants will gain additional knowledge and familiarity with software tools and hardware. Individuals and Teams will submit their project title in the morning of the first day and specify their chosen hardware and software platforms. The Hackathon could use the provided hardware to get the data and build applications or use the sample datasets for their applications. Hackers can create their own application or technology extension for their project. Internet access will be provided.

Professional teams will also be participating to develop applications during the Hackathon to demonstrate full potential of some of the sponsored hardware/software.

The evening of the first day will be set up with discussions of progress and obstacles encountered. Participants can continue their project or to brew their ideas through social interactions with peers, instructors, and manufacturer representatives throughout the evening, entertained with food and beverages.

The second day will continue with more hacking. The submission of final prototype/ product/ analysis/ proof will be expected by 2 pm on the second day. With demonstrations by participants, the Expert Panel will conduct evaluations to determine the winners.

JUDGING CRITERIA

The judging criteria shown below will determine hacker's winning potential. Depending on the number of teams participating, professional teams will be judged in a separate category than student teams.

INNOVATION

- Is the project unique or have a different take on an existing / similar idea?
- What makes the project special?
- Is the idea behind the project creative? Ambitious? Positive?

EXECUTION

- Does the application (e.g., game) demonstrably work?
- Is the technical achievement significant considering the time spent on development (whether weekend only or time involved prior to Hackathon)?
- Does the implementation and user experience serve the idea well?
- Does the project presentation convey the idea and process behind it well?

IMPACT

- How large is the market for this prototype?
- Will it have a potential impact on people's health & wellbeing, the gaming industry or wearable devices market, or any other meaningful contribution to the field?
- Does the project stand a chance in the real world? Will it cater to an audience outside of the Hackathon?
- What are the shortfalls?

ADDITIONAL INFORMATION

We highly encourage Brain Hackathon participants to register for the IEEE SMC BMI Workshop (http://smc2016.org/node/45) at SMC2016 - where the Brain Hackathon is held, to learn more about BMI (registration fee required)

- Meet and talk with experts from around the world
- Listen to papers presented by experts, attend receptions, etc.

For additional information or questions about the hackathon, please contact:

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