From: Elon Musk <erm@neuralink.com>
To: Paul Merolla <paul@neuralink.com>
Cc: Philip Sabes <sabes@neuralink.com>, Tim Hanson <tim@neuralink.com>, Max Hodak <max@neuralink.com>, DJ Seo <dj@neuralink.com>, Sam Teller <sam@neuralink.com>
Subject: Re: Communicative rhesus?
Date: Mon, 12 Dec 2016 13:12:52 -0800

Interesting. Deepmind is moving very fast. I am concerned that OpenAI is not on a path to catch up. Setting it up as a non-profit might, in hindsight, have been the wrong move. Sense of urgency is not as high.

On Dec 12, 2016, at 1:06 PM, Paul Merolla <paul@neuralink.com> wrote:

Just arrived back from NIPS and wanted to share two highlights that I thought you guys might like.

First, Ilya announced the OpenAI Universe--I am sure Sam and Elon are intimately familiar with this, but I am including for the rest of the team. Universe is an api to the digital world for AI agents, where these agents can interact with computers via pixels and keyboard / mouse commands. They already support dozens of games and physics environments, as well as an interface for internet browsing. Ilya showed and example where an agent takes an instruction such as "Buy an airline ticket ..." and learns to perform the appropriate sequence of actions (see the blog). Down the road, this could be a great training environment for our BCI (perhaps coupled to an AI agent). Certainly would make for a really cool demo going beyond the typical "mind moving a mouse"-like demos.

Second, Nando's group at DeepMind had a paper Learning to Communicate with Deep Multi-Agent Reinforcement Learning. In my mind, this paper attempts to address one of the fundamental questions in AI: How can we train multiple agents with limited communication to coordinate and solve a complex task? They created an end-to-end reinforcement learning system where remarkably, the agents learn a communication protocol (language?) to solve some interesting puzzles. Although the work is preliminary, I think we could leverage this type of training to connect a neural system with an AI agent to maximize their shared utility :).

-Paul

[redacted]







