

From: "[REDACTED]" on behalf of Itamar Arel [REDACTED]
To: Ben Goertzel <[REDACTED]>
Cc: Jeffrey Epstein <jeevacation@gmail.com>
Subject: Re: Distinguishing Cats from Dogs
Date: Sat, 10 Oct 2009 15:19:48 +0000

I apologize for joining this thread a bit late this morning. I concur with Ben: the key point is that my system learns purely by viewing examples, even if they represent complex, high-dimensional patterns. There is absolutely no fine-tuning or hand-crafting of features, which is how one envisions the brain works. It is also what makes it scale and serve as an engine for AGI.

As for Poggio's work, I believe that our system can be viewed as a working, scalable version of Poggio's (and others') concepts, particularly in the context of having a hierarchical inference system that comprises of identical cortical circuits. I appreciate the elegance in that architecture, specially since it proves to work well.

- Itamar

On Sat, Oct 10, 2009 at 10:27 AM, Ben Goertzel <[REDACTED]> wrote:

Hi,

OK, I'll try to keep this reply "as simple as possible but no simpler" ...

To compare Itamar's emotion recognition to Poggio's, you would need to run both systems on the same corpus of videos, divided into the same set of categories, and then calculate the precision and recall of both systems. If they're not tested on the same corpus and the same set of categories, you can't make a rigorous comparison. I don't know if they've been tested on the same corpus or not.

But, then you also have to look at how much hand-tuning of the feature extractors was done. If one system achieves better precision/recall figures than the other based on hand-tuning of feature extractors, this is nice for practical applications but not helpful for AGI.

A more AGI-relevant test would be to test the two systems, without hand-tuning, on some categorization problem for which neither system was hand-configured: for instance, try them both on classifying different species of parrot, without telling Itamar or Tomaso in advance that this was going to be the test problem.... This would be more like the kind of classification problem an AGI encounters (novel categories, with no opportunity for hand-tuning of feature extractors).

The other thing I pointed out in my long reply is that for AGI we don't just need an accurate vision system, we need one that integrates well with a cognition system. Actually Poggio's systems and Itamar's are both OK in that regard (unlike, say, an SVM based vision system) .. they're both hierarchical recurrent NN architectures and are kinda similar on the broad level.

If that wasn't clear enough, call me sometime [REDACTED] and we can discuss verbally

ben

On Sat, Oct 10, 2009 at 10:13 AM, Jeffrey Epstein <jeevacation@gmail.com> wrote:

> in this instance i totally agree brevity it not your strong suit,, itamar
> sent me an emotion recognition , that merely saw awake , and three moods..
> you did not tell why this is in anyway not inferior, to poggios work of many
> years ago. it is a simple question that i would appreciate a very short
> answer to. / compare ithamr s emotion rec to poggios

>
> On Sat, Oct 10, 2009 at 9:59 AM, Ben Goertzel <[REDACTED]> wrote:

>>
>> Hi Jeffrey,

>>
>> First: Regarding MIT ... IMO the best vision work being done there now
>> is Tomaso Poggio's work, which I suppose you're familiar with. He has
>> some biologically realistic neural nets that classify images and
>> videos, and that appear to effectively emulate the way humans classify
>> images when they see them very briefly. (But not how humans classify
>> images when they see them at length ... because this requires feedback
>> connections which Poggio's networks don't model.) Based on
>> discussions with some people who are involved in trying to
>> commercialize Poggio's work, my strong impression is that Poggio's
>> networks provide inferior classification results to Itamar's system

>>
>> Next, about the "cats vs. dogs" task: of course it *isn't* that
>> interesting....

>>
>> People talk about "distinguishing cats vs. dogs" because Jeff Hawkins
>> likes to give speeches about how hard the problem of distinguishing
>> cats vs. dogs is (because Hawkins' Numenta vision system can't solve
>> it). And of course if a famous guy like Hawkins speechifies about it,
>> it must be important ;-D

>>
>> So when Itamar first built his vision system he loaded in some cats
>> vs. dogs pictures to see if it would distinguish them OK, and it
>> seemed to ... and then he didn't pursue that anymore, since it was of
>> no practical use and not terribly interesting [except to prove a point
>> to people].... But it's not much work for him to download some more
>> pictures of cats vs. dogs and run the algorithm on them again though.
>> However, the machines his algorithm is running on are currently doing
>> some practical video classification work as part of a contract with
>> ITT, so this will wait a week or so till the machines are available...
>> (the code now is running on ordinary PCs, though there is an
>> almost-complete port to the Nvidia GPU supercomputer).

>>
>> About MIT's and other peoples' vision processing results -- as Itamar
>> pointed out at your house, the quality of video or image
>> classification systems has to be considered carefully. For problems
>> like face recognition or car recognition [or recognition of any

>> specific class of objects], extremely high success rates can be
>> achieved by hand-tuning a set of feature extractors, and then building
>> a system with a pipeline like
>>
>> video or image ==> hand-tuned feature extractors ==> machine learning
>> system ==> image classification
>>
>> Cassio and his Brazilian team built a face recognizer like this a
>> couple years ago, for a Brazilian government customer to use with
>> security cameras.
>>
>> What's a harder problem is making a vision system that can solve ANY
>> video classification problem WITHOUT creation of hand-tuned feature
>> extractors.
>>
>> Itamar's system does not outperform the competition if one assumes use
>> of hand-tuned feature extractors. I think it does outperform the
>> competition if one assumes hand-tuned feature extractors are not
>> allowed.
>>
>> But that's not even the main point ("outperforming" the competition on
>> classification metrics). The main point -- from my perspective -- is
>> that his vision system allows easy integration with a cognition system
>> (like mine).
>>
>> For instance, the face recognizer we built for the Brazilian
>> government uses Support Vector Machines (SVMs) for the machine
>> learning component (together with some hand-tuned feature extractors).
>> That works OK for face recognition under appropriate lighting
>> conditions... but there's no way for SVMs to interact with a cognition
>> system except by feeding the cognition system its outputs.
>>
>> So if you use SVMs for vision processing, there is no way to use
>> cognition to help vision handle the really difficult perception
>> problem (say, where you have to use both structure *and* apparent
>> function to identify any object). But in Itamar's architecture, it is
>> straightforward to link his vision system in with my cognition
>> system... which is important.
>>
>> As I said to you before, I think much of the "trick" to how
>> intelligence works is: It's not that each component of the intelligent
>> system has to be SO awesome, but rather that the different components
>> have to be interconnected in a "synergetic" way that helps them all
>> work together.
>>
>> If this is correct, then work on fine-tuning particular components
>> (vision systems, language systems, etc.) is largely misdirected, and
>> effort should be better spent on building holistic integrated
>> intelligent systems. But of course this is more expensive and takes
>> longer and it's harder to measure progress, so people tend to focus on
>> particular components instead...
>>
>> While we are not trying to model the brain in any detail, it makes
>> sense for us to pay attention to high-level systemic properties of the

>> brain -- and massive interconnectedness between regions carrying out
>> different functions, is one of the brain's very notable properties.
>>
>> Sorry for the long answer; brevity is not one of my virtues ;-)
>>
>> ben
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>>
>> On Sat, Oct 10, 2009 at 9:37 AM, Jeffrey Epstein <jeevacation@gmail.com>
>> wrote:
>> > videos are fine. // however I have seen the robot at the mit media lab.
>> > doing far more complex recognition many years ago.. i 'm not sure why
>> > you
>> > consider this interesting at all
>> >
>> > On Fri, Oct 9, 2009 at 3:51 PM, Itamar Arel [REDACTED] wrote:
>> >>
>> >> Jeffrey,
>> >> Thanks, again, for inviting us to talk to you - I enjoyed our
>> >> discussion
>> >> very much.
>> >> Ben mentioned that you would like to see a demonstration of our system
>> >> distinguishing between cats and dogs. I have a deadline for delivering
>> >> a
>> >> surveillance demo based on the same system to a defense contractor
>> >> exactly a
>> >> week from today. I plan to spend a few days after that putting together
>> >> a
>> >> video that clearly demonstrates our system's capabilities in
>> >> distinguishing
>> >> cats and dogs. I hope that time frame is acceptable to you.
>> >> Meanwhile, I'm attaching a short video demonstrating our emotion
>> >> recognition system, which was trained to identify when a person is
>> >> smiling,
>> >> pouting and either awake or asleep. Sending videos is the easy way to
>> >> show
>> >> you what the system does. If you want to run our system directly rather
>> >> than
>> >> just watching videos, you'll need to have MATLAB installed; our system
>> >> is
>> >> currently implemented as a set of MATLAB scripts, rather than as a
>> >> standalone executable program. We also have a GPU version of the code
>> >> in
>> >> development, which is bound to be integrated with Ben's system after
>> >> our
>> >> collaborative project gets off the ground.
>> >> - Itamar
>> >>
>> >> --
>> >> =====
>> >> Itamar Arel, Ph.D., M.B.A.

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>>> Ben Goertzel, PhD
>>> CEO, Novamente LLC and Biomind LLC
>>> Director of Research, SIAI
>>> [REDACTED]

>>> "Truth is a pathless land" -- Jiddu Krishnamurti

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