All the technology companies seem to believe that they have to provide increasing perks for their employees. Here is our fitness coach:

https://www.youtube.com/watch?v=_sBBaNYex3E

The response to our latest job vacancies has also been interesting:

https://www.youtube.com/watch?v=4o0FZalxIYw

Boston Dynamics is owned by Softbank, a Japanese company whose major investors include Saudi Arabia and China. They have a \$100B fund called Vision Fund and they have just started Vision Fund 2 with another \$109B. Our fund is slightly less than that, about \$500.

Since the last post, I have updated the face detection program so that it can detect faces from images that I scan from a newspaper. It is about 90% accurate at this more fuzzy quality level.

The next step is to work with video (stream of images). Most computers/tables/smartphones have cameras. The first version of the program will use the web camera on our development computer.

Video is basically a series of still shots which are taken at an interval of a minimum of 30 shots (frames) per second. So our program will do four things with a live video feed:

- 1. capture a video frame
- 2. search the frame (detect) for a face
- 3. if found, place a rectangle frame around the face
- 4. write the resultant frame out to a new video file
- 5. repeat steps 1-4 until we stop the program

The big challenge is to write efficient enough code so that there is no/little delay between processing each frame. One technique is to convert each frame from RGB colour to grayscale. This reduces the analysis by one third. In theory, a small change to the program would allow it to process a saved video file and the time delay would not be noticed.

The end result looks like the camera is tracking/following the face.

After a few conversations with people experiencing crime in their area, I wanted to see how much of a disguise was needed to NOT detect a face. Here is the resultant video:

As we develop this software, the list of "can it do this?" list expands and includes:

- detect eyes and identify eye colour
- create facial recognition database *
- other object detection and recognition

* In 1973, I was offered a position at the University of Toronto to work on database design. I designed my first commercial database system, Locator, in 1976

PAN TILT DEVICE

We decided to take a break from software development and build some more hardware. About 18 months ago, I shared my challenges in building a horizontal rotating ultrasonic sensor which had rice size nuts/bolts. This time we are doubling the "fun" by building a device with two servo motors and a platform. One servo will move the platform horizontal (pan) a total range of 180 degrees. The other servo will move the platform vertical (tilt) a total range of 180 degrees.

We will then attach an 8MB pin hole colour camera to the top of the platform. The device will then be attached to one of our playing card sized Raspberry Pi computers.



I now use 1.5x bifocal safety glasses when I am working on stuff this small and a maximum of two cups of high test coffee.

NOTE TO FILE: Test all the electrical components BEFORE you assemble those with tiny nuts/bolts.

The servo motor that I used for the tilt part of the device appears to be defective. Of course I found that out after I built the complete unit and torqued all the nuts so that nothing could come loose. Email exchange with the support guys and they will ship me a replacement unit (no cost to me), from England. It should be here in a couple of weeks. The cost of postage will be more than the value of the servo, but it is good that they stand behind their product.