Automated Photo Capture Stand

The derbynet-extras package includes some scripts to support using a Raspberry Pi and a barcode scanner to drive an automated photo capture stand. (See it in action on YouTube.) The photostand.sh script triggers the camera when a barcode is scanned, and uploads the photo and assigns it to a racer.

This document describes setting up such a photo capture station[1].

1. Gather your hardware:

   (a) A Raspberry Pi running Raspberry Pi OS (previously called Raspbian).

   (b) A barcode scanner

   (c) A camera, one of:

      i. A webcam; *OR*

      ii. A digital SLR camera and USB cable; *OR*

      iii. A Canon camera running the “Canon Hack Development Kit” (https://chdk.fandom.com/wiki/CHDK)

2. Install the derbynet-extras package on the Raspberry Pi (see the “Installation- Debian” document for details).

3. Install software to interact with your camera.

   (a) If using a webcam, install fswebcam:

   ```
   sudo apt install -y fswebcam
   ```

   (b) If using a dSLR, install gphoto2:

   ```
   sudo apt install -y gphoto2
   ```

   (c) If using CHDK, install the chdk picture transfer protocol (chdkptp):

      i. Download chdkptp from https://app.assembla.com/spaces/chdkptp/documents. (As of this writing, chdkptp-r964-raspbian-gui.zip is the most recent version for Raspberry Pi OS.)

      ii. Unzip the contents into /opt/chdkptp directory.

      iii. Install LibUSB:

      ```
      sudo apt install -y libusb-0.1-4
      ```

      iv. Make the chdkptp script available as a command:

[1] The shoot-then-scan.sh script is similar to photostand.sh, but allows the operator to take a picture manually, and *then* scan a barcode to upload the photo and assign it to a racer. (Better than trying to capture a smile by scanning a barcode.)

```
sudo ln -s /opt/chdkptp/chdkptp.sh /usr/local/bin/chdkptp
```

(This *must* be a symbolic link, as the script needs to find other files near it.)

4. *Optional but recommended:* If you intend to run "headless," (i.e., without the clutter of a keyboard and monitor), it's useful to connect a speaker to the audio-out jack, and install command line tools for speech synthesis and sound effects to help you understand what the pi is doing:

   ```
   sudo apt install -y flite mpg123
   ```

   (Bringing a keyboard and monitor for on-site troubleshooting is still recommended, even if you hope not to have to use them.)

5. Copy the autostart file into place:

   ```
   mkdir .config/autostart
   cp /usr/share/derbynet/autostart/photostand.desktop .config/autostart/
   ```

6. Edit /etc/derbynet.conf

   (a) Indicate which photo capture software you're using by uncommenting (removing the leading '#' character from) *one* of these three lines:

   ```
   # PHOTO_CAPTURE=gphoto2    # default
   # PHOTO_CAPTURE=chdkptp
   # PHOTO_CAPTURE=fswebcam
   ```

   (b) Indicate whether you're capturing photos of cars or of racers (heads) by uncommenting one of these two lines:

   ```
    # PHOTO_REPO=head
   # PHOTO_REPO=car
   ```

   (c) If you wish, you can have the script check in a racer when the racer's bar code is scanned. Include this line to enable that feature:

   ```
   PHOTO_CHECKIN=1
   ```

   (d) If you really want to get fancy, /etc/derbynet.conf can also include some bash script overrides of functions in photostand.sh and the library files it includes. For example, this function auto-zooms a particular camera using CHDK for a particular photo geometry (YMMV):

   ```
   # Auto-zoom the chdkptp camera for car photo station
   unset prepare_camera_before_shot
   prepare_camera_before_shot() {
         chdkptp -c -e"rec" -e"luar set_zoom(40)"
   }
   ```