

**RED = Important info to pay attention to**

**BLUE = Additional details in another document**

**PURPLE = Linux familiarity necessary**

## Step 1: FLASH-TV Camera Setup

- If the living room is so big that the camera cannot cover all the positions the child can watch TV from, ask the family about the place where the child watches TV from the most to decide on the camera location and angles
  - Try to align the camera with the TV plane
- Set the camera at a height where it can get the best view of facial features like eyes of target child for gaze estimation
- Choose from one of the below camera mounting options (check slides for details)
  - Wall mounting (most preferred)
  - TV top mounting
  - Table top / console top mounting
- Adhesives for mounting (check slides for details)
  - For most cases Command strips should be able to hold the camera
  - Strong adhesives like velcro need to be used on rugged surfaces like stone walls. On drywall it peels off the paint.
  - Wipe the surface with alcohol wipes and wait for the surface to dry fully before attaching the Command strips to the camera
  - Attach the Command strips to the wall then press the camera to make sure the strips are hooked properly
- Check that the camera is connected properly to the housing via USB
  - Run the cheese command to see the camera feed
  - Adjust the camera angle to best cover the places that the child watches TV from
  - Use the foam wedges to restrict the freedom of movement of the camera (check slides for details)

## Step 2: FLASH-TV Housing Setup

- Find a place for the housing near the camera
- Connect the power plug of the housing to the source (use power extension cords if necessary), this should boot the device directly
- Connect the monitor to the same power source or extension cord as the housing
- Connect the monitor to HDMI output from the housing
- Log into the device and test the internet connection and time synchronization
- Make sure all the service files are stopped and disabled just in case
  - Run stop\_services.sh or do it manually by copy pasting the commands from it

### Step 3: Bluetooth Smart Plug Connection to Home Assistant

- Home Assistant should have already been partly configured before going to the family's home using the first part of [Home\\_Assistant\\_Usage.pdf](#) in the [flash-tv-scripts](#) folder
  - Make sure that those steps have been done by making sure that the `~/homeassistant` folder exists and has full read and write permissions
  - Continue by following the "At Homes" section of [Home\\_Assistant\\_Usage.pdf](#), the steps are reproduced here just in case
- Take out the plug from the box and note the four character ID of the smart plug written on the side
  - Convert the ID to lowercase for the next step
  - Put the plug into a socket and plug the TV into it
- **THIS STEP IS VERY IMPORTANT FOR FUTURE STEPS AS WELL**, run [participant\\_change.sh](#) and correctly enter the ID for the plug (lowercase), device, and family when prompted, making sure there are NO TYPOS.
  - Open "configuration.yaml" in the "`~/homeassistant`" folder and make sure that the lowercase plug ID is copied to the correct line
- Start the Home Assistant service ("`sudo systemctl start homeassistant-run-on-boot.service`") and make sure there are no relevant errors
- Open the internet browser and enter "localhost:8123" into the address bar
  - This should open the Home Assistant interface, you might need to login
- Now we need to make sure that the smart plug is detected
  - Click Settings on the bottom left
  - Click Devices & Services
  - Look for "Plug Mini YYYY SwitchBot" where YYYY is the alphanumeric ID labeled on the side of the plug
  - If the smart plug does not show up, try pressing the button on its side to make sure it's turned on (there should be a white LED light visible)
- Click Configure and set up the smart plug
  - Set the area to whatever matches, you can name a new area if necessary
- Now make sure that the power data is coming in
  - Click the "History" tab on the middle left
  - Click "Choose entity"
  - Select the option that looks like "Plug Mini YYYY Power"
  - If the data is coming in as expected, continue, otherwise troubleshoot
- Start the Home Assistant service again ("`sudo systemctl start homeassistant-run-on-boot.service`") and make sure there are no relevant errors
- Look for and open "123XXX\_tv\_power\_5s.csv" in "`~/data/123XXX_data`" to make sure the .csv log is being written

### Step 3: FLASH-TV Gallery Building

- Ideally this only needs to be done for one device and then the faces can be transferred as explained in the steps below
- Make sure that there is a folder named `123XXX\_data` where 123 is the family ID and XXX is the device ID in the Home > data folder (/home/flashsysXXX/data)
  - If the folder isn't there, then full\_initial\_configuration.sh was not run properly or you need to run participant\_change.sh to update the IDs
  - DO NOT manually create or rename the folder, run participant\_change.sh and enter the new family ID (or run full\_initial\_configuration.sh if there are other issues)
- Now start the gallery building
  - From runtime\_scripts run the build\_gallery.sh script
  - Check slides for further instructions
    - Press `t` to track target child face
    - Press `s` to track sibling face
    - Press `p` to track parent face
    - Press `u` to untrack face
    - Press `q` to quit/close the program
- Select the faces
  - They should be in Home > data > 123XXX\_data > 123XXX\_face\_crops (/home/flashsysXXX/data/123XXX\_data/123XXX\_face\_crops)
    - parent\_faces, sib\_faces, tc\_faces
  - Select 5 faces for each identity (slides for instructions)
    - Put them in sib\_faces\_selected, tc\_faces\_selected, par\_faces\_selected
- Note that sometimes there might not be 3 identities in the family (maybe only the mom and child are participating)
  - In this case, you will end up with less than 3 identities for gallery building
  - Use the gallery images in Home > flash-tv-scripts > filler\_faces (/home/flashsysXXX/flash-tv-scripts/filler\_faces) as substitutes for missing identities
    - Copy the respective filler face images (5 of them) into the real missing identity folder (for example from the sib folder to the sib\_selected folder in 123XXX\_face\_crops folder)
- Rename the faces for the FLASH\_TV set up (slides for instructions)
  - From runtime\_scripts, run create\_faces.sh
  - The 123XXX\_faces folder should be copied into the 123XXX\_data folder automatically
    - Verify this

- The target child's images should be named 123XXX\_tc1.png through 123XXX\_tc5.png
- For the sibling, 123XXX\_sib1.png through 123XXX\_sib5.png
- For the parent, 123XXX\_parent1.png through 123XXX\_parent5.png
- Copy the gallery faces (123XXX\_faces) onto an external storage medium in order to copy them onto any other Jetsons being used for the current participant

### Step 3b: Copying Faces onto Current Participant's Other Jetsons

- To properly copy the face images (only onto the current participant's Jetsons)
  - From the external storage medium, select the 123XXX\_faces folder and copy it into the Home > data > 123YYY\_data folder (/home/flashsysYYY/data/123YYY\_data) of the new device
    - XXX is the ID of the device you took the faces FROM
    - YYY is the ID of the device you are copying the faces TO
    - 123 is the family ID that matches the file and folder names on all of the devices being used for the current participant
    - If the 123YYY\_data folder isn't there, then full\_initial\_configuration.sh was not run properly or you need to run participant\_change.sh to update the IDs
  - From runtime\_scripts, run face\_id\_transfer.sh
    - When prompted, enter the ID of the device you are transferring faces FROM, the one with ID XXX, this should be the same as the ID in the name of the faces folder on the external storage medium
    - When prompted, enter the ID of the device you are transferring faces TO, the one with ID YYY, this should be the same as the ID of the device that you are currently setting up
    - Go to the Home > data > 123YYY\_data folder (/home/flashsysYYY/data/123YYY\_data) and make sure the 123XXX\_faces folder has been renamed to 123YYY\_faces and the images inside it have been renamed as well
  - Once the 123XXX\_faces folder has been properly copied and set up on all of the devices being used for the current participant, continue

## Step 5a: FLASH-TV Gaze Estimation Test (with image output)

- This must be tested on every device being used for the current participant after the above steps have been completed
- Stop and disable the service files
  - Run `stop_services.sh` or do it manually by copy pasting the commands from it
- Run `run_flashtv_system.sh` from the `runtime_scripts` folder (check the slides for details)
- It will take 4-5 mins for the algorithm to start
- Make sure the target child is present in front of the camera and watching TV during this time
- Use this time to go set up the camera and housing in the other room
- Once you start seeing the gaze output log make sure the recent timestamp is not too delayed from the current time
  - The expected delay is about 4-5 secs
- Check that everything is running correctly (check the slides for details)
  - Go to `Home > data > 123XXX_data > 123XXX_test_res`  
(`/home/flashsysXXX/data/123XXX_data/123XXX_test_res`)
    - Check if FLASH-TV picked up the correct target child in the images
    - If not, make sure the gallery is built correctly
      - The target child's images should be named correctly and present in the expected location
    - Check if the gaze estimated directions make sense
      - Red arrows pointing the direction the child is looking at should mostly correspond with their actual gaze
  - Go to the data folder and check the `123XXX_flash_log_timestamp.txt` file
    - Every 20 secs the gaze log is dumped into this file
    - See if it is written as expected (see slides for details)
  - Stop the script `run_flashtv_system.sh`
    - Press Ctrl+C on the terminal and close and kill the terminal if it doesn't exit
- Now Shift+Delete the test results images folder (`123XXX_test_res`) and proceed to the next step

## Step 5b: FLASH-TV Long-Term Service Setup (without image output)

- This must be set up on every device being used for the current participant after the above steps have been completed
- Make sure that all of the relevant service files (flash-run-on-boot.service, flash-periodic-restart.service, homeassistant-run-on-boot.service) are located in /etc/systemd/system and open them in a text editor to make sure that the device ID and family ID values are correct in all of the folder paths
  - If they are not, then full\_initial\_configuration.sh was not run properly or you need to run participant\_change.sh in the flash-tv-scripts folder
- Start and test the services
  - Run test\_services.sh or do it manually by copy pasting the commands from it
- It will take 4-5 mins for the FLASH-TV algorithms to start again
  - Make sure the target child is present in front of the camera and watching TV during this time
  - Use this time to work on setting up the other FLASH-TV system
- Check the service status of flash-run-on-boot
  - sudo systemctl status flash-run-on-boot.service
  - Around 1 min 30 secs you should see the camera turning on (LEDs)
  - Around 2 min 50 secs the log file will be created
  - Around 3 min 20 secs you should see data logging in the log files
- Once the algorithm starts logging the gaze, check the FLASH-TV logs
  - Open Home > data > 123XXX\_data > 123XXX\_flash\_log\_timestamp.txt (/home/flashesysXXX/data/123XXX\_data/123XXX\_flash\_log\_timestamp.txt where "timestamp" will be the time the log was initialized)
    - Every 20 secs the gaze log is dumped into this file
    - See if the timestamped data is populated every 20 secs

## Step 6: FLASH-TV Final Exit Steps

- Make sure that the Wi-Fi is turned off
- Lock the screen
- Disconnect the monitor HDMI output and the USB hub (keyboard and mouse)
- Close the lid on the housing and fix the screws
- Make sure that the camera is on and if not, check for any loose cables
  - Once the cables have been fixed the camera should turn on again in 4-5 mins automatically, make sure this happens
- Leave instructions for the family to let the study team know if the camera turns off for more than 20 minutes