

NOSTR AFRICA · SETUP GUIDE

Setting Up AI Attendance at a New School

A practical, step-by-step guide to preparing, installing, piloting and running face-recognition attendance with the dashboard at attendance.nostr.africa.

School administrators

Principals & teachers

The person installing it

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HOW TO USE THIS GUIDE

Read sections 1–3 before buying or mounting anything. Follow section 4 on setup day. Keep sections 6 and 8 handy for staff, and print the one-page checklist in section 10 for the go-live meeting. Words in **purple** are the exact labels you will see on screen.

1 What the system does (and doesn't)

Cameras watch doorways and classrooms; the system recognises enrolled students' faces and records attendance automatically. Staff check and correct it on a web dashboard.

Dashboard: <https://attendance.nostr.africa>

Top menu: [Live](#) [Events](#) [Reports](#) [Students](#) [Cameras](#) [Users](#) [Settings](#) [Audit](#) [Log out](#)

What it does

- ✓ Recognises enrolled students from IP cameras or video files.
- ✓ Logs **entry** and **exit** times from Entrance/Exit cameras and works out **dwell time** (time on site).
- ✓ Shows a live view of recent events, camera status and a "present today" count.
- ✓ Lets staff mark students present/absent by hand, with a required note.
- ✓ Produces reports by class, student and date range — download as CSV or print / save as PDF.
- ✓ Keeps an audit log of logins, enrollments, corrections, exports and settings changes.
- ✓ Stores no video or camera frames.

What it doesn't do (yet)

- ✗ Exam invigilation / exam monitoring.
- ✗ Strong anti-spoofing: it only requires a face to match across several frames, so **a printed photo may fool it**.
- ✗ Restrict teachers to their own classes — teachers currently see all classes.
- ✗ Built-in PDF export (use the browser's print to PDF instead).
- ✗ Take enrollment photos straight from a camera — photos are uploaded.

How recognition works, in plain English

- 1 When you enroll a student, the system turns their photos into a **face fingerprint** — a list of 512 numbers. The photos themselves are then thrown away.
- 2 Each camera is checked about **5 times per second**. Every face it finds is compared with the enrolled fingerprints.
- 3 A student is only logged when their face matches well (similarity of **0.45 or more**) in **3 of the last 5 frames**. This avoids one-off lucky or unlucky matches.
- 4 The same student is not logged again on the same camera for **5 minutes** (the "cooldown"), so standing in a doorway doesn't create dozens of records.

WHO CAN DO WHAT

Role	Can do
Admin	Everything, including cameras, users, settings and enrollment.
Principal	View, reports, and the audit log.
Teacher	View, reports, and manual corrections. (Not yet limited to their own classes.)

2 Before you start

Face recognition handles sensitive personal data about children. Sort out these five things before a single camera is switched on.

- 1 **Get consent from students and parents — this is required.** Explain what is recorded (a face fingerprint, attendance times, optionally a small thumbnail), why, who can see it and how long it is kept. Keep a record of who has consented, and only enroll students who have.
- 2 **Put up notice signs near every camera.** Anyone walking past should know that face recognition is in use for attendance.
- 3 **Decide how long to keep attendance data.** The system automatically deletes events older than `retention_days` (default **365 days**). Agree the right period with school leadership and set it on the [Settings](#) page.
- 4 **Check your local data-protection law.** Many countries have specific rules for biometric data and children's data. Confirm what applies to your school (for example registration, a responsible officer, or a written assessment) before going live.
- 5 **Decide who will be admin.** The admin can see and change everything. Keep it to one or two trusted people; everyone else gets a teacher or principal account.

WARNING

Do not enroll any student without consent, and do not rely on the system as a security barrier. It can be fooled by a printed photo and is designed for attendance, not access control.

TIP

Use the facts in section 7 (Privacy & data handling) as the basis for your parent letter — it lists exactly what is kept and what is not.

3 Camera & network checklist

Good recognition is 80% camera placement and lighting. Walk through this list with your camera installer.

Requirement	Why / what to check
RTSP-capable IP cameras	The system reads camera streams over RTSP. Most Hikvision and Dahua IP cameras support this.
720p resolution or better	Faces need enough pixels to be recognised. (You will still connect the lower-resolution <i>substream</i> to save CPU — see step 4c.)
Entrance cameras at face / eye level	The camera should see faces straight on as students walk towards it — not the tops of heads from a high ceiling.
Good light on the front of faces	Faces must be lit from the front. Dim corridors cause missed students.
Avoid backlight	Don't point a camera at a bright doorway or window — faces turn into dark silhouettes.

Camera network reachable from the server	The server must be able to connect to each camera's IP address. Ask your installer/IT to confirm this.
RTSP username & password	Get these from the installer for every camera, together with its IP address.

Where to put cameras

- **Entrance** — logs when a student **arrives**. Start here: one entrance camera is enough for a pilot.
- **Exit** — logs when a student **leaves**. With both Entrance and Exit cameras you get entry time, exit time and dwell time.
- **Classroom** — logs that a student was seen in that room.

TIP

A narrow doorway where students walk one or two at a time towards the camera works much better than a wide, crowded gate.

SERVER CAPACITY

The current server (20 CPU cores, no GPU) handles about 5 frames per second per camera and uses about 2 CPU cores per active camera. That is fine for a **pilot of about 2–4 cameras**. See section 9 before going past about 6–8 cameras.

4 Step-by-step setup

Follow steps a–g in order. Plan for one entrance camera and one pilot class first; add more once the pilot works well.

a Log in, handle the admin account, delete demo data

- 1 Open <https://attendance.nostr.africa> in a web browser.
- 2 Log in with username `admin`. The admin password is kept by the system owner on the server — get it from them directly. There is no public signup.
- 3 Agree who holds the admin password and store it somewhere safe (for example a password manager). Don't share the admin login for daily use — create individual accounts in step b.
- 4 Go to [Students](#). You will see a class called **DEMO** with 4 test people. **Delete all four** before going live.

WARNING

If the DEMO people are left in, they will show up in your counts and reports. Removing them is on the go-live checklist.

b Create staff accounts

- 1 Go to [Users](#) and find [Add or update user](#).
- 2 Enter a **username** and **password** for the staff member.
- 3 Choose the **role**: **teacher**, **principal** or **admin** (see the table in section 1).
- 4 Click [Save](#). To remove someone, use [Delete](#).

TIP

Give every person their own account. The [Audit](#) page records who did what, which only helps if logins aren't shared.

c Add the first entrance camera

- 1 Go to [Cameras](#) and find [Add camera or video](#).
- 2 **Name**: something staff will recognise, e.g. "Main gate".
- 3 **URL**: the camera's RTSP address. Use the camera's **lower-resolution substream** to save CPU:

Brand	RTSP URL (substream)
Hikvision	<code>rtsp://user:pass@IP:554/Streaming/Channels/102</code>
Dahua	<code>rtsp://user:pass@IP:554/cam/realmonitor?channel=1&subtype=1</code>

Replace `user`, `pass` and `IP` with the details from your installer.

- 4 **Zone**: choose **Entrance** (logs entry). Other options are **Exit** (logs exit) and **Classroom**.
- 5 Submit the form, then open [Live](#). Check the new camera appears in camera status with an **fps** figure (frames per second, around 5). If it does, the system is receiving the video.

GOOD TO KNOW

- Camera passwords are hidden on the page once saved.
- If a camera drops its connection, the system retries automatically.
- Cameras can be switched on or off on the [Cameras](#) page — handy for holidays or maintenance.
- No camera yet? A video file works too: put it in `/home/jb/attendance/media/` on the server and enter `/media/name.mp4` as the URL.

d Enroll a pilot class

- 1 Go to [Students](#) and find [Enroll a student](#).
- 2 Enter the student's **name**, **student ID** and **class**.
- 3 Upload **5–10 photos** with **only that student's face** in each.
- 4 Submit the form. Photos with no face, or with several faces, are rejected with a message — replace them and try again.
- 5 Repeat for each student in the pilot class (only those with consent).

PHOTO TIPS — THIS MATTERS MOST

- **5–10 photos** per student, from **slightly different angles** (straight on, a little left, right, up, down).
- **Good, even light** on the face; no strong shadows or bright window behind.
- **No hats or sunglasses**; the full face visible.
- **Ideally taken at the camera's angle** — e.g. standing where students walk past the entrance camera, at that height.
- Only one face per photo; crop out friends in the background.

ADDING MORE PHOTOS LATER

Enrolling again with the **same student ID** adds the new photos to the existing student instead of creating a duplicate. Photos are discarded after processing; only the face fingerprint (and optionally one small thumbnail) is kept.

e Watch Live as students walk in

- 1 On the first pilot morning, open [Live](#) on a screen near the entrance (it refreshes every 5 seconds).
- 2 Watch **recent events** appear as students arrive, and the **present today** count go up.
- 3 Keep an eye on camera status: **fps**, **faces seen** and **unknown faces**. Lots of unknown faces from enrolled students means photos or camera position need work (section 5).
- 4 Note any student who walked in but wasn't logged — you will fix them in the next step.

f Review Events and make corrections

- 1 Go to [Events](#) and look through today's records.
- 2 For a missed student, use **Manual correction**: pick the student, choose [Mark present](#) or [Mark absent](#), choose [Entry](#) or [Exit](#), type a **reason/note** (required), then [Save](#).
- 3 For a wrong or duplicate record, click [Void](#) to cancel it. Changed your mind? Click [Restore](#).

TIP

Write useful notes ("arrived late with parent", "camera offline 8:00–8:20"). Every correction appears in the audit log.

g Run Reports and export

- 1 Go to [Reports](#). Filter by **class**, **student** and **date range**.
- 2 Read the results: present/absent, first and last seen, and dwell time.
- 3 Click [Download CSV](#) to open it in a spreadsheet, or [Print / save as PDF](#) to print or save it through your browser.

5 Tuning in week 1

The pilot test went well, but real cameras are harder than a test clip. Treat the first week as the real test and adjust based on what you see.

WHAT THE PILOT TEST SHOWED

On a 60-second test clip built from a public research photo set (LFW), all 4 enrolled people were recognised, with no false matches and no duplicates. Real entrances have crowds, bad light and odd angles — expect to tune.

Problem: wrong student logged (false match)

- Raise `match_threshold` on [Settings](#) a little (default 0.45; higher = stricter).
- Void the wrong events on [Events](#).
- Change one thing at a time and watch for a day.

Problem: students missed

- Add more and better photos (same student ID adds to existing).
- Lower `match_threshold` slightly — small steps only.
- Check `min_face_px` isn't ignoring faces that are too small.
- Improve camera placement and lighting (section 3).

The settings you can change

All of these are on [Settings](#) → [Recognition & privacy settings](#). Changes are recorded in the audit log.

Setting	What it means
<code>match_threshold</code>	How close a face must be to count as a match. Default 0.45 ; higher = stricter (fewer false matches, more missed students).
<code>vote_frames</code>	How many frames must match before logging (3 in the default "3 of the last 5").
<code>vote_window</code>	How many recent frames are considered (5 in the default "3 of the last 5").
<code>cooldown_seconds</code>	How long before the same student can be logged again on the same camera (5 minutes by default).
<code>process_fps</code>	Frames analysed per second per camera (about 5). Lower uses less CPU.
<code>min_face_px</code>	Faces smaller than this (in pixels) are ignored.
<code>retention_days</code>	Events older than this are deleted automatically. Default 365 .
<code>keep_thumbnail</code>	1 = keep one small thumbnail per student; 0 = keep none.

STILL NOT ACCURATE ENOUGH?

The system can switch to a more accurate face model, **buffalo_l**, with one server setting. The catch: **everyone must be re-enrolled** afterwards, and it needs more computing power. Decide early — ideally before enrolling the whole school. See the appendix.

6 Daily & weekly routine for staff

A few minutes a day keeps the records accurate. The system is an assistant, not the final word — a teacher's correction always wins.

Every morning

- ☐ Open [Live](#); check every camera shows an fps figure.
- ☐ Watch the **present today** count rise during arrival.
- ☐ Note students you know arrived but aren't shown.

After arrival / end of day

- ☐ Review [Events](#); fix missed students with [Mark present](#) / [Mark absent](#) plus a note.
- ☐ [Void](#) wrong or duplicate records.
- ☐ Run today's report on [Reports](#) if your school needs a daily register.

Every week

- ☐ [Download CSV](#) or [Print / save as PDF](#) the weekly report.
- ☐ Principal reviews the [Audit](#) page: logins, corrections, exports, settings changes.
- ☐ Enroll new students (with consent); add photos for students who are often missed.
- ☐ Remove students who have left on [Students](#).
- ☐ Delete accounts for staff who have left on [Users](#).
- ☐ Check for students who are often missed or often wrongly logged; adjust per section 5.

7 Privacy & data handling summary

What is kept

- Name, student ID and class.
- A face fingerprint (embedding): 512 numbers, not a photo.
- Optionally one small thumbnail per student (`keep_thumbnail` = 1; set 0 for none).
- Attendance events (entry/exit times, corrections and notes) — deleted automatically after `retention_days` (default 365).
- An audit log of logins, enrollments, corrections, exports and settings changes.

What is not kept

- No video recordings.
- No camera frames.
- Enrollment photos are discarded after processing.
- Camera passwords are hidden on the dashboard.

Your responsibilities

- Collect and record consent before enrolling; put notice signs near cameras.
- Give access only to people who need it, with the lowest role that works. Remember teachers can currently see all classes.
- Treat CSV and PDF exports as personal data: store them securely and delete them when no longer needed — the automatic retention only covers data inside the system.
- Follow your local data-protection law and the retention period you agreed.
- Remove students who leave, or whose parents withdraw consent.

8 Troubleshooting

Most problems come down to the camera connection, lighting, or enrollment photos.

Problem	Likely cause	What to do
Camera offline / no fps on Live	Camera off or unplugged; network can't reach it; wrong URL, username or password; camera switched off in the dashboard.	Check the camera has power and the server can reach its IP. Re-check the RTSP URL format and credentials from the installer. Check the camera is switched on on Cameras . Short drop-outs reconnect automatically.
Camera works but no faces detected	Camera too high or far away; backlight; dim light; faces smaller than <code>min_face_px</code> .	Watch faces seen on Live . Move the camera to face/eye level, closer to where students walk, with light on their faces. Check <code>min_face_px</code> .
A student is never recognised	Not enrolled, or poor/too few photos; photos from a very different angle; threshold too strict.	Check they're on Students . Add 5–10 better photos with the same student ID, ideally at the camera's angle. If many students are missed, lower <code>match_threshold</code> slightly. Mark them present by hand meanwhile.
Wrong student logged	Threshold too loose; similar-looking students; poor photos.	Void the event. Raise <code>match_threshold</code> slightly. Improve the photos for both students. Consider <code>buffalo_l</code> (section 5).
Duplicate logs	Student seen by more than one camera (each camera logs separately); <code>cooldown_seconds</code> too short; same person enrolled twice under different student IDs.	Void duplicates on Events . Check <code>cooldown_seconds</code> (default 5 minutes). Make sure each student has only one student ID.
Server slow / Live lagging	Too many active cameras for the CPU (~2 cores each); main stream used instead of substream.	Use each camera's substream URL. Switch off unused cameras. Lower <code>process_fps</code> . Plan a GPU before going past about 6–8 cameras.
Photo rejected at enrollment	No face found, or more than one face.	Use a clear photo with only that student's face, well lit, no hat or sunglasses.

9 Scaling up & what's coming later

Growing from pilot to whole school

- 1 **Prove the pilot first:** one entrance camera, one class, at least a week of good results with few corrections.
- 2 **Decide on the face model** before enrolling everyone. Moving to the more accurate **buffalo_I** is one server setting but requires re-enrolling every student.
- 3 **Add cameras gradually.** Each active camera uses about 2 CPU cores at ~5 frames/sec. The current server (20 cores, no GPU) is fine for about 2–4 cameras.
- 4 **Plan an NVIDIA GPU** before going past about **6–8 cameras**, or before adding exam monitoring once it exists.
- 5 **Enroll class by class**, collecting consent as you go, and watch [Live](#) each time a new class starts.

CAPACITY AT A GLANCE

Setup	Current server (20 CPU cores, no GPU)
1 camera	~5 frames/sec, ~2 CPU cores
2–4 cameras	Fine for a pilot
Beyond ~6–8 cameras	Plan an NVIDIA GPU first

Not built yet

These features are not available today. Don't plan school processes that depend on them:

- Exam invigilation.
- Anti-spoofing beyond multi-frame matching (a printed photo may fool the system).
- Restricting teachers to their own classes.
- Built-in PDF export (use [Print / save as PDF](#) through the browser).
- Capturing enrollment photos straight from a camera.

10 Go-live checklist

Print this page and tick each item at your go-live meeting.

PERMISSIONS & POLICY

- ☐ Consent collected and recorded for every enrolled student
- ☐ Parent/student information letter sent
- ☐ Notice signs posted near every camera
- ☐ Local data-protection requirements checked
- ☐ Retention period agreed and `retention_days` set
- ☐ `keep_thumbnail` decision made (1 or 0)

ACCOUNTS

- ☐ Admin password held safely by agreed person(s)
- ☐ Individual accounts created on [Users](#)
- ☐ Roles checked (teacher / principal / admin)
- ☐ Staff know teachers can see all classes

CAMERAS

- ☐ Entrance camera(s) at face/eye level, front-lit, no backlight
- ☐ Substream RTSP URLs used
- ☐ Correct zone set (Classroom / Entrance / Exit)
- ☐ Every camera shows fps on [Live](#)
- ☐ Number of cameras within server capacity

DATA

- ☐ DEMO class and its 4 test people deleted
- ☐ Face model decided (`buffalo_sc` or `buffalo_l`) before full enrollment
- ☐ Pilot class enrolled with 5–10 good photos each
- ☐ Student IDs and class names checked for typos

PILOT RESULTS

- ☐ At least one week of pilot running
- ☐ Missed students fixed (photos / threshold / placement)
- ☐ False matches reviewed; `match_threshold` tuned
- ☐ Duplicate logs checked
- ☐ Report run and CSV / PDF export tested

ROUTINE

- ☐ Staff trained on [Live](#), [Events](#), [Reports](#)
- ☐ Staff know how to make manual corrections with a note
- ☐ Person named for daily Events review
- ☐ Principal scheduled for weekly [Audit](#) review
- ☐ Process for new students and leavers agreed

Approved by (name & role)

Signature

Go-live date

A Appendix: technical notes

For the person installing or maintaining the server.

Stack

Everything lives in `/home/jb/attendance` on the server and runs as three Docker services:

Service	Role
<code>att-db</code>	PostgreSQL with pgvector — stores students, face embeddings, events, settings and the audit log.
<code>att-api</code>	FastAPI — serves the web dashboard at <code>attendance.nostr.africa</code> .
<code>att-worker</code>	Video processing — reads camera streams/files, detects and recognises faces, writes events.

To (re)start the stack, from `/home/jb/attendance` run:

```
docker compose up -d
```

Recognition pipeline

- InsightFace: **SCRFD** face detector + **ArcFace** 512-dimension face embedding.
- Default model pack **buffalo_sc**, running on CPU.
- Logged when similarity $\geq$ `match_threshold` (0.45) in `vote_frames` of the last `vote_window` frames (3 of 5).
- Per-camera cooldown: `cooldown_seconds` (5 minutes). Entrance/Exit zones give entry/exit times and dwell time.
- No video or frames are stored; enrollment photos are discarded after the embedding is computed.

Changing the face model

The model is set with `FACE_MODEL` in the `.env` file in `/home/jb/attendance`. Switching to `buffalo_l` (more accurate) is one setting, then restart with `docker compose up -d`.

WARNING

Embeddings from different models are not interchangeable. After changing `FACE_MODEL`, **every student must be re-enrolled**. `buffalo_l` is also heavier — check capacity, and plan a GPU for larger installs.

Cameras & media

- Hikvision substream: `rtsp://user:pass@IP:554/Streaming/Channels/102`
- Dahua substream: `rtsp://user:pass@IP:554/cam/realmonitor?channel=1&subtype=1`
- Video files: place in `/home/jb/attendance/media/`, enter `/media/name.mp4` as the URL.
- Lost RTSP connections are retried automatically.

Capacity

Current server: 20 CPU cores, no GPU. ~5 frames/sec per camera (`process_fps`), ~2 CPU cores per active camera. Suitable for a 2–4 camera pilot; add an NVIDIA GPU before going past ~6–8 cameras or adding exam monitoring.