Jupiter Robot Application Startup Guide (Updated)

Target setup: Ubuntu 20.04 + ROS Noetic. Prototype elder-care robot on the JupiterRobot platform, combining an Orbbec Astra RGB-D camera, MediaPipe Pose, multi-level fall-detection logic, local voice alerts and Telegram push notifications.

1 Environment checklist

Item	Requirement
Hardware	Astra RGB-D camera plugged into a USB 3.0 port
Software	source ~/catkin_ws/devel/setup.bash done; packages sound_play, opencv-python, mediapipe, requests installed
Network	Host can reach api.telegram.org
Config	fall_detection_with_telegram_en.launch contains your telegram_token & chat_id
Workflow	Use GNOME Terminal tabs / tmux – keep one pane per step for easy log watching

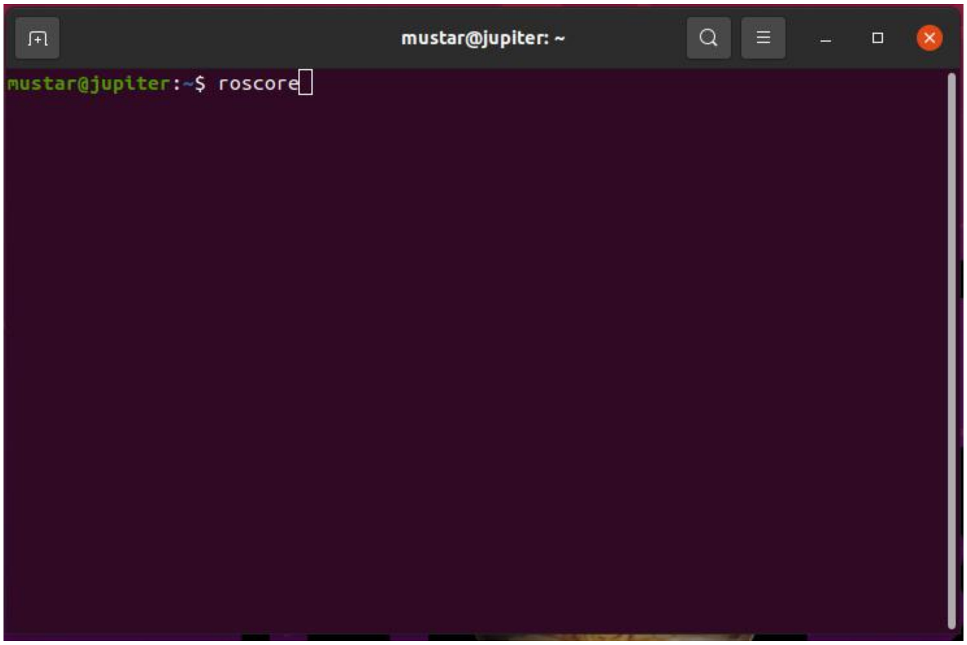
2 Launch sequence at a glance

- Start ROS Master – roscore
- Start Astra camera driver – roslaunch astra_camera astra.launch
- Start MediaPipe Pose node – roslaunch jupiterobot2_vision_mediapipe mediapipe_pose.launch image:=/camera/color/image_raw
- Start sound_play service – rosrun sound_play soundplay_node.py
- Start fall-detection monitor – roslaunch fall_monitor fall_detection_with_telegram_en.launch
- Start optimised fall-detection monitor (v2) – roslaunch fall_monitor fall_detection_with_telegram_en2.launch

3 Step-by-step with screenshots

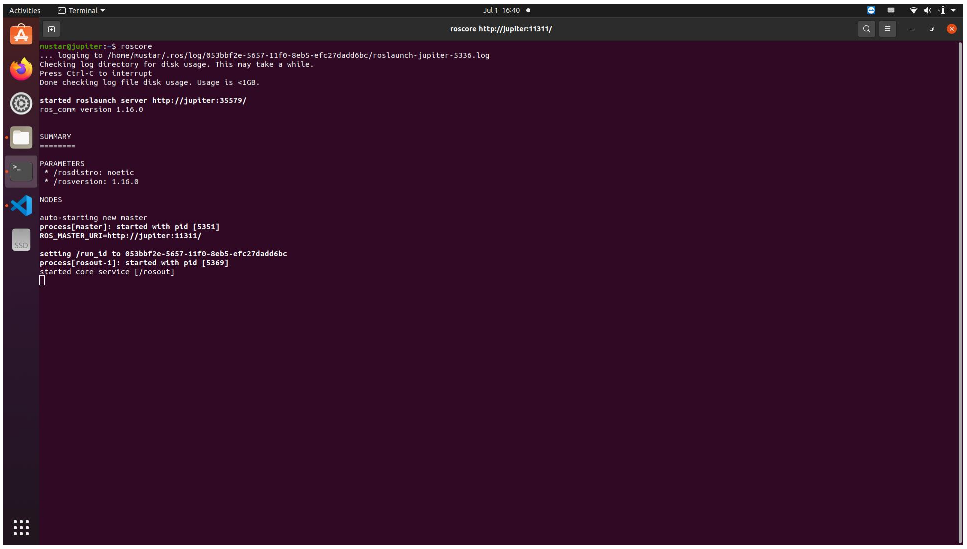
Step 1 — Start roscore

Command:
roscore



```
mustar@jupiter:~$ roscore
```

(Typing command)

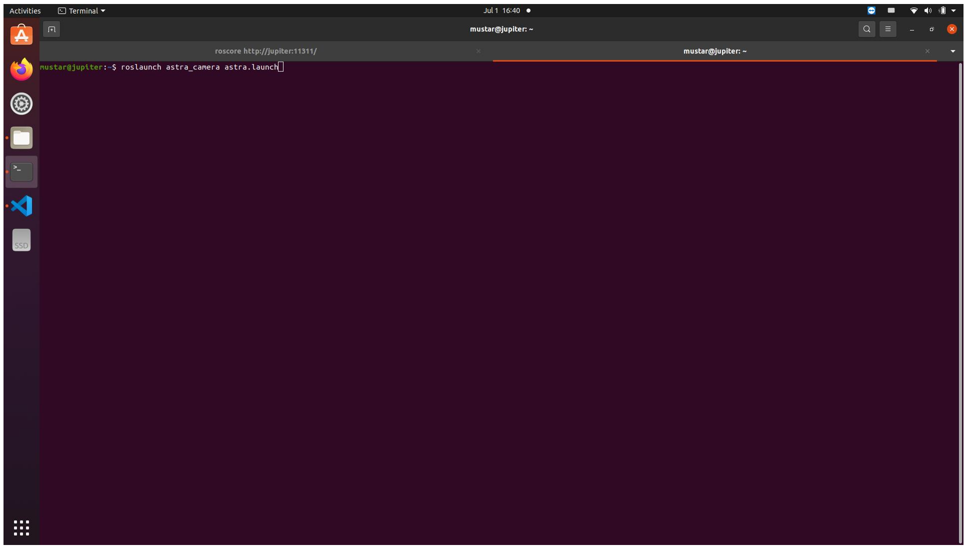


```
mustar@jupiter:~$ roscore
... logging to /home/mustar/.ros/log/053bbf2e-5657-11f0-8eb5-efc27dadd6bc/roslaunch-jupiter-5336.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://jupiter:35579/
ros_comm version 1.16.0


SUMMARY
========

PARAMETERS
 * /rosdistro: noetic
 * /rosversion: 1.16.0

NODES

auto-starting new master
process[master]: started with pid [5351]
ROS_MASTER_URI=http://jupiter:11311/

setting /run_id to 053bbf2e-5657-11f0-8eb5-efc27dadd6bc
process[rosout-1]: started with pid [5369]
started core service [/rosout]
```

(Runtime log)

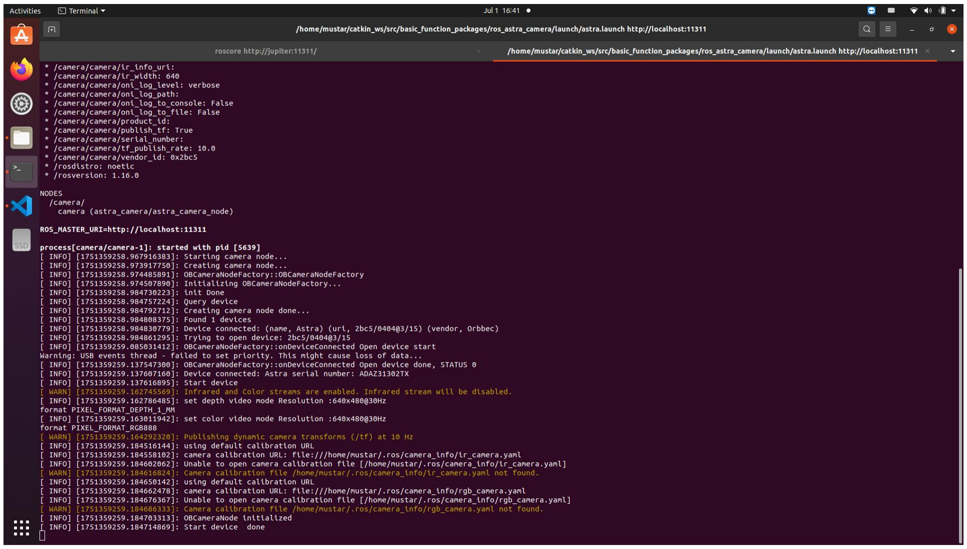
Step 2 — Start the Astra camera driver

Command:
roslaunch astra_camera astra.launch



```
mustar@jupiter:~$ roslaunch astra_camera astra.launch
```

(Typing command)

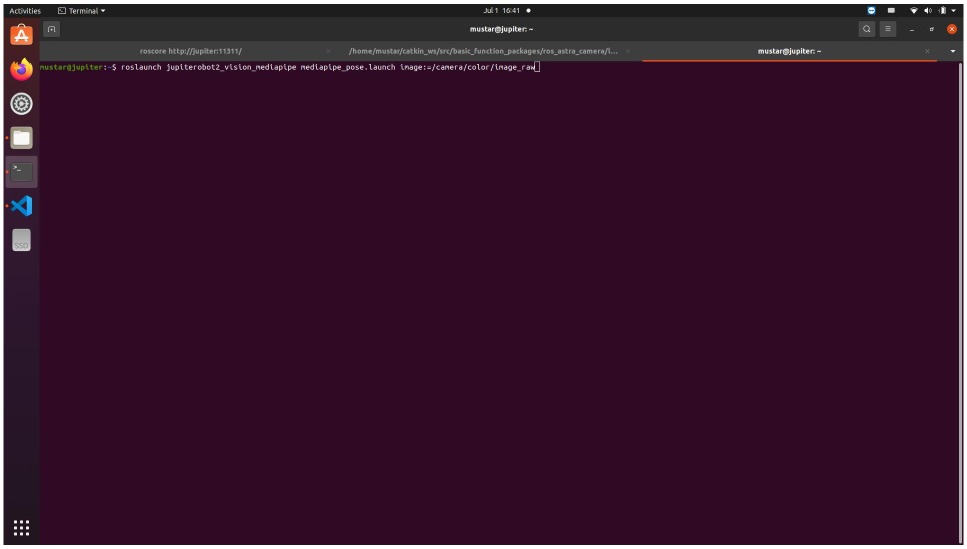

Activities
Terminal
Jul 1 16:41
/home/mustar/catkin_ws/src/basic_function_packages/ros_astra_camera/launch/astra.launch http://localhost:11311
roscore http://jupiter:11311/
/home/mustar/catkin_ws/src/basic_function_packages/ros_astra_camera/launch/astra.launch http://localhost:11311

```
 * /camera/camera/ir_info_uri:
 * /camera/camera/ir_width: 640
 * /camera/camera/oni_log_level: verbose
 * /camera/camera/oni_log_path:
 * /camera/camera/oni_log_to_console: False
 * /camera/camera/oni_log_to_file: False
 * /camera/camera/product_id:
 * /camera/camera/publish_tf: True
 * /camera/camera/serial_number:
 * /camera/camera/tf_publish_rate: 10.0
 * /camera/camera/vendor_id: 0x2bc5
 * /rosdistro: noetic
 * /rosversion: 1.16.0

NODES
  /camera/
    camera (astra_camera/astra_camera_node)

ROS_MASTER_URI=http://localhost:11311

process[camera/camera-1]: started with pid [5639]
[ INFO] [1751359258.967916383]: Starting camera node...
[ INFO] [1751359258.973917750]: Creating camera node...
[ INFO] [1751359258.974485891]: OBCameraNodeFactory::OBCameraNodeFactory
[ INFO] [1751359258.974507890]: Initializing OBCameraNodeFactory...
[ INFO] [1751359258.984730223]: init Done
[ INFO] [1751359258.984757224]: Query device
[ INFO] [1751359258.984792712]: Creating camera node done...
[ INFO] [1751359258.984808375]: Found 1 devices
[ INFO] [1751359258.984830779]: Device connected: (name, Astra) (uri, 2bc5/0404@3/15) (vendor, Orbbec)
[ INFO] [1751359258.984861295]: Trying to open device: 2bc5/0404@3/15
[ INFO] [1751359259.085031412]: OBCameraNodeFactory::onDeviceConnected Open device start
Warning: USB events thread - failed to set priority. This might cause loss of data...
[ INFO] [1751359259.137547300]: OBCameraNodeFactory::onDeviceConnected Open device done, STATUS 0
[ INFO] [1751359259.137607160]: Device connected: Astra serial number: ADAZ31302TX
[ INFO] [1751359259.137616895]: Start device
[ WARN] [1751359259.162745569]: Infrared and Color streams are enabled. Infrared stream will be disabled.
[ INFO] [1751359259.162786485]: set depth video mode Resolution :640x480@30Hz
format PIXEL_FORMAT_DEPTH_1_MM
[ INFO] [1751359259.163011942]: set color video mode Resolution :640x480@30Hz
format PIXEL_FORMAT_RGB888
[ WARN] [1751359259.164292320]: Publishing dynamic camera transforms (/tf) at 10 Hz
[ INFO] [1751359259.184516144]: using default calibration URL
[ INFO] [1751359259.184558102]: camera calibration URL: file:///home/mustar/.ros/camera_info/ir_camera.yaml
[ INFO] [1751359259.184602062]: Unable to open camera calibration file [/home/mustar/.ros/camera_info/ir_camera.yaml]
[ WARN] [1751359259.184616824]: Camera calibration file /home/mustar/.ros/camera_info/ir_camera.yaml not found.
[ INFO] [1751359259.184650142]: using default calibration URL
[ INFO] [1751359259.184662478]: camera calibration URL: file:///home/mustar/.ros/camera_info/rgb_camera.yaml
[ INFO] [1751359259.184676367]: Unable to open camera calibration file [/home/mustar/.ros/camera_info/rgb_camera.yaml]
[ WARN] [1751359259.184686333]: Camera calibration file /home/mustar/.ros/camera_info/rgb_camera.yaml not found.
[ INFO] [1751359259.184703313]: OBCameraNode initialized
[ INFO] [1751359259.184714869]: Start device  done
```

(Runtime log)

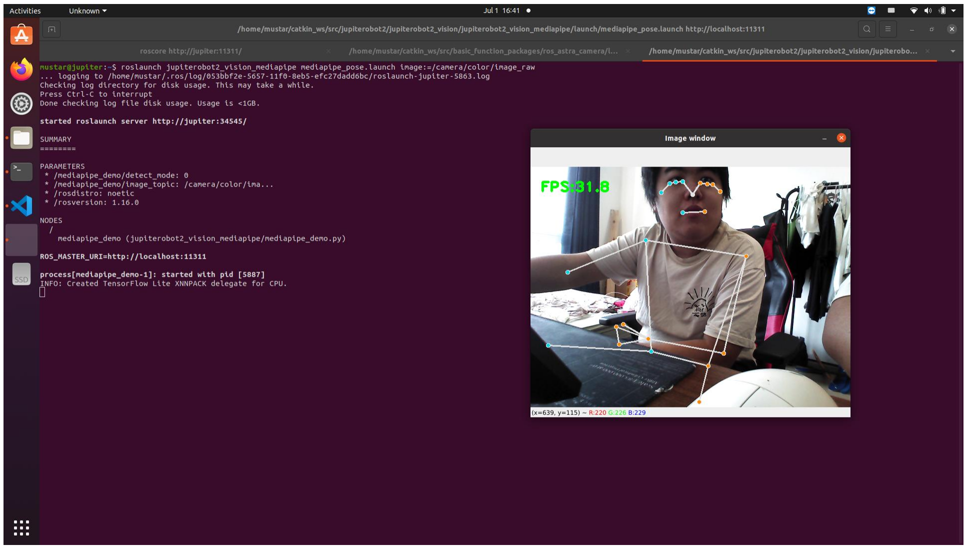
Step 3 — Start the MediaPipe Pose node

Command:
roslaunch jupiterobot2_vision_mediapipe mediapipe_pose.launch image:=/camera/color/image_raw


Activities
Terminal
Jul 1 16:41
mustar@jupiter: ~
roscore http://jupiter:11311/
/home/mustar/catkin_ws/src/basic_function_packages/ros_astra_camera/l...
mustar@jupiter: ~

```
mustar@jupiter:~$ roslaunch jupiterobot2_vision_mediapipe mediapipe_pose.launch image:=/camera/color/image_raw
```

(Typing command)

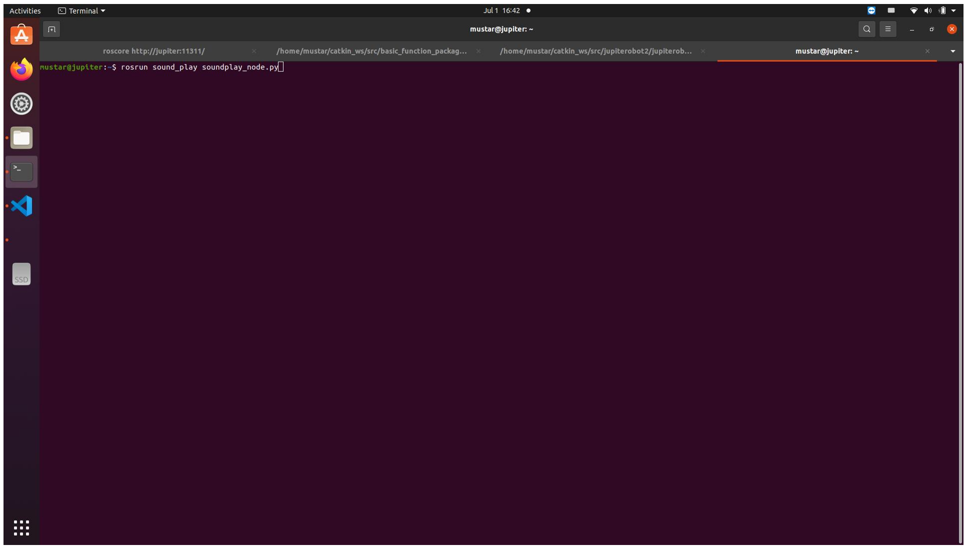

Activities
Unknown
Jul 1 16:41
/home/mustar/catkin_ws/src/jupiterobot2/jupiterobot2_vision/jupiterobot2_vision_mediapipe/launch/mediapipe_pose.launch http://localhost:11311
roscore http://jupiter:11311/
/home/mustar/catkin_ws/src/basic_function_packages/ros_astra_camera/l...
/home/mustar/catkin_ws/src/jupiterobot2/jupiterobot2_vision/jupiterobo...
Image window
FPS:31.8
(x=639, y=115) ~ R:220 G:226 B:229

```
mustar@jupiter:~$ roslaunch jupiterobot2_vision_mediapipe mediapipe_pose.launch image:=/camera/color/image_raw
... logging to /home/mustar/.ros/log/053bbf2e-5657-11f0-8eb5-efc27dadd6bc/roslaunch-jupiter-5863.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://jupiter:34545/

SUMMARY
========

PARAMETERS
 * /mediapipe_demo/detect_mode: 0
 * /mediapipe_demo/image_topic: /camera/color/ima...
 * /rosdistro: noetic
 * /rosversion: 1.16.0

NODES
  /
    mediapipe_demo (jupiterobot2_vision_mediapipe/mediapipe_demo.py)

ROS_MASTER_URI=http://localhost:11311

process[mediapipe_demo-1]: started with pid [5887]
INFO: Created TensorFlow Lite XNNPACK delegate for CPU.
```

(Runtime log)

Step 4 — Start the sound_play service

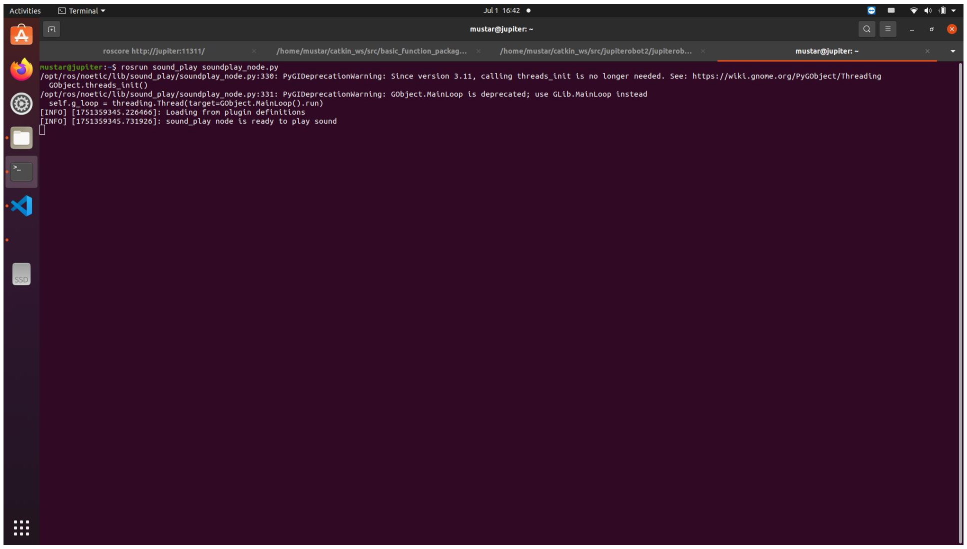
Command:
rosrun sound_play soundplay_node.py



Activities
Terminal
Jul 1 16:42
mustar@jupiter: ~
roscore http://jupiter:11311/
/home/mustar/catkin_ws/src/basic_function_packag...
/home/mustar/catkin_ws/src/jupiterobot2/jupiterob...
mustar@jupiter: ~

```
mustar@jupiter:~$ rosrun sound_play soundplay_node.py
```

(Typing command)



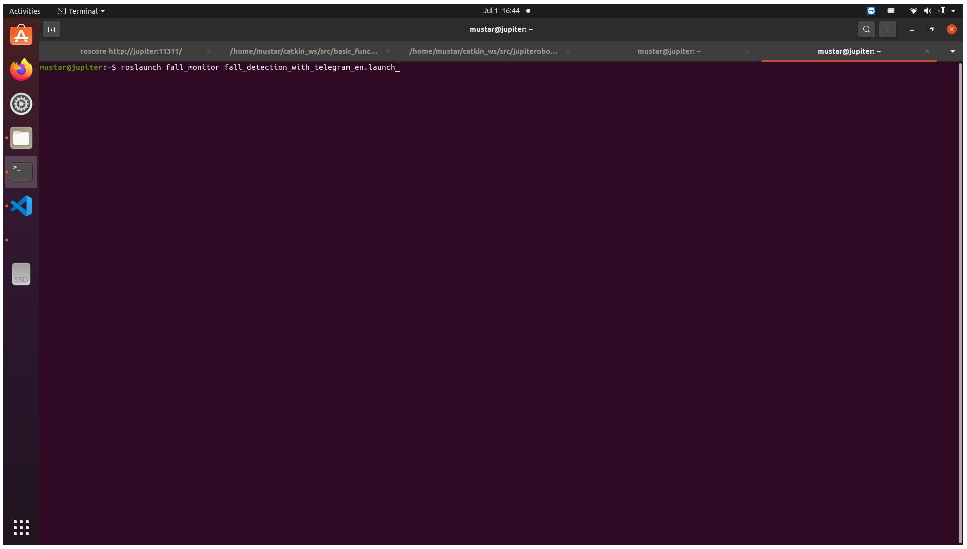
Activities
Terminal
Jul 1 16:42
mustar@jupiter: ~
roscore http://jupiter:11311/
/home/mustar/catkin_ws/src/basic_function_packag...
/home/mustar/catkin_ws/src/jupiterobot2/jupiterob...
mustar@jupiter: ~

```
mustar@jupiter:~$ rosrun sound_play soundplay_node.py
/opt/ros/noetic/lib/sound_play/soundplay_node.py:330: PyGIDeprecationWarning: Since version 3.11, calling threads_init is no longer needed. See: https://wiki.gnome.org/PyGObject/Threading
  GObject.threads_init()
/opt/ros/noetic/lib/sound_play/soundplay_node.py:331: PyGIDeprecationWarning: GObject.MainLoop is deprecated; use GLib.MainLoop instead
  self.g_loop = threading.Thread(target=GObject.MainLoop().run)
[INFO] [1751359345.226466]: Loading from plugin definitions
[INFO] [1751359345.731926]: sound_play node is ready to play sound
```

(Runtime log)

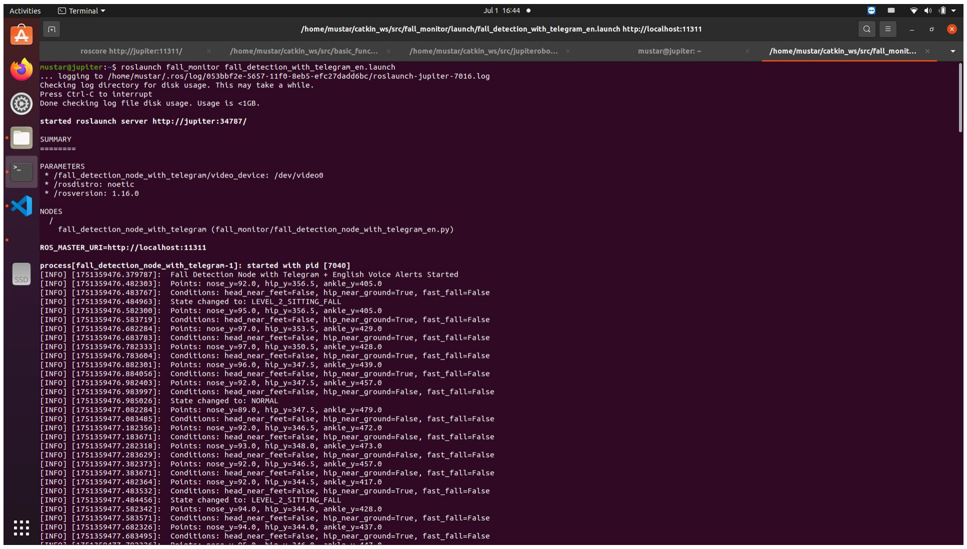
Step 5 — Start the fall-detection monitor

Command:
roslaunch fall_monitor fall_detection_with_telegram_en.launch


Activities
Terminal
Jul 1 16:44
mustar@jupiter: ~
roscore http://jupiter:11311/
/home/mustar/catkin_ws/src/basic_func...
/home/mustar/catkin_ws/src/jupiterobo...
mustar@jupiter: ~
mustar@jupiter: ~
SSD

```
mustar@jupiter:~$ roslaunch fall_monitor fall_detection_with_telegram_en.launch
```

(Typing command)

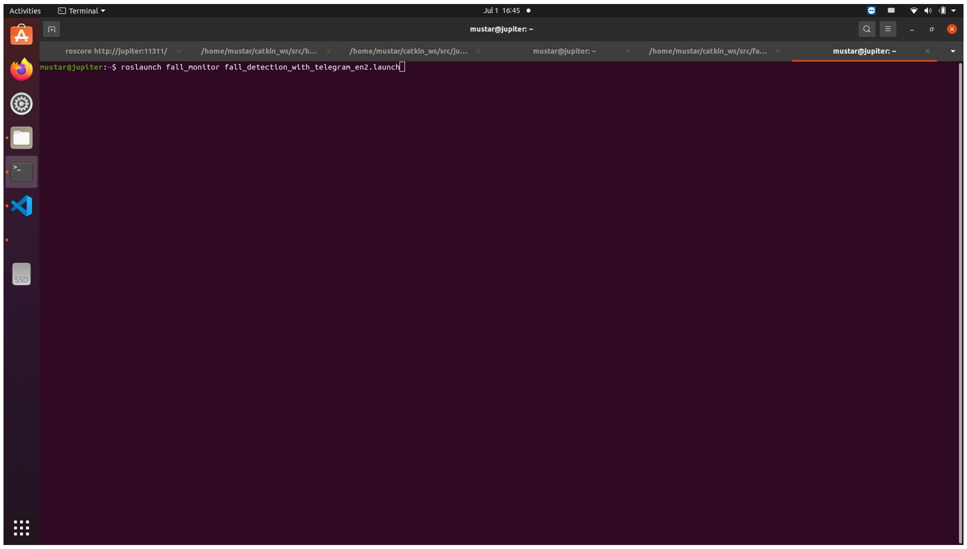

Activities
Terminal
Jul 1 16:44
/home/mustar/catkin_ws/src/fall_monitor/launch/fall_detection_with_telegram_en.launch http://localhost:11311
roscore http://jupiter:11311/
/home/mustar/catkin_ws/src/basic_func...
/home/mustar/catkin_ws/src/jupiterobo...
mustar@jupiter: ~
/home/mustar/catkin_ws/src/fall_monit...
SSD

```
mustar@jupiter:~$ roslaunch fall_monitor fall_detection_with_telegram_en.launch
... logging to /home/mustar/.ros/log/053bbf2e-5657-11f0-8eb5-efc27dadd6bc/roslaunch-jupiter-7016.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://jupiter:34787/

SUMMARY
========

PARAMETERS
 * /fall_detection_node_with_telegram/video_device: /dev/video0
 * /rosdistro: noetic
 * /rosversion: 1.16.0

NODES
  /
    fall_detection_node_with_telegram (fall_monitor/fall_detection_node_with_telegram_en.py)

ROS_MASTER_URI=http://localhost:11311

process[fall_detection_node_with_telegram-1]: started with pid [7040]
[INFO] [1751359476.379787]:  Fall Detection Node with Telegram + English Voice Alerts Started
[INFO] [1751359476.482303]:  Points: nose_y=92.0, hip_y=356.5, ankle_y=405.0
[INFO] [1751359476.483767]:  Conditions: head_near_feet=False, hip_near_ground=True, fast_fall=False
[INFO] [1751359476.484963]:  State changed to: LEVEL_2_SITTING_FALL
[INFO] [1751359476.582300]:  Points: nose_y=95.0, hip_y=356.5, ankle_y=405.0
[INFO] [1751359476.583719]:  Conditions: head_near_feet=False, hip_near_ground=True, fast_fall=False
[INFO] [1751359476.682284]:  Points: nose_y=97.0, hip_y=353.5, ankle_y=429.0
[INFO] [1751359476.683783]:  Conditions: head_near_feet=False, hip_near_ground=True, fast_fall=False
[INFO] [1751359476.782333]:  Points: nose_y=97.0, hip_y=350.5, ankle_y=428.0
[INFO] [1751359476.783604]:  Conditions: head_near_feet=False, hip_near_ground=True, fast_fall=False
[INFO] [1751359476.882301]:  Points: nose_y=96.0, hip_y=347.5, ankle_y=439.0
[INFO] [1751359476.884056]:  Conditions: head_near_feet=False, hip_near_ground=True, fast_fall=False
[INFO] [1751359476.982403]:  Points: nose_y=92.0, hip_y=347.5, ankle_y=457.0
[INFO] [1751359476.983997]:  Conditions: head_near_feet=False, hip_near_ground=False, fast_fall=False
[INFO] [1751359476.985026]:  State changed to: NORMAL
[INFO] [1751359477.082284]:  Points: nose_y=89.0, hip_y=347.5, ankle_y=479.0
[INFO] [1751359477.083485]:  Conditions: head_near_feet=False, hip_near_ground=False, fast_fall=False
[INFO] [1751359477.182356]:  Points: nose_y=92.0, hip_y=346.5, ankle_y=472.0
[INFO] [1751359477.183671]:  Conditions: head_near_feet=False, hip_near_ground=False, fast_fall=False
[INFO] [1751359477.282318]:  Points: nose_y=93.0, hip_y=348.0, ankle_y=473.0
[INFO] [1751359477.283629]:  Conditions: head_near_feet=False, hip_near_ground=False, fast_fall=False
[INFO] [1751359477.382373]:  Points: nose_y=92.0, hip_y=346.5, ankle_y=457.0
[INFO] [1751359477.383671]:  Conditions: head_near_feet=False, hip_near_ground=False, fast_fall=False
[INFO] [1751359477.482364]:  Points: nose_y=92.0, hip_y=344.5, ankle_y=417.0
[INFO] [1751359477.483532]:  Conditions: head_near_feet=False, hip_near_ground=True, fast_fall=False
[INFO] [1751359477.484456]:  State changed to: LEVEL_2_SITTING_FALL
[INFO] [1751359477.582342]:  Points: nose_y=94.0, hip_y=344.0, ankle_y=428.0
[INFO] [1751359477.583571]:  Conditions: head_near_feet=False, hip_near_ground=True, fast_fall=False
[INFO] [1751359477.682326]:  Points: nose_y=94.0, hip_y=344.0, ankle_y=437.0
[INFO] [1751359477.683495]:  Conditions: head_near_feet=False, hip_near_ground=True, fast_fall=False
```

(Runtime log)

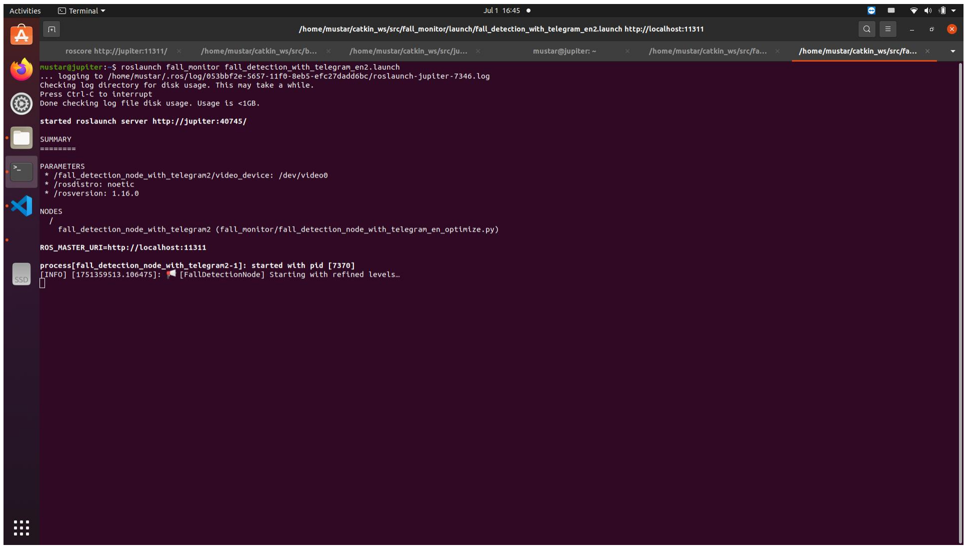
Step 6 — Start the optimised fall-detection monitor (v2)

Command:
roslaunch fall_monitor fall_detection_with_telegram_en2.launch


Activities
Terminal
Jul 1 16:45
mustar@jupiter: ~
roscore http://jupiter:11311/
/home/mustar/catkin_ws/src/b...
/home/mustar/catkin_ws/src/ju...
mustar@jupiter: ~
/home/mustar/catkin_ws/src/fa...
mustar@jupiter: ~
SSD

```
mustar@jupiter:~$ roslaunch fall_monitor fall_detection_with_telegram_en2.launch
```

(Typing command)


Activities
Terminal
Jul 1 16:45
/home/mustar/catkin_ws/src/fall_monitor/launch/fall_detection_with_telegram_en2.launch http://localhost:11311
roscore http://jupiter:11311/
/home/mustar/catkin_ws/src/b...
/home/mustar/catkin_ws/src/ju...
mustar@jupiter: ~
/home/mustar/catkin_ws/src/fa...
/home/mustar/catkin_ws/src/fa...
SSD

```
mustar@jupiter:~$ roslaunch fall_monitor fall_detection_with_telegram_en2.launch
... logging to /home/mustar/.ros/log/053bbf2e-5657-11f0-8eb5-efc27dadd6bc/roslaunch-jupiter-7346.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://jupiter:40745/

SUMMARY
========

PARAMETERS
 * /fall_detection_node_with_telegram2/video_device: /dev/video0
 * /rosdistro: noetic
 * /rosversion: 1.16.0

NODES
  /
    fall_detection_node_with_telegram2 (fall_monitor/fall_detection_node_with_telegram_en_optimize.py)

ROS_MASTER_URI=http://localhost:11311

process[fall_detection_node_with_telegram2-1]: started with pid [7370]
[INFO] [1751359513.106475]: 📢 [FallDetectionNode] Starting with refined levels…
```

(Runtime log)

4 Runtime sanity checks

- - Check nodes with **rqt_graph**
  - Verify camera stream with **rqt_image_view** (topic `/camera/color/image_raw`)
  - Simulate a fall; within ~3 s a Telegram photo and a Level 2/3 alert should appear

5 Common pitfalls & fixes

Symptom	Likely cause	Fix
Cannot open device	USB cable loose / device busy	Re-plug Astra or kill the blocking process
Unable to create calibration file … yaml not found	First-time run	Ignore or later generate calibration YAMLs
No Telegram message	Firewall / wrong token or chat_id	Check Internet route or token values
No audio output	Audio device muted or permission denied	Test with `aplay test.wav`; add user to audio group

6 Graceful shutdown

Press Ctrl + C in each terminal tab (start with fall-detection), then stop roscore.

7 One-click startup tip

Place the six commands above in a bash script `scripts/start_robot.sh` and launch each in its own tmux window. A sample script lives in the repository for reference.