Table 4.1. Use Case Index Table

Project Name: Distracted/Drowsy Driver Detection on Snapdragon Mobile Platform				
Use Case ID	**Use Case Name**	**Level**	**Author**	**Version**
UC-001	Start Monitoring Session	Summary	Chase Tanner	0.1
UC-002	Detect and Alert Driver Drowsiness	Summary	Tarig Elamin	0.1
UC-003	Acknowledge or Snooze Alert	Summary	Tarig Elamin	0.1
UC-004	Adjust Sensitivity and Settings	Summary	Tarig Elamin	0.1
UC-005	Calibrate / Align Camera	Summary	Tarig Elamin	0.1
UC-006	View Alert Summary	Summary	Tarig Elamin	0.1
UC-007	Export Logs	Primary task	Tarig Elamin	0.1
UC-008	Manage App Deployment (System Administrator)	Subfunction	Tarig Elamin	0.1
UC-009	View Aggregated Reports (Fleet Manager)	Summary	Tarig Elamin	0.1
UC-010	Receive Distraction Alert	Summary	Tarig Elamin	0.1
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Table 4.2. Use Case UC-001

Project Name:	**Distracted/Drowsy Driver Detection on Snapdragon Mobile Platform**
Use Case ID:	UC-001
Use Case Name:	Start Monitoring Session
User Goal:	The driver wants to manually start and stop monitoring a session so they can control when the app analyzes their driving behavior
Scope:	Driver Monitoring Sub-System
Level:	Summary
Relevant User Reqs:	UF-B,UF-E,UF-H
Relevant System Reqs:	SF-B-01,SF-B-02,SF-C-01
Primary Actor:	Driver (mobile app user)
Precondition:	The ALVION app is installed and permissions (camera, audio, vibration) are granted. User is logged in
Minimal Guarantee:	If camera permission is denied or initialization fails, the app informs the user and remains idle
Success Guarantee:	Monitoring session begins successfully; live interface runs at >= 15 FPS, analyzing eye openness and head orientation.
Trigger:	Driver taps "Start Monitoring" on main dashboard screen
Success Scenario:	**Step** / **Actions** **1** The user launches the ALVION application **2** The system request camera, audio, and vibration permissions if not already granted **3** The user taps "Start Monitoring" **4** The system activates the front-facing camera via CameraX **5** The system initializes the on-device ML inference engine using Snapdragon CPU/GPU/NPU **6** The system calibrates the frame to ensure lighting and positioning are valid **7** The system begins continuous real-time analysis of eye openness and head orientation **8** The system triggers an alert if drowsiness or distraction is detected **9** The user can manually tap "Stop Monitoring" to end the session **10** The system records the session timestams and saves the results locally
Extensions:	**Branching Scenarios**
3A	**Condition:** Camera permission denied
	Step / **Actions** **1** The system displays error "Camera access is required to begin monitoring". Disable Start button until granted
3B	**Condition:** Calibration fails (low lighting)

	Step **Actions** **1** The system Prompt user "Lighting insufficient -- please adjust position or brightness".
3C	**Condition:** Hardware overload (temperature threshold exceeded)
	Step **Actions** **1** The system notifies driver "Monitoring paused to cool device".
3D	**Condition:** User revokes permission during session
	Step **Actions** **1** The system suspends monitoring safely and informs the driver
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Table 4.3. Use Case UC-002

Project Name:	**Distracted/Drowsy Driver Detection on Snapdragon Mobile Platform**
Use Case ID:	UC-002
Use Case Name:	Detect and Alert Driver Drowsiness
User Goal:	The driver wants the system to monitor their face and eyes in real time and warn them immediately if signs of drowsiness are detected, helping them stay alert and safe.
Scope:	Distracted/Drowsy Driver Detection System (the in-
Level:	Summary
Relevant User Reqs:	UF-B
Relevant System Reqs:	SF-B-01,SF-B-02
Primary Actor:	Driver
Precondition:	1- The system is installed and running. 2- The camera is calibrated, and lighting conditions allow detection. 3- Driver monitoring mode is active.
Minimal Guarantee:	If sensors fail or detection confidence is too low, the system logs the issue and notifies the driver that monitoring accuracy is reduced
Success Guarantee:	If drowsiness is detected, the system immediately issues audible and visual alerts, prompting the driver to regain focus
Trigger:	The system detects drowsiness indicators (e.g., eyes closed for prolonged periods or slow blink rate)
Success Scenario:	**Step** / **Actions** **1** The system continuously monitors the driver’s eyes and facial expressions using the camera. **2** The system analyzes blink frequency, eyelid closure duration, and gaze direction in real time. **3** The system the system classifies the state as “drowsy.” **4** The system the system triggers audible and visual alerts **5** The user hears/see the alert and adjusts posture, eye focus, or takes a break. **6** The system monitoring continues once the driver’s state normalizes.
Extensions:	**Branching Scenarios**
1A	**Condition:** The Driver continues to show "drowsy" symptoms for a long pried of time
	Step / **Actions** **1** The system sends notification to family members and emergency contacts
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Table 4.4. Use Case UC-003

Project Name:	**Distracted/Drowsy Driver Detection on Snapdragon Mobile Platform**
Use Case ID:	UC-003
Use Case Name:	Acknowledge or Snooze Alert
User Goal:	The driver acknowledges an alert or snoozes further alerts for a short cooldown.
Scope:	Driver Monitoring Sub-System
Level:	Summary
Relevant User Reqs:	UF-D,UF-F,UF-G,UF-I,UF-J
Relevant System Reqs:	SF-A-01,SF-B-01,SF-D-01
Primary Actor:	Driver
Precondition:	A drowsiness or distraction alert has just been displayed.
Minimal Guarantee:	If input is not received, alert auto-dismisses after timeout; monitoring continues.
Success Guarantee:	System records the user action and applies cooldown if snoozed.
Trigger:	Driver taps "Acknowledge" or "Snooze".
Success Scenario:	**Step** **Actions** **1** The system presents actions: Acknowledge | Snooze. **2** The Driver selects an action.
Extensions:	**Branching Scenarios**
1A	**Condition:** If Acknowledge
	Step **Actions** **1** The system System clears alert UI and logs acknowledgment. **2** The system updates session stats.
1B	**Condition:** If Snooze
	Step **Actions** **1** System starts cooldown timer; suppresses new alerts. **2** The system updates session stats.
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Table 4.5. Use Case UC-004

Project Name:	**Distracted/Drowsy Driver Detection on Snapdragon Mobile Platform**
Use Case ID:	UC-004
Use Case Name:	Adjust Sensitivity and Settings
User Goal:	The driver adjusts thresholds (eye-closure time, yaw angle) and alert cooldown/volume; changes persist locally between sessions.
Scope:	Settings Sub-System
Level:	Summary
Relevant User Reqs:	UF-D
Relevant System Reqs:	SF-D-01,SF-D-02,SF-D-03
Primary Actor:	Driver
Precondition:	App is installed; monitoring may be idle or running.
Minimal Guarantee:	Invalid inputs are rejected with guidance; previous values remain.
Success Guarantee:	New settings are validated, saved, and hot-applied to active monitoring.
Trigger:	Driver opens Settings.
Success Scenario:	**Step** **Actions** **1** The user navigates to Settings. **2** The system loads current Settings (thresholds, cooldown, volume) and displays controls. **3** The user edits one or more values (e.g., PERCLOS window, yaw threshold, alert volume/cooldown). **4** The system validates ranges and dependencies. **5** The system persists updates locally and, if monitoring is active, hot-applies them to detection/alerts. **6** The system confirms “Settings saved.”
Extensions:	**Branching Scenarios**
3A	**Condition:** Out-of-range value
	Step **Actions** **1** The system clamps or shows inline error; cannot save until valid.
5A	**Condition:** Restore defaults
	Step **Actions** **1** The user taps Restore; system resets to defaults and saves.
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Table 4.6. Use Case UC-005

Project Name:	**Distracted/Drowsy Driver Detection on Snapdragon Mobile Platform**
Use Case ID:	UC-005
Use Case Name:	Calibrate / Align Camera
User Goal:	Align the camera/phone so the face is centered and lighting is sufficient before monitoring.
Scope:	Calibration Sub-System
Level:	Summary
Relevant User Reqs:	UF-H
Relevant System Reqs:	SF-H-01,SF-H-02
Primary Actor:	Driver
Precondition:	Camera permission granted; preview available.
Minimal Guarantee:	If calibration fails, user receives guidance and can retry or skip.
Success Guarantee:	Calibration passes; app allows monitoring to start (or continues with improved alignment).
Trigger:	First use, or system detects poor alignment/lighting; driver taps Start Calibration.
Success Scenario:	**Step** **Actions** **1** System shows live preview with guidance overlays (face box/eye markers). **2** System evaluates framing stability and pose (e.g., yaw/pitch within bounds) and lighting quality. **3** When all criteria hold for the window, system marks Calibration Passed. **4** System returns to main screen with Start Monitoring enabled (or auto-continues if already starting).
Extensions:	**Branching Scenarios**
1A	**Condition:** User skips
	Step **Actions** **1** The system Start remains allowed but with degraded confidence notice until conditions improve
2A	**Condition:** Insufficient lighting/unstable face
	Step **Actions** **1** Show tips (increase brightness, hold steady, reposition); remain in calibration.
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Table 4.7. Use Case UC-006

Project Name:	**Distracted/Drowsy Driver Detection on Snapdragon Mobile Platform**
Use Case ID:	UC-006
Use Case Name:	View Alert Summary
User Goal:	After a session, the driver reviews counts by alert type, timeline, duration, and average PERCLOS.
Scope:	Reporting (Local)
Level:	Summary
Relevant User Reqs:	UF-I
Relevant System Reqs:	SF-I-01,SF-I-02
Primary Actor:	
Precondition:	At least one session ended with recorded events.
Minimal Guarantee:	If no events exist, show “No alerts recorded” with session duration.
Success Guarantee:	Summary displays key metrics from local storage and supports time-range filters.
Trigger:	Driver taps Summary.
Success Scenario:	**Step** **Actions** **1** Driver selects Last Session, Today, 7 Days, or Custom. **2** The system loads session data locally and aggregates counts, durations, and PERCLOS. **3** The system renders timeline and KPI cards. **4** The user closes summary or proceeds to Export.
Extensions:	**Branching Scenarios**
2A	**Condition:** Data missing/corrupted
	Step **Actions** **1** The system shows error and offers diagnostics/logs link.
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Table 4.8. Use Case UC-007

Project Name:	**Distracted/Drowsy Driver Detection on Snapdragon Mobile Platform**
Use Case ID:	UC-007
Use Case Name:	Export Logs
User Goal:	Export anonymized summaries (and optional event logs) for external analysis—offline and consented.
Scope:	Reporting (Local Export)
Level:	Primary task
Relevant User Reqs:	UF-I,UF-J
Relevant System Reqs:	SF-J-03
Primary Actor:	Driver
Precondition:	Local session data exists; user consents to export.
Minimal Guarantee:	If storage permission denied or canceled, no file is written.
Success Guarantee:	A CSV/JSON file is created with aggregated/session fields—no PII or images.
Trigger:	Driver taps Export from Summary or Settings.
Success Scenario:	**Step** **Actions** **1** The system presents consent text and lets the user choose CSV or JSON and a destination. **2** The system serializes summaries (and optional event rows) and writes to selected location. **3** The system confirms success and offers Open
Extensions:	**Branching Scenarios**
1A	**Condition:** User cancels/denies permission
	Step **Actions** **1** The system Abort export; show guidance.
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Table 4.9. Use Case UC-008

Project Name:	**Distracted/Drowsy Driver Detection on Snapdragon Mobile Platform**
Use Case ID:	UC-008
Use Case Name:	Manage App Deployment (System Administrator)
User Goal:	Deploy updates, enforce permissions, and apply managed configurations uniformly across devices.
Scope:	Device Management / Deployment
Level:	Subfunction
Relevant User Reqs:	UF-K
Relevant System Reqs:	SF-K-01,SF-K-02
Primary Actor:	System Administrator
Precondition:	Devices are enrolled in enterprise MDM; app is approved in store.
Minimal Guarantee:	If a policy cannot be applied, admin is notified with reason.
Success Guarantee:	Target devices receive the assigned version and enforced settings; status is auditable.
Trigger:	Admin schedules a rollout or pushes a policy refresh
Success Scenario:	**Step** **Actions** **1** Admin selects device group(s) and rollout plan (staged or immediate). **2** MDM distributes the app/update and managed configs (permissions, locked settings). **3** Devices install/update and apply configs automatically. **4** App reflects managed settings and displays “Managed by your organization.” **5** Admin reviews deployment status and audit logs in the console.
Extensions:	**Branching Scenarios**
2A	**Condition:** Policy revokes CAMERA
	Step **Actions** **1** App transitions to IDLE, releases camera, shows policy notice.
3A	**Condition:** Device offline
	Step **Actions** **1** MDM queues install; applies on next check-in.
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Table 4.10. Use Case UC-009

Project Name:	**Distracted/Drowsy Driver Detection on Snapdragon Mobile Platform**
Use Case ID:	UC-009
Use Case Name:	View Aggregated Reports (Fleet Manager)
User Goal:	View aggregated drowsiness/distraction trends across drivers to identify safety issues and inform policies.
Scope:	Fleet Reporting (Future)
Level:	Summary
Relevant User Reqs:	UF-L
Relevant System Reqs:	SF-L-01,SF-L-02,SF-L-03
Primary Actor:	Fleet Manager
Precondition:	Consented, anonymized summaries have been uploaded to an org data store.
Minimal Guarantee:	If data for a range is missing, dashboard shows “incomplete coverage.”
Success Guarantee:	Dashboard shows alerts/hour, type distribution, and time-of-day/week trends with filters and export.
Trigger:	Manager opens Fleet Dashboard and selects filters and date range.
Success Scenario:	**Step** **Actions** **1** The system aggregates data for the selected org/cohort/date range, normalized by monitored hours. **2** The system renders trend charts and KPIs (alerts/hr, type mix, peak hours). **3** The user exports CSV/PDF for sharing.
Extensions:	**Branching Scenarios**
1A	**Condition:** Small cohort (<5 drivers)
	Step **Actions** **1** The system Suppress display to protect privacy (k-anonymity).
2A	**Condition:** Backend unavailable
	Step **Actions** **1** Serve last-known aggregates with a stale badge.
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Table 4.11. Use Case UC-010

Project Name:	**Distracted/Drowsy Driver Detection on Snapdragon Mobile Platform**
Use Case ID:	UC-010
Use Case Name:	Receive Distraction Alert
User Goal:	The driver is alerted when their head remains turned away from the forward direction longer than the allowed threshold, so they can refocus attention.
Scope:	Driver Monitoring Sub-System
Level:	Summary
Relevant User Reqs:	UF-C
Relevant System Reqs:	SF-C-02,SF-F-02
Primary Actor:	Driver
Precondition:	Monitoring session is active; camera/inference running; thresholds configured. (See UC-001 preconditions for session start details.)
Minimal Guarantee:	If face/pose confidence is low, the system withholds the alert and logs the reason.
Success Guarantee:	A distraction alert (visual + configured audio/vibration) is issued and recorded with timestamp and metrics.
Trigger:	Head yaw remains beyond the configured threshold for longer than the dwell time.
Success Scenario:	**Step** **Actions** **1** System continuously estimates head yaw from the face-detection model. **2** System accumulates time while |yaw| exceeds the threshold. **3** When dwell time is reached, system creates a DISTRACTED event (with yaw peak, duration, confidence). **4** The System issues a real-time alert (visual banner + audio/vibration per settings). **5** The System logs the event in the current session for later summary/reporting.
Extensions:	**Branching Scenarios**
2A	**Condition:** Low confidence / face not detected
	Step **Actions** **1** The system pause dwell timer; show non-blocking tip (e.g., “reposition/brighten”); no alert.
4A	**Condition:** Alerts snoozed
	Step **Actions** **1** The system suppress during cooldown; log suppression.
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