

1 Vocabulary Reference for ASIP 2025 Paper

Created: Nov 14, 2025 **Purpose:** Academic and technical vocabulary for paper writing

1.1 I. ACADEMIC WRITING PHRASES

1.1.1 A. Introducing Problems

- “remains a pressing challenge”
- “poses significant concerns”
- “presents critical barriers to”
- “has emerged as a key issue”
- “represents a fundamental challenge”
- “constitutes a growing concern”
- “continues to pose challenges”

1.1.2 B. Identifying Gaps

- “Limited research demonstrates...”
- “Few studies have examined...”
- “Prior literature lacks...”
- “Existing approaches rarely address...”
- “Insufficient attention has been paid to...”
- “remains underexplored”
- “has received limited empirical validation”
- “warrants further investigation”

1.1.3 C. Stating Objectives

- “This study aims to...”
- “The present work seeks to...”
- “This research demonstrates...”
- “We validate the technical feasibility of...”

- “This paper investigates...”
- “The primary objective is to...”
- “This work contributes by...”

1.1.4 D. Presenting Findings

- “Results indicate that...”
- “Findings suggest...”
- “Analysis reveals...”
- “Data demonstrate...”
- “Validation confirms...”
- “Evidence shows...”
- “Our results show that...”
- “Empirical validation demonstrates...”

1.1.5 E. Discussing Implications

- “These findings have implications for...”
- “Results suggest that...”
- “This work demonstrates the potential for...”
- “Our approach offers...”
- “These results indicate...”
- “Evidence suggests...”
- “This study contributes to understanding...”

1.1.6 F. Acknowledging Limitations

- “This study is subject to several limitations”
- “Several caveats should be noted”
- “It is important to acknowledge...”
- “Results should be interpreted with caution”
- “Future work is needed to...”
- “Further validation is required...”

- “This represents a preliminary investigation”

1.1.7 G. Transitions

- “Building on this foundation...”
- “In contrast to...”
- “Extending previous work...”
- “To address this gap...”
- “Given these challenges...”
- “In light of these findings...”
- “Consequently...”
- “Moreover...”
- “Furthermore...”
- “Nevertheless...”
- “However...”

1.1.8 H. Hedging Language

- “suggests that”
 - “appears to”
 - “may indicate”
 - “potentially”
 - “likely”
 - “tends to”
 - “could enable”
 - “might require”
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1.2 II. GOVERNANCE & POLICY TERMS

1.2.1 A. Privacy Governance

- **Privacy-by-design:** Embedding privacy principles into system architecture from inception

- **Privacy-first architecture:** System design prioritizing privacy as primary constraint
- **Privacy governance framework:** Structured approach to managing privacy requirements
- **Data locality:** Keeping data processing within geographic/system boundaries
- **Data sovereignty:** Control over where data is stored and processed
- **Edge-first processing:** Prioritizing on-device computation over cloud transmission
- **Zero cloud transmission:** Complete elimination of data transfer to remote servers
- **Facial anonymity by design:** Architectural prevention of facial recognition capability
- **Re-identification risk:** Possibility of linking anonymized data to individuals
- **Pose-only storage:** Retaining skeletal keypoints without image data
- **Immediate frame disposal:** Real-time deletion of video frames post-processing

1.2.2 B. AI Governance

- **Governance-driven design:** Using policy principles to inform technical decisions
- **Architectural enforcement:** Implementing rules through system design constraints
- **Design-based validation:** Confirming compliance through structural analysis
- **Privacy preservation mechanisms:** Technical methods for protecting sensitive data
- **Operational promises vs. system constraints:** Policy commitments vs. technical guarantees
- **Retrofitted vs. inception-stage design:** Post-hoc additions vs. integrated planning
- **Governance fragmentation:** Disconnected or inconsistent policy frameworks
- **Context-specific governance:** Tailoring frameworks to regional/situational needs

1.2.3 C. Technology Ethics

- **Transparency:** Clarity about system operations and data handling
- **Accountability:** Responsibility for system outcomes and decisions
- **Fairness:** Equitable treatment across user groups
- **Explainability:** Ability to interpret system decisions
- **Informed consent:** User agreement based on full understanding
- **Beneficence:** Designing systems to benefit users
- **Non-maleficence:** Avoiding harm through system design

1.2.4 D. Accessibility & Equity

- **Accessibility barriers:** Obstacles preventing technology adoption
 - **Digital inclusion:** Ensuring technology access across populations
 - **Affordability thresholds:** Income levels enabling technology purchase
 - **Market accessibility:** Percentage of population able to adopt technology
 - **Zero-subscription model:** One-time payment without recurring fees
 - **Recurring payment burden:** Ongoing cost barriers to adoption
 - **Middle-income market:** Households in 4th-5th income quintiles
 - **Resource-constrained contexts:** Settings with limited financial/technical resources
 - **Economic co-benefits:** Additional financial advantages beyond primary function
 - **Cost optimization:** Reducing expenses while maintaining performance
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1.3 III. TECHNICAL TERMS - AI/ML

1.3.1 A. Computer Vision

- **Pose estimation:** Detecting skeletal joint positions from images
- **Person detection:** Identifying human presence and location in frames
- **Bounding box:** Rectangle enclosing detected object
- **Region of Interest (ROI):** Cropped area for focused processing
- **Keypoint detection:** Locating specific body landmarks
- **Skeletal landmarks:** Joint positions forming body skeleton
- **Confidence score:** Model certainty about prediction
- **False negative rate:** Percentage of missed detections
- **False positive rate:** Percentage of incorrect detections
- **Detection accuracy:** Correctness of identification
- **Pose coverage:** Completeness of keypoint detection

1.3.2 B. Deep Learning Models

- **YOLOv8n (You Only Look Once v8 Nano):** Lightweight object detection model

- **MediaPipe:** Google’s pose estimation framework
- **CNN (Convolutional Neural Network):** Deep learning architecture for image processing
- **LSTM (Long Short-Term Memory):** Sequential data processing model
- **Transformer:** Attention-based neural network architecture
- **Baseline pipeline:** Simple/reference processing approach
- **Integrated pipeline:** Combined model approach
- **Multi-modal fusion:** Combining multiple data sources
- **Real-time inference:** Processing at operational speed

1.3.3 C. Edge Computing

- **Edge computing:** Processing data on local devices, not cloud
- **Edge device:** Local hardware performing computation
- **Edge deployment:** Installing systems on local processors
- **On-device processing:** Computation within single hardware unit
- **Distributed computing:** Spreading processing across multiple nodes
- **Cloud-edge hybrid:** Combining local and remote processing
- **Latency:** Delay between input and output
- **Throughput:** Processing volume per time unit
- **Computational efficiency:** Resource usage vs. performance

1.3.4 D. Performance Metrics

- **Frames Per Second (FPS):** Processing speed measurement
- **Keypoint detection rate:** Percentage of landmarks successfully detected
- **Average confidence:** Mean certainty across predictions
- **Processing speed:** Rate of data handling
- **Model accuracy:** Correctness of predictions
- **Precision:** $\text{Correct positive predictions} / \text{total positive predictions}$
- **Recall:** $\text{Correct positive predictions} / \text{total actual positives}$
- **F1 score:** Harmonic mean of precision and recall
- **Inference time:** Duration for single prediction

- **Real-time capability:** Meeting operational speed requirements (typically 15+ FPS)
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1.4 IV. TECHNICAL TERMS - HARDWARE

1.4.1 A. Cameras & Imaging

- **RGB camera:** Standard color camera (Red, Green, Blue sensors)
- **Near-Infrared (NIR):** Light wavelength 700-1000nm, invisible to humans
- **850nm infrared:** Specific NIR wavelength used in night vision
- **IR night vision:** Imaging capability in complete darkness
- **CCTV (Closed-Circuit Television):** Security camera system
- **IP camera:** Network-connected camera
- **Turret camera:** Dome-style adjustable camera
- **Bullet camera:** Cylindrical outdoor camera
- **Dome camera:** Spherical protective housing camera
- **Camera resolution:** Image dimensions (e.g., 1080p, 4K)
- **Field of view:** Observable angle/area
- **90-degree spacing:** Camera placement for 360° coverage
- **Multi-camera fusion:** Combining data from multiple cameras
- **Camera calibration:** Adjusting camera parameters for accuracy

1.4.2 B. Edge Processors

- **NVIDIA Jetson Orin Nano:** Edge AI computing platform with 8GB RAM
- **GPU (Graphics Processing Unit):** Parallel processing hardware for AI
- **Edge processor:** Local computing device for on-site processing
- **System-on-Module (SoM):** Integrated computer on single board
- **CUDA cores:** NVIDIA parallel processing units
- **Tensor cores:** Specialized AI processing units
- **Memory bandwidth:** Data transfer rate to/from RAM
- **Power consumption:** Energy usage (watts)

- **Thermal management:** Heat dissipation systems

1.4.3 C. System Architecture

- **Multi-camera array:** Multiple cameras working together
 - **Camera network:** Connected camera system
 - **Processing pipeline:** Sequential data transformation steps
 - **Hardware deployment:** Physical installation of equipment
 - **System integration:** Combining components into functional unit
 - **Modular design:** Separable, replaceable components
 - **Scalability:** Ability to expand system capacity
 - **Hardware requirements:** Minimum equipment specifications
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1.5 V. HEALTHCARE & ELDERLY CARE TERMS

1.5.1 A. Elderly Safety

- **Elderly safety monitoring:** Surveillance systems for older adults
- **Fall detection:** Identifying falling incidents
- **Incident detection:** Recognizing abnormal events
- **Safety-critical application:** System where failures cause serious harm
- **Assistive technology:** Devices helping with daily activities
- **Remote monitoring:** Observation from distant location
- **24/7 monitoring:** Continuous surveillance
- **Contactless monitoring:** Observation without physical sensors

1.5.2 B. Fall Incidents (Specific Types)

- **Falls while standing/walking:** Incidents during upright locomotion
- **Falls from bed/chair:** Incidents during transitions from seated/lying
- **Abnormal sit-to-stand transitions:** Unusual movements when rising
- **Injury-related deaths:** Fatalities from physical trauma

- **Fall prevalence:** Percentage of population experiencing falls
- **Fall incidence:** Rate of fall occurrences over time

1.5.3 C. Healthcare Privacy

- **Health data protection:** Safeguarding medical information
- **Patient privacy:** Confidentiality of individual health records
- **HIPAA (Health Insurance Portability and Accountability Act):** U.S. healthcare privacy law
- **GDPR (General Data Protection Regulation):** European data protection law
- **Protected Health Information (PHI):** Identifiable health data requiring protection
- **Facial recognition risk:** Potential for identifying individuals from images
- **Sensitive health data:** Medical information requiring enhanced protection

1.5.4 D. Elderly Population

- **Aging population:** Increasing proportion of older adults
- **Demographic transition:** Population age structure shift
- **Elderly demographics:** Statistical characteristics of older population
- **Care dependency:** Need for assistance with daily activities
- **Family caregiving:** Informal care by relatives
- **Long-term care:** Extended support for chronic conditions
- **Age-appropriate actors:** Performers matching target age range

1.6 VI. REGIONAL CONTEXT TERMS

1.6.1 A. Cambodia-Specific

- **Middle-income Cambodian households:** Families in 4th-5th income quintiles
- **Cambodia Socio-Economic Survey (CSES):** National household income study
- **Income quintiles:** Population divided into five 20% income brackets
- **Urban households:** Families in city/town areas
- **Monthly household income:** Total family earnings per month

- **Market reach:** Percentage of population able to access product/service
- **Target segment:** Specific population group for product/service
- **Estimated elderly population:** Projected number of seniors by specific year

1.6.2 B. Southeast Asia

- **Southeast Asian elderly care:** Senior support systems in ASEAN region
- **Regional epidemiological evidence:** Disease/injury patterns in geographic area
- **Cultural norms:** Shared social expectations and practices
- **Technology adoption patterns:** Rates and methods of tech usage
- **Regional context:** Geographic/cultural setting
- **Developing countries:** Nations with lower economic development
- **Resource-constrained environments:** Settings with limited financial/technical capacity

1.6.3 C. Economic Context

- **Affordability analysis:** Evaluation of cost relative to income
 - **Market penetration:** Percentage of potential customers reached
 - **Breakeven point:** Time when cumulative savings equal initial investment
 - **Total cost of ownership:** Complete expenses over system lifetime
 - **One-time cost:** Single payment without recurring fees
 - **Subscription-based model:** Ongoing payment system
 - **Cost-effectiveness:** Value delivered per dollar spent
 - **Financial barriers:** Economic obstacles to adoption
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1.7 VII. RESEARCH METHODOLOGY TERMS

1.7.1 A. Study Design

- **Design study:** Research demonstrating system design approach
- **Case study:** In-depth investigation of specific instance
- **Validation study:** Research confirming technical feasibility

- **Preliminary investigation:** Initial exploratory research
- **Proof of concept:** Demonstration of fundamental feasibility
- **Feasibility study:** Assessment of practicality
- **Comparative analysis:** Evaluation of multiple alternatives
- **Empirical validation:** Evidence-based confirmation

1.7.2 B. Data & Analysis

- **Validation dataset:** Data used to test system performance
- **Benchmark dataset:** Standard data for comparing approaches
- **Ground truth:** Known correct answers for validation
- **Test set:** Data reserved for evaluation
- **Commercial CCTV footage:** Security camera video from businesses
- **Demo footage:** Example videos from manufacturers
- **Diverse video sources:** Content from varied origins/conditions
- **Video resolution:** Image dimensions (pixels)

1.7.3 C. Evaluation

- **Acceptance criteria:** Standards for determining success
- **Performance metrics:** Measurements of system capability
- **Validation metrics:** Specific measurements for confirmation
- **Quantitative analysis:** Numerical data evaluation
- **Qualitative assessment:** Descriptive evaluation
- **Comparative evaluation:** Side-by-side performance assessment
- **Statistical validity:** Reliability of numerical findings
- **Baseline comparison:** Evaluation against reference approach

1.7.4 D. Scope & Limitations

- **Study scope:** Boundaries of what research covers
- **Validation scope:** What is tested vs. what is not
- **Study limitations:** Constraints and weaknesses

- **Future work:** Planned subsequent research
 - **Generalizability:** Applicability to other contexts
 - **External validity:** Relevance beyond study setting
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1.8 VIII. STATISTICS & RESULTS PHRASES

1.8.1 A. Quantitative Findings

- “91.3% keypoint detection rate”
- “30.1 of 33 landmarks detected on average”
- “0.868 average confidence score”
- “12.3% false negative rate”
- “20.53 frames per second”
- “61% cost reduction”
- “\$672 vs. \$1,719 over 3 years”
- “\$1,047 savings”
- “216,000-324,000 elderly individuals”
- “12-18% of elderly population”
- “5.7% higher detection accuracy”
- “2.3× slower processing speed”
- “22.2% better pose coverage”
- “Month 1 of Year 2 breakeven”

1.8.2 B. Comparisons

- “compared to [alternative]”
- “relative to [baseline]”
- “in contrast with [approach]”
- “versus [competing system]”
- “as opposed to [method]”
- “outperformed [baseline] by X%”

- “achieved X% improvement over [reference]”
- “demonstrated superior [metric] compared to [alternative]”

1.8.3 C. Ranges & Distributions

- “ranged from X to Y”
- “varied between X and Y”
- “spanned X-Y range”
- “distributed across [categories]”
- “concentrated in [range]”

1.8.4 D. Statistical Significance

- “statistically significant”
 - “meaningful difference”
 - “substantial improvement”
 - “notable reduction”
 - “marked increase”
 - “considerable savings”
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1.9 IX. COST ANALYSIS TERMS

1.9.1 A. Cost Components

- **Hardware cost:** Physical equipment expenses
- **Initial investment:** Upfront payment
- **Recurring fees:** Ongoing regular payments
- **Subscription cost:** Regular service payments
- **Maintenance cost:** Upkeep expenses
- **Operational expenses:** Running costs
- **Total system cost:** Complete expense including all components
- **3-year total cost of ownership:** All expenses over 36 months

1.9.2 B. Cost Breakdown

- **Camera cost:** “\$252 (4× cameras @ \$63 each)”
- **Edge processor cost:** “\$250 (Jetson Orin Nano 8GB)”
- **Accessories cost:** “\$170 (power, cables, storage)”
- **Cloud hardware cost:** “\$99 (Kami camera)”
- **Cloud subscription:** “\$45/month × 36 months = \$1,620”

1.9.3 C. Cost Comparison

- **Edge-based system:** \$672 one-time
 - **Cloud-based alternative:** \$1,719 total
 - **Cost savings:** 61% reduction
 - **Breakeven point:** Month 13 (Month 1, Year 2)
 - **Cumulative savings:** \$1,047 over 3 years
 - **Zero recurring fees:** No ongoing payments
 - **Subscription-free model:** One-time purchase only
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1.10 X. WRITING STRUCTURE PHRASES

1.10.1 A. Sectioning

- “This section presents...”
- “We begin by...”
- “The following subsection describes...”
- “Building on the previous section...”
- “This chapter is organized as follows...”

1.10.2 B. Referencing

- “As shown in Table X...”
- “Figure X illustrates...”
- “Detailed in Section X...”

- “As discussed in [Author, Year]...”
- “Consistent with prior findings [Citation]...”
- “In line with [Author’s] framework...”

1.10.3 C. Summarizing

- “In summary...”
 - “To summarize...”
 - “In conclusion...”
 - “Taken together, these findings...”
 - “Collectively, results demonstrate...”
 - “Overall, evidence suggests...”
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1.11 XI. COMMON PAPER-SPECIFIC PHRASES

1.11.1 A. Privacy Governance Focus

- “privacy governance-driven architectural design”
- “governance principles inform technical decisions”
- “edge architecture eliminates cloud transmission”
- “facial anonymity by design, not policy”
- “pose-only storage prevents re-identification”
- “immediate frame disposal eliminates retention risk”
- “100% on-device processing”
- “zero cloud transmission enforces data locality”
- “architectural enforcement rather than operational promises”
- “retrofitted post-hoc vs. designed from inception”

1.11.2 B. Cost & Accessibility

- “expanding market accessibility”
- “zero-subscription model removes payment barriers”

- “middle-income urban households (4th-5th quintile)”
- “\$870-\$1,622 monthly household income”
- “61% cost reduction over 3-year period”
- “economic co-benefits beyond privacy protection”
- “financial barriers to assistive technology adoption”
- “recurring payment burden”

1.11.3 C. Technical Validation

- “validated on 20 commercial 850nm NIR videos”
- “diverse manufacturers and environments”
- “91.3% keypoint detection confirms feasibility”
- “integrated pipeline prioritizes accuracy over speed”
- “safety-critical priority guides design decisions”
- “both configurations exceed real-time requirements”
- “20.53 FPS on standard hardware”
- “Jetson Orin Nano validation pending”

1.11.4 D. Study Scope

- “design study demonstrating governance-driven approach”
- “validates technical feasibility, not fall detection accuracy”
- “requires benchmark dataset validation (MCF, LE2I, UP-Fall)”
- “tested on commercial CCTV footage, not elderly subjects”
- “hardware deployment performance requires validation”
- “preliminary investigation requiring further work”

1.12 XII. VERBS FOR ACADEMIC WRITING

1.12.1 Strong Verbs for Results

- demonstrate, validate, confirm, establish, reveal

- indicate, suggest, show, illustrate, highlight
- achieve, attain, reach, obtain, yield
- reduce, eliminate, prevent, avoid, minimize
- improve, enhance, optimize, increase, expand
- compare, contrast, evaluate, assess, analyze

1.12.2 Verbs for Methodology

- employ, utilize, implement, deploy, adopt
- design, develop, construct, build, create
- select, choose, identify, determine, specify
- measure, quantify, calculate, compute, estimate
- collect, gather, obtain, acquire, capture
- process, analyze, examine, investigate, evaluate

1.12.3 Verbs for Discussion

- interpret, explain, account for, attribute to
- imply, suggest, indicate, reflect, represent
- support, corroborate, align with, consistent with
- challenge, contradict, differ from, diverge from
- require, necessitate, warrant, demand, call for

1.13 XIII. CAMBODIA STATISTICS (QUICK REFERENCE)

- **Total elderly population by 2030:** 1.8 million
- **Target market:** Middle-income urban households (4th-5th quintile)
- **Target income range:** \$870-\$1,622 per month
- **Estimated market reach:** 216,000-324,000 elderly (12-18%)
- **Fall prevalence (Thai data):** 37.7% elderly home accidents
- **System cost:** \$672 one-time
- **Cloud alternative:** \$1,719 over 3 years

- **Cost savings:** 61% (\$1,047)
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1.14 XIV. HARDWARE SPECIFICATIONS (QUICK REFERENCE)

1.14.1 Cameras

- **Model:** Hikvision DS-2CD1343G2-IUF
- **Type:** RGB with 850nm IR night vision
- **Quantity:** 4× cameras
- **Cost:** \$63 per camera (\$252 total)
- **Placement:** 90-degree spacing for 360° coverage
- **Resolution:** 1080p or 4K

1.14.2 Edge Processor

- **Model:** NVIDIA Jetson Orin Nano 8GB
- **Cost:** \$250
- **Purpose:** On-device AI inference

1.14.3 Accessories

- **Components:** Power supplies, ethernet cables, microSD storage
- **Cost:** \$170

1.14.4 Total System Cost

- **One-time investment:** \$672
 - **Recurring fees:** \$0
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1.15 XV. CONFERENCE-SPECIFIC ALIGNMENT

1.15.1 ASIP 2025 Theme

- “Governance of Emerging Intelligent Technologies”

1.15.2 Primary Sub-themes

1. **AI & Technology Applications:** Healthcare AI with governance principles embedded in design
2. **AI & Technology Ethics:** Privacy-preserving AI through edge computing

1.15.3 Secondary Sub-themes

3. **AI & Technology Governance:** Privacy governance framework for healthcare AI

1.15.4 Key Conference Keywords

- technology governance
- intelligent systems
- AI ethics
- policy implications
- innovation
- digital transformation
- healthcare applications
- privacy governance
- accessibility
- developing countries

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