Design Documentation

User Stories:

1. Safe Independent Practice

As a **trainee**, I want to **upload a short video of my CNC task**, so that **I can practice and demonstrate skills independently without risking expensive equipment.**
Acceptance Criteria: Upload accepts standard video formats under 250 MB, includes progress bar, and displays a success confirmation.

2. Context-Rich Upload Form

As a **trainee**, I want to **tag each upload with tool type, task name, and difficulty level**, so that **the AI and trainers can interpret my performance in context.**
Acceptance Criteria: Upload form includes metadata fields (task name, tool, difficulty); upload blocked if missing fields.

3. Fast Automated Feedback

As a **trainee**, I want to **get an AI-generated evaluation summary right after uploading**, so that **I receive timely feedback even if a trainer isn't available.**
Acceptance Criteria: AI returns a scorecard (accuracy, stability, completion time) within 2 minutes of upload.

4. Standardized Evaluation Metrics

As a **trainer**, I want **AI scoring to follow clear, consistent metrics**, so that **feedback quality doesn't depend on individual trainer judgment.**
Acceptance Criteria: Evaluation uses the same scoring model for all videos, with transparent metric explanations.

5. Human Oversight & Control

As a **trainer**, I want to **review AI-evaluated videos and adjust scores or add timestamped comments**, so that **I can combine automation with expert judgment.**

Acceptance Criteria: Trainer dashboard lists videos flagged by AI; trainers can play, pause, and add comments per timestamp.

6. Efficient Task Review Management

As a **trainer**, I want to **see and filter trainee submissions by score or name**, so that **I can quickly identify which trainees need immediate feedback.**
Acceptance Criteria: Dashboard supports search and filters; flagged low-score videos shown at top.

7. Consolidated Feedback View

As a **trainee**, I want to **view AI and trainer feedback together in one dashboard**, so that **I clearly understand what went wrong and how to improve.**
Acceptance Criteria: Feedback screen combines AI metrics + trainer notes in a single report view.

8. Visual Progress Indicators

As a **trainee**, I want to **see visual performance indicators (scores, charts, or color-coded results)**, so that **I can track improvement across different tasks.**
Acceptance Criteria: Dashboard includes performance graphs over multiple uploads.

9. Downloadable Performance Report

As a **trainee**, I want to **download a PDF report summarizing my feedback and metrics**, so that **I can use it for self-improvement or future certification.**
Acceptance Criteria: One-click PDF export includes task name, date, AI metrics, and trainer comments.

10. Feedback Validation Transparency

As a **trainer**, I want to **see how my feedback compares to AI scores**, so that **I can validate the system's accuracy and provide consistent mentoring.**
Acceptance Criteria: Trainer view displays AI-generated summary beside their entered feedback.
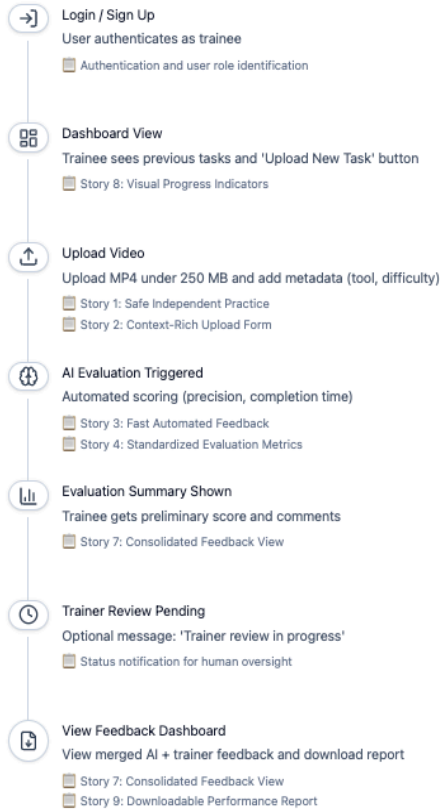
User Flow Diagram:
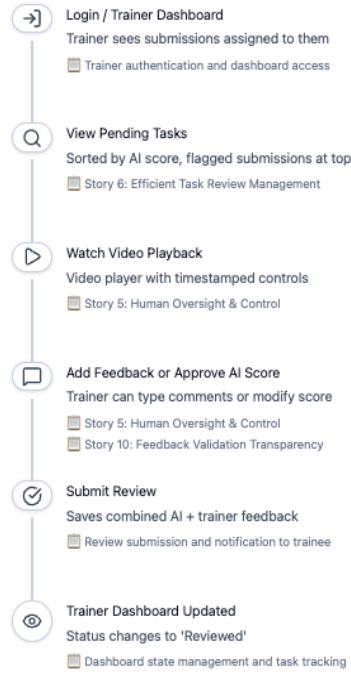
CNC Training Platform - User Flow Diagram

Complete journey for trainees and trainers from upload to feedback

● Trainee Journey ● Trainer Journey ● System/AI Process

● Trainee Journey

Login / Sign Up
User authenticates as trainee
☐ Authentication and user role identification

Dashboard View
Trainee sees previous tasks and 'Upload New Task' button
☐ Story 8: Visual Progress Indicators

Upload Video
Upload MP4 under 250 MB and add metadata (tool, difficulty)
☐ Story 1: Safe Independent Practice
☐ Story 2: Context-Rich Upload Form

AI Evaluation Triggered
Automated scoring (precision, completion time)
☐ Story 3: Fast Automated Feedback
☐ Story 4: Standardized Evaluation Metrics

Evaluation Summary Shown
Trainee gets preliminary score and comments
☐ Story 7: Consolidated Feedback View

Trainer Review Pending
Optional message: 'Trainer review in progress'
☐ Status notification for human oversight

View Feedback Dashboard
View merged AI + trainer feedback and download report
☐ Story 7: Consolidated Feedback View
☐ Story 9: Downloadable Performance Report

● Trainer Journey

Login / Trainer Dashboard
Trainer sees submissions assigned to them
☐ Trainer authentication and dashboard access

View Pending Tasks
Sorted by AI score, flagged submissions at top
☐ Story 6: Efficient Task Review Management

Watch Video Playback
Video player with timestamped controls
☐ Story 5: Human Oversight & Control

Add Feedback or Approve AI Score
Trainer can type comments or modify score
☐ Story 5: Human Oversight & Control
☐ Story 10: Feedback Validation Transparency

Submit Review
Saves combined AI + trainer feedback
☐ Review submission and notification to trainee

Trainer Dashboard Updated
Status changes to 'Reviewed'
☐ Dashboard state management and task tracking

Key Features Mapped to User Flow

Feature 1: Video Upload Portal

- Safe independent practice environment
- Context-rich metadata tagging (tool, task, difficulty)
- 250 MB limit with progress indicator

Feature 2: Automated Evaluation

- AI-generated evaluation within 2 minutes
- Standardized metrics (accuracy, stability, time)
- Consistent scoring across all submissions

Feature 3: Trainer Review Interface

- Human oversight with timestamped comments
- Efficient filtering and prioritization
- Score adjustment capabilities

Feature 4: Feedback Dashboard

- Consolidated AI + trainer feedback view
- Visual progress tracking and charts
- Downloadable PDF performance reports

Continuous Improvement Feedback Loop

1. Trainee Uploads → 2. AI Evaluates → 3. Trainer Reviews → 4. Trainee Improves ↻

The platform creates a continuous cycle where feedback informs improvement, building trainee confidence and skill mastery over time.

Product Requirement Document

1. Product Overview

Product Name: SkillCam

Purpose: SkillCam is a web-based platform enabling trainees in vocational and technical programs to safely practice, record, and receive AI-assisted feedback on their hands-on tasks (e.g., CNC machining, welding, electrical wiring).

Problem It Solves: Training programs struggle with:
- Trainees lack confidence to practice independently due to fear of damaging equipment.
- Slow, inconsistent feedback dependent on trainer availability.
- Employers report new graduates as technically certified but under-prepared for real work.

Solution: SkillCam bridges these gaps by combining **AI evaluation** with **trainer oversight**, offering a scalable, objective, and consistent way to assess skill performance through short video uploads.

Vision (Long-Term): Evolve into a real-time AI coaching system providing immediate visual and verbal feedback during task execution.

2. Target User & Needs

Customer Discovery Summary: Interviews with 17 trainers, trainees, and employers revealed three major pain points:
- **Confidence Without Risk**: Safe independent practice opportunities.
- **Slow, Inconsistent Feedback**: Automated, standardized evaluation.
- **Low Post-Certification Readiness**: Measurable progress and readiness reports.

User Type	Key Needs	Supporting Insight
Trainees (Primary)	Practice safely, get structured, fast feedback, track improvement.	Trainees fear damaging expensive machinery without supervision; need confidence-building tools.

Trainers (Secondary)	Standardize evaluation, manage large cohorts efficiently, maintain oversight.	Trainers reported inconsistent scoring and fatigue managing many submissions.
Employers (Tertiary)	Identify truly job-ready workers, track progress over time.	Employers found graduates technically qualified but lacking applied proficiency.

3. Core Features

Feature 1: Video Upload Portal

Purpose: Enable trainees to submit task videos for evaluation.
Discovery Link: Trainees want safe, independent practice without risking expensive machinery.
MVP Scope: Basic upload with metadata form.

Feature 2: Automated Evaluation Summary

Purpose: Deliver quick, standardized AI feedback after upload.
Discovery Link: Trainers and engineers wanted faster, unbiased feedback.
MVP Scope: Rule-based CV metrics and summary report.

Feature 3: Trainer Review Interface

Purpose: Allow trainers to review and refine AI evaluations.
Discovery Link: Trainers wanted to retain control and oversight.
MVP Scope: Basic dashboard with playback and comment tools.

Feature 4: Feedback Dashboard

Purpose: Provide trainees a single place to view all feedback and progress.
Discovery Link: Users wanted actionable, unified feedback.
MVP Scope: Combined results and downloadable report.

4. Success Metrics:

SkillCam's success will be evaluated based on user engagement, system reliability, and learning impact. Key metrics for the MVP phase include:

- **Upload Completion Rate:** A high percentage of users should be able to successfully upload videos on their first attempt. A target of 90% or higher will indicate a smooth and intuitive upload experience.

- **AI Evaluation Speed:** The automated evaluation should complete within two minutes of upload. This ensures timely feedback and validates the efficiency of the core AI pipeline.

- **Trainer Adoption Rate:** At least 70% of registered trainers should actively review AI-evaluated submissions. This demonstrates that the system effectively integrates human oversight rather than replacing it.

- **Feedback Engagement:** A majority of trainees (target ≥ 80%) should view their combined AI + trainer feedback within 24 hours of availability, showing strong engagement with learning outcomes.

- **User Satisfaction:** Post-MVP surveys should yield an average satisfaction score of at least 4.0 out of 5, reflecting that both trainees and trainers find SkillCam valuable and easy to use.

5. MVP Score Statement

Included in MVP (Version 1.0):
- Video Upload Portal with metadata validation.
- Automated Evaluation Summary using basic AI scoring.
- Trainer Review Interface with playback and comments.
- Feedback Dashboard with combined feedback and downloadable reports.

Excluded / Deferred for Future Phases:
- Real-time feedback during task execution.
- Long-term progress tracking and employer-facing reports.
- Mobile app version and localization features.