EagleEye V2 Frontend MVP - Product Requirements Document

Product Overview

EagleEye V2 is a web-based platform for machine vision system integrators to build accurate inspection solutions through efficient image annotation, ground truth management, and dataset creation for training and evaluation.

Target Users

- **Primary**: Machine vision system integrators building quality control solutions
- **Secondary**: Quality control engineers and vision system operators

Core User Value Proposition

Streamlined workflow for collecting, annotating, and managing training datasets with optimized UI for rapid image grading and ground truth annotation.

MVP Scope & Key Features

1. Authentication & Project Access

- **Login/Registration**: Simple email/password authentication
- **Project Switching**: Quick project selector for users with multi-project access
- **Role-based UI**: Same interface with conditional edit permissions (Admin vs User)

2. Image Upload & Management Hub

- **Training Data Upload**: Bulk upload for raw images without ground truth
  - Multi-file drag-and-drop interface
  - Progress tracking for large batches
  - Associate images with specific camera/inspection station
- **Production Inference Upload**: Batch upload for model output evaluation
  - Automatic EXIF metadata extraction for inference results
  - Parse and populate observation values from image metadata
  - Visual confirmation of extracted inference data
- **Image Gallery**: Grid view with thumbnails, pagination, and basic filtering
- **Image Details**: Full-size image viewer with metadata display

3. Ground Truth Annotation System ⭐ *Core Feature*

- **Image-level Annotation Interface**:
  - Side-by-side layout: Image viewer + annotation form
  - Dynamic form fields based on project's observation types
  - Support for text, number, and categorical data types
  - Quick navigation between images (Previous/Next buttons)
- **Annotation Status Tracking**: Visual indicators for annotated vs unannotated images
- **Batch Operations**: Select multiple images for status updates

4. Dataset Creation & Management

- **Query Builder**: Simple interface to filter images by ground truth values
- **Dataset Assembly**: Create training/evaluation datasets from filtered results
- **Dataset Export**: Download capabilities for external use

7. Project Structure Navigation

- **Upload Type Selection**: Choose between training data vs production inference upload
- **Batch Upload Interface**:
  - Camera/station selection before upload
  - Progress tracking with error handling
  - EXIF metadata preview for inference uploads
- **Upload History**: Track and manage previous upload sessions
- **Hierarchical View**: Organization → Project → Inspection Station → Camera structure
- **Context Switching**: Maintain user's current location while allowing easy navigation
- **Breadcrumb Navigation**: Clear path showing current location

User Workflows

Primary Workflow: Training Data Collection & Annotation

1. User uploads batch of raw images (no ground truth)
2. Selects project/camera context for upload
3. Opens annotation interface
4. Views image and manually adds ground truth observations
5. Quickly moves to next unannotated image

6. Repeats until batch is complete

Secondary Workflow: Production Evaluation

1. User uploads images with inference results in EXIF metadata
2. System extracts and displays inference observations
3. User reviews and adds/corrects ground truth for comparison
4. Creates evaluation datasets from annotated production data

Tertiary Workflow: Dataset Creation

1. User defines filter criteria based on ground truth values
2. Reviews filtered image set
3. Creates and names dataset
4. Exports for training/evaluation use

Technical Requirements

Performance Priorities

- **Fast Image Loading**: Optimized image display and caching
- **Responsive Annotation**: Minimal latency between image switches
- **Efficient EXIF Processing**: Quick metadata extraction and parsing
- **Efficient Pagination**: Handle large image collections smoothly

UI/UX Principles

- **Clean Minimalist Design**: Uncluttered interface focusing on core functionality
- **Blue & White Color Scheme**: Primary blue (#3B82F6) with white backgrounds and subtle gray accents
- **shadcn/ui Component Library**: Consistent, accessible components throughout
- **Keyboard Shortcuts**: Support for rapid annotation workflows
- **Progressive Loading**: Show content as it becomes available
- **Clear Visual Hierarchy**: Prioritize annotation interface clarity
- **Mobile-Friendly**: Responsive design for tablet/mobile access

Design System

- **Primary Color**: Blue (#3B82F6) - for primary actions, navigation, and key elements

- **Secondary Color**: White (#FFFFFF) - for backgrounds and content areas
- **Accent Colors**: Light gray (#F8FAFC) for subtle backgrounds, dark gray (#64748B) for text
- **Typography**: Clean, readable fonts with clear hierarchy
- **Components**: shadcn/ui library for buttons, forms, cards, dialogs, and navigation
- **Layout**: Generous white space, clear content separation, focused interfaces

Page Structure Overview

1. Dashboard/Home

- Project overview cards
- Quick access to recent work
- Upload shortcuts (Training vs Production)

2. Upload Interface

- Upload type selection
- Camera/station context selection
- Batch upload with progress tracking
- EXIF metadata preview (for production uploads)

3. Project View

- Camera/station hierarchy
- Image collection overview
- Annotation progress indicators

4. Annotation Interface ⭐

- Main image viewer
- Ground truth form panel (with pre-filled inference data for production images)
- Navigation controls
- Progress tracking

5. Dataset Management

- Query interface
- Dataset list
- Export controls

6. Image Gallery

- Thumbnail grid
- Filter/search capabilities
- Bulk selection tools