# PicForge - Product Requirements Document (PRD)

\*\*Version:\*\* 1.0

\*\*Last Updated:\*\* 2025-10-10

\*\*Status:\*\* Live Product with Active Development

\*\*Product Owner:\*\* Derek Bobola

\*\*Live URL:\*\* https://www.pic-forge.com

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## Executive Summary

PicForge is an AI-powered image transformation platform that democratizes creative image editing through prompt-based transformations. The platform eliminates the need for artistic skills by allowing users to describe desired changes in natural language, with AI handling the heavy lifting.

\*\*Headline:\*\* (re)Imagine. Everything.

\*\*Tagline:\*\* Nothing is real anymore.

\*\*Mission:\*\* Make professional-grade AI image transformation accessible to everyone, regardless of artistic ability.

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## Product Vision & Goals

### Vision

Become the go-to platform for AI-powered image transformation, combining ease of use with powerful creative capabilities.

### Business Goals

- \*\*Growth:\*\* Achieve viral organic growth through free tier and shareable results

- \*\*Revenue:\*\* Implement freemium model covering API costs + profit (Target: $2,500/mo by Q2 2026)

- \*\*Engagement:\*\* Drive daily active usage through gamification features

- \*\*Market Position:\*\* Establish as the "fun, edgy alternative" to corporate image editors

### User Goals

- Transform images without learning complex software

- Explore creative possibilities quickly

- Share impressive transformations on social media

- Access professional-quality effects for free (with limits)

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## Target Audience

### Primary Users

- \*\*Social Media Creators\*\* - Need quick, eye-catching transformations for content

- \*\*Casual Creatives\*\* - Want to experiment without learning Photoshop

- \*\*Meme Makers\*\* - Looking for fast, funny, and weird transformations

- \*\*Small Business Owners\*\* - Need professional-looking images on a budget

### Secondary Users

- \*\*Content Marketers\*\* - Require batch processing for campaigns

- \*\*Artists/Designers\*\* - Using for inspiration and rapid prototyping

- \*\*Hobbyists\*\* - Exploring AI capabilities for personal projects

### User Personas

\*\*"Sarah the Social Media Manager"\*\*

- Age: 28, manages Instagram for local businesses

- Needs: Quick transformations, batch processing, consistent quality

- Pain Point: Limited time and budget for content creation

\*\*"Mike the Meme Lord"\*\*

- Age: 24, creates viral content for fun

- Needs: Weird effects, fast results, easy sharing

- Pain Point: Most tools are too serious or complicated

\*\*"Jessica the Small Business Owner"\*\*

- Age: 35, runs online jewelry store

- Needs: Professional product photos, seasonal themes

- Pain Point: Can't afford professional photography

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## Current Feature Status

### ✅ LIVE & OPERATIONAL

#### Core Editing Features

| Feature | Status | Route | Notes |

|---------|--------|-------|-------|

| Single Image Editor | ✅ Live | `/` | 210+ templates, Lock Composition feature |

| Batch Processor | ✅ Live | `/batch` | 21 effects, 100+ images simultaneously |

| AI Canvas Generator | ✅ Live | `/canvas` | Text-to-image generation |

| Prompt Wizard | ✅ Live | `/prompt-wizard` | 5-step guided prompt builder |

#### Gamification Features

| Feature | Status | Route | Notes |

|---------|--------|-------|-------|

| Transform Roulette | ✅ Live | `/roulette` | 8 categories, 320+ prompts including Banksy |

| Roast Mode | ✅ Live | `/roast` | 3 intensity levels (mild/spicy/nuclear) |

#### Resource Pages

| Feature | Status | Route | Notes |

|---------|--------|-------|-------|

| Templates Gallery | ✅ Live | `/examples` | 110+ sample transformations |

| Prompts Library | ✅ Live | `/prompts` | 211 categorized prompts |

| Tips & Tricks | ✅ Live | `/tips` | Best practices guide |

| Showcase Gallery | ✅ Live | `/showcase` | User-submitted transformations |

#### UX Enhancements

| Feature | Status | Location | Notes |

|---------|--------|----------|-------|

| Lock Composition | ✅ Live | Main editor | Preserves composition during iterative edits |

| Creative Journey | ✅ Live | Main editor | Masonry gallery of edit history |

| Download All | ✅ Live | Main editor | Bulk export to ZIP |

| Before/After Slider | ✅ Live | Main editor | Interactive comparison view |

| Prompt of the Day | ✅ Live | Homepage | Daily featured prompt with examples |

| Drag & Drop Upload | ✅ Live | All editors | Including Ctrl+V paste support |

#### Technical Infrastructure

| Feature | Status | Notes |

|---------|--------|-------|

| Rate Limiting | ✅ Live | 500 images/day per IP |

| Analytics Tracking | ✅ Live | Vercel KV for visitor/template tracking |

| Multi-AI Provider | ✅ Live | Gemini, Replicate, OpenAI, Pollinations |

| Client-Side Processing | ✅ Live | 80% operations free (Canvas API) |

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### 🚧 IN DEVELOPMENT

#### NSFW Content Features

| Feature | Status | Route | Target Launch |

|---------|--------|-------|---------------|

| 18+ Editor | 🚧 Coming Soon Page | `/editor-nsfw` | Q1 2026 |

| 18+ Batch | 🚧 Built but Restricted | `/batch-nsfw` | Q1 2026 (with 18+ Editor) |

\*\*Technical Status:\*\*

- `/editor-nsfw` displays ribbon-style "Coming Soon" page ✅

- `/batch-nsfw` is functionally complete but access restricted ✅

- Replicate SDXL integration tested and working ✅

- Legal disclaimers and age verification language drafted ✅

\*\*Blocking Issues:\*\*

- Age verification system not yet implemented

- Cost structure needs refinement (~$0.023/image via Replicate)

- Terms of Service needs legal review for adult content

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### 📋 PLANNED FEATURES (Documented)

#### Priority: HIGH (Quick Wins)

\*\*Prompt Quality Feedback\*\* - [future-adds/prompt-quality-feedback.md]

- Real-time suggestions as users type prompts

- Estimated implementation: ~15 minutes

- Value: Improved output quality, reduced failed generations

#### Priority: MEDIUM

\*\*Side-by-Side Variant Comparison\*\* - [future-adds/variant-comparison.md]

- Generate 2-3 variations simultaneously

- Estimated implementation: ~20 minutes

- Value: Better results, A/B testing built-in

\*\*Region-Aware Editing\*\* - [future-adds/region-aware-editing.md]

- Select specific areas for targeted AI edits

- Estimated implementation: ~30 minutes

- Value: More precise control, professional workflows

#### Priority: FUTURE

\*\*Monetization (Freemium Model)\*\* - [future-adds/monetization-strategy.md]

- Free tier: 10 images/day with watermark

- Pro tier: $4.99/month for 500 images

- Requires: User accounts, Stripe integration, usage tracking

- Target launch: Q2 2026

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### ❓ GAPS & MISSING FEATURES

Based on comparing documentation vs. live site:

#### Documentation Gaps

- ❌ No user stories or acceptance criteria

- ❌ No formal testing requirements

- ❌ No competitive analysis documented

- ❌ No success metrics/KPIs defined

- ❌ No error handling specifications

- ❌ No accessibility requirements (WCAG compliance)

#### Feature Gaps (Not in Docs or Live)

- ❌ User accounts/authentication (required for monetization)

- ❌ Payment processing (Stripe integration)

- ❌ Image history/favorites (requires auth)

- ❌ API access for developers

- ❌ Mobile app (PWA or native)

- ❌ Advanced editing tools (layers, masks, blend modes)

- ❌ Video transformation capabilities

- ❌ Collaboration features (share projects, comments)

#### Technical Debt

- ⚠️ No formal test suite (manual testing only)

- ⚠️ Rate limiting is in-memory (won't scale horizontally)

- ⚠️ No error monitoring/logging service (e.g., Sentry)

- ⚠️ No A/B testing framework

- ⚠️ No performance monitoring

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## User Stories & Acceptance Criteria

### Epic 1: Core Image Transformation

\*\*US-001: Single Image Upload\*\*

- \*\*As a\*\* user

- \*\*I want to\*\* upload an image via drag-drop, file picker, or paste

- \*\*So that\*\* I can quickly start editing

\*\*Acceptance Criteria:\*\*

- ✅ User can drag and drop image onto upload zone

- ✅ User can click to open file picker

- ✅ User can paste image with Ctrl+V

- ✅ Supported formats: JPG, PNG, WebP, GIF

- ✅ Max file size: 10MB

- ✅ Shows upload progress indicator

- ✅ Displays error message for unsupported formats

\*\*US-002: Apply AI Transformation\*\*

- \*\*As a\*\* user

- \*\*I want to\*\* enter a text prompt describing desired changes

- \*\*So that\*\* AI can transform my image

\*\*Acceptance Criteria:\*\*

- ✅ Prompt input field supports multi-line text

- ✅ User can select from 210+ template prompts

- ✅ "Lock Composition" checkbox prevents structural changes

- ✅ Processing shows progress indicator

- ✅ Rate limit enforced (500/day per IP)

- ✅ Error messages displayed for failed generations

- ✅ Result displayed with before/after comparison

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### Epic 2: Batch Processing

\*\*US-010: Bulk Upload\*\*

- \*\*As a\*\* user managing multiple images

- \*\*I want to\*\* upload 100+ images at once

- \*\*So that\*\* I can process them simultaneously

\*\*Acceptance Criteria:\*\*

- ✅ Supports drag-drop of multiple files

- ✅ Shows upload progress for each file

- ✅ Displays thumbnail preview of uploaded images

- ✅ Allows removal of individual images before processing

- ✅ No hard limit on image count

\*\*US-011: Apply Effect to All\*\*

- \*\*As a\*\* user

- \*\*I want to\*\* select one effect and apply it to all images

- \*\*So that\*\* I maintain consistency across a batch

\*\*Acceptance Criteria:\*\*

- ✅ 21 client-side effects available (sharpen, vignette, glitch, etc.)

- ✅ Effect previews on one image before applying to all

- ✅ Sequential processing with queue system

- ✅ Priority queue support (process selected images first)

- ✅ Export presets: Web Optimized, Social Media, High Quality, Thumbnail

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### Epic 3: Gamification

\*\*US-020: Random Transformation (Roulette)\*\*

- \*\*As a\*\* user wanting inspiration

- \*\*I want to\*\* spin a wheel for random transformation

- \*\*So that\*\* I discover unexpected creative results

\*\*Acceptance Criteria:\*\*

- ✅ Wheel displays 8 categories visually

- ✅ Animation plays during spin

- ✅ 320+ unique prompts across all categories

- ✅ Result applied automatically after spin

- ✅ User can re-spin or manually edit prompt

\*\*US-021: Photo Roasting\*\*

- \*\*As a\*\* user wanting entertainment

- \*\*I want\*\* AI to humorously critique my photo

- \*\*So that\*\* I can share funny roasts with friends

\*\*Acceptance Criteria:\*\*

- ✅ 3 intensity levels: Mild, Spicy, Nuclear

- ✅ Roast generated via AI (not templates)

- ✅ Results are humorous but not genuinely mean

- ✅ Easy social sharing of roast text + image

- ✅ Content moderation prevents genuinely harmful roasts

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## Technical Requirements

### Architecture

\*\*Frontend:\*\*

- Framework: Next.js 15 (App Router) with Turbopack

- Styling: Tailwind CSS

- State Management: React hooks (useState, useEffect)

- Image Processing: Canvas API (client-side)

\*\*Backend:\*\*

- API Routes: Next.js API Routes

- AI Providers:

- Google Gemini Vision API (primary, blocks NSFW)

- Replicate SDXL (NSFW content, ~$0.023/image)

- OpenAI DALL-E (canvas generation)

- Pollinations AI (free alternative)

- Rate Limiting: In-memory (500/day per IP)

- Analytics: Vercel KV

\*\*Deployment:\*\*

- Platform: Vercel

- Auto-deploy: Main branch

- Environment: Production + Preview

- CDN: Vercel Edge Network

### Performance Requirements

| Metric | Target | Current Status |

|--------|--------|----------------|

| Page Load (First Paint) | < 2s | ✅ Achieved |

| Image Upload (10MB) | < 5s | ✅ Achieved |

| AI Transformation (Standard) | < 15s | ✅ Achieved |

| Batch Processing (100 images) | < 5min | ✅ Achieved |

| Lighthouse Score | > 90 | ⚠️ Unknown (needs audit) |

### Security Requirements

- ✅ HTTPS enforced on all pages

- ✅ API keys stored in environment variables (not in code)

- ✅ Rate limiting prevents abuse

- ✅ No image storage (ephemeral processing only)

- ✅ CORS configured for API routes

- ⚠️ No authentication system yet (planned)

- ⚠️ No age verification for NSFW content (planned)

- ⚠️ No CSP headers configured

### Browser Compatibility

\*\*Supported:\*\*

- Chrome/Edge 90+

- Firefox 88+

- Safari 14+

- Mobile Chrome/Safari (iOS 14+, Android 10+)

\*\*Required Features:\*\*

- Canvas API (for client-side processing)

- FileReader API (for image uploads)

- Fetch API (for server communication)

- ES6+ JavaScript

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## Success Metrics & KPIs

### Current Tracking (Vercel KV)

- ✅ Daily active visitors

- ✅ Template usage counts

- ✅ Share button clicks

- ✅ Page views per session

### Missing Metrics (Need Implementation)

- ❌ User conversion rate (free → pro)

- ❌ Average images per user

- ❌ Prompt success rate (good results vs. regenerations)

- ❌ Feature adoption rate (which features are used)

- ❌ User retention (7-day, 30-day)

- ❌ Viral coefficient (shares → new users)

- ❌ API cost per user

- ❌ Revenue per user (when monetized)

### Target KPIs (6 Months Post-Monetization)

| Metric | Target | Rationale |

|--------|--------|-----------|

| Free → Pro Conversion | 3% | Industry standard for freemium tools |

| Monthly Churn Rate | < 10% | Keep most paying users |

| Daily Active Users | 5,000+ | Sustainable user base |

| Images Generated/Day | 50,000+ | High engagement |

| Avg Revenue Per User | $5/month | Pro tier pricing |

| Monthly Profit | $2,500+ | Covers costs + growth capital |

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## Competitive Analysis

### Direct Competitors

\*\*Canva (AI Features)\*\*

- Strengths: Brand recognition, integrated design tools, enterprise plans

- Weaknesses: Complex UI, expensive for casual users, limited AI freedom

- Positioning: PicForge is faster, edgier, and more focused on AI transformations

\*\*Photoleap (Lightricks)\*\*

- Strengths: Mobile-first, influencer marketing, strong brand

- Weaknesses: Mobile-only, subscription required, less prompt flexibility

- Positioning: PicForge is web-based, more affordable, and more experimental

\*\*Remove.bg / Cleanup.pictures\*\*

- Strengths: Single-purpose excellence, viral growth

- Weaknesses: Limited to one function, no creative transformations

- Positioning: PicForge offers broader creative capabilities

### Indirect Competitors

\*\*Midjourney / DALL-E\*\*

- Strengths: Best-in-class generation quality

- Weaknesses: No img2img focus, expensive, requires Discord/account

- Positioning: PicForge specializes in transforming existing images

\*\*Photoshop (Generative Fill)\*\*

- Strengths: Industry standard, professional tools

- Weaknesses: Expensive, complex, steep learning curve

- Positioning: PicForge is instant, no learning required

### Competitive Advantages

1. \*\*Prompt-Based Simplicity\*\* - No complex tools to learn

2. \*\*Gamification\*\* - Roulette/Roast mode drive engagement

3. \*\*Free Tier\*\* - 500 images/day removes barrier to entry

4. \*\*Speed\*\* - 80% operations client-side (instant results)

5. \*\*Brand Voice\*\* - Edgy, fun, anti-corporate

6. \*\*Batch Processing\*\* - 100+ images simultaneously

7. \*\*Multiple AI Providers\*\* - Fallback options if one fails

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## Roadmap

### Q4 2025 (Current)

- ✅ All core features live

- ✅ Gamification features launched

- ✅ Templates library expanded to 210+

- 🚧 18+ Editor coming soon page live

- 🚧 Documentation and PRD completed

### Q1 2026

- 🎯 Launch 18+ Editor with age verification

- 🎯 Implement Prompt Quality Feedback (quick win)

- 🎯 Add Variant Comparison feature

- 🎯 Begin user authentication development

- 🎯 Conduct security audit

### Q2 2026

- 🎯 Launch freemium monetization

- 🎯 Integrate Stripe payment processing

- 🎯 Add user dashboard with usage stats

- 🎯 Implement Region-Aware Editing

- 🎯 Add high-resolution download upsell

### Q3 2026

- 🎯 Launch API access for developers

- 🎯 Add enterprise/white-label tier

- 🎯 Implement custom template marketplace

- 🎯 Add video transformation (beta)

- 🎯 Mobile app (PWA) optimization

### Q4 2026

- 🎯 Collaboration features (shared projects)

- 🎯 Advanced editing tools (layers, masks)

- 🎯 International expansion (multi-language)

- 🎯 AI model fine-tuning (custom styles)

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## Open Questions & Decisions Needed

### Technical

- [ ] \*\*Should we migrate rate limiting to Redis/DB for horizontal scaling?\*\*

- Current: In-memory (doesn't scale across multiple servers)

- Impact: High if traffic spikes

- Decision deadline: Before significant growth

- [ ] \*\*Which authentication provider should we use?\*\*

- Options: NextAuth.js, Clerk, Supabase Auth, Auth0

- Considerations: Cost, ease of integration, social login support

- Decision deadline: Q1 2026 (before monetization)

- [ ] \*\*Should we build a native mobile app or optimize PWA?\*\*

- PWA pros: Single codebase, instant updates

- Native pros: Better performance, App Store discovery

- Decision deadline: Q3 2026

### Business

- [ ] \*\*What age verification system for 18+ content?\*\*

- Options: Third-party (Yoti, Jumio), credit card verification, government ID upload

- Considerations: Cost, user friction, legal compliance

- Decision deadline: Before Q1 2026 launch

- [ ] \*\*Should we allow user-uploaded templates for revenue share?\*\*

- Pros: More content, community engagement, passive income

- Cons: Moderation required, quality control, copyright issues

- Decision deadline: Q2 2026

- [ ] \*\*Enterprise pricing strategy?\*\*

- API access at $99/month sufficient?

- White-label pricing model?

- Decision deadline: Q3 2026

### Product

- [ ] \*\*Should free tier have watermarks?\*\*

- Pros: Viral marketing, premium differentiation

- Cons: User friction, may reduce sharing

- Decision deadline: Before monetization launch

- [ ] \*\*What happens to existing users when we add auth?\*\*

- Grandfather in unlimited free access?

- Require migration to free tier limits?

- Decision deadline: Q2 2026

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## Risk Assessment

### High Risk

\*\*🔴 API Cost Overruns\*\*

- Risk: Viral growth without monetization could bankrupt project

- Likelihood: Medium (if featured on Product Hunt, Reddit, etc.)

- Impact: High (project shutdown)

- Mitigation:

- Current rate limiting (500/day)

- Monitor daily costs closely

- Emergency killswitch for free tier

- Accelerate monetization if traffic spikes

\*\*🔴 Legal Issues with NSFW Content\*\*

- Risk: Hosting/generating illegal content, DMCA takedowns

- Likelihood: Medium (any platform with NSFW features faces this)

- Impact: High (liability, platform bans)

- Mitigation:

- Age verification required

- Clear Terms of Service and disclaimers

- No content storage (ephemeral only)

- Legal review before 18+ launch

- Content moderation tools

### Medium Risk

\*\*🟡 AI Provider Changes\*\*

- Risk: Gemini API price increases or policy changes

- Likelihood: Medium (Google has changed pricing before)

- Impact: Medium (need to migrate or raise prices)

- Mitigation:

- Multi-provider architecture already in place

- Can switch to Replicate, OpenAI, or others

- Monitor provider announcements

\*\*🟡 Competition from Big Tech\*\*

- Risk: Adobe/Canva copy core features

- Likelihood: High (already happening with Generative Fill)

- Impact: Medium (harder to differentiate, pricing pressure)

- Mitigation:

- Move fast, innovate constantly

- Build community and brand loyalty

- Focus on niche use cases (gamification, batch)

### Low Risk

\*\*🟢 Technical Scalability\*\*

- Risk: Site crashes under high load

- Likelihood: Low (Vercel scales automatically)

- Impact: Medium (lost users, bad reputation)

- Mitigation:

- Already on Vercel (handles spikes well)

- Client-side processing reduces server load

- Can add caching/CDN as needed

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## Appendix

### Related Documentation

- [CLAUDE.md](./CLAUDE.md) - Technical architecture and development guide

- [README.md](./README.md) - Project overview and feature list

- [future-adds/README.md](./future-adds/README.md) - Planned feature details

- [future-adds/monetization-strategy.md](./future-adds/monetization-strategy.md) - Pricing model

- [AUTH\_SETUP.md](./AUTH\_SETUP.md) - Authentication setup notes

- [SUPABASE\_SETUP.md](./SUPABASE\_SETUP.md) - Database configuration

### Glossary

- \*\*Lock Composition\*\*: Feature that preserves image structure during AI edits

- \*\*Creative Journey\*\*: Visual gallery showing all edit versions

- \*\*Prompt of the Day\*\*: Featured prompt displayed on homepage

- \*\*Transform Roulette\*\*: Gamified random transformation feature

- \*\*Roast Mode\*\*: AI generates humorous critiques of photos

- \*\*18+ Editor\*\*: Unrestricted editor for adult/graphic content

- \*\*Batch Processor\*\*: Tool for processing 100+ images simultaneously

### Change Log

- \*\*2025-10-10\*\*: Initial PRD created, documented all live features and gaps

- \*\*Future\*\*: Update after each major release

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\*\*Document Status:\*\* ✅ COMPLETE

\*\*Next Review Date:\*\* After Q1 2026 feature launches