# ANKKA

## Technical Product Overview

# 1. Platform Architecture

ANKKA is an AI-native platform designed to support footwear and accessory product development through structured generative workflows.

The platform integrates artificial intelligence, industry-specific product logic, and component-based design systems to accelerate concept creation and validation before manufacturing.

Unlike generic generative AI tools, ANKKA is built specifically for real footwear development processes and is structured around production-oriented design workflows.

The system architecture consists of several functional layers:

### User Input Layer

Users define product parameters through a structured design brief including market, product category, brand positioning, and price segment.

### Prompt Construction Engine

The platform converts structured design parameters into optimized prompts for generative models.

### AI Generation Pipeline

AI models generate multiple product concepts based on defined parameters and selected footwear components.

### Component Integration Layer

The system uses real footwear components (such as soles and construction elements) as starting points for concept generation.

### Concept Exploration Layer

Designers and product teams can explore multiple variations, directions, and refinements of generated concepts.

### Export and Collaboration Layer

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Concepts can be shared, exported, and further developed within the product development workflow.

This architecture allows ANKKA to function as a structured AI product development environment rather than a simple image generation tool.

# 2. AI Generation Pipeline

The core of the ANKKA platform is its AI-driven concept generation pipeline.

The process begins when a user defines product parameters through a structured questionnaire.

Typical parameters include:

- target market
- footwear category
- brand positioning
- price segment
- design direction

These inputs are converted into structured prompts that guide the AI generation process.

The system then generates footwear concepts using generative models trained to operate within footwear-specific design constraints.

The generation process is designed to support rapid exploration of multiple product directions and visual variations.

Design teams can evaluate concepts before committing resources to physical prototyping, reducing both development time and product risk.

# 3. AI Model Stack

ANKKA combines several technologies to support the generation and refinement of product concepts.

| Component | Technology |
|---|---|
| Inference orchestration | ComfyUI node-based workflow |
| Base model | Stable Diffusion XL (SDXL) |
| Fine-tuning | LoRA footwear models |
| Structural guidance | ControlNet |
| Generation refinement | Inpainting and variation generation |
| Infrastructure | Cloud GPU inference |

The system uses a modular architecture allowing models, workflows, and datasets to evolve as the platform grows.

New models and specialized training datasets can be integrated into the platform without restructuring the core system.

# 4. Workflow Orchestration

The generation pipeline is orchestrated through a node-based workflow architecture.

The workflow is organized into the following stages:

User input parameters are first translated into structured prompts that define design constraints and stylistic directions.

These prompts are then processed by the AI generation engine to produce initial product concepts.

ControlNet guidance is used to maintain structural consistency during generation.

Additional refinement steps allow for inpainting and generation of design variations.

The final output is a set of product concepts that can be evaluated by designers and product teams.

This architecture enables a flexible and repeatable generation process capable of producing multiple design directions efficiently.

# 5. Product Modules

The ANKKA platform is structured as a set of modular product components.

### Guided Design Brief

A structured questionnaire that captures key product parameters from the user.

### AI Concept Generation

The AI engine generates footwear concepts based on defined parameters and component inputs.

### Component Library

A structured database of footwear components used by manufacturers worldwide.

### Concept Exploration

Users can explore multiple variations and design directions derived from generated concepts.

### Collaboration Layer

Generated concepts can be shared with designers, manufacturers, and product teams.

This modular architecture allows the platform to expand into additional product categories and workflows over time.

# 6. Prototype Status

ANKKA has already completed the development of its core AI concept generation pipeline.

The current prototype includes:

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- a working AI generation pipeline
- validated model stack using SDXL
- operational ComfyUI workflow orchestration
- repeatable concept generation process
- tested generation of footwear design concepts

The prototype demonstrates the feasibility of structured AI-assisted product development for the footwear industry.

The current stage of development focuses on refining the platform architecture and preparing the system for production deployment.

# 7. Productization Roadmap

Following the completion of the core AI prototype, the next phase focuses on transforming the system into a scalable product platform.

Key development priorities include:

### User Interface

Development of a web-based user interface allowing brands and designers to interact with the platform.

### Component Database

Creation of a structured database of footwear components used in concept generation.

### Backend Infrastructure

Implementation of user accounts, data management, and platform administration systems.

### Workflow Automation

Automation of prompt construction and generation pipelines.

### Collaboration Tools

Development of sharing and collaboration features for product teams.

These steps will transform the existing prototype into a full SaaS platform.

# 8. Strategic Advantage

Most generative AI tools available today are general-purpose systems designed primarily for image generation.

They lack the structured workflows required for real product development.

ANKKA takes a fundamentally different approach.

The platform is designed as a vertically specialized AI product development system tailored specifically for the footwear industry.

Key advantages include:

- structured design workflows
- integration of real footwear components
- industry-specific AI generation logic
- compatibility with real manufacturing processes

By combining generative AI with structured product development workflows, ANKKA enables brands and manufacturers to generate, explore, and validate product concepts significantly faster than traditional design processes.