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AI-POWERED AESTHETIC ASSESSMENT FOR CAREGIVER PROFILE PHOTOS

Replacing Manual Photo Review with Deep Learning at Marketplace Scale

Developed a deep CNN model that automatically scores caregiver profile photos on aesthetic quality — eliminating a labor-intensive manual review workflow and improving family-side discovery on a leading online care marketplace.

— The Client

A leading online family care platform connecting millions of families with caregivers across child care, senior care, special needs care, pet care, housekeeping, and tutoring. The platform operates at consumer-marketplace scale, where profile trust, content quality, and time-to-match directly drive engagement and conversion.

Veltris has partnered with the client for over **15 years**, embedded across enterprise engineering, security operations, customer experience systems, and data and analytics. This case study reflects one of many AI and engineering initiatives delivered as part of that long-standing relationship.

— Executive Summary

Veltris built a deep Convolutional Neural Network (CNN) model, trained with human-labeled data, that scores caregiver profile photos reliably and with high correlation to human aesthetic perception. The model replaces a labor-intensive manual photo review process and improves end-user experience by surfacing higher-scoring profiles first in family-side search.

The work reflects Veltris's **Build–Modernize–Monetize** approach in practice: building an AI-native capability into a live consumer platform, modernizing a manual operational workflow into an intelligent automated pipeline, and helping the client unlock new value from their existing image and review data.

Project Duration: 3 months

— The Challenge

The client's platform already used rich data-driven insights — pay rates, location, family makeup, and care needs — to help families narrow their caregiver shortlist. But one critical step in the trust pipeline remained entirely manual: **profile photo review.**

Customer service teams manually skimmed every caregiver profile picture uploaded to the platform to accept or reject it against platform norms. At marketplace scale, this created compounding problems — operational cost tied directly to user growth, inconsistency across reviewers, and latency between caregiver sign-up and profile activation.

Veltris was engaged to automate the scoring and tagging of all caregivers' profile pictures against universally accepted aesthetic norms — by introducing a deep CNN model that could act as a reliable proxy for human judgment.

Aesthetic quality assessment of photos is itself a challenging task, especially given the visual complexity of profile photos and the subjectivity of human aesthetic perception.

— The Approach

To solve this, Veltris introduced a deep CNN model that could encode information regarding standard image quality (technically) and facial attributes (aesthetically), and then learn to combine these two dimensions to explicitly predict the aesthetic score of each profile picture.

Data Acquisition. Training data was hosted in Amazon S3 — 200,000 unlabeled caregiver images, plus 30,000 labeled images previously scored manually by the client's review team (the ground truth for human aesthetic perception on the platform).

Phase I — Unsupervised Pretraining. Veltris built a Convolutional Autoencoder and trained it on the 200,000 unlabeled images. The autoencoder learned the inherent visual patterns within caregiver photos before being introduced to any labeled judgments.

Phase II — Supervised Training. The 30,000 human-scored images were segregated into 20,000 for training and 10,000 for validation. A truly diverse dataset was chosen to ensure no known biases were introduced into the training data. By starting from a pretrained autoencoder rather than from scratch, the team achieved higher

— The Solution

Veltris leveraged **AWS SageMaker with Docker** to train and deploy the model. The training script was containerized along with Gunicorn and Nginx serving the model's predictions.

Training Phase. The container ran in a high-profile, GPU-powered environment with the location of the training data stored in Amazon S3. The training script was invoked using the TensorFlow framework, and the model was built and trained with data loaded directly from the S3 bucket.

After training, Veltris observed that the aesthetic ranking of these photos closely matched the mean scores given by human raters. Based on this observation, the team confirmed that the model could achieve high correlation with ground-truth ratings while ranking photos aesthetically.

Deployment Phase. Once the model was built and trained, the Docker container was run in deployment mode. The Gunicorn server, running behind Nginx, served the model's predictions through a REST interface — consumed in turn by the client's web and mobile applications.

The model ranks photos aesthetically and assigns a score for each image on a **1 to 10 scale,** with the scoring directly aligned to how the training data was originally captured — making it a strong predictor of human preference.

The model was also trained to recognize patterns that align jobs to job seekers. For instance, if a child care provider uploads a picture that includes a child, that profile is likely to receive a higher score than another with similar image aesthetics but no contextual signal — making the model a soft alignment layer between caregiver profiles and the jobs they are applying for.

— How the Product Helped

This model is capable of a wide range of useful functions beyond raw scoring.

Optimized image parameter guidance. It can suggest near-optimal settings of image parameters — brightness, highlights, shadows — to users, increasing their chances of getting a higher score.

Profile feedback against platform norms. It can provide further feedback to jobseekers based on the client's suggested norms for uploading profile pictures — for example, recommending that users upload a picture without sunglasses where appropriate.

Continuous improvement. While the model acts as a near-perfect proxy for human preference in images, Veltris continues to retrain and test it as new labeled data accumulates — turning every future human review into training signal rather than one-off labor.

— Tech Stack

Deep Learning Framework
TensorFlow

Application Container Platform
Docker

Model Training & Deployment on Cloud
Amazon SageMaker

Python Microframework
Flask

WSGI HTTP Server
Gunicorn

HTTP & Reverse Proxy Server
Ngnix

Data Storage
Amazon S3

— Sidebar: A 15-Year Partnership Across the Platform

Veltris currently supports the client across four active delivery areas, in addition to AI initiatives like the one described in this case study.

Enterprise Engineering — Core application feature development and backend infrastructure. 30+ major feature releases delivered, 22% performance improvement, team scaled from 4 to 18 engineers in under 6 months.

Security Operations (SOC) — 24x7 security monitoring, alert triage, and incident response. 1,500+ critical alerts managed annually, >99% SLA compliance, sub-7-minute average response time, hybrid offshore/onshore model.

Salesforce & USC Systems — Salesforce platform engineering and customer experience systems. 200+ issues resolved, 3 new platform modules integrated, ongoing system enhancement support.

Data Warehouse & Analytics — Data engineering, ingestion pipelines, and analytics enablement. Supporting 15+ business units, 35% reduction in reporting latency, enhanced ingestion and dashboarding performance.

— Anchored in Delivery, Built for What's Next

Beyond AI initiatives like this one, Veltris has been a long-standing partner to the client for over 15 years — through platform evolutions, scaling challenges, security mandates, and performance optimization. Across every chapter, Veltris has acted as an extension of the client's internal teams, with strong contextual understanding, the ability to ramp at speed, and a commitment to outcome-led delivery.

Looking forward, Veltris is positioned to support the client's evolving roadmap — including **Lifemart platform modernization, AI integration for SOC alert triage and response automation, accelerated QA through modular automation frameworks, and enhanced data governance and reporting layer improvements.**

Underpinning this is Veltris's evolution from a trusted delivery partner into a transformation-focused, AI-first technology firm — anchored in three pillars: **Build–Modernize–Monetize, AI-First Accelerators, and Micro-Industry Specialization** across consumer platforms, HealthTech, workforce enablement, and care delivery technologies.