EarthDNA
Project S.H.O.E.S.

Technical Product Manager - Data & AI Platform

Position Overview

We are seeking an experienced Technical Product Manager with deep expertise in data platforms and AI/ML systems to lead product strategy and execution for Project S.H.O.E.S. This role combines technical depth in data infrastructure, machine learning operations, and platform engineering with strategic product management to deliver a revolutionary AI-powered mobile platform for sustainable footwear lifecycle management.

You will own the product roadmap for a complex multi-modal AI system integrating computer vision, predictive analytics, and material science models while managing stakeholder relationships across government, industry partners, and technical teams. This is a critical leadership position that will shape how AI technology transforms circular economy practices, with measurable environmental and economic impact.

Key Responsibilities

Product Strategy & Roadmap
- Define and execute the 18-month product roadmap across 6 iterative phases with 83 discrete deliverables
- Translate complex AI capabilities into market-ready features that serve 100,000+ target users
- Balance technical constraints with business objectives to achieve 30% waste reduction and $50M consumer value recovery
- Develop go-to-market strategies for phased municipal rollout targeting 50% Massachusetts adoption by 2030
- Create product positioning that resonates with diverse stakeholders (consumers, retailers, recyclers, government)

Data Platform Management
- Own the data strategy integrating 1M+ shoe images, 5M+ marketplace listings, and real-time user contributions
- Define requirements for multi-source data pipelines (brand partnerships, consumer uploads, public datasets)
- Establish data governance frameworks ensuring 98% PII removal and GDPR compliance
- Manage synthetic data generation strategy (250K+ GANs-generated images) to address data scarcity
- Oversee federated learning implementation enabling secure manufacturer collaboration

AI/ML Product Development
- Product manage three interconnected AI models:
    - **ShoeDNA™**: Computer vision with 95% mAP@0.5IOU accuracy requirement
    - **ValueLens™**: Predictive analytics maintaining <9.5% MAPE
    - **CircularSort™**: Material routing with 90% F1-Score
- Define model performance benchmarks and validation criteria
- Prioritize model improvements based on user impact and technical feasibility
- Manage MLOps pipeline requirements for continuous model monitoring and retraining

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Technical Requirements & Architecture
- Define technical specifications for mobile-first edge computing (<100ms inference)
- Establish infrastructure requirements (AWS 1.2PB storage, 78,000 vCPU-hours)
- Drive architectural decisions balancing performance, cost, and sustainability
- Ensure platform scalability for 10,000+ concurrent users with >98% uptime
- Define API requirements for marketplace integrations and partner systems

Metrics & Validation
- Establish and track KPIs across technical, business, and environmental dimensions:
    - Technical: Model accuracy, latency, uptime, drift detection
    - Business: User adoption, engagement, transaction volume
    - Environmental: Waste diversion, CO_2 reduction, material recovery
- Design A/B testing frameworks for feature validation
- Implement continuous monitoring through Weights & Biases MLOps pipelines
- Manage beta testing program with 1,000 users and 25 retail partners

Stakeholder Management
- Interface with Massachusetts government (MassTech Collaborative) on grant requirements
- Coordinate with brand partners (New Balance, Vibram, Target) on data sharing
- Align with MIT Media Lab researchers on technical innovations
- Manage relationships with Material Recovery Facilities (MRFs) for real-world validation
- Present to executive stakeholders on progress, risks, and opportunities

Team Leadership
- Lead cross-functional teams including data engineers, ML researchers, mobile developers
- Define sprint goals and acceptance criteria in Agile/Scrum framework
- Facilitate technical decision-making across distributed teams
- Mentor junior product managers and technical staff
- Build culture of data-driven decision making

Required Qualifications

Experience

- 5+ years of product management experience with data platforms or ML products
- 3+ years managing technical products with complex data pipelines
- Proven track record launching consumer-facing mobile applications
- Experience with computer vision, NLP, or predictive analytics products
- Background in marketplace, e-commerce, or two-sided platforms

Technical Skills
- Deep understanding of ML model lifecycle (training, validation, deployment, monitoring)
- Experience with data infrastructure (AWS, Snowflake, streaming pipelines)
- Knowledge of privacy-preserving ML (federated learning, differential privacy)
- Understanding of mobile AI deployment and edge computing constraints
- Familiarity with MLOps tools (Weights & Biases, MLflow, Kubeflow)

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Product Skills

- Strong analytical skills with ability to derive insights from complex datasets
- Experience defining and tracking technical and business metrics
- Proven ability to prioritize features based on ROI and technical debt
- Excellence in writing technical requirements and user stories
- Experience with product analytics tools (Amplitude, Mixpanel, Segment)

Leadership Skills

- Demonstrated ability to influence without authority
- Experience managing stakeholders across technical and non-technical domains
- Strong communication skills for executive presentations
- Ability to navigate ambiguity in emerging technology spaces
- Track record of building high-performing product teams

Preferred Qualifications

- Master's or PhD degree in Computer Science, Data Science, or MBA with technical focus
- Experience in sustainability, circular economy, or environmental tech
- Background in fashion, retail, or consumer goods industries
- Knowledge of government contracts and grant-funded projects
- Experience with blockchain or digital twin technologies
- Understanding of material science or recycling systems
- Previous work on products with significant social/environmental impact
- Experience scaling products to 100,000+ users

Why This Role Matters

This is not just a product management role—it's an opportunity to lead a transformative initiative at the intersection of AI, sustainability, and social impact. You will:

- **Drive Environmental Change**: Your decisions will directly impact waste reduction, with potential to divert millions of pounds from landfills
- **Pioneer AI Applications**: Lead cutting-edge applications of computer vision, predictive analytics, and federated learning
- **Build Scalable Impact**: Create a replicable model that can transform circular economy practices globally
- **Shape Industry Standards**: Define how AI enables sustainable consumer behavior at scale

The Technical Product Manager will be instrumental in proving that advanced AI technology can create measurable environmental and economic benefits while remaining accessible to everyday consumers. This role offers the rare opportunity to combine deep technical challenges with meaningful social impact.

Equal Opportunity Statement

EarthDNA is committed to building a diverse, inclusive team and is an equal opportunity employer. We encourage applications from candidates who bring diverse perspectives and experiences to our mission of using AI for planetary sustainability.