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A Market-Oriented Business Model and AI System Design for Multilingual Business Card Intelligence

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Motivation

"In real-world information extraction, practitioners iterate between foraging and sensemaking, and need transparency for debugging and correction." — Rahman & Kandogan (2022)

"Cognitive automation creates value when it transforms downstream workflows, not when it only restructures data." — Helm et al. (2021)

"CRM value comes from managing relationships over time, not from storing contacts as static records." — Buttle & Prior (2019)

Core Gap: Current solutions optimize data capture, not relationship conversion

Users need:

- Multilingual extraction accuracy
- Event-scale throughput
- Action-oriented prioritization
- Trust-preserving architecture

Research Objective

Design and evaluate an AI-based multilingual business card intelligence system that:

- Converts raw images into structured records
- Routes uncertainty via confidence-based review
- Generates prioritized strike lists
- Supports AI-assisted follow-up
- Links technical performance to measurable networking outcomes

Methodology

Research Design

Mixed-method field experiment at real networking events.

Experimental Conditions

Baseline: manual entry or OCR-only workflow

Treatment: confidence-routed AI system with prioritization and AI follow-up

Key Research Questions

RQ1: Does confidence routing reduce manual review time?

RQ2: Does prioritization improve 48-hour outreach completion?

RQ3: Does AI drafting reduce follow-up latency?

Quantitative Metrics

- Extraction Quality
- Precision, Recall, F1 (field-level)
- Review Burden
- Review Rate
- Average Review Time
- Follow-up Speed
- Time to First Outreach
- Ranking Quality
- Precision@K for high-value contacts

Event-Level Regression Model

$$Y_e = \beta_0 + \beta_1 System_e + \beta_2 EventSize_e + \beta_3 IndustryMix_e + \epsilon_e$$

System

Web-based cloud system

- A Market-Oriented Business Mode…
- Frontend capture and review interface
- Cloud Functions extraction pipeline
- Firestore structured contact model
- Server-side secret management

Preprocessing Standardization

- maxSizeMB = 0.8
- maxWidthOrHeight = 1280

Reduces latency variance and cloud cost while preserving OCR fidelity

Schema-Driven Extraction Structured fields:

- name
- company
- title
- email
- phone
- address
- website
- notes
- confidence
- language

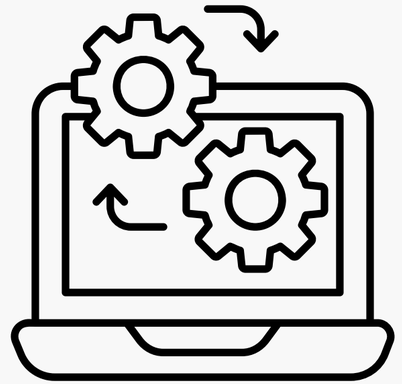
Confidence Routing Logic

- ≥ 0.60 → Auto-accept
- 0.35–0.60 → Manual review
- < 0.35 → Reprocess

Implements a selective human-in-the-loop workflow

Event Mode

- Batch processing with event metadata
- Enables event-level outcome evaluation



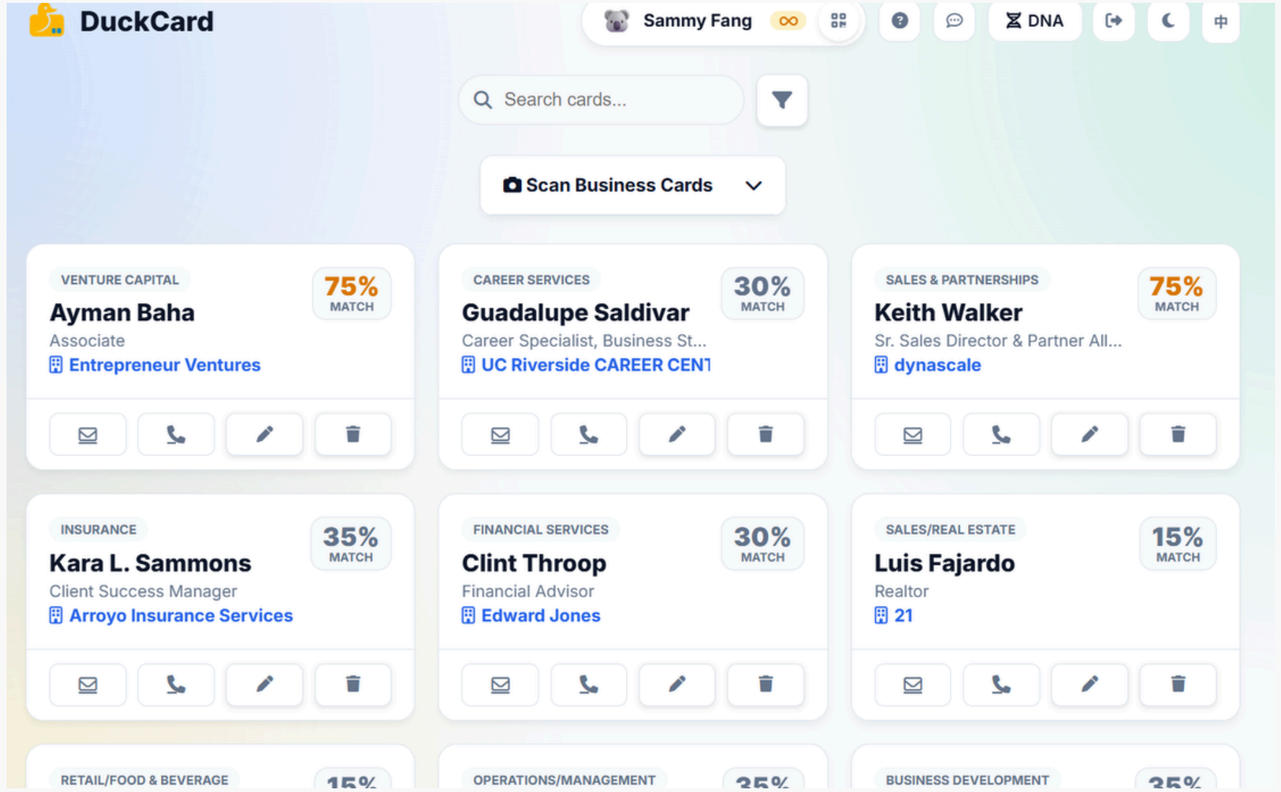
Demo:BusinessCard Try

Workflow Sequence

- Image capture and compression
- Multilingual structured extraction
- Confidence-based routing
- Score computation
- Strike list generation
- AI-assisted icebreaker and follow-up drafting

Weighted Networking Score

$$S_i = \sum_{k=1}^{7} w_k x_{ik}, \quad \sum w_k = 1$$



Key Results & Interpretation

Illustrative Field Scenario

- Baseline processing: 3.5 min per card
- System-assisted: 1.5 min per card
- Time saved: 200 minutes per event

Follow-up Uplift Example

- 48-hour outreach completion: 35% → 55%

Interpretation

Technical Gains

- Reduced review burden
- Higher structured accuracy
- Selective human correction

Operational Gains

- Faster strike-list activation
- Reduced memory decay effect
- Higher probability of high-value contact engagement

Strategic Implication

The measurable unit of value is not scans per month

The measurable unit is conversion acceleration per event

Conclusion & RoadMap

Core Contribution

Unified framework connecting:

- Multilingual extraction
- Confidence-routed review
- Event-scale workflow
- Ranking-based prioritization
- AI-assisted follow-up
- Market-oriented positioning

Current Limitations

- Heuristic weight calibration
- Limited field-scale validation
- Privacy governance requires further formalization

Next-Phase Roadmap

1. Field experiments with calibrated weighting optimization
2. Threshold tuning via review-cost minimization
3. Predictive modeling of response probability
4. Enterprise-grade audit logs and retention policies
5. CRM integration and team analytics dashboard

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Thank You

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