Next-Generation Conversational Travel Insurance Distribution Hackathon

MSIG x Ancileo Innovation Challenge

BLOCK 1: Policy Wording Intelligence & Taxonomy-Based Normalization

Foundation Layer - The Cornerstone of Intelligent Customer Service and Product Knowledge

STRATEGIC OBJECTIVE: Transform MSIG's complex policy documents into a dual-layer intelligence system that enables both Benefits comparisons and detailed coverage explanations without information loss.

THE TAXONOMY NORMALIZATION FRAMEWORK

Business Challenge: One of the key challenges of insurance industries in conversational commerce is the ability to explain complex technical legal documents (policy wordings) with words that customers understand while ensuring compliance and legal accuracy remains. AI assistants should leverage a normalized framework (eg. terminology, legal language) in order to provide meaningful recommendations.

The Normalization Solution:

- **Standardized formating :** Enable apples-to-apples comparison across different range of products of the insurer
- **Scalable Analysis:** Process hundreds of policies in different languages (MSIG sells travel insurance in 16 countries) without manual intervention

Core Philosophy: Every insurance product, regardless of complexity, can and should be decomposed into standardized taxonomic elements while preserving the original textual richness for detailed queries.

TAXONOMIC STRUCTURE DESIGN

Four-Layer Taxonomy Architecture:

Layer 1: General Conditions

- **Eligibility Criteria:** Age restrictions, residency requirements, trip duration limits, health declarations, travel purpose restrictions, geographic coverage zones
- **General Exclusions:** Pre-existing medical conditions with specific lookback periods, high-risk activities and sports, war and terrorism risks, intentional acts and criminal behavior

Layer 2: Benefits Structure

- **Benefit Categories:** Medical, Trip Cancellation, Baggage coverage with distinct parameters
- **Coverage Limits:** Maximum payouts per incident and per policy with geographic variations
- **Sub-limits:** Specific restrictions within broader benefits and currency considerations

Layer 3: Benefit-Specific Conditions

- **Eligibility per Benefit:** When specific coverage applies with waiting periods and documentation requirements
- **Benefit Exclusions:** What is not covered under particular benefits with detailed conditions

Layer 4: Operational Parameters

- **Cost-sharing:** Deductibles and co-pays with claim procedures and time limits
- **Provider Networks:** Approved medical facilities and services with access requirements

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THE NORMALIZATION PROCESS ARCHITECTURE

Stage 1: Document Intelligence Pipeline

Input Processing:

- **PDF Ingestion:** Handle various policy document formats and layouts in different languages
- **GenVision/OCR Technology:** Extract text and tables from image-based PDFs with high accuracy, handling both single and dual column formats
- **Document Structure Recognition:** Identify sections, subsections, and hierarchies
- **Quality Validation:** Detect and flag extraction errors or ambiguities

Stage 2: Taxonomic Mapping Engine

Concept Recognition:

- **Benefit Identification:** Recognize insurance concepts regardless of naming conventions
- **Limit Extraction:** Parse complex monetary limits and conditions with standardization protocols

Normalization Rules:

- **Parameter Extraction:** Convert textual conditions to structured parameters
- **Exception Handling:** Manage unique policy features that don't fit standard patterns
- **Standardization Protocols:** Map varied language to common taxonomic terms

Stage 3: Validation & Quality Assurance

Automated Validation:

- **Completeness Checks:** Ensure all required taxonomic elements are populated using boolean validation
- **Consistency Verification:** Validate logical relationships between elements

The core objective is converting complex, inconsistently formatted insurance policies into a standardized comparison matrix where each product becomes a row, each possible feature becomes a column, and each cell contains a simple **true/false value indicating coverage availability**. This process extracts text from various PDF formats, identifies insurance concepts regardless of naming conventions, converts complex conditions into standardized parameters, and validates completeness through boolean checks. The result transforms hours of manual comparison across multiple policy documents into instant, accurate side-by-side analysis.

ACKNOWLEDGED DATA LOSS - STRATEGIC DESIGN DECISION

Why We Accept Information Loss:

When converting complex policies into comparable data, we face a fundamental challenge: insurance policies are written by lawyers for legal precision, but customers need simple comparisons to make decisions. We solve this by making strategic trade-offs that prioritize what matters most for coverage decisions.

Acceptable Information Loss:

- **Marketing language and promotional text** that doesn't affect actual coverage
- **Dense legal clauses for minor provisions** that don't impact claims
- **Regional terminology variations** that create confusion without adding value
- **Historical background information** unrelated to current coverage

Critical Information Preservation:

- **Coverage boundaries** with exact limits, deductibles, and exclusions
- **Eligibility criteria** defining who is covered and when
- **Claim procedures** specifying how to access benefits
- **Legal obligations** containing binding contract terms

Mitigation Architecture: The system will use a dual-access of data :

- The normalized data for relevant and normalized customer service / recommendation
- The raw policy wording data for FAQ and precise questions of each product

Our dual-access system provides simplified comparisons for decision-making and exact policy language for legal precision. Every simplified answer traces back to the original text, the system flags areas of uncertainty, and complex scenarios escalate to human experts. This approach enables informed decisions quickly while maintaining the legal accuracy essential for insurance contracts.

BLOCK 2: Conversational FAQ & Intelligent Product Recommendation

Intelligence Layer - Where Normalization Meets Conversation

STRATEGIC OBJECTIVE: Create an intelligent conversational layer that seamlessly switches between normalized data for comparisons and original text for detailed explanations, providing users with both precision and accuracy.

THE INTELLIGENT QUERY CLASSIFICATION SYSTEM

Business Challenge: Users ask questions in natural language that require different types of data access. The system must intelligently determine whether to use normalized data for comparisons, original text for detailed explanations, or both for complex scenarios.

Query Classification Framework:

Comparison Queries: "Which plan has better medical coverage?"

- **Data Source:** Normalized taxonomic data for structured analysis
- **Processing:** Structured comparison algorithms with quantified differences
- **Output:** Side-by-side feature matrices with clear differentiation

Explanation Queries: "What exactly is covered under medical expenses?"

- **Data Source:** Original policy text with normalized context for accuracy
- **Processing:** Natural language generation maintaining legal precision
- **Output:** Detailed explanations with exact policy language references

Eligibility Queries: "Am I covered for pre-existing conditions?"

- **Data Source:** Both normalized rules and original conditions for comprehensive assessment
- **Processing:** Rule-based eligibility assessment with clear logic
- **Output:** Clear yes/no answers with qualifying conditions explained

Scenario Analysis: "What happens if I break my leg skiing in Japan?"

- **Data Source:** Multiple benefits and exclusions from both normalized and original sources
- **Processing:** Complex scenario modeling across multiple coverage areas
- **Output:** Step-by-step coverage analysis with claim guidance

CONVERSATIONAL INTELLIGENCE ARCHITECTURE

Memory System Management:

Session Context: One shared context dictionary maintains source of truth knowledge during the conversation, ensuring consistency across all interactions and preventing information loss or contradiction within a single session.

Long-term Memory: Cross-session memory retention enables enhanced customer experience by remembering preferences, previous discussions, and customer-specific needs, allowing for personalized service improvement over time.

Context Preservation: The system maintains conversation state through complex multi-turn discussions, preserving extracted document data, quotation parameters, and customer preferences while enabling seamless transitions between different conversation topics.

ADVANCED COMPARISON ENGINE ARCHITECTURE

Multi-Dimensional Comparison Framework:

Coverage Comparison Matrix:

- **Benefit-by-Benefit Analysis:** Medical, Trip Cancellation, Baggage coverage with detailed feature comparison
- **Limit Comparison:** Absolute limits, sub-limits, and geographic variations with clear value differentiation
- **Exclusion Analysis:** What's not covered and why, with impact assessment for customer understanding
- **Value Assessment:** Coverage per dollar spent with cost-benefit analysis for informed decision-making

Contextual Comparison Intelligence: The system generates personalized comparisons based on extracted travel data, customer preferences, and conversation history. Instead of generic product comparisons, customers receive tailored analysis showing how different policies address their specific travel plans, destinations, and risk factors.

MCP INTEGRATION TECHNICAL SPECIFICATION

MCP Server Architecture:

Tools Layer:

- **Policy Comparison Tool:** Structured comparison using normalized data for accurate product differentiation
- **FAQ Tool:** Natural language explanation using original text for legal precision and detailed answers

Resources Layer:

- **Normalized Policy Resource:** Structured, comparable policy data enabling algorithmic processing
- **Original Document Resource:** Full-fidelity policy text maintaining legal accuracy
- **User Session Resource:** Conversation context and history for personalized interactions
- **Taxonomy Schema Resource:** Insurance normalization standards for consistent processing

Prompts Layer:

- **Comparison Prompt Templates:** Structured formats for product comparison presentation
- **Explanation Prompt Templates:** Natural language generation guides for clear, accurate responses

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BLOCK 3: Document Intelligence & Auto-Extraction & Quotation

Innovation Differentiator - The Customer Experience Game Changer

STRATEGIC OBJECTIVE: Transform insurance quotation from manual form-filling to document upload, automatically extracting travel details for instant personalized recommendations.

BUSINESS TRANSFORMATION IMPERATIVE

Current Challenge: Customers abandon 70% of insurance purchases due to 15-30 manual data fields required for quotation, creating significant friction in the purchase process.

Document-First Approach: Enable customers to upload existing travel documents instead of filling forms. Flight confirmations, hotel bookings, and itineraries already contain all quotation data needed for accurate policy recommendations.

Competitive Advantage: MSIG becomes an intelligent "show-us-your-plans" advisor while competitors remain dependent on traditional "fill-out-our-form" approaches that create customer friction.

Business Impact: Reduces purchase time from 20 minutes to 2 minutes, dramatically improving conversion rates and customer satisfaction while providing more accurate risk assessment based on actual travel plans.

DOCUMENT TYPE PROCESSING

Flight Booking Confirmations - Primary Travel Framework: Flight documents provide the foundation of travel intelligence with structured, reliable data including traveler details for policy generation, trip framework with departure and arrival dates for coverage timing, and investment indicators through ticket costs and cabin class for coverage recommendations.

Core Insight: Customers' existing travel documents contain comprehensive risk intelligence that traditional form-based approaches cannot capture, enabling superior risk assessment and coverage recommendations.

INTELLIGENT DATA EXTRACTION FRAMEWORK

Advanced OCR & Vision Processing:

Multi-Format Handling:

- **Document Variety:** PDF confirmations, mobile screenshots, email attachments, physical document photos
- **Quality Enhancement:** Image quality improvement for low-resolution mobile photos
- **Multilingual Processing:** International travel documents with mixed languages
- **Accuracy Standards:** 95%+ accuracy requirement for critical information extraction

Structured Data Recognition:

- **Format Adaptation:** Varying airline, hotel, and visa application formats with pattern recognition
- **Industry Standards:** Recognition across different layout standards and provider formats
- **Cross-document Validation:** Consistency verification between all uploaded documents

Data Validation & Quality Control:

Logical Consistency Checks:

- **Timeline Validation:** Departure dates precede return dates with trip duration verification
- **Geographic Consistency:** Destination cities align across flight and hotel bookings
- **Identity Verification:** Traveler names remain consistent across all documents

- **Gap Detection:** Trip timelines validate without coverage gaps or overlaps

Cross-Document Verification: Flight and hotel dates alignment with name consistency across bookings, destination coherence verification, and inconsistency flagging for human review rather than proceeding with potentially incorrect information.

AUTOMATED QUOTATION GENERATION

Core Process: Based on the ongoing discussion which contains travel information, previous product recommendation (based on traveler profile), the AI agent can leverage MCP quotation in order to propose a quote to the customer without manual intervention

Technical Flow: Product and travel discussion leads to MCP quotation tool execution. It serves as a proposal for customers. The acceptation of this quote will lead to the Purchase step

Risk-Based Recommendations:

- **Activity Analysis:** Adventure activities trigger specialized coverage suggestions
- **Destination Assessment:** Risk assessment determines appropriate coverage limits
- **Investment Protection:** Travel investment value calculates trip cancellation coverage needs
- **Personalization:** Recommendations based on extracted travel patterns and preferences

Real-Time Processing: Document upload to quotation generation occurs within seconds, maintaining conversation flow without interruption while providing error handling for incomplete extractions with specific clarification requests when needed.

This approach transforms document upload into immediate, personalized insurance recommendations, eliminating traditional form completion friction while providing superior coverage accuracy based on actual travel plans rather than estimated customer inputs.

BLOCK 4: Purchase Engine

Commercial Completion - Conversation to Policy

STRATEGIC OBJECTIVE: Convert accepted quotes into completed policies using MCP purchase tools within the conversation flow.

PURCHASE EXECUTION

Core Process: Customer has accepted a quote from previous conversation steps. AI agent executes purchase using MSIG MCP purchase tool with collected customer data and selected coverage options.

Technical Flow: Quote acceptance leads to MCP purchase tool execution, payment processing, policy generation, and delivery confirmation within the same conversation session.

MCP PURCHASE TOOL IMPLEMENTATION

Purchase Tool Capabilities:

Essential Functions:

- **Purchase Execution:** Using accepted quote parameters and customer selections
- **Payment Processing:** With customer payment method and validation through the integrated payment gateway

Required Data Inputs:

- **Payment Information:** Customer payment method with processing preferences

Payment Processing:

Payment Method Handling: Payment gateway integration with multiple payment options and real-time validation for immediate transaction confirmation.

Error Management:

- **Failure Handling:** Clear error messages with retry mechanisms for declined transactions
- **Alternative Options:** Payment method suggestions and graceful failure with conversation continuity
- **Recovery Mechanisms:** Transaction retry capabilities and customer guidance through payment issues

CONVERSATION INTEGRATION

Seamless Purchase Experience:

Within-Conversation Flow:

- **Continuous Process:** Purchase completion without leaving conversation interface
- **Status Updates:** Real-time processing information and progress confirmation
- **Immediate Confirmation:** Successful purchase verification with policy details

Context Preservation:

- **History Maintenance:** Complete conversation history through purchase process
- **Immediate Access:** Enable policy questions and clarifications within the same session and leveraging block 2

This streamlined purchase capability enables AI agents to complete insurance transactions using MCP tools, transforming accepted quotes into delivered policies within the same conversation session while maintaining customer engagement and satisfaction.

BLOCK 5: MSIG Proprietary Intelligence & Predictive Recommendations

Data-Driven Product Recommendations

STRATEGIC OBJECTIVE: Use MSIG's historical claims data to provide specific product recommendations during the quotation process, leveraging actual claim patterns to guide customers to optimal coverage choices.

CLAIMS DATA INTELLIGENCE INTEGRATION

Core Capability: Integrate MSIG's proprietary claims database alongside the quotation process to provide data-driven recommendations on which specific MSIG product tier and coverage options best match the customer's extracted travel profile.

Implementation Approach: When the system generates quotes based on document intelligence, it simultaneously analyzes MSIG's historical claims data to identify patterns matching the customer's travel profile, destination, and activities, then recommends the most appropriate product tier with supporting rationale.

Example : The LLM notice that at the destination, 80% of medical claims are above XXX Sgd → It recommend to take the silver option where the limit for this benefits is YYY with YYY>XXX

HISTORICAL CLAIMS PATTERN ANALYSIS

Destination-Specific Recommendations:

Claim Frequency Analysis:

- **High-Risk Destinations:** Locations with elevated medical claim frequencies recommend comprehensive coverage tiers

Coverage Adequacy Assessment:

- **Limit Sufficiency:** Historical claim amounts determine whether standard or enhanced coverage limits are recommended

Product Tier Optimization:

Data-Driven Recommendations:

- **Basic Plan Suitability:** Low-risk profiles matching successful basic plan claim patterns receive appropriate tier recommendations
- **Standard Plan Indicators:** Moderate risk factors correlating with standard plan adequacy based on historical outcomes
- **Comprehensive Plan Triggers:** High-risk activities or destinations with expensive claim histories prompt premium tier suggestions

Personalized Coverage Advice: Customer travel profiles compared against similar historical customers to identify optimal coverage combinations, with recommendations supported by actual claim resolution data and customer outcome satisfaction metrics.

QUOTATION ENHANCEMENT INTEGRATION

Real-Time Recommendation Engine:

Alongside Quote Generation: During the standard quotation process, the system simultaneously accesses MSIG's claims database to provide specific product recommendations based on the customer's extracted travel intelligence and historical claim patterns for similar profiles.

Evidence-Based Guidance:

- **Claim Examples:** "Customers with similar Japan skiing trips average $X in medical claims, suggesting comprehensive coverage"
- **Success Stories:** "85% of customers with this travel profile were fully covered under our standard plan"
- **Risk Mitigation:** "Based on historical data, travelers to this destination typically need enhanced medical evacuation coverage"

MCP Tool Enhancement:

Recommendation Tool Integration: Add recommendation capabilities to existing MCP quotation tools, enabling the AI agent to provide not just pricing but specific product guidance based on MSIG's proprietary claims experience and customer outcome data.

Contextual Advice: The system provides clear rationale for product recommendations using MSIG's actual claims data, helping customers understand why specific coverage levels or product tiers are suggested for their particular travel scenario.

This focused approach transforms MSIG's claims database into actionable product recommendations during the quotation process, providing customers with data-driven coverage guidance that competitors cannot match through their own claims experience and historical customer outcomes.