



Applied AI Services & Venture Labs

HITL (Human-in-the-Loop) Handover

Seamless AI-to-CSR Transition and Context Preservation

Statement of Work

Proposed for

Exceleron

06.Nov.2025

Executive Summary

Exceleron, a leading energy services provider, is partnering with Moative to enhance its customer support operations through the integration of Billie, an AI-powered voice assistant designed to handle customer inquiries and service interactions.

While Billie efficiently manages routine queries and automates high-volume interactions, certain customer issues require human empathy and decision-making. At present, Billie responds to complex or unrecognized queries by providing the customer helpline number—forcing users to leave the automated system and re-explain their issue to a CSR. This disjointed process results in customer frustration, reduced efficiency, and higher call-handling times.

To address this, Moative proposes a Human-in-the-Loop (HITL) Handover feature that leverages Billie's voice and text interfaces to detect when a customer query requires escalation and seamlessly connect the user to a live human agent (CSR) without ending the conversation or losing context. This ensures customers receive uninterrupted, personalized support across channels, while CSR's gain immediate access to summarized conversation histories to respond more effectively.

The solution will be delivered in **two structured phases**:

- **Phase 1 (Chat MVP)** introduces the core escalation and handover framework, allowing Billie to identify when a query requires human assistance and hand it over to a CSR through the existing dashboard.

Timelines & Cost: Phase 1 will be completed over **4 weeks** at a fixed cost of **\$15,000**

- **Phase 2 (Intelligent Handover & Voice Integration)** extends these capabilities with sentiment-based escalation, AI-generated conversation summaries, and call handover via automated dialer integration.

Timelines & Cost: Phase 2 will be executed over the next **4 weeks** as a **time-and-material** engagement based on the provided rate card.

This phased approach gives Exceleron immediate functional value while laying the foundation for advanced AI-human collaboration. Together, these enhancements bridge the gap between **automation and empathy**, strengthening Exceleron's ability to deliver responsive, context-aware, and high-quality customer service experiences at scale.

Current Process Analysis

The Current Challenge

Exceleron's customer service model currently involves both automated and manual support channels. When a customer query exceeds Billie's handling scope, Billie provides the helpline number, prompting users to restart the conversation with a human agent (CSR).

This workflow creates friction on multiple fronts:

- **User Frustration:** Customers must exit the AI experience and manually dial the helpline.
- **Increased Handling Time:** CSR's spend the first portion of the call re-establishing context and verifying customer details.
- **Operational Inefficiency:** CSRs manually search for the user's prior conversation by entering their phone number and scrolling through multiple threads while the caller waits on hold.

This leads to prolonged resolution times and inconsistent user experiences, particularly during peak call hours or complex issue escalations.

Opportunity for AI-Driven Transformation

The Seamless '**Escalation to Humans**' capability transforms this process by allowing Billie to **detect when a conversation requires human intervention** and **automatically route** it to an available CSR, without breaking the user's chat or call session.

Key benefits include:

- **Continuous Experience:** Customers stay within the same interface during escalation.
- **Context Preservation:** CSRs automatically receive a summarized view of prior messages and the customer's query.
- **Operational Efficiency:** Calls are intelligently routed to available CSR's, optimizing workload balance.
- **Faster Resolution:** By removing manual lookups, CSRs can immediately address the issue.

This system enhances both **customer satisfaction** and **CSR productivity**, establishing a unified support experience that blends automation with human empathy.

Solution Architecture & Approach – HITL Handover

The HITL Handover feature enables Billie to detect the need for human intervention based on intent, sentiment, or confidence levels and smoothly transfer the conversation to a CSR.

Core Functionality

1. Trigger Detection

Escalation can be triggered through:

- **Intent-based cues:** User explicitly says “I want to talk to a representative.” (Phase 1)
- **Confidence-based triggers:** Billie identifies low response confidence for a query. (Phase 1)
- **Sentiment-based triggers:** Billie can detect frustration or dissatisfaction in tone. (Phase 2)

Tech Notes

*The **Escalation Detection module** shall rely on direct statements from the user (Phase 1) as well as sentiment analysis (only for Phase 2). We shall maintain a **cumulative sentiment score** during the conversation. This score shall be obtained by analysing the customer’s sentiment after each statement. When this score crosses certain thresholds, an escalation may be triggered.*

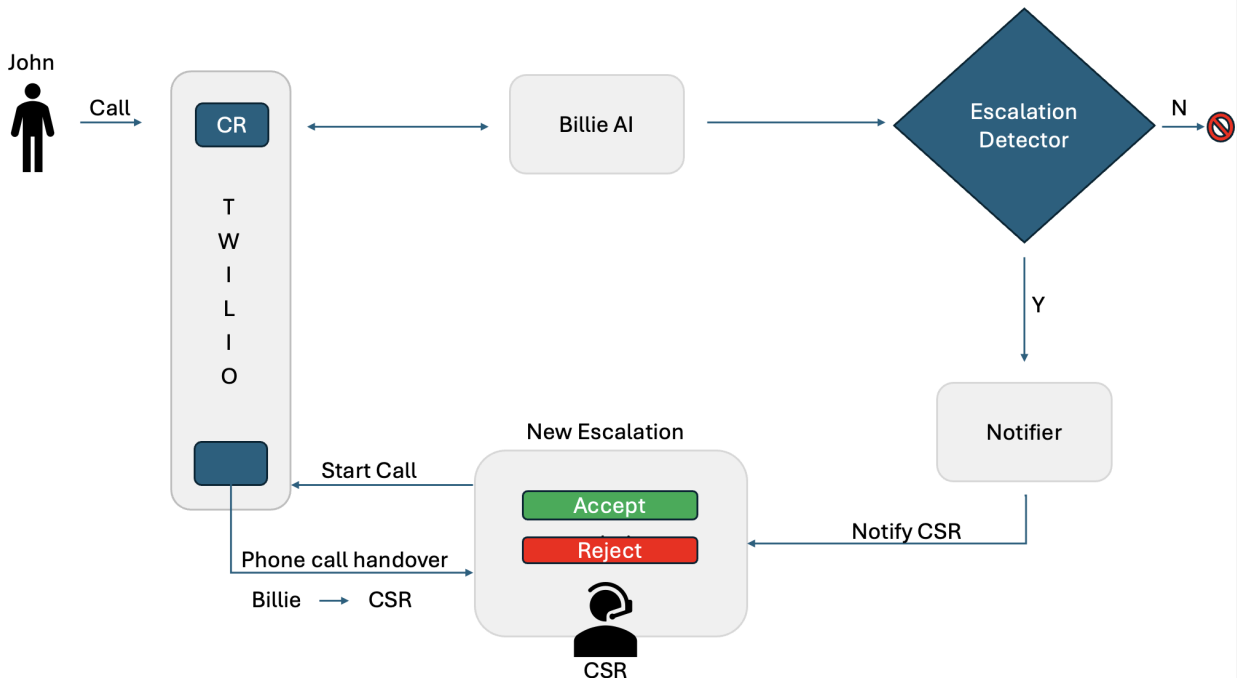
2. Transition Flow

- **Customer Side:** Billie communicates naturally (Ex: “Hold on while I bring in my colleague who can help you better.”)
- **AI Handover:** Billie then transfers the chat or call without disconnecting.
- **CSR Side:** The human agent receives the alert with context already summarized - eliminating the need to manually search for the conversation thread

Tech Notes

When the Escalation-Detector triggers an escalation, the following shall happen:

- *A notification (escalation-request along with summary) will be sent to human agents (CSR) on the Billie-Dashboard*
- *The human agent shall accept the escalation-request, and a notification is sent to Twilio, instructing it to connect the human agent to the ongoing call.*
- *The conversation (chat / phone-call) shall be seamlessly transferred to the human agent.*



3. CSR Experience (Full Implementation)

- The CSR dashboard displays a **summary of the issue** and the **complete conversation history** in a continuous view.
- CSR's can scroll up to view prior messages, respond seamlessly, and mark the case as resolved.
- Once resolved, the dashboard refreshes with the next queued interaction.

Implementation Roadmap

The development of the HITL Handover capability will be delivered in two structured phases, balancing near-term functionality with a forward-looking roadmap for continued innovation.

Phase 1 – Core Handover Enablement (Text Chat MVP)

Objective: Deliver a functional end-to-end chat handover between Billie and CSRs demonstrating escalation, continuity, and usability.

Scope of Work:

- Implement **intent- and confidence-based** escalation triggers.
- Extend Billie's conversational logic to pause and transfer control to a CSR.
- Enhance CSR dashboard to support:
 - Real-time chat assignment and alerts

- Issue summaries and full conversation history
- Queue refresh after closure
- Implement lightweight **CSR assignment logic** (availability or round-robin).
- Develop a **demo-ready flow** using mock data.

Timeline: ~4 weeks

Outcome

A production-ready text **chat-based** handover system that can be expanded by Exceleron's in-house team for voice and advanced triggers later.

Version 1.0 Scope

The first version will focus on the **chat-based version** of the HITL Handover feature, showcasing how Billie detects the need for escalation and transfers the conversation to a CSR within the same interface.

Version 1.0 Flow:

1. **Customer side:** The user asks an escalation-triggering or out-of-scope question (e.g., "Can I get a refund for last month's outage?").
2. **AI trigger:** Billie identifies the need for human assistance and responds with: "Hold on while I bring in my colleague who can help you better."
3. **CSR side:**
 - The CSR dashboard updates automatically with the incoming conversation.
 - A **summary of the issue** is displayed at the top, followed by the full chat history (WhatsApp-style view).
 - When the CSR closes the conversation, the dashboard refreshes with the next queued chat.

Version 1.0 Timeline: At the end of 4 weeks (*Only intent- and confidence-based triggers will be showcased using mock data and simulated CSR alerts.*)

Phase 2 – Intelligent Handover & Voice Integration (Optional Extension)

Objective: Expand the framework to include sentiment-based escalation, voice handover via automated dialer, and AI-assisted CSR capabilities.

Scope of Work:

- Add **sentiment-based escalation detection** (frustration or dissatisfaction).

- Integrate **automated dialer workflows** for voice-based handovers.
- Implement **AI-generated conversation summaries** for CSR onboarding.
- Build **handover analytics and performance reports**.
- Optimize latency and routing efficiency.

Timeline: ~8 weeks (inclusive of Phase 1)

Outcome:

A complete multi-channel HITL handover solution covering **chat and voice**, supporting intelligent escalation and context sharing.

Assumptions & Risks

Assumptions

- Existing Billie dashboard and APIs available for integration.
- Telephony integration will be provisioned through Exceleron's existing infrastructure (Twilio).
- Mock data will be used for the initial demo.
- Exceleron will have access to a shared testing environment.
- The summarisation and routing modules will reuse and build on Billie's existing backend and queue management logic. (Phase 2)

Risks

- Minor latency during real-time summarisation or agent assignment.
- Telephony API or third-party dialer dependency may affect timelines.
- Speech recognition quality may vary under noisy conditions. (Phase 2)
- Model accuracy for sentiment detection may require calibration. (Phase 2)

Deliverables

Version 1.0 Deliverables: At the end of Phase 1 [4 weeks]

- Develop and integrate Phase 1 of **Escalation detection module** (for **intent- and confidence-based escalation triggers**) within Billie's chat interface.
- Updated **CSR dashboard** supporting:
 - Real-time chat assignment and notifications.

- Automatic display of AI based **conversation summaries** for quick CSR onboarding.
- Full **conversation history** view and queue refresh on closure.
- Lightweight **CSR assignment logic** (availability or round-robin).
- **Demo-ready environment**, simulating customer-to-CSR transition with mock data.
- **End-of-phase demo** showcasing complete chat handover flow:
 - User initiates escalation over chat → Billie detects and transfers → CSR continues seamlessly within the dashboard.

Full Implementation Deliverables [8 weeks]

In addition to Phase 1 (Version 1.0 of Chat handover) deliverables,

- **Fully built Escalation detection module (with Intent, Confidence & Sentiment-based escalation detection)** enabling emotion-aware routing.
- **Automated dialer integration** enabling real-time voice handover between Billie and live CSRs.
- **Post-call summarization and queue refresh** logic for call sessions.
- **Handover analytics dashboard**, tracking key KPIs such as:
 - Number of escalations.
 - Average resolution times.
 - Escalation reasons and sentiment breakdowns, across channels
- **Performance optimization** for latency, routing accuracy, and CSR response time.

Project Resourcing & Costs [Phase 1 +2]

A lean, cross-functional team will deliver the demo and the full feature build. The same team that develops the demo will extend it into production-ready chat and call flows.

Resource	Rate (in USD)	Indicated Hours (8 Weeks)	Estimated Cost
Solution Architect	\$75	80	\$6,000
Project Manager	\$60	80	\$4,800
AI / Full Stack Engineer	\$50	320	\$16,000
AI / Full Stack Engineer	\$40	120	\$4,800
QA Engineer	\$35	80	\$2,800
Total			\$34,400

Notes:

- **Phase 1 (Chat MVP)** will be delivered as at an indicative price of **USD 15,000**, covering all work required to implement and demonstrate the core handover capability. Should there be an overflow of time due to detailed out of the Phase 1 requirements, edge cases etc., there may be corresponding increase in billable hours
- **Phase 2 (Intelligent Handover & Voice Integration)** will be executed on a **time and material basis**, billed as per the rate card provided above.
- The hours shown above are **illustrative for both phases combined**. Actual billing for Phase 2 will reflect hours consumed based on approved scope.
- Final invoicing for time-and-material work will be on an **actual basis**, supported by detailed monthly timesheets.

RACI Matrix

Activity/Deliverable	Moative	Exceleron
Phase 1 - Core Handover Enablement (Chat MVP)		
Requirements validation and scope confirmation	R/A	C/I
Design and architecture setup	R/A	C/I
Development of chat-based handover logic	R/A	I
CSR dashboard enhancement	R/A	C
Internal QA & Testing	R/A	C/I
Demo preparation & Delivery	R/A	C
Sign off for Phase 1 completion	C/I	A
Phase 2 - Intelligent Handover & Voice integration		
Sentiment based escalation & Ai summaries	R/A	C/I
Automated dialer & Voice integration	R/A	C/I
Analytics dashboard development	R/A	C/I
Final QA & UAT	R/A	A/C
Sign off Phase 2	C/I	A
Go live & Knowledge Transfer	R/A	C/I

Legend

- R: Responsible (Does the work)
- A: Accountable (Owns the outcome)
- C: Consulted (Provides input)
- I: Informed (Kept updated)

Future Potential

The HITL Handover lays the foundation for a more advanced **CSR Co-Pilot** capability , transforming Billie from a standalone AI assistant into a collaborative support system.

In its future iterations, Billie can:

- **Seamless Integration with existing call centers:** Billie can seamlessly integrate with existing infrastructure currently being used by call centers.
- **Act as a Co-Pilot:** Suggest responses, summarize prior context, and surface relevant knowledge base articles for CSRs in real time.
- **Enable Continuous Learning:** Use CSR interventions as feedback signals to retrain Billie's models, refining intent accuracy and escalation detection.
- **Enhance Analytics:** Generate insights around escalation rates, average resolution times, and customer sentiment trends across utilities.

These enhancements will evolve Billie into a **self-improving, human-augmented service platform**, combining the scale of automation with the empathy of human support.

Next Steps

Upon Exceleron's approval of this SOW, Moative will:

1. Execute the SOW with Excelron
2. Schedule the **kick-off meeting** to confirm scope, timelines, and delivery milestones.
3. Begin work on **Phase 1 (Chat MVP)** under a fixed-price engagement and deliver the end-of-phase demo at week 4
4. Seek **Exceleron's confirmation on proceeding with Phase 2 (Intelligent Handover & Voice Integration)** (to be executed on a time-and-material basis as defined in this SOW) so planning and resourcing can be aligned from the outset

For Moative

For Exceleron (EnergyCom Network)
