

Financial startup

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Building Multi-Turn Conversation System for Tax Optimization Startup

Situation

I was approached by a fintech startup that wanted to revolutionize how individuals maximize their tax returns through an intelligent conversational interface.

The company had domain expertise in tax law but lacked the technical infrastructure to deliver their vision.

They needed to create a sophisticated system that could guide users through complex tax scenarios via natural conversation while accessing both **structured legal data and unstructured financial assessments**.

The startup was preparing for a Series A funding round and needed a working demonstration to prove their concept's viability and unique value proposition to potential investors.

Task

My **responsibility** was to lead the **technical assessment** and **development** of their conversational tax optimization platform. Specifically, I needed to:

- **Evaluate available tools** and technologies for building multi-turn conversation systems
- **Work with non-technical stakeholders** to translate business requirements into technical specifications

- **Design and implement a hybrid data architecture** combining structured and unstructured data
- **Deliver a proof-of-concept** within 2 months and a minimum viable product within 4 months
- **Create a compelling technical demonstration** that would showcase the platform's unique capabilities to investors
- Ensure the solution could **handle complex tax scenarios** while maintaining an intuitive user experience

Action

I structured the project into clear phases while maintaining close collaboration with the non-technical founding team:

1. Technology Assessment & Requirements Gathering (Weeks 1-3):

- Conducted comprehensive evaluation of conversational AI platforms including Dialogflow, Microsoft Bot Framework, Rasa, and OpenAI's GPT models
- Organized structured workshops with tax experts and business stakeholders to understand complex use cases
- Mapped out user journeys for different tax scenarios (individual, small business, complex deductions)
- Selected a hybrid approach using OpenAI for natural language processing with Amelia conversation management

2. Architecture Design (Weeks 4-6):

- Designed a multi-turn conversation engine that could maintain context across complex tax questioning sequences
- Created a hybrid RAG (Retrieval-Augmented Generation) architecture:
 - Vector database (Pinecone) for unstructured data including financial structures, user assessments, and contextual tax advice
 - Elasticsearch for structured data containing tax laws, policies, deduction rules, and regulatory updates

- Planned a notification system for account status updates and tax deadline reminders
- Developed data flow diagrams and API specifications for stakeholder review

3. POC Development (Weeks 7-8):

- Built core conversation flow handling 5 primary tax scenarios
- Implemented basic RAG functionality with sample tax law database
- Created interactive demo showcasing intelligent question branching based on user responses
- Developed simple dashboard for tracking conversation analytics and user progress

4. MVP Development (Months 3-4):

- Expanded conversation engine to handle 15+ tax scenarios with dynamic follow-up questions
- Fully implemented hybrid RAG system with comprehensive tax law database and user assessment storage
- Built notification system with email and in-app alerts for important tax dates and status changes
- Created admin dashboard for tax experts to review and validate system recommendations
- Implemented user authentication, data security, and GDPR compliance measures

5. Stakeholder Communication & Demo Preparation:

- Conducted weekly demos with founders to gather feedback and iterate on user experience
- Created technical documentation explaining the architecture's competitive advantages
- Prepared investor presentation materials highlighting the system's unique methodology
- Trained the founding team on technical aspects for investor discussions

Result

The project delivered exceptional results that directly contributed to the startup's fundraising success:

Technical Achievements:

- Successfully delivered **POC in 8 weeks** and **MVP in 16 weeks**, meeting all deadlines
- Built a conversation system that could handle complex multi-turn tax scenarios with **85% accuracy** in recommendation quality
- Implemented **hybrid RAG architecture** processing 50,000+ tax law documents and personalized user assessments
- Achieved average *conversation completion rate of 78%* with **users spending 12 minutes on average** per session

Business Impact:

- **Funding Success:** The startup successfully raised \$2.3M in Series A funding, with investors specifically citing the technical demonstration and unique user experience as key differentiators
- **Competitive Advantage:** The hybrid RAG approach allowed them to provide more accurate and contextual tax advice compared to traditional rule-based systems
- **User Experience:** Beta users reported 40% higher satisfaction compared to existing tax software, primarily due to the conversational interface
- **Scalability:** The architecture supported onboarding 500+ beta users without performance degradation

Strategic Value:

- Demonstrated how conversational AI could make complex financial services more accessible to everyday users
- Created a reusable framework for building domain-specific conversational systems with hybrid data retrieval

- Established technical credibility that attracted additional engineering talent to the startup
- Generated intellectual property around conversational tax optimization that became part of their competitive moat

Personal Growth:

- Enhanced my ability to translate complex technical concepts for non-technical stakeholders
- Gained deep **experience in designing RAG systems** for highly regulated domains
- Developed **expertise in rapid prototyping** and MVP development under tight timelines
- **Strengthened skills in working with startups** where every technical decision directly impacts business outcomes

This project exemplified the importance of understanding customer needs deeply - by creating an intuitive conversational interface backed by sophisticated technical architecture, we were able to make complex tax optimization accessible to users while providing investors with confidence in the startup's technical capabilities and market potential.