Module 2: AI Engine - Detailed Functional Requirements

2.5 Confidence Scoring (AI-2.1.3)

AI Config
- Intents
- Entities
- Responses
- **Test Console**

Where is my order ORD-78923? **Test**

```
"intent": "order_status",
"confidence": 0.94,
"entities": {
    "order_id": "ORD-78923"
},
"response": "Your order ORD-78923 is out for
delivery..."
```

Intent Scores

order_status	**94%**
shipping_info	42%
refund_request	12%

2.6 Knowledge Base Matching (AI-2.3.1 - AI-2.3.3)

AI Config
- Intents
- Entities
- Responses
- **Test Console**

KB Search Results

Query: "How do I get a refund for my order?"

Matching Articles (3)

How to Request a Refund
To request a refund, go to your order history, select the order, and click "Request Refund". Refunds are processed within 5-7 business days...
✓ 96% match

Refund Policy
We offer full refunds within 30 days of purchase for unused items in original packaging. Some restrictions apply...
✓ 82% match

Return vs Refund
Understanding the difference between returns and refunds...

2.7 AI Processing Flow (AI-2.1.5)

START Message Received → PROCESS Intent Recognition → CHECK Confidence ≥70%? → PROCESS Generate Response → END Send AI Reply

→ PROCESS Escalate → END Human Handoff

Legend: ☐ Start ☐ Process ☐ Decision ☐ End

2.8 Default Intents (AI-2.4)

INTENT	SAMPLE PHRASES	ACTION	STATUS
greeting	Hello, Hi, Good morning	Welcome message	Active
order_status	Where is my order, Track order	Fetch order + respond	Active
refund_request	I want a refund, Return item	KB article + guide	Active
shipping_info	Delivery time, When arrive	Shipping details	Active
account_help	Can't login, Reset password	Account recovery flow	Active
pricing	How much, Pricing plans	Pricing info	Active
contact_human	Talk to agent, Human please	Trigger handoff	Active
goodbye	Thanks, Bye, That's all	Closing message	Active
fallback	(No match)	Escalate to human	Active

Document Info

Module: AI Engine | **Version:** 1.0 | **Status:** Approved

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1. Intent Recognition

1.1 Intent Matching

ID	Requirement	Details

AI-1.1.1	Message analysis	System analyzes each incoming customer message
AI-1.1.2	Intent matching	System compares message against all active intents
AI-1.1.3	Confidence score	System returns confidence score 0-100% for each intent
AI-1.1.4	Top intent	System selects highest confidence intent
AI-1.1.5	Threshold check	If confidence ≥70%, process as matched
AI-1.1.6	Below threshold	If confidence <70%, trigger fallback/escalation
AI-1.1.7	Multiple matches	Handle cases where multiple intents score similarly
AI-1.1.8	Processing time	Intent recognition completes in <500ms

Acceptance Criteria:

- [ ] System correctly identifies intent for 85%+ of test messages
- [ ] Confidence scores are consistent for similar messages
- [ ] Processing completes within time limit

1.2 Training Phrases

ID	Requirement	Details
AI-1.2.1	Phrase storage	Each intent has list of training phrases
AI-1.2.2	Minimum phrases	Minimum 5 phrases per intent (warning if less)
AI-1.2.3	Phrase variations	Support different phrasings of same intent
AI-1.2.4	Entity annotation	Phrases can contain entity placeholders
AI-1.2.5	Case insensitive	Matching is case-insensitive
AI-1.2.6	Typo tolerance	Basic tolerance for common typos
AI-1.2.7	Add phrase	Admin can add new training phrase
AI-1.2.8	Delete phrase	Admin can delete training phrase
AI-1.2.9	Duplicate check	Warn if phrase already exists

AI-1.2.10   Bulk import   Import phrases from CSV

Phrase Format Examples:

"Where is my order?"
"Check order status for @order_id"
"I want to track @order_id"
"What's the status of my order @order_id?"

Acceptance Criteria:

- [ ] Phrases save correctly
- [ ] Entity annotations parse correctly
- [ ] Duplicate warning displays

1.3 Context Handling

ID	Requirement	Details
AI-1.3.1	Context window	Consider last 5 messages for context
AI-1.3.2	Session context	Maintain context within conversation session
AI-1.3.3	Entity memory	Remember extracted entities in session
AI-1.3.4	Follow-up detection	Detect follow-up questions ("What about...", "And...")
AI-1.3.5	Context reset	Reset context on new conversation
AI-1.3.6	Pronoun resolution	Resolve "it", "that", "this" from context

Context Example:

Customer: "Where is my order ORD-12345?"
AI: [extracts order_id, stores in context]
Customer: "When will it arrive?"
AI: [uses stored order_id from context]

Acceptance Criteria:

- [ ] Follow-up questions answered correctly
- [ ] Entities persist in session

- [ ] Context clears on new conversation

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2. Entity Extraction

2.1 Built-in Entities

Entity	Type	Pattern/Description
@email	Built-in	Standard email format
@phone	Built-in	Phone number formats
@date	Built-in	Date expressions (today, tomorrow, Jan 15)
@time	Built-in	Time expressions (3pm, 15:00)
@number	Built-in	Numeric values
@currency	Built-in	Money amounts ($50, 50 USD)
@person_name	Built-in	Person name detection
@url	Built-in	URL/link detection

2.2 Custom Entities

ID	Requirement	Details
AI-2.2.1	Create entity	Admin creates custom entity
AI-2.2.2	Entity name	Unique name, alphanumeric + underscore
AI-2.2.3	Regex type	Define pattern using regex
AI-2.2.4	List type	Define list of allowed values
AI-2.2.5	Synonyms	Support synonyms for list values
AI-2.2.6	Edit entity	Admin edits entity definition
AI-2.2.7	Delete entity	Admin deletes entity (with usage check)

	AI-2.2.8	Test entity	Test entity extraction inline

Custom Entity Examples:

Entity	Type	Definition
@order_id	Regex	`ORD-[0-9]{5}`
@product_sku	Regex	`SKU-[A-Z]{2}[0-9]{4}`
@plan_name	List	Basic, Pro, Enterprise
@department	List	Sales, Support, Billing

2.3 Extraction Process

ID	Requirement	Details
AI-2.3.1	Auto-extract	Extract entities from message automatically
AI-2.3.2	Multiple entities	Extract multiple entities from single message
AI-2.3.3	Entity validation	Validate extracted value against pattern
AI-2.3.4	Extraction confidence	Return confidence for each extraction
AI-2.3.5	Missing required	Prompt user if required entity missing
AI-2.3.6	Entity storage	Store extracted entities with message

Extraction Response:

```
{
 "entities": {
  "order_id": {
   "value": "ORD-78923",
   "confidence": 0.98,
   "start": 24,
   "end": 33
  },
  "email": {
   "value": "john@email.com",
   "confidence": 0.95,
```

```
    "start": 45,
    "end": 59
  }
 }
}
```

Acceptance Criteria:

- ● [ ] Built-in entities extract correctly
- ● [ ] Custom entities work as defined
- ● [ ] Multiple entities extracted from one message

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3. Response Generation

3.1 Response Templates

ID	Requirement	Details
AI-3.1.1	Template storage	Each intent has response templates
AI-3.1.2	Multiple templates	Support multiple templates per intent
AI-3.1.3	Random selection	Randomly select from templates
AI-3.1.4	Template variables	Support variable placeholders
AI-3.1.5	Conditional text	Support conditional blocks
AI-3.1.6	Add template	Admin adds response template
AI-3.1.7	Edit template	Admin edits template
AI-3.1.8	Delete template	Admin deletes template
AI-3.1.9	Preview	Preview rendered template

3.2 Variable System

Variable	Source	Example
{{customer.name}}	Customer record	"John"

{{customer.email}}	Customer record	"john@email.com"
{{order.id}}	Extracted entity	"ORD-78923"
{{order.status}}	API lookup	"Shipped"
{{order.delivery_date}}	API lookup	"Jan 20, 2025"
{{agent.name}}	System	"Sarah"
{{company.name}}	Config	"Acme Inc"

3.3 Response Rules

ID	Requirement	Details
AI-3.3.1	Variable substitution	Replace variables with actual values
AI-3.3.2	Missing variable	Use fallback or omit if variable unavailable
AI-3.3.3	Max length	Response max 1000 characters
AI-3.3.4	Formatting	Support basic formatting (bold, links)
AI-3.3.5	Emoji support	Allow emoji in templates
AI-3.3.6	Response time	Generate response in <1 second

Template Example:

Hi {{customer.name|there}}! 👋

Your order {{order.id}} is currently {{order.status}}.

{{#if order.tracking_number}}
Track it here: {{order.tracking_url}}
{{/if}}

Anything else I can help with?

Acceptance Criteria:

- [ ] Variables substitute correctly
- [ ] Missing variables handled gracefully
- [ ] Conditional blocks work

4. Confidence & Fallback

4.1 Confidence Thresholds

Confidence	Action	Description
90-100%	High confidence	Respond immediately
70-89%	Medium confidence	Respond with confirmation
50-69%	Low confidence	Ask clarifying question
0-49%	No confidence	Trigger fallback

4.2 Fallback Handling

ID	Requirement	Details
AI-4.2.1	Fallback intent	Special intent for unmatched messages
AI-4.2.2	Clarification	Ask clarifying question first
AI-4.2.3	Retry limit	Max 2 clarification attempts
AI-4.2.4	Escalation trigger	Escalate after retry limit
AI-4.2.5	Negative sentiment	Escalate on detected frustration
AI-4.2.6	Explicit request	Escalate when user asks for human
AI-4.2.7	Fallback response	Configurable fallback message

Fallback Flow:

1. Message received → No intent matched (confidence <50%)
2. Send: "I'm not sure I understand. Could you rephrase?"
3. Customer rephrases → Still no match
4. Send: "Let me connect you with a team member."
5. Trigger human handoff

4.3 Escalation Triggers

Trigger	Condition
Low confidence	Confidence <50% twice
User request	"human", "agent", "person", "representative"
Frustration	Negative sentiment detected
Complex query	Multiple intents detected
Repeated fallback	3 consecutive fallbacks

Acceptance Criteria:

- [ ] Thresholds work correctly
- [ ] Fallback messages display
- [ ] Escalation triggers fire appropriately

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5. Knowledge Base Integration

5.1 Article Search

ID	Requirement	Details
AI-5.1.1	Query generation	Generate search query from message
AI-5.1.2	Semantic search	Search by meaning, not just keywords
AI-5.1.3	Top results	Return top 3 matching articles
AI-5.1.4	Match score	Calculate relevance score 0-100%
AI-5.1.5	Threshold	Only use articles with >60% match
AI-5.1.6	Published only	Search only published articles

5.2 Article Usage

ID	Requirement	Details

AI-5.2.1	Content extraction	Extract relevant section from article
AI-5.2.2	Response enhancement	Use article content to enhance response
AI-5.2.3	Article link	Option to include article link
AI-5.2.4	Citation	Track which article was used
AI-5.2.5	Feedback loop	Track if article resolved query

KB-Enhanced Response Example:

Customer: "How do I get a refund?"

AI Response (enhanced with KB):
"To request a refund:
1. Go to Order History
2. Select the order
3. Click 'Request Refund'

Refunds process in 5-7 business days.

📄 Full details: [Refund Policy](link)"

Acceptance Criteria:

- [ ] Relevant articles found
- [ ] Content enhances response
- [ ] Links work correctly

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6. Intent Management (Admin)

6.1 Intent CRUD

ID	Requirement	Details
AI-6.1.1	List intents	View all intents with status
AI-6.1.2	Search intents	Search by name
AI-6.1.3	Filter intents	Filter by active/inactive

AI-6.1.4	Create intent	Create new intent
AI-6.1.5	Edit intent	Edit intent details
AI-6.1.6	Delete intent	Delete intent (with confirmation)
AI-6.1.7	Enable/disable	Toggle intent active status
AI-6.1.8	Duplicate	Duplicate existing intent

6.2 Intent Fields

Field	Type	Required	Validation
name	String	Yes	Unique, lowercase, no spaces
display_name	String	Yes	Max 100 chars
description	Text	No	Max 500 chars
is_active	Boolean	Yes	Default: true
training_phrases	Array	Yes	Min 5 recommended
responses	Array	Yes	Min 1 required
entities	Array	No	Valid entity references

6.3 Intent Analytics

ID	Requirement	Details
AI-6.3.1	Match count	Show total matches for intent
AI-6.3.2	Accuracy rate	Show accuracy percentage
AI-6.3.3	Trend	Show match trend (up/down)
AI-6.3.4	Low performers	Highlight intents with <80% accuracy
AI-6.3.5	Unmatched log	Log messages that didn't match any intent

Acceptance Criteria:

- [ ] CRUD operations work
- [ ] Validation enforced
- [ ] Analytics display correctly

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7. Default Intents

7.1 Pre-configured Intents

Intent	Description	Auto-Action
greeting	Hello, hi, good morning	Welcome message
goodbye	Thanks, bye, that's all	Closing message
order_status	Check order, track package	Fetch order API
refund_request	Want refund, return item	KB article + guide
shipping_info	Delivery time, tracking	Shipping info
account_help	Login issues, password	Account recovery
pricing	How much, plans, cost	Pricing info
contact_human	Speak to agent	Trigger handoff
fallback	(No match)	Clarify or escalate

7.2 Default Training Phrases

greeting:

- Hello
- Hi
- Hey
- Good morning
- Good afternoon

order_status:

- Where is my order?

- Check order status
- Track my order
- Order status for @order_id
- When will my order arrive?

refund_request:

- I want a refund
- How do I get my money back?
- Return this item
- Refund for order @order_id
- I'd like to return my purchase

contact_human:

- Talk to a human
- Speak to an agent
- I want a real person
- Connect me to support
- Human please

7.3 Default Responses

greeting:

Hi there! 👋 How can I help you today?

order_status (with order):

Your order {{order.id}} is {{order.status}}.
Expected delivery: {{order.delivery_date}}.

order_status (without order):

I'd be happy to check your order status!
Could you please provide your order number?
It starts with "ORD-".

contact_human:

Of course! Let me connect you with a team member.
Please hold for a moment... 💁

fallback:

I'm not sure I understood that. Could you try rephrasing?
Or type "agent" to speak with a team member.

---

8. Test Console

8.1 Testing Interface

ID	Requirement	Details
AI-8.1.1	Test input	Text input for test message
AI-8.1.2	Send test	Button to send test message
AI-8.1.3	Show intent	Display detected intent
AI-8.1.4	Show confidence	Display confidence score
AI-8.1.5	Show all scores	Display scores for all intents
AI-8.1.6	Show entities	Display extracted entities
AI-8.1.7	Show response	Display generated response
AI-8.1.8	Show KB matches	Display matching articles
AI-8.1.9	JSON view	Toggle raw JSON output

8.2 Test Output Format

```
{
 "input": "Where is my order ORD-78923?",
 "intent": {
  "name": "order_status",
  "confidence": 0.94
 },
 "all_intents": [
  {"name": "order_status", "confidence": 0.94},
  {"name": "shipping_info", "confidence": 0.42},
  {"name": "refund_request", "confidence": 0.12}
 ],
 "entities": {
```

```
    "order_id": "ORD-78923"
  },
  "kb_matches": [
    {"title": "Track Your Order", "score": 0.87}
  ],
  "response": "Your order ORD-78923 is out for delivery...",
  "processing_time_ms": 245
}
```

Acceptance Criteria:

- [ ] Test input works
- [ ] All output fields display
- [ ] JSON toggle works

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9. AI Configuration Settings

9.1 Global Settings

Setting	Type	Default	Description
confidence_threshold	Number	70	Min confidence to respond
fallback_threshold	Number	50	Below this, trigger fallback
max_clarifications	Number	2	Max clarifying questions
context_messages	Number	5	Messages to consider for context
response_delay_ms	Number	500	Artificial delay for natural feel
kb_match_threshold	Number	60	Min KB article match score

9.2 Model Settings

Setting	Type	Default	Description
ai_provider	Enum	openai	AI provider (openai/anthropic)
model_name	String	gpt-4o-mini	Model to use

temperature	Number	0.3	Response creativity (0-1)
max_tokens	Number	500	Max response length

10. Performance Requirements

Metric	Target
Intent recognition	<500ms
Entity extraction	<200ms
Response generation	<1000ms
Total processing	<2000ms
Accuracy rate	>85%
Uptime	99.9%

11. Logging & Analytics

11.1 Message Logging

Field	Description
message_id	Unique identifier
conversation_id	Parent conversation
input_text	Customer message
detected_intent	Matched intent
confidence	Confidence score
entities	Extracted entities
response_text	AI response

processing_time	Time to process
timestamp	When processed

11.2 Analytics Metrics

Metric	Description
Total processed	Messages processed by AI
Automation rate	% handled without human
Avg confidence	Average confidence score
Fallback rate	% triggered fallback
Top intents	Most common intents
Low confidence	Messages below threshold

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12. Error Handling

Error	Handling
AI service timeout	Retry once, then fallback message
AI service error	Log error, send fallback message
Entity extraction fail	Continue without entity
KB search fail	Respond without KB enhancement
Invalid response	Use default fallback response

Fallback Message:

I'm having trouble processing your request.
Let me connect you with a team member who can help.

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13. Security Requirements

ID	Requirement
SEC-1	Sanitize all input before processing
SEC-2	No PII in logs (mask sensitive data)
SEC-3	Rate limit AI API calls
SEC-4	Validate all admin inputs
SEC-5	Audit log for intent changes
SEC-6	Encrypt API keys at rest

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Module 2: AI Engine Screens

AI-2.1 to AI-2.4 Requirements Coverage

2.1 Intent Management - List View (AI-2.1.1)

🎛 AI Config

- **Intents**
- Entities
- Responses
- Test Console
- Analytics

Total Intents	Active	Avg Accuracy
12	**10**	**91%**

order_status
📄 15 phrases ✓ 94% accuracy   `Active`

refund_request
📄 12 phrases ✓ 89% accuracy   `Active`

shipping_info
📄 10 phrases ✓ 92% accuracy   `Active`

contact_human
📄 8 phrases ✓ 97% accuracy   `Active`

2.2 Intent Detail - Training Phrases (AI-2.1.2)

🎛 AI Config

- **Intents**
- Entities
- Responses
- Test Console

order_status   `Disable` `Save`

Description

Customer wants to check order status

Training Phrases (15)   `+ Add Phrase`

Where is my order?   ✕

Check order status for `@order_id`   ✕

I want to track my order   ✕

What's the status of order `@order_id`   ✕

When will my package arrive?   ✕

2.3 Entity Extraction (AI-2.1.4)

🎛 AI Config

- Intents
- **Entities**
- Responses
- Test Console

Entities   `+ New Entity`

ENTITY NAME	TYPE	PATTERN / VALUES	USED IN
@order_id	Regex	`ORD-[0-9] {5}`	order_status, refund_request
@email	Built-in	Email address pattern	account_help
@customer_name	Built-in	Person name detection	greeting
@date	Built-in	Date/time expressions	shipping_info
@product_name	List	Product catalog	product_inquiry

2.4 Response Templates (AI-2.2.1 - AI-2.2.4)

🎛 AI Config

- Intents
- Entities
- **Responses**
- Test Console

order_status Responses   `+ Add Response`

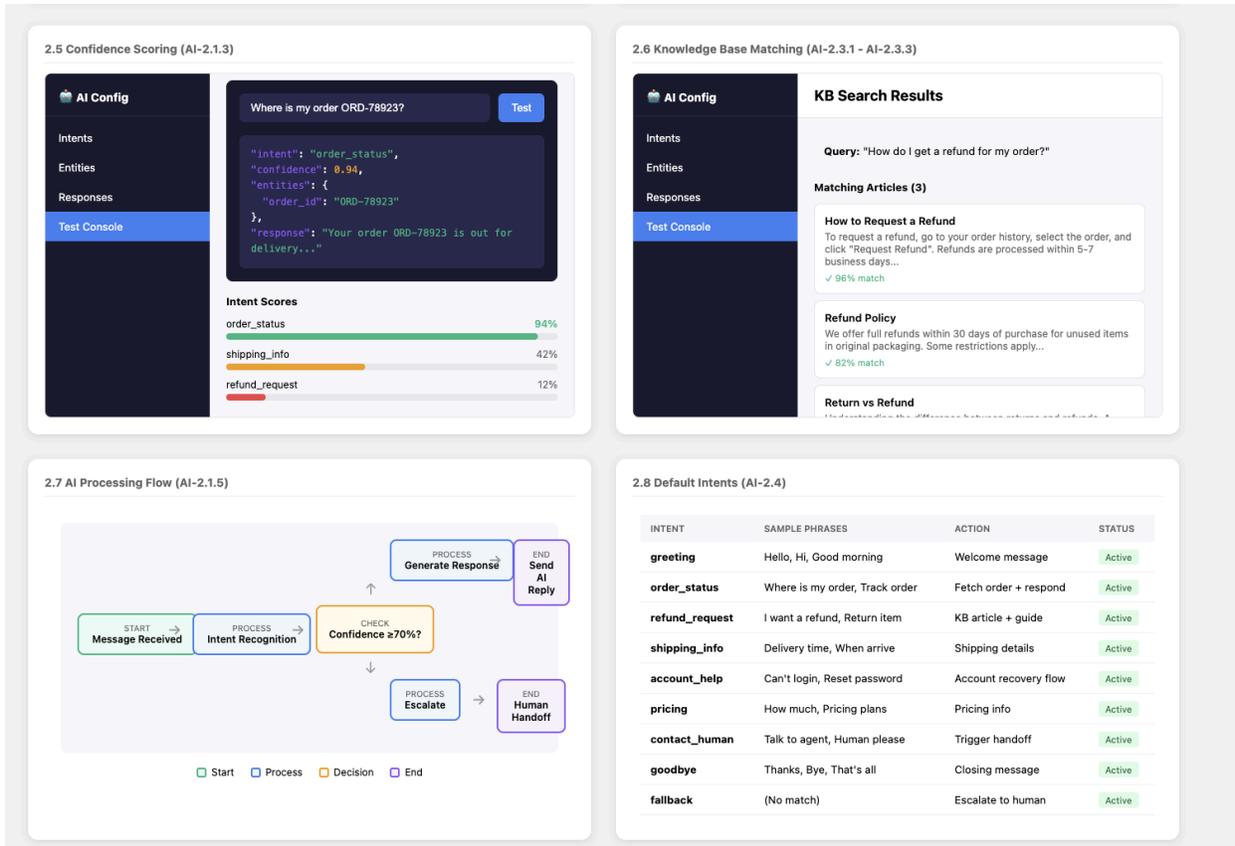Multiple responses will be randomly selected. Use variables for personalization.

Hi {{customer.name}} ! Your order {{order.id}} is currently {{order.status}} . Expected delivery: {{order.delivery_date}} .

I found your order {{order.id}} ! It's {{order.status}} and should arrive by {{order.delivery_date}} . 📦

Let me check that for you, {{customer.name}} . Order {{order.id}} status: {{order.status}} .

Available Variables

{{customer.name}}   {{customer.email}}   {{order.id}}

2.5 Confidence Scoring (AI-2.1.3)

AI Config
Intents
Entities
Responses
Test Console

Where is my order ORD-78923?   Test

```
"intent": "order_status",
"confidence": 0.94,
"entities": {
    "order_id": "ORD-78923"
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"response": "Your order ORD-78923 is out for
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Intent Scores

order_status	94%
shipping_info	42%
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AI Config
Intents
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Test Console

KB Search Results

Query: "How do I get a refund for my order?"

Matching Articles (3)

How to Request a Refund
To request a refund, go to your order history, select the order, and click "Request Refund". Refunds are processed within 5-7 business days...
✓ 96% match

Refund Policy
We offer full refunds within 30 days of purchase for unused items in original packaging. Some restrictions apply...
✓ 82% match

Return vs Refund
Understanding the difference between returns and refunds...

2.7 AI Processing Flow (AI-2.1.5)

PROCESS Generate Response → END Send AI Reply

START Message Received → PROCESS Intent Recognition → CHECK Confidence ≥70%?

PROCESS Escalate → END Human Handoff

□ Start □ Process □ Decision □ End

2.8 Default Intents (AI-2.4)

INTENT	SAMPLE PHRASES	ACTION	STATUS
greeting	Hello, Hi, Good morning	Welcome message	Active
order_status	Where is my order, Track order	Fetch order + respond	Active
refund_request	I want a refund, Return item	KB article + guide	Active
shipping_info	Delivery time, When arrive	Shipping details	Active
account_help	Can't login, Reset password	Account recovery flow	Active
pricing	How much, Pricing plans	Pricing info	Active
contact_human	Talk to agent, Human please	Trigger handoff	Active
goodbye	Thanks, Bye, That's all	Closing message	Active
fallback	(No match)	Escalate to human	Active

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>AI Engine - Module 2 Screens</title>
    <style>
        *{margin:0;padding:0;box-sizing:border-box}
        body{font-family:-apple-system,BlinkMacSystemFont,'Segoe UI',sans-serif;background:#f0f0f0;min-height:100vh;padding:20px}
        .page-header{text-align:center;margin-bottom:30px}
        .page-header h1{font-size:24px;color:#1a1a2e;margin-bottom:8px}
        .page-header p{color:#666;font-size:14px}

.screens-grid{display:grid;grid-template-columns:repeat(auto-fit,minmax(500px,1fr));gap:30px;max-width:1400px;margin:0 auto}
        .screen-card{background:#fff;border-radius:12px;padding:20px;box-shadow:0 2px 8px rgba(0,0,0,0.1)}
        .screen-card h3{font-size:14px;color:#666;margin-bottom:12px;padding-bottom:8px;border-bottom:1px solid #eee}
```

```css
/* Admin Layout */
.admin-layout{display:flex;height:420px;border-radius:8px;overflow:hidden;border:1px solid #e5e7eb}
.admin-sidebar{width:200px;background:#1a1a2e;color:#fff;padding:16px 0}
.admin-sidebar h4{padding:0 16px 12px;font-size:14px;border-bottom:1px solid #2a2a4e;margin-bottom:8px}
.admin-nav-item{padding:10px 16px;font-size:13px;cursor:pointer}
.admin-nav-item:hover{background:#2a2a4e}
.admin-nav-item.active{background:#3b82f6}
.admin-main{flex:1;background:#f8f9fa;overflow:auto}
.admin-header{padding:16px 20px;background:#fff;border-bottom:1px solid #e5e7eb;display:flex;justify-content:space-between;align-items:center}
.admin-header h2{font-size:18px}
.admin-content{padding:20px}

/* Buttons */
.btn{padding:8px 16px;border-radius:6px;font-size:13px;cursor:pointer;border:none}
.btn-primary{background:#3b82f6;color:#fff}
.btn-secondary{background:#fff;border:1px solid #e5e7eb}
.btn-sm{padding:5px 10px;font-size:12px}

/* Intent List */
.intent-list{display:flex;flex-direction:column;gap:8px}
.intent-item{background:#fff;padding:14px 16px;border-radius:8px;display:flex;justify-content:space-between;align-items:center;border:1px solid #e5e7eb}
.intent-item:hover{border-color:#3b82f6}
.intent-name{font-weight:600;font-size:14px}
.intent-meta{display:flex;gap:16px;font-size:12px;color:#666;margin-top:4px}
.intent-status{padding:3px 8px;border-radius:4px;font-size:11px}
.intent-status.active{background:#dcfce7;color:#166534}
.intent-status.inactive{background:#fee2e2;color:#dc2626}

/* Training Phrases */
.phrase-list{display:flex;flex-direction:column;gap:6px}
.phrase-item{background:#f8f9fa;padding:10px 14px;border-radius:6px;font-size:13px;display:flex;justify-content:space-between;align-items:center}
.phrase-item .entity{background:#dbeafe;color:#1d4ed8;padding:2px 6px;border-radius:4px;font-size:12px}
.phrase-item .delete{color:#999;cursor:pointer}
.phrase-item .delete:hover{color:#dc2626}

/* Response Templates */
```

```css
.response-box{background:#f8f9fa;border-radius:8px;padding:14px;margin-bottom:10px;font-size:13px;line-height:1.5}
.response-box .var{background:#fef3c7;color:#92400e;padding:1px 4px;border-radius:3px}

/* Confidence Meter */
.confidence-meter{display:flex;align-items:center;gap:10px}
.confidence-bar{flex:1;height:8px;background:#e5e7eb;border-radius:4px;overflow:hidden}
.confidence-fill{height:100%;border-radius:4px}
.confidence-fill.high{background:#10b981}
.confidence-fill.medium{background:#f59e0b}
.confidence-fill.low{background:#ef4444}
.confidence-value{font-size:13px;font-weight:600;min-width:45px}

/* Entity Tags */

.entity-tag{display:inline-flex;align-items:center;gap:4px;background:#eff6ff;color:#3b82f6;padding:4px 10px;border-radius:4px;font-size:12px;margin-right:6px;margin-bottom:6px}

/* Test Console */
.test-console{background:#1a1a2e;border-radius:8px;padding:16px;color:#fff}
.test-input{display:flex;gap:10px;margin-bottom:16px}
.test-input input{flex:1;background:#2a2a4e;border:none;padding:10px 14px;border-radius:6px;color:#fff;font-size:13px}
.test-input input::placeholder{color:#666}

.test-output{background:#2a2a4e;border-radius:6px;padding:14px;font-family:monospace;font-size:12px;line-height:1.6}
.test-output .key{color:#8b5cf6}
.test-output .string{color:#10b981}
.test-output .number{color:#f59e0b}

/* Flow Diagram */

.flow-diagram{background:#f8f9fa;border-radius:8px;padding:20px;position:relative;min-height:200px}
.flow-node{position:absolute;background:#fff;border:2px solid #e5e7eb;border-radius:8px;padding:10px 16px;font-size:12px;text-align:center}
.flow-node.start{border-color:#10b981;background:#ecfdf5}
.flow-node.process{border-color:#3b82f6;background:#eff6ff}
.flow-node.decision{border-color:#f59e0b;background:#fffbeb;transform:rotate(0deg)}
.flow-node.end{border-color:#8b5cf6;background:#f5f3ff}
.flow-arrow{position:absolute;color:#999;font-size:18px}
```

```
    /* Stats Cards */
    .stats-row{display:grid;grid-template-columns:repeat(3,1fr);gap:12px;margin-bottom:16px}
    .stat-card{background:#fff;padding:14px;border-radius:8px;border:1px solid #e5e7eb}
    .stat-card .label{font-size:11px;color:#666;margin-bottom:4px}
    .stat-card .value{font-size:20px;font-weight:700}

    /* Table */
    table{width:100%;border-collapse:collapse;font-size:13px}
    th{text-align:left;padding:10px
12px;background:#f8f9fa;font-weight:600;font-size:11px;text-transform:uppercase;color:#666}
    td{padding:10px 12px;border-bottom:1px solid #f0f0f0}

    /* Knowledge Match */
    .kb-match{background:#fff;border:1px solid
#e5e7eb;border-radius:8px;padding:12px;margin-bottom:8px}
    .kb-match-title{font-weight:600;font-size:13px;margin-bottom:4px}
    .kb-match-excerpt{font-size:12px;color:#666;margin-bottom:6px}
    .kb-match-score{font-size:11px;color:#10b981}
  </style>
</head>
<body>
  <div class="page-header">
    <h1>Module 2: AI Engine Screens</h1>
    <p>AI-2.1 to AI-2.4 Requirements Coverage</p>
  </div>

  <div class="screens-grid">
    <!-- Screen 1: Intent List -->
    <div class="screen-card">
      <h3>2.1 Intent Management - List View (AI-2.1.1)</h3>
      <div class="admin-layout">
        <div class="admin-sidebar">
          <h4>🤖 AI Config</h4>
          <div class="admin-nav-item active">Intents</div>
          <div class="admin-nav-item">Entities</div>
          <div class="admin-nav-item">Responses</div>
          <div class="admin-nav-item">Test Console</div>
          <div class="admin-nav-item">Analytics</div>
        </div>
        <div class="admin-main">
          <div class="admin-header">
            <h2>Intents</h2>
            <button class="btn btn-primary">+ New Intent</button>
          </div>
```

```html
<div class="admin-content">
    <div class="stats-row">
        <div class="stat-card"><div class="label">Total Intents</div><div class="value">12</div></div>
        <div class="stat-card"><div class="label">Active</div><div class="value">10</div></div>
        <div class="stat-card"><div class="label">Avg Accuracy</div><div class="value">91%</div></div>
    </div>
    <div class="intent-list">
        <div class="intent-item">
            <div>
                <div class="intent-name">order_status</div>
                <div class="intent-meta"><span>📝 15 phrases</span><span>✓ 94% accuracy</span></div>
            </div>
            <span class="intent-status active">Active</span>
        </div>
        <div class="intent-item">
            <div>
                <div class="intent-name">refund_request</div>
                <div class="intent-meta"><span>📝 12 phrases</span><span>✓ 89% accuracy</span></div>
            </div>
            <span class="intent-status active">Active</span>
        </div>
        <div class="intent-item">
            <div>
                <div class="intent-name">shipping_info</div>
                <div class="intent-meta"><span>📝 10 phrases</span><span>✓ 92% accuracy</span></div>
            </div>
            <span class="intent-status active">Active</span>
        </div>
        <div class="intent-item">
            <div>
                <div class="intent-name">contact_human</div>
                <div class="intent-meta"><span>📝 8 phrases</span><span>✓ 97% accuracy</span></div>
            </div>
            <span class="intent-status active">Active</span>
        </div>
    </div>
</div>
```

```
        </div>
      </div>
    </div>


    <!-- Screen 2: Intent Detail -->
    <div class="screen-card">
      <h3>2.2 Intent Detail - Training Phrases (AI-2.1.2)</h3>
      <div class="admin-layout">
        <div class="admin-sidebar">
          <h4>🤖 AI Config</h4>
          <div class="admin-nav-item active">Intents</div>
          <div class="admin-nav-item">Entities</div>
          <div class="admin-nav-item">Responses</div>
          <div class="admin-nav-item">Test Console</div>
        </div>
        <div class="admin-main">
          <div class="admin-header">
            <h2>order_status</h2>
            <div style="display:flex;gap:8px">
              <button class="btn btn-secondary">Disable</button>
              <button class="btn btn-primary">Save</button>
            </div>
          </div>
          <div class="admin-content">
            <div style="margin-bottom:16px">
              <label
style="font-size:12px;color:#666;display:block;margin-bottom:6px">Description</label>
              <input type="text" value="Customer wants to check order status"
style="width:100%;padding:8px 12px;border:1px solid
#e5e7eb;border-radius:6px;font-size:13px">
            </div>
            <div
style="margin-bottom:12px;display:flex;justify-content:space-between;align-items:center">
              <h4 style="font-size:14px">Training Phrases (15)</h4>
              <button class="btn btn-sm btn-secondary">+ Add Phrase</button>
            </div>
            <div class="phrase-list">
              <div class="phrase-item">
                <span>Where is my order?</span>
                <span class="delete">×</span>
              </div>
              <div class="phrase-item">
                <span>Check order status for <span
class="entity">@order_id</span></span>
```

```
            <span class="delete">×</span>
          </div>
          <div class="phrase-item">
            <span>I want to track my order</span>
            <span class="delete">×</span>
          </div>
          <div class="phrase-item">
            <span>What's the status of order <span
class="entity">@order_id</span></span>
            <span class="delete">×</span>
          </div>
          <div class="phrase-item">
            <span>When will my package arrive?</span>
            <span class="delete">×</span>
          </div>
          <div class="phrase-item">
            <span>Track order <span class="entity">@order_id</span></span>
            <span class="delete">×</span>
          </div>
        </div>
      </div>
    </div>
  </div>

  <!-- Screen 3: Entity Extraction -->
  <div class="screen-card">
    <h3>2.3 Entity Extraction (AI-2.1.4)</h3>
    <div class="admin-layout">
      <div class="admin-sidebar">
        <h4>🤖 AI Config</h4>
        <div class="admin-nav-item">Intents</div>
        <div class="admin-nav-item active">Entities</div>
        <div class="admin-nav-item">Responses</div>
        <div class="admin-nav-item">Test Console</div>
      </div>
      <div class="admin-main">
        <div class="admin-header">
          <h2>Entities</h2>
          <button class="btn btn-primary">+ New Entity</button>
        </div>
        <div class="admin-content">
          <table>
            <thead>
```

```html
            <tr>
              <th>Entity Name</th>
              <th>Type</th>
              <th>Pattern / Values</th>
              <th>Used In</th>
            </tr>
          </thead>
          <tbody>
            <tr>
              <td><span class="entity-tag">@order_id</span></td>
              <td>Regex</td>
              <td><code style="font-size:11px;background:#f0f0f0;padding:2px 6px;border-radius:3px">ORD-[0-9]{5}</code></td>
              <td>order_status, refund_request</td>
            </tr>
            <tr>
              <td><span class="entity-tag">@email</span></td>
              <td>Built-in</td>
              <td>Email address pattern</td>
              <td>account_help</td>
            </tr>
            <tr>
              <td><span class="entity-tag">@customer_name</span></td>
              <td>Built-in</td>
              <td>Person name detection</td>
              <td>greeting</td>
            </tr>
            <tr>
              <td><span class="entity-tag">@date</span></td>
              <td>Built-in</td>
              <td>Date/time expressions</td>
              <td>shipping_info</td>
            </tr>
            <tr>
              <td><span class="entity-tag">@product_name</span></td>
              <td>List</td>
              <td>Product catalog (245 items)</td>
              <td>product_inquiry</td>
            </tr>
          </tbody>
        </table>
      </div>
    </div>
  </div>
```

```
        </div>

        <!-- Screen 4: Response Configuration -->
        <div class="screen-card">
            <h3>2.4 Response Templates (AI-2.2.1 - AI-2.2.4)</h3>
            <div class="admin-layout">
                <div class="admin-sidebar">
                    <h4>🤖 AI Config</h4>
                    <div class="admin-nav-item">Intents</div>
                    <div class="admin-nav-item">Entities</div>
                    <div class="admin-nav-item active">Responses</div>
                    <div class="admin-nav-item">Test Console</div>
                </div>
                <div class="admin-main">
                    <div class="admin-header">
                        <h2>order_status Responses</h2>
                        <button class="btn btn-primary">+ Add Response</button>
                    </div>
                    <div class="admin-content">
                        <p style="font-size:12px;color:#666;margin-bottom:12px">Multiple responses will
be randomly selected. Use variables for personalization.</p>

                        <div class="response-box">
                            Hi <span class="var">{{customer.name}}</span>! Your order <span
class="var">{{order.id}}</span> is currently <span class="var">{{order.status}}</span>.
Expected delivery: <span class="var">{{order.delivery_date}}</span>.
                        </div>

                        <div class="response-box">
                            I found your order <span class="var">{{order.id}}</span>! It's <span
class="var">{{order.status}}</span> and should arrive by <span
class="var">{{order.delivery_date}}</span>. 📦
                        </div>

                        <div class="response-box">
                            Let me check that for you, <span class="var">{{customer.name}}</span>.
Order <span class="var">{{order.id}}</span> status: <span class="var">{{order.status}}</span>.
                        </div>

                        <div style="margin-top:16px">
                            <h4 style="font-size:13px;margin-bottom:8px">Available Variables</h4>
                            <div>
                                <span class="entity-tag">{{customer.name}}</span>
                                <span class="entity-tag">{{customer.email}}</span>
```

```html
                <span class="entity-tag">{{order.id}}</span>
                <span class="entity-tag">{{order.status}}</span>
                <span class="entity-tag">{{order.delivery_date}}</span>
              </div>
            </div>
          </div>
        </div>
      </div>

      <!-- Screen 5: Confidence Scoring -->
      <div class="screen-card">
        <h3>2.5 Confidence Scoring (AI-2.1.3)</h3>
        <div class="admin-layout">
          <div class="admin-sidebar">
            <h4>🤖 AI Config</h4>
            <div class="admin-nav-item">Intents</div>
            <div class="admin-nav-item">Entities</div>
            <div class="admin-nav-item">Responses</div>
            <div class="admin-nav-item active">Test Console</div>
          </div>
          <div class="admin-main">
            <div class="admin-header">
              <h2>Test Console</h2>
            </div>
            <div class="admin-content">
              <div class="test-console">
                <div class="test-input">
                  <input type="text" placeholder="Enter test message..." value="Where is my order ORD-78923?">
                  <button class="btn btn-primary">Test</button>
                </div>
                <div class="test-output">
                  <span class="key">"intent"</span>: <span class="string">"order_status"</span>,<br>
                  <span class="key">"confidence"</span>: <span class="number">0.94</span>,<br>
                  <span class="key">"entities"</span>: {<br>
                    <span class="key">"order_id"</span>: <span class="string">"ORD-78923"</span><br>
                  },<br>
                  <span class="key">"response"</span>: <span class="string">"Your order ORD-78923 is out for delivery..."</span>
                </div>
```

```
            </div>
            <div style="margin-top:16px">
                <h4 style="font-size:13px;margin-bottom:12px">Intent Scores</h4>
                <div style="display:flex;flex-direction:column;gap:10px">
                    <div>
                        <div
style="display:flex;justify-content:space-between;font-size:12px;margin-bottom:4px">
                            <span>order_status</span>
                            <span style="color:#10b981;font-weight:600">94%</span>
                        </div>
                        <div class="confidence-bar"><div class="confidence-fill high"
style="width:94%"></div></div>
                    </div>
                    <div>
                        <div
style="display:flex;justify-content:space-between;font-size:12px;margin-bottom:4px">
                            <span>shipping_info</span>
                            <span style="color:#666">42%</span>
                        </div>
                        <div class="confidence-bar"><div class="confidence-fill medium"
style="width:42%"></div></div>
                    </div>
                    <div>
                        <div
style="display:flex;justify-content:space-between;font-size:12px;margin-bottom:4px">
                            <span>refund_request</span>
                            <span style="color:#666">12%</span>
                        </div>
                        <div class="confidence-bar"><div class="confidence-fill low"
style="width:12%"></div></div>
                    </div>
                </div>
            </div>
        </div>
    </div>

    <!-- Screen 6: Knowledge Base Search -->
    <div class="screen-card">
        <h3>2.6 Knowledge Base Matching (AI-2.3.1 - AI-2.3.3)</h3>
        <div class="admin-layout">
            <div class="admin-sidebar">
                <h4>🤖 AI Config</h4>
```

```html
        <div class="admin-nav-item">Intents</div>
        <div class="admin-nav-item">Entities</div>
        <div class="admin-nav-item">Responses</div>
        <div class="admin-nav-item active">Test Console</div>
      </div>
      <div class="admin-main">
        <div class="admin-header">
          <h2>KB Search Results</h2>
        </div>
        <div class="admin-content">
          <div
style="background:#f8f9fa;padding:12px;border-radius:6px;margin-bottom:16px;font-size:13px">
            <strong>Query:</strong> "How do I get a refund for my order?"
          </div>
          <h4 style="font-size:13px;margin-bottom:12px">Matching Articles (3)</h4>
          <div class="kb-match">
            <div class="kb-match-title">How to Request a Refund</div>
            <div class="kb-match-excerpt">To request a refund, go to your order history,
select the order, and click "Request Refund". Refunds are processed within 5-7 business
days...</div>
            <div class="kb-match-score">✓ 96% match</div>
          </div>
          <div class="kb-match">
            <div class="kb-match-title">Refund Policy</div>
            <div class="kb-match-excerpt">We offer full refunds within 30 days of
purchase for unused items in original packaging. Some restrictions apply...</div>
            <div class="kb-match-score">✓ 82% match</div>
          </div>
          <div class="kb-match">
            <div class="kb-match-title">Return vs Refund</div>
            <div class="kb-match-excerpt">Understanding the difference between returns
and refunds. A return involves sending the item back, while a refund...</div>
            <div class="kb-match-score">✓ 67% match</div>
          </div>
        </div>
      </div>
    </div>
  </div>

  <!-- Screen 7: AI Processing Flow -->
  <div class="screen-card">
    <h3>2.7 AI Processing Flow (AI-2.1.5)</h3>
    <div style="padding:20px">
      <div class="flow-diagram" style="height:280px">
```

```html
<div class="flow-node start" style="left:20px;top:110px">
   <div style="font-size:10px;color:#666">START</div>
   <div style="font-weight:600">Message Received</div>
</div>
<div class="flow-arrow" style="left:130px;top:120px">→</div>

<div class="flow-node process" style="left:160px;top:110px">
   <div style="font-size:10px;color:#666">PROCESS</div>
   <div style="font-weight:600">Intent Recognition</div>
</div>
<div class="flow-arrow" style="left:280px;top:120px">→</div>

<div class="flow-node decision" style="left:310px;top:100px;padding:14px">
   <div style="font-size:10px;color:#666">CHECK</div>
   <div style="font-weight:600">Confidence ≥70%?</div>
</div>

<div class="flow-arrow"
style="left:370px;top:70px;transform:rotate(-45deg)">↗</div>
<div class="flow-node process" style="left:400px;top:20px">
   <div style="font-size:10px;color:#666">PROCESS</div>
   <div style="font-weight:600">Generate Response</div>
</div>
<div class="flow-arrow" style="left:520px;top:35px">→</div>
<div class="flow-node end" style="left:550px;top:20px">
   <div style="font-size:10px;color:#666">END</div>
   <div style="font-weight:600">Send AI Reply</div>
</div>

<div class="flow-arrow"
style="left:370px;top:165px;transform:rotate(45deg)">↘</div>
<div class="flow-node process" style="left:400px;top:190px">
   <div style="font-size:10px;color:#666">PROCESS</div>
   <div style="font-weight:600">Escalate</div>
</div>
<div class="flow-arrow" style="left:500px;top:205px">→</div>
<div class="flow-node end" style="left:530px;top:190px">
   <div style="font-size:10px;color:#666">END</div>
   <div style="font-weight:600">Human Handoff</div>
</div>
</div>
<div
style="margin-top:16px;display:flex;gap:20px;justify-content:center;font-size:12px">
```

```html
            <div style="display:flex;align-items:center;gap:6px"><span
style="width:12px;height:12px;background:#ecfdf5;border:2px solid
#10b981;border-radius:3px"></span> Start</div>
            <div style="display:flex;align-items:center;gap:6px"><span
style="width:12px;height:12px;background:#eff6ff;border:2px solid
#3b82f6;border-radius:3px"></span> Process</div>
            <div style="display:flex;align-items:center;gap:6px"><span
style="width:12px;height:12px;background:#fffbeb;border:2px solid
#f59e0b;border-radius:3px"></span> Decision</div>
            <div style="display:flex;align-items:center;gap:6px"><span
style="width:12px;height:12px;background:#f5f3ff;border:2px solid
#8b5cf6;border-radius:3px"></span> End</div>
        </div>
      </div>
    </div>

    <!-- Screen 8: Default Intents -->
    <div class="screen-card">
      <h3>2.8 Default Intents (AI-2.4)</h3>
      <div style="padding:10px">
        <table>
          <thead>
            <tr>
              <th>Intent</th>
              <th>Sample Phrases</th>
              <th>Action</th>
              <th>Status</th>
            </tr>
          </thead>
          <tbody>
            <tr>
              <td><strong>greeting</strong></td>
              <td>Hello, Hi, Good morning</td>
              <td>Welcome message</td>
              <td><span class="intent-status active">Active</span></td>
            </tr>
            <tr>
              <td><strong>order_status</strong></td>
              <td>Where is my order, Track order</td>
              <td>Fetch order + respond</td>
              <td><span class="intent-status active">Active</span></td>
            </tr>
            <tr>
              <td><strong>refund_request</strong></td>
```

```
              <td>I want a refund, Return item</td>
              <td>KB article + guide</td>
              <td><span class="intent-status active">Active</span></td>
           </tr>
           <tr>
              <td><strong>shipping_info</strong></td>
              <td>Delivery time, When arrive</td>
              <td>Shipping details</td>
              <td><span class="intent-status active">Active</span></td>
           </tr>
           <tr>
              <td><strong>account_help</strong></td>
              <td>Can't login, Reset password</td>
              <td>Account recovery flow</td>
              <td><span class="intent-status active">Active</span></td>
           </tr>
           <tr>
              <td><strong>pricing</strong></td>
              <td>How much, Pricing plans</td>
              <td>Pricing info</td>
              <td><span class="intent-status active">Active</span></td>
           </tr>
           <tr>
              <td><strong>contact_human</strong></td>
              <td>Talk to agent, Human please</td>
              <td>Trigger handoff</td>
              <td><span class="intent-status active">Active</span></td>
           </tr>
           <tr>
              <td><strong>goodbye</strong></td>
              <td>Thanks, Bye, That's all</td>
              <td>Closing message</td>
              <td><span class="intent-status active">Active</span></td>
           </tr>
           <tr>
              <td><strong>fallback</strong></td>
              <td>(No match)</td>
              <td>Escalate to human</td>
              <td><span class="intent-status active">Active</span></td>
           </tr>
        </tbody>
     </table>
   </div>
</div>
```

```
    </div>
</body>
</html>
```