MCP Server for Recommendation System

This document describes a hosted MCP server that provides tools exposing Large Language Models to a Reinforcement Learning-based Recommendation Engine. The system learns iteratively to tailor recommendations based on user interactions and journey patterns within the store.

Tools

- Status: Get the current status of the recommender system
- Submit feedback: Record user interaction events and update the Multi-Armed Bandit simulation with reward feedback
- Get recommendations: Generate personalized product recommendations using the MABSimulation recommender

Server Endpoint

The MCP server is hosted at: `https://mcp-server.workzy.co`

MCP Server Communication Schema

HTTP Transport

The server implements the FastMCP HTTP transport protocol and exposes the following endpoints:

1. List Tools

```
GET /tools
```

Returns: Array of tool definitions with `inputSchema` automatically generated from Pydantic models

2. Call Tool

```
POST /tools/call_tool
Content-Type: application/json
```

```
{
  "name": "tool_name",
  ...tool_arguments_flattened
}
```

Response Format: The response is a direct tool return value as a JSON object.

Tool Request/Response Formats

`status`

Request:

```
{
  "name": "status"
}
```

Response:


```
{
  "status": "success",
  "message": "Recommender system is running",
  "tools": [
    {
      "name": "get_system_status",
      "description": "Get the current status of the recommender system",
      "structured_output": false
    },
    {
      "name": "submit_feedback",
      "description": "Handles the MAB reward by feedback and updates the
         recommender simulation",
      "structured_output": false
    }
  ]
}
```


`submit_feedback`

Request:

```
{
  "name": "submit_feedback",
  "feedback": {
    "user_id": 1,
    "item_id": 5,
    "event_type": "purchase",
    "timestamp": "2024-01-15T10:30:00Z"
  }
}
```

Response:


```
{
  "status": "success",
  "item_id": 5,
  "user_id": 1,
  "reward": 1.0,
  "n": 10,
```

```
  "q": 0.85,
  "message": "Feedback processed and MABSimulation updated"
}
```


Reward Mapping

- purchase: 1.0
- cart: 0.33
- view: 0.1
- remove_from_cart: -0.5

get_recommendations

Request:


```
{
  "name": "get_recommendations",
  "request": {
    "user_id": 1,
    "n_recommendations": 3,
    "algorithm_type": "epsilon_greedy",
    "algorithm_params": {
      "epsilon": 0.1
    }
  }
}
```


Response:


```
{
  "status": "success",
  "user_id": 1,
  "recommendations": [6841151684791, 7096764989623, 6701918027959],
  "products": [
    {
      "product_id": 6841151684791,
      "product_name": "Now or Never - Mehndi Green  Pajama Set",
      "brand_name": "Unknown Brand",
      "category": "general",
      "price": 899.0,
      "description": "...",
      "image_url": "https://cdn.shopify.com/...",
      "created_at": "2025-12-01 04:14:37"
    },
    ...
  ],
  "algorithm_type": "epsilon_greedy",
  "algorithm_class": "EpsilonGreedyMAB",
  "confidence_scores": [0.1, 0.1, 0.1],
  "total_recommendations": 3,
```

```
  "message": "Recommendations generated using MABSimulation"
}
```

Pydantic Model Schemas

RecommendationRequest

- user_id (integer, required)
- n_recommendations (integer, default = 3, min = 1, max = 50)
- algorithm_type (string, default = epsilon_greedy)
- algorithm_params (object, optional)

FeedbackData

- user_id (integer, required)
- item_id (integer, required)
- event_type (string, required, enum: view, cart, purchase, remove_from_cart)
- timestamp (string, optional)