

Monday.com BI Agent

AI-powered Business Intelligence agent answering founder-level queries using live monday.com data. Built with Groq AI (Llama 3.3 70B), Streamlit, and a 5-tool ReAct agent architecture. Every query triggers live GraphQL API calls — no caching.

Candidate: Mohamed Razal K · github.com/razalkapat/BI.agent · Deployed: Streamlit Cloud

Technology Stack & Decisions

Component	Choice	Reason for Decision
UI Framework	Streamlit	Built-in st.chat_input (Enter key, auto-clear, bottom-pinned), session state, one-click Streamlit Cloud deploy
AI Model	Groq Llama 3.3 70B	Free unlimited inference, <1s latency, reliable JSON tool calls. Replaced Gemini after hitting free quota limits
Data Layer	monday.com GraphQL	Two-pass: fetch column schema first (id->title map), then items. Required as API v2024-01 omits titles from item responses
Architecture	5-file modular	config.py, monday_api.py, tools.py, agent.py, app.py — clean separation of concerns for easy evaluation
Agent Pattern	ReAct loop (5 iter)	User msg -> JSON tool call -> live API -> results -> plain English analysis. Handles multi-tool queries
Token Control	Last 2 msgs, 500 char cap	Prevents Groq 12k TPM rate limit errors during long sessions. Assistant history truncated before each call
Deployment	Streamlit Cloud + GitHub	Auto-deploys on every git push. Permanent URL. Secrets stored in Streamlit — never in code or git history

Verified Live Data

Metric	Value
Total Deals	344
Open / Won / Dead / On Hold	49 / 165 / 127 / 2
Total Pipeline Value	Rs. 230.55 Cr
Total Work Orders	176
Completed / Ongoing / Not Started	117 / 25 / 11
Total Contract Value	Rs. 249.75 Cr
Total Billed	Rs. 126.72 Cr
Total Collected	Rs. 90.43 Cr
Total Receivable	Rs. 36.29 Cr
Unbilled Amount	Rs. 123.03 Cr
Collection Rate	71.4%
Top Revenue Sector	Renewables Rs. 90.97 Cr
2nd Revenue Sector	Mining Rs. 30.61 Cr
Most WOs Sector	Mining — 100 WOs
Mining Pipeline	Rs. 454.84 Cr, 106 deals
Renewables Pipeline	Rs. 109.26 Cr, 111 deals
Railways Work Orders	13 WOs

Data Resilience — Real Issues Found & Fixed

Issue Discovered During Development	Board	Fix Applied
Header row 'Deal name masked' mixed into data	Work Orders	Filter by name on fetch
Column titles showed data values not column names	Deals	Re-imported CSV, renamed all columns in monday.com
Null values stored as "", 'null', 'None', ' ', 'N/A'	Both	Comprehensive null value list in normalize_item()
Numeric fields had Rs. symbols and commas	Both	safe_float() strips all non-numeric characters
Billing status typos: 'Billed', 'biled', 'billied'	Work Orders	Lowercase normalize + alias mapping in revenue tool
GraphQL 'title' field not supported on ColumnValue	Both	Separate columns{id,title} query before item fetch
Wrong Board IDs configured in .env initially	Both	Verified correct IDs via ListBoards GraphQL query
LLM wrote preamble text before JSON tool call	Agent	Regex extracts JSON from anywhere in LLM response
deal_status vs deal_stage confusion (27 vs 165 won)	Agent	Explicit disambiguation rules in system prompt

All Requirements Met

Requirement	Status
Live API calls — no caching	Done
Handle null/missing values	Done
Normalize inconsistent formats	Done
Communicate data quality caveats	Done
Interpret founder-level queries	Done
Ask clarifying questions	Done
Support follow-up context	Done
Revenue insights	Done
Pipeline health analysis	Done
Sector performance analysis	Done
Cross-board queries	Done
Visible tool-call traces	Done
Hosted prototype (live URL)	Done
monday.com board links	Done
Decision Log (max 2 pages)	Done
Source code ZIP + README	Done

Tested Queries & Accuracy Results

Query Asked	Expected Answer	Result
Total pipeline value?	Rs. 230.55 Cr	Correct
How many deals won?	165 deals	Correct
Collection rate?	71.4%	Correct
Total receivable?	Rs. 36.29 Cr	Correct
Top revenue sector?	Renewables Rs. 90.97 Cr	Correct
Most work orders sector?	Mining — 100 WOs	Correct
Mining sector performance?	106 deals, Rs. 454 Cr pipeline	Correct
Renewables analysis?	111 deals, Rs. 109 Cr, 51 WOs	Correct
Work orders completed?	117 of 176	Correct
Improve cash flow?	Rs. 36 Cr receivables + Rs. 123 Cr unbilled	Correct
Open deals overview?	49 open, Rs. 305 Cr value	Correct
hey (casual greeting)	Friendly reply, no tool called	Correct
tell me about deals	Clarifying question asked	Correct
follow-up: what about revenue?	Context maintained, revenue tool called	Correct

Production Gaps & Future Roadmap

Gap	Current	Production Fix
Authentication	Open access	OAuth2 / monday.com SSO
Rate limiting	No retry	Exponential backoff
Conversation memory	Last 2 msgs	Vector store
Test coverage	No tests	pytest + mocked APIs
Real-time updates	Pull only	monday.com webhooks
Error observability	Plain text	Sentry + structured logs
Large boards	Token limits	Pagination + summarization

Future Features

- Export query results to PDF/Excel
- Natural language date filtering
- Auto-refreshing KPI dashboard
- Multi-sector comparison queries
- Confidence scores on AI insights
- Audit log of all queries per session
- Webhook for real-time data updates