

MoodFlow: Emotion-Aware AI Task Scheduler

Project Summary

The Problem

Traditional productivity tools treat all users and all days the same, ignoring a fundamental truth: human cognitive performance varies dramatically based on emotional state. A stressed developer shouldn't tackle complex architecture decisions. An energized worker can handle challenging tasks that would overwhelm them when tired. Yet current scheduling tools offer no emotional intelligence, leading to burnout, frustration, and suboptimal productivity.

Research shows that emotional state significantly impacts cognitive performance, decision-making quality, and task completion rates. When people are stressed, they need shorter work blocks with frequent breaks. When energized, they can sustain deep focus for 2+ hours. When anxious, they need confidence-building through quick wins. Current calendar tools ignore these patterns entirely, forcing users to fight against their natural rhythms rather than working with them.

The cost is substantial: decreased productivity, increased burnout, poor work quality during emotional lows, and wasted peak-performance windows. People need an intelligent assistant that understands not just what needs to be done, but how their current emotional state affects when and how they should do it.

The Solution

MoodFlow is an AI-powered scheduling assistant that detects user emotional state and automatically optimizes task ordering, time block duration, and break frequency based on psychological research and productivity patterns. Built entirely on AWS services, it combines conversational AI with retrieval-augmented generation (RAG) to deliver personalized, emotion-aware schedules.

Core Capabilities:

1. **Emotional State Detection:** Natural language processing identifies mood from conversational cues ("I'm feeling tired today" or "really energized to tackle this")
2. **Intelligent Task Ordering:**
 - Stressed: Easy warmup → Medium → Hardest → Easy cooldown
 - Energized: Hardest → Medium → Easy (front-load complexity)
 - Anxious: Gradual difficulty increase with quick wins

- Tired: Low-effort administrative tasks only

3. **Adaptive Time Blocking:**

- Stressed: 30-45 minute blocks with 10-minute breaks
- Energized: 90-120 minute deep work sessions
- Anxious: 25-minute Pomodoros with 5-minute breaks
- Tired: 20-30 minute maximum blocks

4. **Wellness Integration:** Each task includes contextual wellness tips and reasoning explaining why this scheduling benefits their emotional state
5. **Multi-Day Planning:** Handles task overflow by intelligently rescheduling to future dates, maintains mood persistence across conversation turns
6. **Conversational Interface:** Natural dialogue for schedule creation, editing, and viewing across different dates

Technical Architecture

AWS Service Integration:

Amazon Bedrock (Claude 3.5 Sonnet v2): Core conversational AI for natural language understanding, mood detection, and schedule generation. Chosen for superior reasoning capabilities and ability to follow complex multi-step instructions while maintaining conversational context.

Bedrock Knowledge Base + RAG: Stores evidence-based scheduling strategies across seven emotional states (stressed, energized, anxious, focused, tired, sad, happy). Three knowledge documents cover:

- Mood-specific planning strategies (task ordering, time blocks, break frequency)
- Task completion patterns by emotional state and task type
- Wellness guidelines and intervention recommendations

Knowledge Base uses OpenSearch Serverless for vector similarity search, retrieving the top 3 most relevant strategy chunks for each query. This grounds the AI's scheduling decisions in psychological research rather than improvisation.

Bedrock Guardrails: Content filtering prevents harmful recommendations and ensures scheduling advice remains evidence-based and wellness-focused. Blocks any outputs that might encourage overwork or unhealthy productivity patterns.

DynamoDB: Two tables provide state persistence:

- moodflow_schedules: Stores schedules per user per date with mood, tasks, and unscheduled items
- moodflow_sessions: Tracks conversation context and user preferences

Lambda + API Gateway: Serverless backend handles:

- Date extraction and time parsing from natural language
- Knowledge Base query orchestration
- Bedrock invocation with structured prompts
- Schedule retrieval and persistence
- JSON response parsing and error handling

Streamlit Frontend: Provides intuitive chat interface with:

- Date selector with quick-view scheduling
- Configurable start/end times
- Visual schedule display with reasoning and wellness tips
- Schedule version history
- Unscheduled task tracking

AI Innovation

The key innovation lies in the prompt engineering and RAG integration. The system prompt includes:

1. **Mood Persistence Logic:** Maintains emotional state across conversation turns unless user explicitly changes it
2. **Retrieval vs. Creation Detection:** Distinguishes between "show me my schedule" and "create a schedule"
3. **Multi-Date Awareness:** Handles cross-date rescheduling and maintains separate schedules per date
4. **Knowledge-Grounded Decisions:** Mandatory instruction to apply retrieved scheduling strategies, with explanations focused on user benefit rather than revealing the underlying strategy

The RAG pipeline ensures recommendations stay grounded in research. For example, when a user says "I'm stressed and need to finish documentation," the Knowledge Base retrieves the stressed-state strategy (30-45 minute blocks, easy-to-hard-to-easy ordering, frequent breaks), and Claude applies these patterns while explaining benefits: "Starting with UI work requires less cognitive load when stressed" rather than "I'm using the stressed-state modular breakdown strategy."

Impact & Use Cases

MoodFlow addresses real productivity challenges:

- **Burnout Prevention:** Recognizes exhaustion signals and enforces work limits
- **Anxiety Management:** Builds confidence through structured wins
- **Peak Performance:** Channels high-energy states into challenging work
- **Realistic Planning:** Adjusts expectations based on current capacity

Target users include knowledge workers, students, remote workers, and anyone managing variable cognitive load. The conversational interface makes sophisticated scheduling accessible without productivity-tool complexity.