**MarketMinds: Agentic Market Research Report Generator**

*Week of 06/23*

Weekly Progress Report: MarketMind Team  
Project: MarketMind – An Open‑Source Framework for AI‑Driven Marketing Secondary Research  
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Reporting Period: June 23, 2025 – June 30, 2025

1. Executive Summary  
   During Week 2 the team transformed the single‑agent prototype into an operational **multi‑agent research assistant**. Using CrewAI for orchestration, agents now interpret the topic, plan the research, gather live web evidence, synthesise insights with Anthropic’s Claude 3 Sonnet, and export a polished report in Markdown and PDF. This validates agentic decomposition as a scalable path forward.
2. Individual Contributions  
   2.1  Mitesh Singh (30 hrs)

* Integrated **Claude 3 Sonnet** via LiteLLM for controlled LLM access.
* Implemented **FPDF**‑based PDF export of Markdown reports.
* Authored reusable **prompt templates** to ensure coherent agent outputs.
* Built the refreshed **Streamlit** front‑end for topic input and results display.
* Ran multiple end‑to‑end tests, resolving API‑key and deployment issues.

2.2  Anamika Bharali (30 hrs)

* Designed the **five‑agent pipeline** and coded each agent in agents\_and\_tools.py.
* Added free **Serper.dev** search tool for live web queries.
* Configured tasks and sequencing in crew\_config.py with CrewAI.
* Wrote detailed agent prompts; mapped tools/models per role.
* Diagnosed tool‑schema mismatches, memory settings, and output formatting.

1. System Architecture  
   3.1  Technology Stack  
   • Python • Streamlit • CrewAI • LiteLLM + Claude 3 Sonnet • FPDF • Serper.dev search

3.2  Agent Design Principles

* **Single‑responsibility** agents with explicit goals.
* **No delegation** (MVP): linear, predictable flow.
* Each agent given tool/model access only as required.

3.3  Agent Pipeline Workflow

1. **Topic Analyst** → interprets the user topic.
2. **Planning Strategist** → drafts research outline.
3. **Competitive Intelligence Gatherer** → retrieves web evidence.
4. **Insight Synthesiser** → extracts key insights (Claude 3).
5. **Report Author** → builds Markdown report ➜ PDF.
6. Key Development Milestones

* Verified Claude 3 Sonnet compatibility via LiteLLM.
* Chose **Serper.dev** over Firecrawl for cost‑free search.
* Achieved full sequential agent execution with CrewAI.
* Enforced Final Answer: syntax to close agent loops.
* Implemented robust error handling for tools & inputs.

1. Technical Challenges & Fixes

* **API key management** → solved with .env + config.json fallbacks.
* **Prompt placeholders** → corrected {input} → {topic} mismatches.
* **Tool schemas** → passed explicit argument dicts to avoid validation errors.
* **Markdown → PDF** → switched to line‑by‑line formatting to preserve headings.

1. MVP Outcome  
   Test topics:  
   • AI in healthcare • Remote‑learning tech • Social‑media & youth mental health  
   Each run produced a coherent, cite‑rich Markdown report downloadable as PDF—confirming the effectiveness of the multi‑agent design.
2. Next‑Phase Roadmap

* Enable **agent delegation** and iterative sub‑tasks.
* Add citation crawlers & table scrapers for deeper evidence.
* Introduce vector embeddings for memory / context consistency.
* Allow summarisation of uploaded PDFs & web pages.
* Experiment with a "Devil’s Advocate" critic agent.

1. Example Use Case

streamlit run streamlit\_app.py

1. Enter topic → 2) Click Generate Report → 3) Review Markdown → 4) Download PDF.
2. Directory Structure

📁 Marketminds/

├── agents\_and\_tools.py # Agent definitions & tools

├── crew\_config.py # CrewAI orchestration

├── config.json # API keys

├── streamlit\_app.py # UI app

├── main.py # Optional CLI runner

1. Suggestions & Research Directions  
   • Clarifying‑question module for better topic scoping.  
   • Document ingestion for richer context.  
   • Competitor scoring rubric by industry & geography.  
   • Synthetic persona support for cohort analysis.  
   • Integrate Clay / Perplexity for enterprise research depth.
2. Hours Contributed This Period  
   Anamika Bharali  : 30 hours  
   Mitesh Singh      : 30 hours  
   **Total**         : 60 hours
3. Representative Code Snippets

# agents\_and\_tools.py (excerpt)

from crewai\_tools import SerperDevTool

from crewai import Agent

search\_tool = SerperDevTool()

TopicAnalyst = Agent(

role="Topic Analyst",

goal="Refine the raw user prompt into a clear research objective",

tools=[search\_tool],

backstory="A consultant who frames ambiguous questions into actionable research briefs."

)

# crew\_config.py (excerpt)

from crewai import Crew, Task

from agents\_and\_tools import (

TopicAnalyst, PlanningStrategist,

IntelligenceGatherer, InsightSynthesiser, ReportAuthor

)

crew = Crew(

agents=[TopicAnalyst, PlanningStrategist, IntelligenceGatherer, InsightSynthesiser, ReportAuthor],

tasks=[

Task(agent=TopicAnalyst, expected\_output="refined\_topic"),

Task(agent=PlanningStrategist, expected\_output="outline"),

Task(agent=IntelligenceGatherer, expected\_output="search\_results"),

Task(agent=InsightSynthesiser, expected\_output="insights"),

Task(agent=ReportAuthor, expected\_output="final\_report", final=True),

]

)

# streamlit\_app.py (excerpt)

import streamlit as st

from crew\_config import crew

from utils import report\_to\_pdf

st.title("MarketMind Research Assistant")

topic = st.text\_input("Enter a research topic", "AI in restaurants")

if st.button("Generate Report"):

with st.spinner("Cooking up insights..."):

report = crew.kickoff(inputs={"topic": topic})

st.markdown(report)

pdf\_bytes = report\_to\_pdf(report)

st.download\_button("Download PDF", pdf\_bytes, file\_name="marketmind\_report.pdf")