

# Your Report Title

Your Name

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# 1 Introduction

In this study, we model a multi-agent system to manage fire-related emergencies in Lloret de Mar, Girona. For this purpose, we have designed five specialized response teams using CrewAI<sup>1</sup>: **medical services**, **emergency services**, **fire-fighters**, **public communication**, and **police**.

The report is structured as follows: in **Section 2**, we analyze the environmental characteristics affecting this system. In **Section 3**, we discuss the distinct agent teams and the attributes of their individual members.

## 1.1 Related Work

The increasing capabilities of Large Language Models (LLMs) have sparked greater interest in this area, as these models demonstrate early signs of general intelligence [2] and adaptability to novel situations [4]. These advances have catalyzed various approaches and applications of autonomous agents, as illustrated by Wang et al. [6].

However, new challenges accompany these advancements, including the optimization of **task allocation** to leverage agents' unique skill sets, enhancing intermediate outcomes through agent discussions, managing complex **context** layers related to tasks, agents, and shared knowledge, and handling multiple **memory types** essential for effective multi-agent collaboration [3].

While not within the scope of our current study, future work might benefit from exploring related topics such as Berthon et al.'s work on modeling environmental uncertainty [1] and Morales et al.'s research on synthesizing norms for multi-agent systems (MAS) [5].

Finally, for the design of our system, we reference key principles in Chapter 2 of [7] and insights from Michael Wooldridge's video on agent properties<sup>2</sup>.

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<sup>1</sup><https://www.crewai.com/>

<sup>2</sup>[https://www.youtube.com/watch?v=vID-\\_uIfAvg&feature=youtu.be](https://www.youtube.com/watch?v=vID-_uIfAvg&feature=youtu.be)

## **2 Environment**

This section describes the methodology used in the study, including data collection and analysis techniques.

## 3 Agents

In this section we will describe the five agents crews.

### 3.1 Public Communication Agent Crew

This agent crew is responsible for managing public communications regarding incident zones, summarizing weekly reports, and analyzing societal behavior. The agents in this crew are: a **facilitator agent** (team coordinator), an **information agent** (information repository), an **article writer** (collaborative writer), a **mayor** (official spokesperson), and a **social media commentator**.

#### 3.1.1 Facilitator Agent

Serves as the main point of contact, bridging communication between other emergency crews (firefighters, police, etc.) and updating the Public Communication Team on all pertinent activities.

- **Main task:** Receives updates from other emergency crews and relays the necessary information to agents within the Public Communication Team. Additionally, gathers insights from the team to share with other relevant crews when needed.
- **Tools:**
- **Type:** Facilitator agent.
- **Properties:**
  - *Flexibility:* Must adapt to and handle varied formats of incoming information from multiple sources.
  - *Reactivity:* Responds to new messages and incidents promptly.
  - *Proactiveness:* Initiates communication with other agents and emergency crews as necessary.
  - *Social Ability:* Facilitates collaboration within the team and interacts effectively with external agents.

#### 3.1.2 Information Agent

Acts as the central information repository for the team, handling data storage and retrieval as required.

- **Main task:** Manages a well-organized database of factual data, ensuring timely access to accurate information for other agents.
- **Tools:**
  - *Long-Term Memory:* A structured database for reliable information storage and retrieval.

- **Type:** Information agent.
- **Properties:**
  - *Reactivity*: Responds promptly to data requests from the facilitator and article writer, efficiently storing and retrieving information as needed.
  - *Social Ability*: Engages with both the facilitator and article writer to ensure access to necessary details.
  - *Learning*: Continuously updates knowledge of city-wide incidents and facts.

### 3.1.3 Article Writer Agent

Responsible for drafting, organizing, and refining articles to provide the public with clear and concise updates.

- **Main task:** Plans and develops well-structured, informative articles, ensuring consistency in public announcements based on current reports.
- **Tools:**
- **Type:** Collaborative agent.
- **Properties:**
  - *Proactiveness*: Independently decides when to begin and publish articles based on recent events.
  - *Social Ability*: Collaborates with the information agent to acquire data on specific neighborhoods or timeframes.
  - *Reasoning*: Applies logical structure and clarity when crafting announcements.

### 3.1.4 Mayor Agent

Represents the city officially, approving important articles for public release and maintaining the city's voice in communications.

- **Main task:** Reviews significant articles for release, ensuring they align with the city's position and information standards.
- **Tools:**
  - *Official Communication Channels*: Direct access to official public announcement platforms.
- **Type:** Collaborative agent.
- **Properties:**

- *Reactivity*: Responds to articles slated for publication to approve or request revisions.
- *Proactiveness*: Can halt articles and issue a modified announcement directly if necessary.
- *Social Ability*: Coordinates with the article writer to ensure messaging aligns with city standards.
- *Reasoning*: Assesses news content for potential public impact, adjusting as needed for public communication strategy.

### 3.1.5 Social Media Commentator

Offers lighthearted, constructive commentary on emergency operations to boost public morale and encourage positive feedback.

- **Main task:** Provides insights on emergency crew operations in a casual, humorous style to foster constructive improvements in a relaxed format.
- **Tools:**
  - *Social Media Platforms*: Direct access to platforms like “Twitter” for posting feedback.
- **Type:** Collaborative agent.
- **Properties:**
  - *Flexibility*: Adapts tone and style to maintain a balanced, lighthearted approach.
  - *Reactivity*: Responds to public and team updates with timely commentary.
  - *Proactiveness*: Actively comments on recent activities, providing feedback in a humorous way.
  - *Social Ability*: Communicates with a friendly, approachable tone.
  - *Reasoning*: Crafts feedback to be constructive and engaging.

## References

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