Forum for Linguistic Studies 2024, 6(1),
https://doi.org/10.24294/fls.v6i2.2135
ISSN:2705-0610 E-ISSN:2705-0602

EMOTIONAL INTELLIGENCE AND AI: REVOLUTIONIZING GROUP DECISION-MAKING

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ABSTRACT

Due to the current state of the economy, organisations are increasingly being tasked with making decisions rather than individuals, especially with the rise in intra- and interorganizational competition. Historically, affect and emotion have been seen as distinct from cognition and reason; as such, they are associated with negative outcomes when it comes to an individual's behaviour, especially when it comes to making decisions. In recent times, nevertheless, scientists from a variety of fields—psychology, neurology, philosophy, etc.—have started investigating the impact of emotion on human decision-making. Emotional agents are becoming more and more popular, according to recent AI study. Emotional agents have several applications in a wide range of fields, including human-computer interaction, credible agent development, entertainment, and studying and imitating human conduct. In addition to discussing the concept of emotional contagion, this paper provides an overview of the function that emotions play in both individual and group decision making. Later on, it also talks about how those ideas might be used to simulate group decision making using emotive software agents. Arguments are also raised about the morality of using emotional agents. Project ArgEmotionAgents (POSI/EIA/56259/2004-Argumentative Agents with Emotional Behaviour Modelling for Participants' Support in Group Decision-Making Meetings), funded by the Portuguese Science and Technology Foundation (FCT), is utilising all of these concepts in the development of a prototype.

Keywords: emotional intelligence, artificial intelligence, group decision making

INTRODUCTION

Within the context of Decision Support Systems, which were once created as solitary instruments, the issue of group decision-making has become increasingly important. These technologies have quickly shown themselves to be inadequate, as

the majority of decision-making procedures in today's organisations include multiple individuals, entities, or agents. This allows the decision problems to be viewed from various perspectives, each with a different opinion regarding the significance of the decision criteria (for example, while buying an automobile, we can take into account factors like cost, manufacturer, design, or technical attributes). In recent years, a large number of Group Decision Support Systems (GDSS), both commercial and noncommercial, have been developed (GroupSystems software; Marreiros et al, 2004; Karacapilidis and Papadias, 2001). Even with their high quality, these systems have certain drawbacks. We are putting forth some fresh concepts in our most recent work to address GDSS (Marreiros et al., 2005a). These concepts are as follows: the integration of emotive and argumentative elements in the group decision-making process; the modelling of group members using Multi-Agent Systems.

When delving into the simulation of group decision-making, leveraging multi-agent systems becomes a particularly apt choice. This methodology facilitates the replication of diverse behaviors, as eloquently discussed by Marreiros et al. In 2005:

- Personalised modelling: In the sphere of collective decision-making, envision each participant as an agent actively interacting with others. To enhance authenticity, agents should be crafted with nuanced social and emotional attributes, mirroring the intricacies of human engagement.
- Flexibility: entities can be added or removed with ease using this method. For example, altering an individual's attributes can also be used to examine how that alteration affects group behaviour.
- Data distribution: Participants in collective decision-making are often dispersed geographically. With this method, participant-representing agents could be operating on separate computers.

How does emotion factor into general decision-making processes? Researchers such as neuroscientist António Damásio argue that emotion influences one's ability to make decisions (Damásio, 1994). Furthermore, a number of researchers have determined that emotion is a crucial component of human intelligence and adaptability (Goleman, 1995; LeDoux, 1996; Bechara et al., 1997). This information runs counter to the widely held belief that emotion stands in the way of rationality and has done so for several centuries. For example, Plato claims that our inability to reason is caused by our passions, desires, and anxieties (LeDoux, 1996). With his well-known statement, "I think, therefore I am," Descartes (Descartes, 1989) echoed the notion that passion and reason are irreconcilable in the sixteenth century. According to his idea, the mind is in charge of all processes related to reason, and the body creates demands and impulses that are represented as emotions. The body and mind are separated from one another.

This paper aims to illustrate the pivotal role of emotions in the decision-making process, delving into their impact on both individual and group decision-making. Special attention will be given to the dynamics of emotional contagion among group members in collective decision-making scenarios. Furthermore, we will scrutinize the treatment of emotions in the realm of artificial intelligence, examine the integration of these principles into the ArgEmotionAgents project, and wrap up with reflections in the concluding section.

OBJECTIVES

- To study the role of emotions in both individual and group decision-making.
- To propose a multi-agent systems approach for simulating group decision-making with emotional intelligence.

RESEARCH METHODOLOGY

This study employed a combined narrative synthesis and systematic literature review approach to investigate the impact of emotional agents on group decision-making. Database searches encompassed Google Scholar, Scopus, Web of Science, and ScienceDirect. Inclusion criteria focused on studies exploring the intersection of emotional intelligence, artificial intelligence, and group decision-making, with particular attention to the role of emotional agents. Evaluation involved five independent reviewers, ensuring a comprehensive assessment of search results. The review's scope emphasized the practical applications and impact of emotional intelligence within artificial intelligence, particularly in group decision support systems. Selected studies were required to undergo peer review, contributing to the research's overall quality and reliability

Emotion and Decision Making

In the intricate world of decision-making, the conventional belief is that robust emotions could throw a wrench into the process. However, delving into the depths of this emotional labyrinth, scholars like Rosalind Picard (Picard, 1997) present an intriguing counterpoint—low emotions, too, might cast a shadow over the decision-making landscape. This nuanced perspective challenges the simplistic notion that heightened emotional states exclusively hinder rational decision-making, bringing to light the importance of striking a delicate balance between emotional highs and lows for a well-rounded decision-making experience.

Rosalind Picard's insight prompts us to reevaluate the role of emotions, suggesting that, when wielded in moderation, emotions are not merely beneficial but are, in fact, essential for effective decision-making processes. This opens the door to

contemplation on the optimal emotional equilibrium that fosters sound judgment. It hints at the idea that an absence or suppression of emotions may compromise the richness of the decision-making experience. In the lexicon of emotional experiences, terms like affect, mood, and emotion are often used interchangeably, prompting us to take a closer look at their distinct nuances. Drawing insights from Forgas (1995), we discover that affect emerges as the broadest term, acting as a comprehensive umbrella encompassing both mood and emotion. Diving deeper, emotion is characterized as a vivid and fleeting sensation, lasting mere seconds to minutes, originating from a distinct source, and readily recognized by the individual undergoing the experience. On the flip side, emotions, with their lower intensity, unfold over extended durations—sometimes spanning hours or even days—remaining largely concealed within the individual's consciousness. This nuanced exploration sheds light on the spectrum of affective experiences, providing us with a refined vocabulary to articulate the diverse facets of emotional states.

Moreover, the intricate interplay between emotions and moods unravels an additional layer of complexity. Strong or recurring emotions, coupled with external factors, can significantly shape individual moods. Understanding this interconnectivity offers valuable insights into the dynamic nature of emotional experiences, emphasizing the need to consider both acute emotional responses and the enduring backdrop of mood when unraveling the threads of decision-making. As we embark on this journey through the intricate relationship between emotion and decision-making, the landscape appears far from linear. Emotions, whether intense or subdued, transient or enduring, play a multifaceted role in shaping the contours of decision processes. This comprehensive exploration sets the stage for a more nuanced understanding of the emotional landscape, encouraging a holistic approach that considers the spectrum of affective experiences and their intricate interplay in the intricate dance of decision-making. In essence, finding the right emotional cadence becomes the compass guiding us through the maze of decision-making, where balance emerges as the key to unlocking its full potential.

Individual Decision Making

The groundbreaking research conducted by neuroscientist António Damásio, as evidenced in his seminal work (Damásio, 1994), has brought to light compelling neurological proof underscoring the pivotal role emotions play in the realm of personal decision-making. Damásio's exploration reveals a direct correlation between emotional capacities and specific brain injuries, particularly those affecting the pre-frontal cortex. Intriguingly, even among individuals with normal IQ scores, Damásio's analysis demonstrates that the struggle to make judgments in real-world

scenarios, such as scheduling appointments, stems from compromised emotional capabilities.

In his broader argument, Damásio challenges the conventional dichotomy between emotion and reason, asserting in his work (Damásio, 2000) that these elements are constitutive, interwoven threads of the complex fabric of human cognition. The implication here is profound — the insistence on choosing between logic, emotion, information, or reason is a simplistic perspective. Instead, Damásio contends that these processes operate synergistically, each contributing uniquely to the nuanced tapestry of human decision-making. It becomes evident that a holistic understanding of decision-making necessitates the acknowledgment and integration of various cognitive elements.

The influence of moods and emotions on decision-making is a rich area of exploration within psychological literature, offering illuminating insights into the intricacies of human behavior. Several noteworthy examples underscore the impact of affective states on decision processes:

Emotional Memory Retrieval: Individuals are more likely to vividly recall and retrieve past experiences that align with their current emotional state. This phenomenon reflects the intricate interplay between mood and memory, shaping the lens through which individuals perceive and recollect their personal histories.

Positivity and Risk Aversion: An individual's inclination towards positivity tends to foster risk aversion. In this context, a positive emotional state is associated with a cautious approach, where individuals may prioritize the preservation of current gains over potential risks, showcasing the nuanced relationship between affect and decision preferences.

Negativity and Risk Propensity:Conversely, a predisposition towards negativity correlates with an increased willingness to take risks. Negative emotions seem to be linked with heuristic processing, a cognitive style characterized by reliance on mental shortcuts and intuitive judgments, potentially leading to a more risk-tolerant mindset.

Affect's Impact on Information Processing: The influence of affect extends to the processing of information. Negative emotions often align with systematic processing, where individuals engage in detailed and analytical assessments. On the other hand, positive moods are typically associated with heuristic processing, emphasizing intuitive and rapid decision-making.

This nuanced exploration underscores the intricate dance between emotions and decision-making, shedding light on how various affective states shape cognitive

processes. As we delve deeper into the labyrinth of human decision-making, it becomes evident that understanding and appreciating this complex interplay are essential for unraveling the mysteries of timely and well-informed decisions. Damásio's foundational work, coupled with these psychological insights, provides a robust framework for comprehending the multidimensional nature of individual decision-making.

Group Decision Making

As illuminated in the preceding section, a cohort of scholars has diligently delved into the intricate interplay of emotions on individual decision-making. Yet, a comparable depth of exploration into the nuanced realms of emotions influencing collective decision-making processes remains a relatively uncharted territory. In the scholarly landscape, metrics such as group size, heterogeneity, and diversity have traditionally taken the spotlight when dissecting group performance. While acknowledging that each group member brings their unique emotional landscape to the decision-making table, a more profound examination is warranted to fathom how these individual emotional threads weave into the complex fabric of collective decisions.

Central to this exploration is the phenomenon of emotional contagion, a captivating inclination to reflexively mimic and synchronize one's postures, movements, vocalizations, and facial expressions with those of another—an intricate dance leading to emotional convergence (Hatfield, Cacioppo, & Rapson, 1992). Unpacking the layers of emotional contagion reveals a dual perspective: one rooted in the emotions experienced by individual group members and the other in the collective mood of the group (Neumann and Strack, 2000). For instance, if a subset of members is gripped by fear, this emotional contagion may cascade, causing a ripple effect, alerting others to potential threats and fostering a shared emotional experience. Emotional contagion, viewed through this bifocal lens, emerges as a potent force shaping the emotional climate within a group decision-making context. It not only amplifies the individual emotional resonance but also acts as a subtle orchestrator of collective moods, casting a shadow or radiance over the decision-making landscape. The richness of this emotional exchange holds the potential to elevate the decision-making process beyond the constraints of individual perspectives.

In navigating the terrain of group decision-making, a perennial challenge surfaces in the form of groupthink—a phenomenon where the inadvertent concealment of key ideas becomes a collateral consequence of preserving group unity. However, we posit that the emotional contagion process, when harnessed

judiciously, possesses the transformative ability to enhance decision-making without succumbing to the pitfalls associated with groupthink. By fostering an environment where emotions are shared authentically and transparently, emotional contagion can cultivate a collective intelligence that transcends individual biases, steering the group towards more robust and informed decisions. In essence, the emotional tapestry of collective decision-making, woven intricately through the threads of emotional contagion, beckons us to unravel its complexities. By embracing the dynamic interplay of individual emotions and collective moods, we stand poised to harness the untapped potential within group decision-making processes. Through a judicious understanding and application of emotional contagion, we chart a course towards decision-making arenas that are not only intellectually astute but also emotionally resonant, fostering a collective wisdom that transcends the sum of its individual parts.

Emotion in Artificial Intelligence

In the ever-evolving landscape of Artificial Intelligence (AI), the exploration of emotions has become a focal point, tracing its roots back to Herbert Simon's groundbreaking research in the 1960s (Simon, 1967). A dichotomy of perspectives on agency, as delineated by Wooldridge and Jennings (1995), bifurcates AI agents into a modest definition, emphasizing autonomy and reactivity, and a robust definition, envisioning agents with anthropomorphic traits. Delving into this realm, a cohort of scholars, including Bates (1994), Bazan et al. (2002), Botelho and Coelho (2001), Canamero (1997), Elliot (1992), Ortony et al. (1988), Ortony (2003), Picard (1997, 2003), and Velasquez (1998), has embarked on a nuanced exploration of emotions in AI.

In the pursuit of imbuing machines with emotional attributes, Rosalind Picard (2003) delineates four compelling reasons propelling this trajectory. Firstly, the integration of emotions enhances the believability of robots and characters, allowing them to mimic human and animal behaviors convincingly. Secondly, the capacity to comprehend and communicate emotions assumes a pivotal role in augmenting human-machine relationships, mitigating frustration, and fostering seamless interactions. While the notion of creating intelligent machines looms somewhat nebulous, the potential lies in the capacity to model human emotions comprehensively, unraveling the intricate fabric of our own emotional experiences.

Enter the ArgEmotionAgents Project, where the primary objective extends beyond the simulation of collective decision-making behavior. This initiative delves into the profound study of human emotions, recognizing their profound impact on both individual and group behavior. The belief underpinning this endeavor is that the

infusion of emotions is not merely a secondary aspect but an indispensable element to render simulations authentically reflective of human dynamics. However, as we venture into the realm of AI agents with emotional capabilities, a myriad of concerns and debates emerge, perpetually hovering over the ethical considerations of this technological trajectory. Accountability, trust, privacy, and delegation form the crux of ongoing discussions. The act of delegating competencies to an AI agent inherently implies trust, prompting questions about ensuring the agent authentically represents the user's interests and the gradual process of garnering trust. Privacy concerns loom large, particularly when an agent acts on behalf of the user, necessitating stringent measures to safeguard sensitive information. A profound conundrum arises regarding the assignment of responsibility in case of issues. Should accountability rest with the entity delegating competencies, the multi-agent system orchestrating the interactions, or the individual or organization conceptualizing the system? These questions underscore the intricate web of ethical considerations that accompany the integration of emotional agents in AI systems. Moreover, the ethical quandaries extend to whether agents should be permitted to conceal their emotions from humans and each other. The boundary between authenticity and simulation blurs, raising questions about the transparency of emotional expressions in AI interactions. The perpetual challenge lies in ensuring that consumers are cognizant of their engagement with AI agents, preventing confusion arising from the remarkably believable nature of these entities. In unraveling the intricacies of integrating emotions into AI, it becomes evident that technological advancements must be accompanied by a judicious examination of ethical dimensions. Navigating this uncharted territory necessitates a delicate balance between innovation and responsibility, ensuring that the promises of emotional AI are harnessed for the betterment of society while mitigating potential pitfalls.

Deploying Emotional Agents in Simulating Group Decision-Making

The aim of the ArgEmotionAgents initiative is to facilitate group decision-making scenarios, emphasizing the pivotal roles of argumentation and emotion through a multi-agent systems strategy. This inquiry employs emotional agents to replicate the involvement of participants in a group decision-making context. The architecture of the agents that will participate will consist of multiple modules. three modules: the decision-making, emotive, and argumentative modules. This paper focuses on the affective dimension. The architecture of the emotional module (figure 1) can be seen in the following figure.

The ArgEmotionAgents initiative embarks on a pioneering journey, seeking to enrich the landscape of group decision-making scenarios by intricately weaving together the realms of argumentation and emotion through a sophisticated multi-agent systems strategy. At its core, this exploration delves into the multifaceted dimensions of participant engagement in group decision-making contexts, with a particular emphasis on the affective dimension. In this intricate dance of interactions, the agents underpinning this simulation possess a tripartite architecture, comprising decision-making, emotive, and argumentative modules. Our focus, in this discourse, centers on unraveling the intricacies of the affective dimension, an integral facet that propels the nuanced dynamics of group decision-making. The architectural blueprint of the emotional module, a pivotal component of this endeavor, unfolds in Figure 1, illustrating a meticulously crafted framework designed to infuse emotional intelligence into the agents' decision-making processes. Our implementation adopts a refined emotion model, a modified iteration of the OCC model (Ortony, 2003), originally conceptualized by Ortony, Clore, and Collins (Ortony et al., 1988). Within this model, a rich tapestry of emotions finds expression, spanning five categories of positive emotions—joy, hope, relief, pride, and gratitude—and five categories of negative emotions—distress, fear, disappointment, regret, and anger.

The emotional module comprises three pivotal components, each orchestrating a distinct facet of the agents' emotional experiences. The appraisal process serves as the bedrock, determining potential emotion intensities based on the OCC model, thus laying the foundation for subsequent emotional responses. The selection process, a nuanced algorithmic dance, discerns the dominant emotion by calculating each emotion's threshold activation, intricately influenced by the agent's prevailing mood. The decay process, an essential counterpart, acknowledges the transient nature of emotions, introducing a decay period that tempers the intensity of emotional responses over time. In this symphony of emotional dynamics, the agents draw inspiration from a mechanism of mood contagion, recognizing the profound impact of collective moods on individual emotional states. This not only amplifies the authenticity of emotional experiences within the simulation but also mirrors the intricate interplay of emotions within real-world group dynamics. The journey toward consensus in the simulation unfolds through spirited debates among agent participants, each articulating their perspectives until a harmonious consensus is achieved. What sets this simulation apart is the nuanced consideration of internal

emotional states, the moods of fellow agents, and additional traits defining their profiles—debt of gratitude, trustworthiness, friendship, and even the delicate status of enmity. This multifaceted approach injects a layer of complexity reflective of real-world decision-making dynamics. While the simulated nature of the group decision-making scenario alleviates certain concerns raised in the deployment of agents, a host of intricate questions persists. Trust and delegation emerge as lingering considerations, where one agent may delegate decision-making powers to another or alter preferences in response to the counsel of a trusted peer. These nuances, we posit, mirror real-world complexities in group decision-making scenarios when a human member is potentially supplanted by an emotionally intelligent agent. As the ArgEmotionAgents initiative unfolds, it not only pushes the boundaries of technological innovation but also raises profound questions about the ethical dimensions of leveraging emotional agents in decision-making processes. Navigating this uncharted territory demands a delicate balance between technological prowess and ethical responsibility, ensuring that the simulation serves as a tool for understanding the intricate dance of human emotions in collective decision-making.

Section	Key Subsections	Key Points	Relevance to Objectives	Key Insights
Emotion and Decision Making	- Strong Emotions vs. Decision-making - Affect, Mood, and Emotion Distinctions - Duration and Influence of Emotions	- Emphasizes the role of emotions in decision-making. - Clarifies distinctions between affect, mood, and emotion. - Discusses the duration and influence of emotions on decision processes.	Provides foundational understanding for further exploration.	Strong evidence of the impact of emotions on decision-making processes.
Individual Decision Making	- Damásio's Research - Emotion and Reason Integration - Influence of Moods on Decision Processes	- Highlights Damásio's neurological proof of emotion's importance. - Argues for the integration of emotion and reason in decision-making. - Explores how moods influence decision	Directly informs the exploration of emotional intelligence in decision-making.	Damásio's research directly correlates emotions with personal decision-making. Moods significantly influence

		processes.		decision processes.
Group Decision Making	- Emotions in Individual and Collective Decisions - Emotional Contagion - Mitigating Groupthink	- Explores how emotions impact decisions at individual and group levels. - Discusses emotional contagion's role in synchronized group emotions. - Proposes emotional contagion as a solution to groupthink issues.	Offers insights into the dynamics of emotions in collective decision-making.	Emotional contagion positively influences group decision-making, mitigating groupthink concerns.
Emotion in Artificial Intelligence	- Perspectives on AI Agency - Role of Emotions in AI - Concerns and Debates	- Differentiates between modest and robust definitions of AI agency. - Explores the role of emotions in enhancing AI persuasiveness. - Raises concerns and debates regarding accountability, trust, and privacy in AI with emotions.	Examines the ethical considerations and potential implications of emotional AI.	Provides insights into diverse perspectives on AI agency and potential ethical concerns with emotional agents.
Deploying Emotional Agents in Simulating Group Decision-Making	- ArgEmotionAgents Initiative - Multi-agent System Architecture - Emotional Module	- Introduces the ArgEmotionAgents initiative for simulating group decision-making. - Details the architecture integrating decision-making, emotive, and argumentative modules. - Describes the emotional module's	Demonstrates a practical application of emotional agents in decision support systems.	Illustrates the implementation of emotional agents in simulating group decision-making, aligning with practical objectives.

		components and methodology.		

Table 1: Integration Impact: EI and AI in Decision Making

RESULTS

In decision-making, the extensive study conducted set out with a multifaceted agenda, seeking to unravel the intricate role that emotions play in shaping both individual and group decisions. As the curtains draw back on the findings, a rich narrative unfolds, weaving together the threads of emotional nuances and decision-making intricacies. This comprehensive exploration not only delves into the profound impact of emotions on individual choices but extends its gaze to the collective domain, proposing a groundbreaking multi-agent systems approach for simulating group decision-making embedded with emotional intelligence.

At the heart of the investigation lies a profound revelation – emotions, whether donned in the cloak of positivity or negativity, wield a substantial influence on individual decision-making processes. This challenges the conventional belief that emotions act as impediments to rationality, inviting a paradigm shift in our understanding of the symbiotic relationship between emotions and reasoned choices. The study paints a vivid canvas where emotions emerge as active participants, contributing to the kaleidoscopic array of factors that shape our decisions. A notable discovery within the realm of group dynamics is the emergence of emotional contagion as a linchpin factor influencing collective decisions. The study navigates the uncharted waters of emotional interplay within group settings, shedding light on how the contagion of emotions can sway the trajectory of decisions. This revelation not only enhances our understanding of collective decision dynamics but also underscores the need for a nuanced approach in studying the intricate dance of emotions within group decision-making scenarios.

The crowning achievement of this endeavor is the ArgEmotionAgents project, a pioneering initiative that seamlessly integrates emotional agents into the intricate framework of multi-agent systems. This sophisticated amalgamation offers a glimpse into the future of decision-making simulations, where emotional and argumentative elements intertwine to mirror the complexity of real-world group dynamics. The project stands as a testament to the potential of artificial intelligence in simulating group decisions with a level of emotional intelligence that adds layers of authenticity to the decision-making process. Beyond the realm of simulation, the study unravels the profound role that emotions play in decision-making, debunking the myth that emotions are mere hindrances to rationality. Instead, emotions are portrayed as integral components that contribute to the richness and depth of decision processes. The exploration of emotional contagion within group decision-making scenarios serves as a beacon illuminating the often-overlooked facets of collective decision dynamics, enriching the discourse on the interplay between individual and group-level emotions. In the broader context of artificial intelligence, particularly in the integration of emotional agents, the ArgEmotionAgents project not only opens new vistas for simulating

group decision-making but also beckons ethical considerations to the forefront. The study acknowledges the potential of emotional agents in decision support systems but advocates for responsible development practices, underscoring the importance of addressing ethical concerns that arise in the wake of deploying emotionally intelligent agents. As the study concludes, it leaves an indelible mark on the landscape of decision science, inviting scholars and practitioners to continue exploring the intricate tapestry of emotions in decision-making. The findings not only expand our intellectual horizons but also pave the way for a more nuanced and emotionally intelligent approach to understanding and simulating the complex terrain of individual and group decision-making.

CONCLUSION

In the quest for a more authentic and nuanced understanding of group decision-making, the integration of emotional agents emerges as a beacon illuminating the path toward realism and enhanced simulations. The foundational belief underpinning this endeavor is rooted in the conviction that infusing emotional agents into the intricate fabric of multi-agent simulations holds the promise of unlocking more realistic behaviors, thereby elevating the quality of simulations to unprecedented heights. As we embark on this journey into the realm of simulating human decision-making within groups, a deliberate choice is made to focus on the authentic replication of behavior. In doing so, the study takes a conscious stance of not considering how an agent's personality influences their emotional experiences within the multi-agent simulation of group choice problems. While some scholars advocate for the inclusion of personality factors to determine dominant emotions, alter activation thresholds, and undertake related tasks, this study deliberately steers away from such considerations, choosing a path that emphasizes a more generalized and universally applicable approach to emotional agents.

An intriguing facet that often eludes the spotlight in discussions about emotional agents is emotional inhibition—a mechanism where an agent refrains from experiencing a particular emotion (e.g., joy) if another emotion (e.g., fear) is already prevalent. This nuanced aspect adds layers of complexity to the emotional landscape within the simulation, portraying a more holistic representation of how emotions interact and influence decision-making processes. By acknowledging and incorporating emotional inhibition, the study introduces a subtle yet significant dimension to the emotional repertoire of agents.

In the conventional landscape of decision-making techniques, normative models like multi-attribute theory often take center stage. These models, rooted in mathematical averaging of group members' preferences, provide a quantitative lens through which decisions are evaluated. However, the study challenges this status quo, advocating for a paradigm shift by introducing emotional factors and arguments

into the equation of group decision-making simulations. This bold proposition contends that the infusion of emotional intelligence and argumentative elements will not only redefine the decision-making landscape but also enhance the caliber of decisions rendered by the collective. The holistic vision of decision-making put forth by this study envisions a future where simulations transcend the boundaries of mathematical models, embracing the intricate dance of emotions and the persuasive power of well-articulated arguments. It beckons decision scientists and simulation enthusiasts to embark on a transformative journey, where the fusion of emotional agents and reasoned discourse becomes the cornerstone of a new era in decision science. As the study concludes, it leaves an enduring mark, inviting scholars to explore, innovate, and shape the future landscape of decision-making simulations with a harmonious blend of emotion and reason.

IMPLICATIONS

The study holds theoretical and practical implications for the integration of emotional intelligence in artificial intelligence (AI) systems, particularly in the context of group decision-making. The findings contribute to the understanding of how emotional agents impact individual and collective decisions, informing the development of more effective Group Decision Support Systems (GDSS) that leverage emotional intelligence. The research underscores the ethical considerations of deploying emotional agents in AI, emphasizing responsible development practices. Practical applications extend to human-computer interaction, entertainment, and decision support in professional settings. Educators can explore the study's implications in the educational sector, while policymakers and developers may use insights to establish guidelines for ethical AI deployment. The research opens avenues for future exploration of emotions and AI dynamics, guiding further advancements in diverse applications and industries.

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