Sentiment Analysis for Indian Defence Ecosystem and Armed Forces

Apurv Gupta*

Today's battlefields extend far beyond physical terrain into the digital realm, where military operations are won or lost through the power of perception. This study dives deep into how Sentiment Analysis (SA) has become a game-changing intelligence asset for modern defence operations. When Russia invaded Ukraine in February 2022, an extraordinary sentiment shift among Ukrainians was observed in public opinion. Analysis of public discourse on social media revealed a substantial transformation throughout the war with initial support for negotiations gradually giving way to increased resolve for continued resistance. This dramatic reversal, having deeply altered modern political outlook and military planning, compelled strategists to rethink the brass tacks. The strategic impact of SA on the conduct of military operations was further cemented during the Israel–Hamas conflict, where Israeli forces analysed over 400,000 Reddit conversations to identify emotional flashpoints and counter misinformation before it gained traction. As the operational landscape becomes increasingly asymmetrical, the application of SA in contemporary geopolitical theatres emerges as a substantial force multiplier, allowing defence strategies to shorten the OODA (Observe, Orient, Decide, Act) loop significantly.

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ISSN 0976-1004 (print); 2583-7567 (online)

Journal of Defence Studies, Vol. 19, No. 2, April–June 2025, pp. 53–78

A qualitative research study on AI-based sentiment analysis for strategic and geopolitical significance, focused on the Indian defence ecosystem and armed forces, was conducted as part of this study, wherein responses from 88 service officers including CAPF officers and academia were recorded. Notably, 40 per cent of respondents found it 'very challenging' to stay updated with strategic information. Additionally, key geopolitical focus areas, including China (85 per cent) and Pakistan (80 per cent), were identified as priorities for sentiment monitoring.

Some of the most advanced SA tools available were evaluated to explore these needs. Integrating SA in the overall Military Decision Making Process (MDMP) will enable the Indian Armed Forces to conduct proactive information dominance, neutralise adversarial narrative warfare and enhance strategic situational awareness. This study lays the groundwork for these advancements, offering a roadmap for integrating cutting-edge technology into national security efforts.

Keywords: *Sentiment Analysis, Defence, AI, Geopolitics, Information Warfare*

Introduction

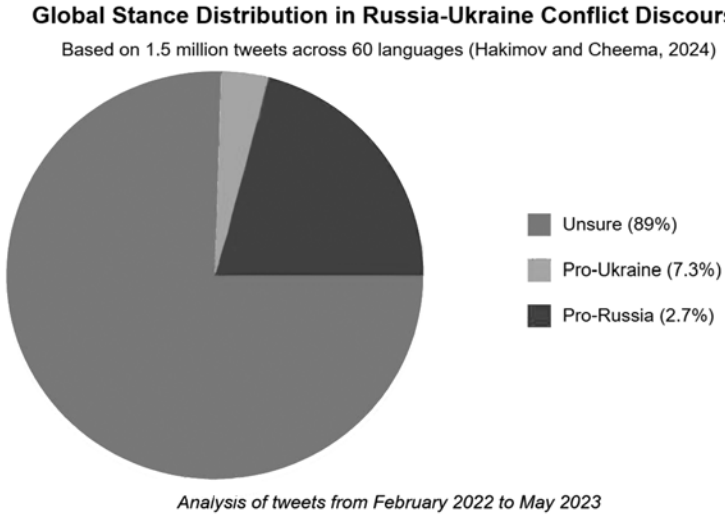
Context

In a world interspersed with rapid technological advancement and pervasive digital communication, the need to understand public sentiment regarding great geopolitical events has never been so strong. The Russia–Ukraine War (RUW), which escalated dramatically on 24 February 2022 emerged as a pivotal inflection point in modern warfare, exemplifying how rapid digital communication can fundamentally reshape strategic doctrine and international policy dynamics. RUW transcended traditional military engagement, evolving into a complex, multi-dimensional confrontation that simultaneously unfolded across physical, diplomatic and digital terrains.

Platforms such as X (formerly Twitter) have cropped up fertile avenues for opinion expression, garnering support and disseminating real-time updates on an issue, thereby positioning social media as one of the key arenas for SA. Applying SA on X feed in March 2022 revealed that over 50 per cent of Ukrainians favoured immediate negotiations to end the conflict, even if it involved territorial concessions. However, in March 2023, the public perception shifted significantly with 73 per cent Ukrainians desiring to fight until victory. For defence strategists, this shift offered critical insights, compelling a comprehensive re-evaluation of military and diplomatic strategies that extended far beyond traditional operational planning. As

documented by Hakimov and Cheema, examination of 1.5 million tweets across 60 languages demonstrated evolving narrative patterns with stance classification revealing 89 per cent unsure, 7.3 per cent pro-Ukraine and 2.7 per cent pro-Russia sentiment distributions globally (see Figure 1).[1]

Figure 1 Global stance distribution of tweets in Russia–Ukraine War

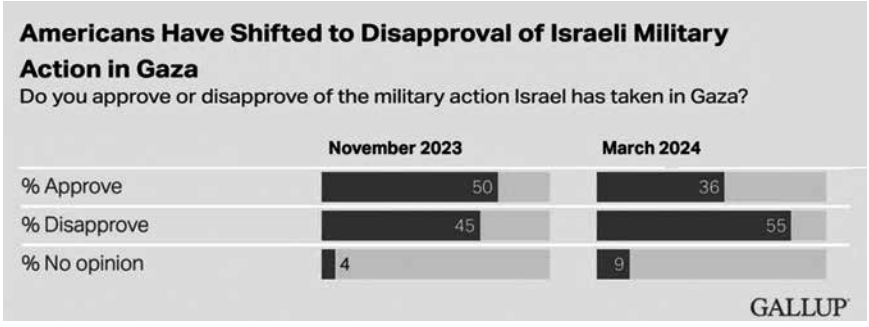


Through such an analysis of public emotions and opinions, SA enables researchers, policymakers and media analysts to factor in public mood and its variation over time. SA goes beyond simple opinion categorisation to provide nuanced insights that may influence strategic decisions and response planning. The process requires feature engineering and sophisticated machine learning algorithms to handle the vast amount of unstructured data, ultimately improving the accuracy of sentiment extraction.

The application of Sentiment Analysis (SA) in defence strategies runs parallel to the growing importance of information warfare and strategic communication over the past decade. It has been used to monitor public reactions, predict threats and manage psychological operations by various countries. The Isamas Red dataset, with nearly 400,000 Reddit conversations about the Israel–Hamas conflict, helped track and identify controversial or emotionally charged content. This allowed Israeli forces to address misinformation through targeted information campaigns, thereby displaying that narrative superiority is as critical as traditional kinetic capabilities. The

application of SA transforms traditional communication strategies from unidirectional information dissemination to dynamic, responsive engagement mechanisms that prioritise public trust and strategic transparency. US military operations in Afghanistan benefitted from SA of public and social media data in near real-time to inform commanders of public sentiment, thus enabling them to modify strategies to effectively communicate and support stabilisation efforts. India is a diverse linguistic and cultural entity; integrating SA will enable the armed forces to monitor public discourse, counter misinformation and enhance operational preparedness. SA can also be used to predict the enemy's possible reactions to one's own operational actions and throw up options for the commanders.

Figure 2 Gallup poll displaying US shift from majority approval to majority disapproval of Israeli offensive



This study highlights how SA has been applied worldwide by military forces, and looks at its possible application within the Indian defence ecosystem. In so doing, the Indian Armed Forces could harness the strategic worth of this subject matter to further the trust of the common people, reshape communication techniques and develop more effective decision-making during vital operations.

Research Methodology

This research employs a comprehensive methodological framework designed to balance academic rigour with battlefield pragmatism, addressing critical gaps in the application of SA within the Indian defence ecosystem. The study's architecture integrates theoretical analysis, structured survey-based field insights and methodological triangulation-based experiments, creating a multi-dimensional understanding of SA applications in military contexts.

A qualitative research study on AI-based SA for strategic and geopolitical significance, focused on the Indian defence ecosystem and armed forces, was conducted as part of this research. This initiative gathered responses from 88 service officers, including responses from CAPF officers and academia, thus ensuring diverse operational perspectives. The survey methodology was deliberately structured to probe three critical dimensions: multilingual complexities unique to India's regional diversity, organisational readiness for AI adoption, and potential tactical and strategic use cases.

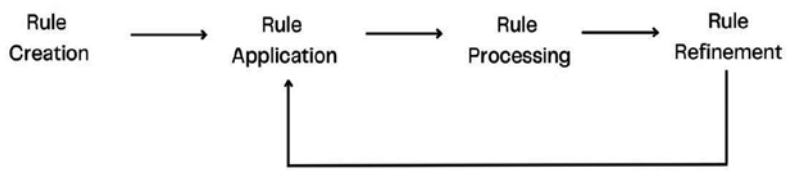
The research framework addressed several identified gaps in the existing literature: *Contextual Relevance*—current SA research has insufficiently addressed India's linguistic diversity and specific geopolitical dynamics; *Practical Insights*—limited studies on SA integration into military operations has delayed understanding and adoption; *Defence-Specific Focus*—the scarcity of documented use cases for armed forces applications has constrained institutional knowledge transfer. Additionally, undertaking a thorough literature review led to analysis of global applications in defence and public security domains, establishing benchmarks against which Indian capabilities could be measured and developed.

By integrating these stakeholder insights with theoretical foundations, this research bridges the gap between academic SA research and defence applications. The ultimate aim is to use these advancements to enhance strategic application, ensuring India's armed forces are equipped with cognitive domain awareness capabilities commensurate with emerging hybrid warfare challenges.

Various Approaches of Sentiment Analysis

Sentiment Analysis leverages Natural Language Processing (NLP) and computational algorithms to assess opinions and sentiments expressed in text. Here we explore the primary approaches, including their strengths, limitations and applications, particularly in the context of the Indian defence ecosystem.

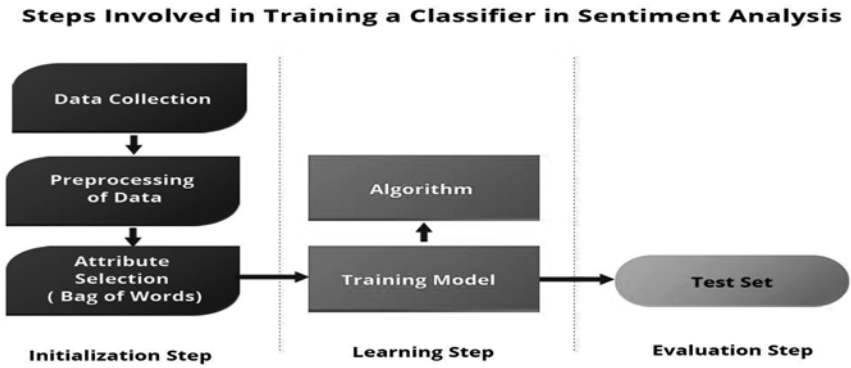
Figure 3 Working of Rule Based Sentiment Analysis



Rule-Based Approach

Rule-based SA relies on pre-defined linguistic rules to classify text sentiments. It employs computational techniques like stemming, tokenisation and parsing. Sentiment classification is typically based on the frequency of positive and negative terms in a text. In military communication, rule-based systems can provide initial insights into public sentiment regarding operational reports or policy announcements.

Figure 4 Automatic Sentiment Analysis Classifier Model



Example: Words like 'excellent' or 'outstanding' might denote positive sentiment, while 'terrible' or 'failure' suggest negativity. When these words dominate the text, it is categorised accordingly.

Limitations: These systems often struggle with complex sentence structures, sarcasm or contextual nuances, reducing their effectiveness in real-world applications.

Automatic Approach

Automatic SA treats sentiment classification as a machine learning problem. Models learn associations between input text and sentiment labels from training data. Feature extraction, such as bag-of-words and word embeddings, transforms text into numerical vectors, enabling machine learning models to classify sentiments accurately. This approach can monitor large-scale social media discussions, identifying trends and risks in real-time.

Example: It can be used to monitor news forums, social media platforms and local digital channels in the border areas of Jammu and Kashmir/North East. The trained models classify sentiments (positive, neutral or negative) associated with key military-relevant aspects, such as public trust in security

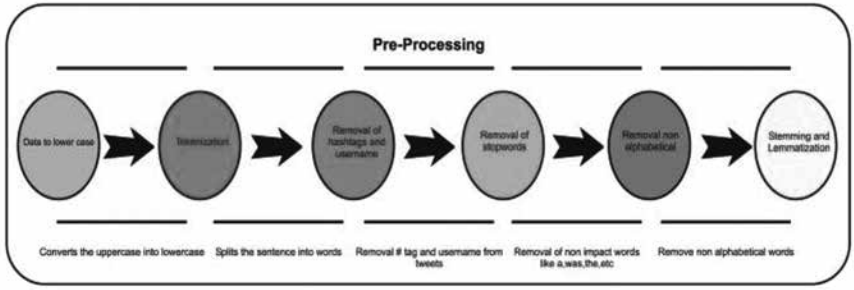
forces, perception of cross-border strikes or narratives about insurgency. This will aid the forces to identify anti-national sentiment spikes, track influence operations by hostile states or detect potential unrest, thereby enabling proactive strategic communication and operational decisions.

Limitation: The accuracy depends heavily on the quality and diversity of training data.

Hybrid Approach

The Hybrid approach combines rule-based and machine learning methods, offsetting individual limitations and enhancing sentiment classification. In nuanced contexts like military intelligence, hybrid approaches analyse structured and unstructured language more effectively, ensuring actionable insights.

Figure 5 Pre-processing of data using Hybrid Sentiment Analysis Approach



Example: A hybrid model might be used to classify an operational report as positive or negative overall, while identifying concerns within specific sections. Thus, enabling a more pragmatic look at the larger picture while providing insights into parameters that may require fine-tuning.

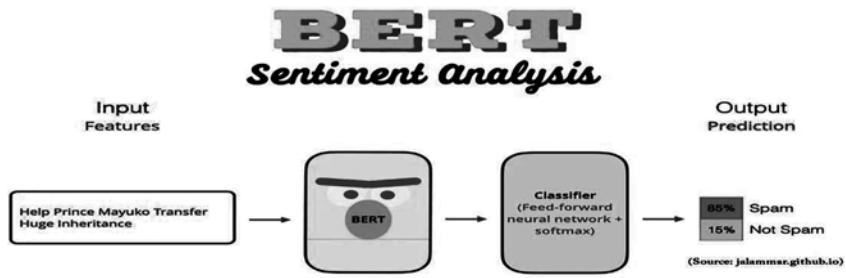
Deep Learning and Advanced Models

Deep learning, especially transformer-based models like BERT, has revolutionised SA. These models use self-attention mechanisms to process complex and context-rich text. BERT's bi-directional text analysis is invaluable for interpreting international communications or intelligence reports, where subtleties in sentiment carry strategic implications.

Example: Advanced models excel at capturing implicit meanings and contextual nuances for critical defence applications. For instance, a seemingly neutral statement like 'troop movements are routine' may

carry underlying tension or intent, which these models can uncover, thus enabling analysts to flag veiled threats, anticipate escalations or adjust posture proactively.

Figure 6 Using BERT Transformer for Sentiment Analysis

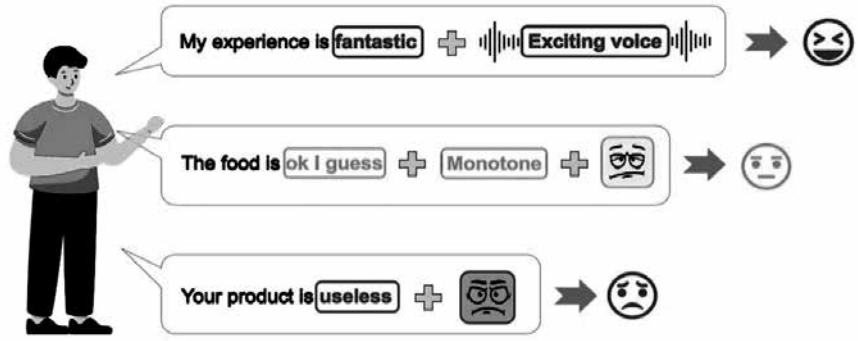


Domain-Specific and Multimodal Analysis

Domain-specific SA is tailored to specialised contexts, such as defence operations. It often incorporates jargon and operational language to improve model relevance. Analysts can monitor public sentiment during public addresses or on social media, using multimodal tools to understand both verbal and non-verbal cues.

Example: Customised models trained on defence-specific data can better interpret military jargon and regional dialects. Furthermore, Multimodal Analysis integrates text, audio and visual data, providing comprehensive sentiment profiles.

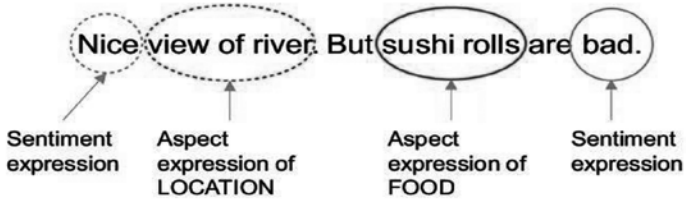
Figure 7 Example depicting Multimodal Sentiment Analysis



Aspect-Based Sentiment Analysis (ABSA)
ABSA breaks down text into specific components or aspects, assigning sentiment to each. This granular approach is ideal for analysing complex reports. ABSA can be employed to analyse the pulse and perception by extracting aspect-level sentiments from structured and unstructured data such as unit feedbacks and internal communication.

Example: Evaluating public reactions to a Defence policy might reveal positive sentiments about humanitarian aid but concerns over financial costs.

Figure 8 Working of ABSA



Sentiment Analysis Tools

VADER (Valence Aware Dictionary and Sentiment Reasoner)
VADER is a rule-based SA tool designed for social media and informal text that can handle slang, abbreviations and emojis. This makes it ideal for tracking real-time sentiments on digital platforms. The defence ecosystem in India could deploy VADER to monitor social sentiment across digital platforms during significant military events or border tensions. For example, using VADER to scan social media for sentiment changes during military exercises near sensitive regions could help to maintain public order and trust. Another significant use case could be analysis of public stance and ensuing reception of new policies, case in point, the Agnipath scheme.

Strengths
- Quick and efficient for real-time text analysis
- Effective for processing informal and social media content
- Minimal set-up required for rapid deployment

Limitations
- Not as effective for long-form or complex text
- Limited contextual understanding of nuanced language
- May need supplementary analysis tools for comprehensive insights

Hugging Face Transformers
Hugging-face transformers are state-of-the-art NLP libraries that support models such as BERT, RoBERTa and GPT, which excel at processing context-rich languages and understanding complex sentence structures. The Indian defence ecosystem can fine-tune transformer models to analyse regional news and intelligence reports, especially in multilingual formats, to detect subtle shifts in public sentiment. This would help anticipate public reactions and fine-tune diplomatic initiatives during military activity.

Strengths
- Excellent at understanding nuanced, context-dependent sentiment
- Supports multilingual analysis, ideal for diverse operational contexts
- Scalable for large-scale data processing

Limitations
- High computational resources are required
- Complex implementation and fine-tuning
- Slower processing for extensive datasets compared to simpler models

IBM Watson Natural Language Understanding (NLU)
IBM Watson NLU is known for its comprehensive text analysis capabilities, including sentiment and emotion detection, keyword extraction and contextual analysis. It is designed for large-scale, detailed SA and can be customised for military-specific use. IBM Watson has been successfully used by the Israeli Defense Forces to analyse sentiment and emotional tone in media and public communication to fine-tune strategic communication, enabling adaptive public engagement. Indian defence agencies could use IBM Watson to evaluate public sentiment during significant speeches by officials, gain insights into public mood and guide public communication strategies to maintain trust and transparency.

Strengths
- High accuracy and comprehensive SA
- Customisable to recognise military-specific jargon
- Efficient for processing large datasets

Limitations
- High subscription costs, especially for large-scale use
- Requires technical expertise for customisation

- Cloud-based processing may raise data security concerns

Microsoft Text Analytics

Microsoft Text Analytics, a part of Azure Cognitive Services, provides scalable SA, key phrase extraction and language detection. It is particularly effective for integration with Azure-based defence projects. The British Ministry of Defence (MoD) has successfully employed Microsoft Text Analytics for real-time sentiment tracking during public crises, thereby analysing political discourse to guide strategy. The Indian defence ecosystem could leverage Microsoft Text Analytics to monitor public reactions during border disputes or military campaigns, ensuring prompt and informed decision-making.

Strengths

- Scalable and integrates with Azure for streamlined data processing
- Quick analysis suitable for real-time applications
- Reliable for processing extensive datasets

Limitations

- Customisation is less flexible than open-source options
- Subscription-based methods may lead to significant costs for long-term use
- Best suited for Azure users, limiting broader adaptability

Custom-Built Solutions with Python and Machine Learning

Custom-built SA solutions using Python and frameworks such as TensorFlow and PyTorch offer unparalleled flexibility for defence agencies that require specialised models. These solutions can incorporate military-specific languages and regional dialects for a comprehensive SA. The US Cyber Command utilises custom-built machine learning models to analyse classified and open-source data for enhanced threat assessment. The defence ecosystem in India could use custom-built models to monitor sentiments in media coverage during national security events, ensuring an understanding of public perception and helping manage narratives effectively.

Strengths

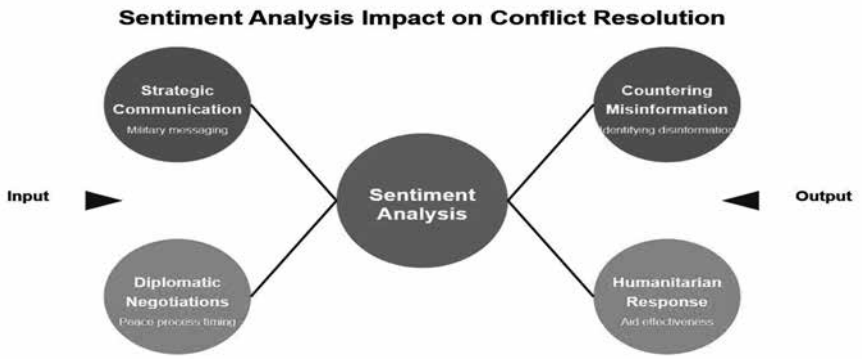
- Fully customisable for defence-specific applications
- Capable of integrating complex language features like sarcasm detection
- Supports comprehensive, context-aware SA

Limitations

- High development and maintenance costs
- Requires technical expertise for building and deploying models
- Dependent on the quality of training data for performance

The SA tools detailed above—VADER, Hugging Face Transformers, IBM Watson NLU, Microsoft Text Analytics and custom-built solutions using Python offer capabilities ranging from real-time social media analysis to in-depth multilingual intelligent processing. By selecting an appropriate tool for their specific needs, defence agencies can improve strategic communication, anticipate public reactions and enhance operational effectiveness. Sentiment Analysis tools and Application Programming Interfaces (APIs) cater to a wide range of needs, from simple, open-source libraries like TextBlob and VADER to sophisticated, enterprise-level solutions like IBM Watson and Google Cloud Natural Language. These tools help in extracting valuable insights from texts, foster data-driven strategies and improve decision-making for commanders at all levels.

Figure 9 Impact of Sentiment Analysis on military operations



Application of Sentiment Analysis

Sentiment Analysis has emerged as a strategic tool for both military and civilian applications. In today's hybrid warfare landscape, controlling the narrative is as crucial as winning battles. SA-aided narrative building gives armed forces a tactical edge by providing a real-time pulse on perception. The suggested application in the defence ecosystem and broader civil domain is dwelled upon in this section.

Intelligence Gathering and Threat Detection

In today's multi-domain battlefield, information is both a weapon and a warning. Sentiment Analysis serves as an 'early warning radar' in the digital space, scanning social media, news and vernacular sources to pick up subtle shifts in public mood that may signal brewing unrest, radicalisation or coordinated disinformation activity. It enhances traditional HUMINT (Human Intelligence) and SIGINT (Signals Intelligence) by adding a real-time emotional pulse of the population by turning data into foresight and foresight into operational advantage. For instance, the US military employed SA during operations in Iraq and Afghanistan to monitor anti-coalition sentiments and adjust their communication strategies accordingly. In the Indian context, this capability could be harnessed to detect and neutralise coordinated disinformation campaigns. By analysing sentiment in regional languages, intelligence units can detect emerging narratives, identify potential threat actors and neutralise hostile information before it escalates.

Psychological Operations (Psy Ops)

Psychological Operations aim to influence the mindset and behaviour of target populations. Sentiment analysis enhances these efforts by gauging the effectiveness of messages and identifying emotional triggers. NATO has time and again utilised SA to dissuade extremist sympathies and foster local support for stabilisation efforts. SA is poised to play a critical role in counter-insurgency grids in J&K and NE by tracking local sentiment, pre-empting unrest and guiding field units on when to push hard or hold back. It also helps combat online radicalisation, allowing us to neutralise the threat before it turns kinetic.

Countering Misinformation and Propaganda

In today's hybrid battlespace, cyberspace is as contested as the Line of Control. As observed in the Russia–Ukraine war, misinformation spreads faster than bullets and SA gives us eyes on the digital frontlines. From deepfake videos to emotionally charged misinformation on civilian attacks, both sides used digital narratives to win international sympathy and shape battlefield morale. Similarly, in the Israel–Palestine war, social media has been flooded with polarising content, making sentiment monitoring essential to manage global perception and internal cohesion. The Indian Armed Forces increasingly recognise the need to dominate the narrative domain. Sentiment Analysis supports Information Warfare domination by identifying emotional fault lines and neutralising misinformation before it festers.

Internal Communication and Soldier Well-being

Within the armed forces, SA can serve as a 'morale monitor', analysing internal communications to identify potential concerns or drops in well-being. Recent incidents such as viral videos of jawans highlighting administrative neglect underscore the critical need for proactive listening. Once such issues hit the public domain, the damage is already done not just to the morale, but also to the military's image. With the help of SA, welfare cells can spot these red flags early, engage at the right level and restore confidence within the ranks before issues escalate. Especially in high-stress environments, be it counter-insurgency ops or deployments at the Line of Actual Control (LAC), this tech-driven approach can reinforce the one thing that matters most in uniform—trust in the chain of command.

Policy Assessment and Public Engagement

For modern military leaders, it is important to evolve from command and control to connect, command and control. Sentiment Analysis enables the armed forces to track how military policies and reforms resonate with the public, especially youth and veterans, helping leadership adapt with empathy and agility. In the RUW, both sides weaponised sentiment to solidify internal resolve. Take the Agnipath scheme, a bold restructuring of recruitment, while operationally sound, its roll-out triggered widespread debate and unrest. Real-time SA could have flagged rising discontent early, enabling strategic communication and community outreach to pre-empt escalation and clarify intent.

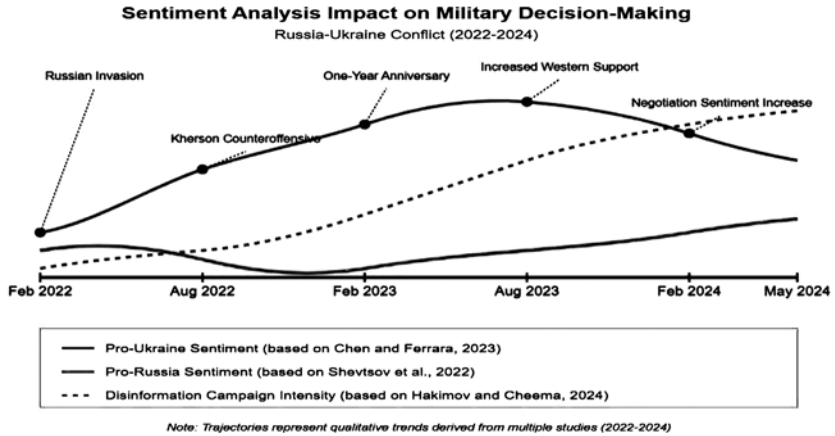
Notable Case Studies

Russia–Ukraine War

Sentiment Analysis of the RUW revealed critical geopolitical insights that influenced strategic decision-making. Analysis detected a significant shift in Ukrainian public sentiment throughout the conflict timeline.[2] While support for continued resistance remained the predominant sentiment through subsequent phases of the war, negotiation support gradually increased as hostilities protracted. Various think tanks, such as the International Republican Institute, documented how public discourse evolved from initially favouring fight until victory to increasingly supporting a call for diplomatic solutions and finally pivoting towards continued resistance as the conflict progressed. A survey by Kyiv International Institute of Sociology released in March 2025 revealed a significant spike in President Zelensky's approval

ratings post the Oval Office confrontation, gaining traction from a borderline 52 per cent in December 2024 to a substantial 69 per cent in March 2025.

Figure 10 Sentiment Analysis timeline of the Russia–Ukraine War

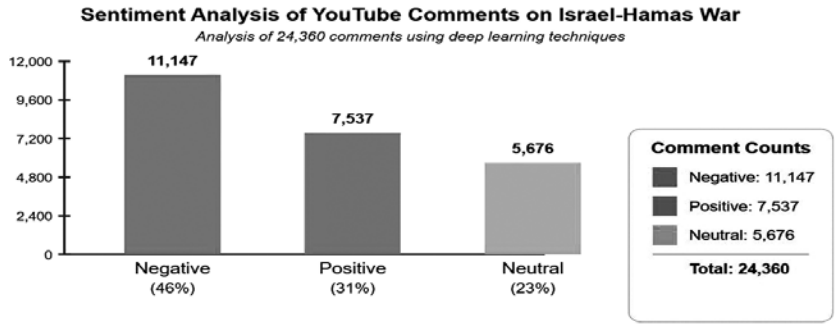


As a result of the application in RUW, Sentiment Analysis has become an integral component of strategic intelligence, providing commanders with near real-time tracking of information warfare campaigns and public opinion trends, which ultimately affect operational planning in a significant way. Additionally, sentiment patterns across different regions revealed divergences between official government positions and public opinion, particularly in East European countries where public sentiment was more pro-Ukraine than what the government policy initially indicated. These findings demonstrate how SA provides a real-time barometer of public perception that serves as a vital intelligence source for shaping diplomatic approaches, military strategies and information warfare tactics.

Israel–Hamas War

The October 2023 escalation between Hamas and Israel created not just a battlefield crisis but also a global information war fought across social media platforms. Analysis using deep learning techniques[3] of over 24,000 YouTube comments revealed striking insights into public perception with implications for military strategy and diplomatic engagement. The distribution showed a predominance of negative sentiment (46 per cent), followed by positive (31 per cent) and neutral (23 per cent) reactions, reflecting the polarised global discourse surrounding the conflict.

Figure 11 Analysis of 24,360 YouTube comments on the Israel-Hamas War

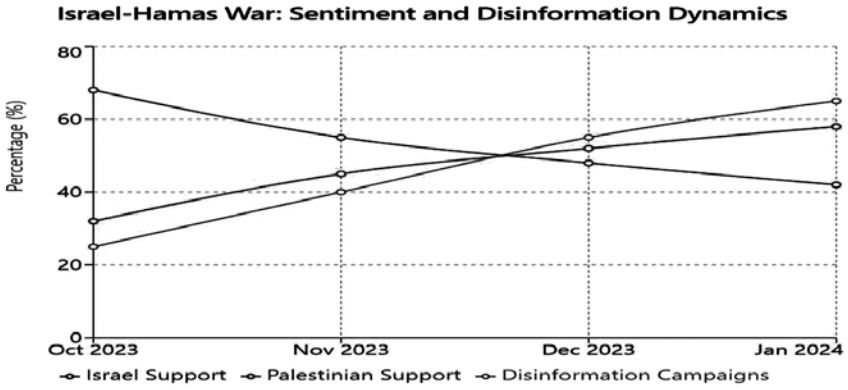


This sentiment landscape shaped military and diplomatic approaches in a significant manner. Israeli Defense Forces reportedly monitored social media sentiment to identify contentious narratives and deploy targeted counter-messaging campaigns. Meanwhile, Israeli humanitarian organisations tracked sentiment shifts to time aid announcements for maximum impact and public support. Perhaps most critically, SA provided early warning signals of disinformation campaigns. Sharp spikes in negative sentiment often preceded or coincided with the spread of unverified claims, allowing security agencies to identify and counter false narratives before they gained traction. The study of 5,000 Google News headlines involving SA performed through a supervised machine learning algorithm in which logistic regression was used to classify the sentiments into positive, negative, or neutral was conducted by M.U. Razaq and N. Naeem.[4] The impact analysis exposed a clear prevalence of the neutral effect displayed with a more extensive ratio of negative effect compared to the positive one.

Sentiment Analysis of the Israel–Hamas War establishes a significant evolution in public perception over time. Research examining social media comments and news headlines demonstrates initial public discourse gravitating towards substantial support for Israel's position, which gradually pivoted away amid growing humanitarian concerns. Studies show how digital platforms become primary battlegrounds for competing narratives with SA revealing patterns of misinformation and counter-messaging campaigns. This analysis clearly underscores how public perception has become a dynamic, real-time geopolitical intelligence source, fundamentally reshaping how international conflicts are perceived and responded to. This case demonstrates how AI-powered SA has evolved from an academic exercise to an essential strategic

tool in modern information warfare, shaping military decisions, diplomatic initiatives and ultimately, paths to possible conflict resolution.

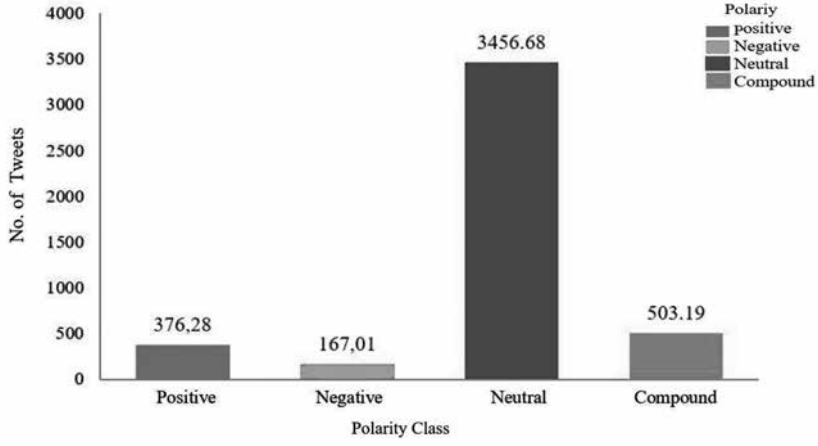
Figure 12 Visualisation of sentiment shifts during the Israel–Hamas conflict



Indian Armed Forces: Agnipath Scheme

Twitter SA of India's Agnipath military recruitment scheme revealed surprising insights that challenge prevailing media narratives. Examination of 4,000 tweets led to a discovery of substantial public support despite mainstream coverage focusing on protests. The VADER SA tool demonstrated that while most tweets (86.4 per cent) expressed neutral sentiments, positive reactions (9.4 per cent) notably outweighed negative ones (4.2 per cent), contradicting the predominant narrative of widespread rejection.[5]

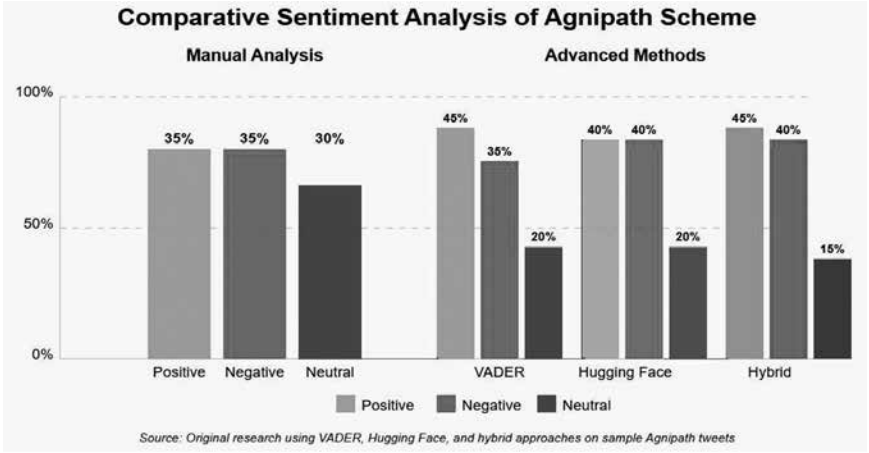
Figure 13 Sentiment Analysis of over 4,000 tweets with #Agnipath



For this research, we conducted a controlled SA experiment to examine public stance regarding the Agnipath scheme beyond traditional survey methods, using carefully selected tweets representing diverse perspectives on the military recruitment policy. The analysis employed three complementary approaches: rule-based VADER Sentiment Analysis, Hugging Face's transformer-based model and a novel hybrid method combining both techniques for enhanced accuracy. Manual content analysis of the dataset revealed a balanced distribution (35 per cent positive, 35 per cent negative, 30 per cent neutral), while the advanced computational methods showed slightly higher positive sentiment. The VADER analysis detected 45 per cent positive sentiment compared to 35 per cent negative and 20 per cent neutral expressions, while the Hugging Face model indicated an even 40-40-20 split. The hybrid approach, which leveraged strengths from both methods, yielded the most refined results with 45 per cent positive, 40 per cent negative and 15 per cent neutral classifications.

These findings align with the large-scale Twitter analysis by Sajwan et al., confirming that despite media portrayal of widespread opposition, public sentiment towards the Agnipath scheme is certainly favourable. This methodological triangulation demonstrates how SA can offer defence strategists a more nuanced understanding of public opinion than traditional media monitoring alone, providing valuable intelligence for strategic communication and policy refinement.

Figure 14 Comparative Sentiment Analysis bringing out Hybrid Approach as most accurate



United States Armed Forces: Enhanced Strategic Operations

The US Armed Forces have strategically integrated SA into various operations, enhancing their capabilities in both external engagements and internal assessments. During missions in Iraq and Afghanistan, SA was employed to monitor local sentiment towards coalition forces, enabling commanders to adjust messaging and civil engagement strategies in real-time. By analysing regional discourse, including tribal and linguistic nuances on social media and local forums, the military could gauge the impact of psychological operations, detect early signs of unrest and counter hostile narratives. Agencies like CENTCOM and SOCOM utilised these insights to adapt influence campaigns and support stability operations.

Beyond combat zones, SA plays a pivotal role in the US defence ecosystem's information warfare and homeland security frameworks. Agencies such as the Department of Homeland Security (DHS) and Cyber Command analyse sentiment trends to detect disinformation campaigns, monitor potential extremist rhetoric and assess public reactions to national security events. Sentiment tools have been explored to assess troop morale, internal communication climates and feedback from veterans, providing leadership with a pulse on well-being and cohesion. This dual application, both outward-facing and inward-looking, positions SA as a vital force multiplier in maintaining strategic awareness and mission readiness.

China and PLA: CDO Integration

The People's Liberation Army (PLA) of China has strategically embedded SA within its broader doctrine of Cognitive Domain Operations (CDO), a cornerstone of its evolving military strategy. Unlike traditional kinetic warfare, CDO focuses on shaping adversaries' perceptions, morale and decision-making processes. SA plays a critical role in this paradigm by monitoring public sentiment across digital platforms to tailor influence operations. According to the 2022 Pentagon China Military Power Report, the PLA is developing AI-enabled psychological warfare capabilities, integrating real-time SA to influence domestic narratives and counter foreign discourse, especially during military stand-offs or crises. For instance, during the 2020 Galwan Valley clashes, Chinese digital channels showed a sudden surge in nationalistic sentiment, orchestrated through state-sponsored influencers and bots, suggesting a coordinated sentiment-driven information operation.

Furthermore, China's policy of Military–Civil Fusion (MCF) accelerates the PLA's access to advanced civilian SA technologies. Tech giants like Baidu, Tencent and iFLYTEK reportedly support sentiment tracking algorithms that

feed military psy-ops tools. According to a 2023 report by the Foreign Military Studies Office (FMSO), over 65 per cent of PLA cyber units are involved in data-driven opinion monitoring and psychological targeting. These insights are applied not only for foreign adversaries but also for internal stability, i.e., tracking dissent and managing narratives around sensitive events such as Taiwan Strait tensions or domestic military reforms. This multipurpose use of SA reflects a sophisticated understanding of narrative control as a force multiplier in hybrid warfare.

Integrating Sentiment Analysis in Indian Defence Ecosystem

Sentiment Analysis offers immense potential for enhancing the operational and strategic capabilities of the Indian defence ecosystem. Using the findings of a structured opinion survey conducted as a part of this study, in this section we explore the unique challenges, current tools and gaps in SA applications, focusing on their relevance to regional and geopolitical priorities. Certain recommendations are proposed to bridge these gaps and enhance the role of SA within the Indian defence ecosystem.

Current Tools and Gaps

While several SA tools, such as VADER and Hugging Face Transformers, have been explored globally, multiple gaps exist for their integration with Indian defence ecosystem. The primary gaps include:

- Lack of training data specific to defence jargon and regional contexts.
- Limited integration with real-time intelligence systems.
- Challenges in detecting nuanced sentiments such as sarcasm or implicit biases.

Survey Findings: Survey respondents expressed dissatisfaction with current news aggregation tools. Specifically, 75 per cent found them 'time-consuming', 60 per cent noted their inefficiency in filtering relevant information and 50 per cent lamented the lack of advanced SA capabilities.

Implication: Existing news aggregators such as Inshorts or Daily Hunt lack the sophistication required for defence-related applications. Introducing SA capabilities tailored to India's geopolitical and defence ecosystem can bridge this gap, offering actionable insights and reducing noise.

Regional and Geopolitical Priorities

Sentiment Analysis is increasingly recognised as a critical tool for understanding regional and geopolitical dynamics. By analysing public sentiment, defence

agencies can monitor potential unrest or propaganda in sensitive regions. This capability is particularly valuable in border areas, where public sentiment can influence local stability.

Survey Findings: Respondents identified critical regions for sentiment monitoring, as follows:

- China: Mentioned by 85 per cent of respondents.
- Pakistan: Mentioned by 80 per cent.
- Indian Ocean Region: Mentioned by 65 per cent.

These areas align with India's geopolitical priorities, emphasising the need for region-specific SA capabilities.

Implication: Sentiment monitoring focused on these regions can provide actionable intelligence to anticipate public and geopolitical responses, supporting informed decision-making in high-stakes situations.

Recommendations

Based on the findings from the qualitative survey and broader research, five key strategic recommendations are proposed for integrating SA within the Indian defence ecosystem:

- ***Indigenous Technology Development & Infrastructure***
  Under the aegis of National Security Council and Integrated Defence Staff, a Sentiment Analysis Focus Group should be established to study and develop India-specific solutions. The aim should be to develop proprietary algorithms trained on military and geopolitical contexts relevant to India, with emphasis on creating a self-reliant, secure, scalable computational infrastructure capable of handling increased monitoring demands during crisis situations, reducing dependency on foreign technologies while ensuring the capability to rapidly process multilingual data from diverse sources.
- ***Sentiment Intelligence Integration with Military Command Structure***
  Incorporate SA capabilities into existing Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) architectures, creating a three-tiered intelligence distribution system that delivers appropriate sentiment insights to strategic, operational and tactical levels. Establish fusion centres that synchronise sentiment intelligence with traditional intelligence streams (HUMINT, SIGINT, IMINT [Imagery Intelligence]), developing comprehensive tools that provide commanders with both physical and cognitive domain awareness to shorten the OODA loop and enable more informed decision-making.

- ***Multi-stakeholder Collaborative Framework***
  Establish structured pathways for adopting cutting-edge SA technologies through public–private partnerships, including joint research programmes between defence establishments and premier technical institutions. Launch focused innovation challenges addressing specific SA problems unique to the defence domain, encouraging participation from start-ups and established technology firms. Create a standardised framework for rapid evaluation and deployment of promising solutions with streamlined acquisition processes for time-sensitive capabilities during evolving security situations.
- ***Ethical Governance & Regulatory Mechanisms***
  Develop robust ethical protocols balancing security imperatives with privacy considerations, focusing on aggregate sentiment trends rather than individual-level monitoring. Establish a multi-disciplinary ethics committee comprising of military, legal and civilian experts to provide governance oversight. Ensure all SA activities align with existing legal frameworks while advocating for updated regulations addressing digital-age intelligence gathering challenges. This ethical foundation will ensure public trust while maintaining operational effectiveness in sensitive domains including border regions and counter-terrorism operations.
- ***Doctrine Development***
  Revise information warfare doctrines to position SA as a component of modern battlefield awareness rather than auxiliary intelligence. Integrate SA scenarios into military exercises and war games to familiarise command elements with incorporating public sentiment factors into operational planning and crisis response mechanisms, particularly for counter-insurgency operations and border management.

These five key recommendations provide a comprehensive roadmap for integrating SA into India's defence ecosystem, enabling the armed forces to gain valuable insights from the cognitive domain while strengthening operational capabilities and strategic awareness in an increasingly complex information environment.

Conclusion and the Way Ahead

The strategic integration of SA into India's defence ecosystem represents not just a technological advancement but a fundamental shift in how information warfare is conceptualised and executed. This research has illuminated both the

immense potential and necessary pathways for this integration, drawing from global case studies, technological capabilities and first-hand survey insights. Drawing from global precedents such as the use of sentiment tools in the Russia–Ukraine conflict, the information dominance exhibited by Israel in the Hamas war and the cognitive doctrine integration by the PLA only goes on to build a strong case for the Indian Armed Forces to chart their own path in leveraging this capability.

Strategic Imperatives and Key Findings

The integration of SA into India's defence architecture comes at a critical juncture where cognitive domain supremacy increasingly determines operational outcomes. This research reveals several strategic imperatives:

Building Indigenous Capabilities: While India has made significant strides in military modernisation, the development of indigenous SA capabilities remains nascent. The survey underscores this gap of defence personnel reporting significant challenges in accessing timely strategic information. This capability deficit could prove critical in asymmetric conflict scenarios where narrative control delivers decisive advantages.

Multilingual Dominance: India's linguistic diversity presents both a unique challenge and strategic opportunity. With 22 official languages and hundreds of dialects, particularly in border regions, developing SA tools capable of processing this linguistic spectrum would provide unparalleled situational awareness across vulnerable territories. The survey findings validate this need, with respondents identifying border regions adjacent to China (85 per cent) and Pakistan (80 per cent) as priority areas for sentiment monitoring.

Real-Time Intelligence Requirements: The overwhelming preference (60 per cent) for real-time sentiment updates among survey respondents reflects the operational tempo of modern warfare, where information cycles accelerate decision loops. This preference aligns with global trends observed in the Russia–Ukraine and Israel–Hamas conflicts, where real-time SA provided tactical advantages in shaping narratives and countering disinformation campaigns.

Strategic Communication Enhancement: The analysis of the Agnipath scheme demonstrates how SA can provide a more nuanced understanding of public perception than traditional media monitoring. This capability becomes particularly relevant for strategic communication planning around sensitive defence reforms and policy initiatives. The hybrid approach to SA validated in this research revealed that positive sentiment towardS the scheme

significantly outweighed negative sentiment, contradicting mainstream narratives.

Ethical and Operational Balance: The implementation of SA must navigate complex ethical considerations without compromising operational effectiveness. Survey respondents emphasised the importance of balancing technological capabilities with regulatory frameworks, recognising that public trust remains a force multiplier in its own right.

Future Trajectory

Based on the comprehensive analysis conducted in this research, SA in the defence ecosystem is likely to evolve along three key trajectories:

Technological Evolution: Next-generation SA will move beyond text to incorporate multimodal inputs by analysing speech patterns, facial expressions and behavioural cues to provide a comprehensive understanding of sentiment across diverse communication formats. These advancements will be powered by increasingly sophisticated transformer models capable of detecting subtle emotional undertones, contextual nuances and cultural references that current systems often miss.

Operational Integration: Future defence operations will likely see SA embedded as a core capability and this integration will manifest in real-time battlespace visualisation systems that display cognitive domain metrics alongside physical terrain maps, enabling commanders to simultaneously monitor kinetic operations and narrative developments. The OODA loop and MDMP will be fundamentally transformed, with sentiment indicators becoming critical decision factors at all command levels.

Strategic Applications: As the technology matures, its strategic applications will expand from primarily defensive monitoring to proactive narrative shaping and information environment management. Defence planners will increasingly factor sentiment trends into long-term strategic planning, particularly in volatile border regions where public perception directly impacts operational effectiveness.

Conclusion: Transforming Information Dominance

As this research has demonstrated, SA represents a transformative opportunity for India's defence ecosystem. The case studies examined the dramatic sentiment shifts during the Russia–Ukraine conflict to the nuanced public reactions to the Agnipath scheme, thereby successfully illustrating how this capability can provide advantages across multiple domains.

The battlefield of tomorrow extends far beyond physical terrain into the cognitive space, where perceptions shape outcomes as decisively as kinetic operations. By harnessing the power of SA, India's armed forces can achieve information dominance enabling detection of narrative warfare attempts before they gain traction, countering disinformation with precision and shaping the information environment to support strategic objectives.

The structured survey conducted as part of this research reveals a clear mandate for this transformation, with defence personnel consistently highlighting the need for more sophisticated tools to monitor, analyse and respond to sentiment trends. As India navigates an increasingly complex security landscape, SA emerges not merely as a technological enhancement but as a strategic imperative.

In concluding this research, it becomes evident that SA is not just about understanding public perception, it is about gaining strategic advantage in the cognitive domain. By understanding the insights outlined in this study, India's defence ecosystem can elevate its capabilities to meet the challenges of modern warfare, where battles are won not just through superior firepower but through superior understanding of the human terrain.

The journey towards full integration of SA into India's defence architecture will require sustained commitment, innovation and adaptation. However, as this research demonstrates, the potential rewards of enhanced strategic agility, improved operational effectiveness and information dominance will make this endeavour not just worthwhile but essential for India's security in the digital age. In the future military and geopolitical operations, trust will be as vital as tanks and narratives as powerful as firepower. This research lays the foundation for the shift where data meets doctrine and algorithms serve the soldier.

Notes

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