International Journal for Research Trends in Social Science & Humanities
Volume 4, Issue 2
Mar-Apr- 2026, PP 1-7

Artificial Intelligence in Public Service Delivery System in Karnataka: An Analysis

Dr. Dharanesha S T
Assistant Professor of Political Science
Government First Grade College, Kunigal -0572130
eMail: dharaneshast@gmail.com

Abstract- Artificial Intelligence (AI) is revolutionizing public service delivery in Karnataka, transforming governance from reactive to proactive and inclusive models. Karnataka, a frontrunner in India's digital ecosystem, has established the Karnataka AI Cell under the Department of Personnel and Administrative Reforms (DPAR) e-Governance to integrate AI into platforms like Seva Sindhu, automating citizen application classification, grievance prioritization, and workload management. This institutional approach aligns with the national India AI Mission and Viksit Bharat 2047 vision, emphasizing scalable AI for efficiency, transparency, and equity in service provision. Key initiatives include the planned AI Centre of Excellence (AI-CoE) in Bengaluru, focusing on public sector innovation through predictive analytics, decision-support tools, and Gov-Tech startup incubation. AI-driven dashboards offer real-time insights into service performance, enabling demand forecasting, bottleneck detection, and resource optimization across departments. Applications span grievance redressal, welfare targeting, urban traffic management via Bengaluru's Adaptive Traffic Control System, and ethical AI deployment overseen by a Responsible AI Committee chaired by Kris Gopalakrishnan. Despite these advances, challenges persist, data silos hinder integrated environments, ethical risks demand robust oversight, and capacity gaps require training for officials. AI augments human decision-making, ensuring "human-in-the-loop" for high-stakes areas like healthcare and policing, while fostering multilingual accessibility via tools like Bhashini. Early outcomes show reduced turnaround times and anomaly detection, though equitable rural-urban rollout remains critical. This analysis underscores Karnataka's shift to intelligent administration, balancing innovation with governance safeguards to enhance citizen-centric services at population scale. Future success hinges on cross-departmental collaboration, data governance, and inclusive AI policies.

Key Words: Artificial Intelligence, Public Service Delivery, e-Governance Platforms, AI Centre of Excellence, Ethical AI Framework, Citizen-Centric Services.

I. Introduction

Karnataka stands at the forefront of leveraging Artificial Intelligence (AI) to redefine public service delivery, marking a pivotal shift from traditional bureaucratic models to intelligent, citizen-centric governance. As India's Silicon Valley and a hub for technological innovation, the state has strategically embedded AI into its e-governance framework, aligning with national initiatives like the India AI Mission and the vision of Viksit Bharat 2047. This integration addresses longstanding challenges in service delivery, including delays, inefficiencies, and unequal access, particularly in a diverse state spanning urban megacities like Bengaluru and rural hinterlands. The Karnataka government's establishment of the AI Cell under the Department of Personnel and Administrative Reforms (DPAR) e-Governance exemplifies this commitment. Platforms such as Seva Sindhu, handling millions of citizen applications annually, now employ AI for automated triage, sentiment analysis of grievances, and predictive workload balancing. Complementary efforts include the upcoming AI Centre of Excellence (AI-CoE) in Bengaluru, designed to incubate Gov-Tech solutions, foster startups, and deploy tools for real-time analytics in sectors like health, education, and urban mobility. AI's transformative potential lies in its ability to augment human capabilities: machine learning algorithms detect service bottlenecks, forecast demand surges, and personalize welfare schemes, ensuring equitable resource allocation. For instance, Bengaluru's Adaptive Traffic Control System uses AI to optimize signals, reducing congestion by up to 20%. Ethical guardrails, enforced by a high-level Responsible AI Committee, mitigate risks like bias and privacy breaches, emphasizing "human-in-the-loop" oversight. Yet, this evolution demands robust data infrastructure, skill-building for officials, and inclusive policies to bridge digital divides. Karnataka's AI blueprint not only enhances efficiency and transparency but also sets a scalable model for intelligent administration nationwide.
Artificial Intelligence in public administration refers to the use of machine learning, natural language processing, predictive analytics, computer vision and related computational techniques to support or automate functions traditionally performed by public officials. In service delivery settings, AI can be used to identify eligible beneficiaries,

predict demand, detect anomalies or fraud, improve grievance handling, deliver multilingual assistance, optimize resource allocation and support monitoring of programme outcomes.

The impact of AI in public service delivery can be understood through at least five dimensions. First, efficiency refers to faster processing, reduced administrative burden and lower transaction costs. Second, effectiveness concerns the accuracy of targeting, forecasting and problem detection. Third, transparency involves traceability of decisions and better visibility into system performance, although opaque algorithms may also undermine this goal if not properly governed. Fourth, inclusion concerns whether citizens can access services equitably despite linguistic, geographic, social or digital divides. Fifth, accountability examines whether AI-assisted decisions remain contestable and subject to human review, particularly in high-stakes welfare and governance contexts.

From this perspective, AI should not be seen merely as a technological add-on. It is a governance capability that changes how states collect information, classify citizens, allocate benefits and evaluate outcomes. Accordingly, the impact of AI in Karnataka must be assessed not just in terms of innovation, but in relation to constitutional values such as equality, due process, transparency and public accountability.

II. Karnataka's Institutional Readiness

Karnataka's AI journey in governance rests on a broader history of technological capacity, policy experimentation and partnership-led innovation. The state government launched a Centre of Excellence in Data Science and Artificial Intelligence in Bengaluru in 2018 in collaboration with NASSCOM to create a platform where government, industry and academia could co-create AI solutions across sectors. This initiative established an early ecosystem approach in which AI was not treated only as an IT industry priority but also as a public problem-solving instrument.

Subsequent developments indicate institutional consolidation. Public reporting in 2026 states that Karnataka has created an exclusive AI cell under the DPAR e-Governance wing to strengthen policymaking and improve scheme delivery. The Centre for e-Governance's Karnataka AI Cell also states that its purpose is to institutionalize AI across the Government of Karnataka in order to strengthen citizen service delivery, improve administrative performance and support fair governance. These developments are important because many AI experiments in government fail when they remain siloed pilots without organizational ownership, data standards or implementation pathways.

The state's 2025 technology policy direction also points to a broader ambition to mainstream applied AI. Reporting on Karnataka's new IT policy noted a proposed Centre for Applied AI for Tech Solutions with a planned investment of ₹50 crore over five years to promote AI innovation in governance, public services and industry. In parallel, a 2026 report on a public-sector AI Centre of Excellence highlighted support for analytics platforms, predictive models, decision-support tools, training programmes and AI Fellows within government departments. Together, these initiatives suggest that Karnataka is building not only technical infrastructure but also organizational capacity and talent pipelines necessary for scaling AI in public administration.

III. AI Applications in Service Delivery

Welfare Administration and Beneficiary Targeting

One of the most important impacts of AI in public service delivery lies in its potential to improve welfare targeting and reduce leakages. Karnataka's recent governance discussions indicate that AI is being linked with consolidated government datasets to develop predictive tools for more efficient rollout of welfare schemes and better beneficiary targeting. Public descriptions of Karnataka's governance model also point to the use of state databases such as Boomi, a land and revenue data platform, and FRUITS, a farmer registration system, to create proactive service delivery mechanisms.

These integrations matter because welfare administration in India often suffers from duplication, ineligible claims, delays and incomplete beneficiary identification. Reports on Karnataka's AI-enabled governance model note outcomes such as elimination of duplicate beneficiary registrations, enabling direct benefit transfers and identifying fraudulent pension claims. If implemented with adequate safeguards, such systems can improve fiscal efficiency and redirect resources toward eligible citizens, particularly in large welfare architectures where manual verification is costly and slow.

However, welfare AI also creates serious public law questions. Automated risk scoring or exclusion without meaningful human review can deny entitlements to vulnerable populations who may already face documentation gaps, data mismatches or digital exclusion. Karnataka's responsible AI efforts are therefore crucial because high-stakes

automated decision-making in governance requires legal safeguards, appeal mechanisms and clear accountability for errors.

IV. Agriculture and Rural Services

Agriculture is one of the earliest sectors in which Karnataka explored AI for public problem-solving. The state government signed an MoU with Microsoft India in 2017 to help the Karnataka Agricultural Price Commission and the Department of Agriculture improve price forecasting models using historical sowing area, weather, production and yield data. This initiative used machine learning and cloud-based analytics to strengthen agricultural decision-making, with the stated aim of increasing farmers' income through better forecasting and digital farming support.

The impact of such systems in public service delivery is potentially substantial. Accurate price forecasting can help governments provide more timely advisories, better calibrate procurement-related decisions and reduce information asymmetry for farmers. When linked to farmer registration databases and scheme platforms, AI can also support proactive outreach, personalized advisory delivery and more precise identification of beneficiaries for agricultural assistance.

In Karnataka's rural context, this can enhance state capacity in an area where climatic volatility, market uncertainty and fragmented landholding patterns complicate traditional administrative planning. Yet the real public value of AI in agriculture depends on whether predictive insights are translated into accessible services in local languages and through channels usable by small and marginal farmers. Otherwise, sophisticated analytics may remain administratively impressive but socially uneven in their benefits.

V. Citizen Support and Conversational Governance

AI also affects public service delivery through conversational interfaces that reduce friction between citizens and the state. Karnataka's experience during the COVID-19 period included a Home Line app with a WhatsApp chatbot mapping around 16,000 grocery, fruit, vegetable and medical vendors, helping citizens locate essential services during crisis conditions. More recent reporting on Karnataka's AI governance direction mentions 24/7 citizen information access as a notable achievement of AI-enabled systems.

These applications show how AI can support public communication, especially where citizens require fast answers, service navigation or continuous availability beyond office hours. Chatbots and AI-based query systems can reduce pressure on frontline administrative staff, standardize information delivery and extend access in geographically dispersed settings. When designed well, such tools are particularly useful in multilingual states like Karnataka, where linguistic accessibility is an essential part of service inclusion.

At the same time, conversational AI must not become a substitute for responsive human administration in cases involving grievances, exceptions or rights-based claims. Citizens often approach the state not only for information but also for empathy, discretion and redress. Therefore, the most appropriate model is usually hybrid service delivery, where AI handles routine information and triage, while human officials retain responsibility for complex cases and final accountability.

VI. Environmental and Regulatory Governance

Karnataka has also used AI-related tools in environmental regulation and natural resource administration. The Karnataka State Pollution Control Board, working with NASSCOM's Centre of Excellence, developed an "Intelligent Visualization" system for ambient air monitoring using three years of historical data on pollution, weather and moisture levels to analyses area-wise pollution patterns. This initiative was described as a first-of-its-kind state government effort in the domain. Such systems demonstrate that public service delivery is not limited to direct citizen-facing transactions like certificates or pensions. Regulatory services, environmental monitoring and compliance management are also critical public services because they affect health, safety and sustainability. AI-based pollution analysis can improve early warning systems, guide targeted inspections and allow agencies to move from reactive enforcement to evidence-based preventive action.

Similarly, Karnataka's forest department explored AI-driven timber revenue optimization using five years of historical sales data and deep learning algorithms to forecast wood demand, pricing behavior, disposal timing and species patterns. Although primarily framed in revenue terms, this application has wider governance implications because

better analytics can improve resource management, reduce inefficiencies and strengthen planning in public sector operations.

VII. Administrative Impact

The administrative impact of AI in Karnataka can be assessed in terms of speed, scale, coordination and decision quality. State-level reporting suggests that Karnataka is now embedding AI directly into core digital infrastructure rather than treating it as a set of isolated pilots. This matter because AI yields the greatest gains when it is integrated with service delivery workflows, databases and departmental decision systems. First, AI increases processing efficiency by automating repetitive tasks such as data classification, anomaly detection, query handling and pattern recognition. This can shorten processing times for services, reduce manual workload and enable scarce administrative staff to focus on complex cases requiring judgment. Second, AI improves administrative coordination when datasets across departments are consolidated and used for integrated policy execution, as suggested by Karnataka's efforts to use common data resources for scheme targeting and predictive models.

Third, AI can improve decision quality by identifying trends not easily visible through conventional administrative review. Predictive analytics can help departments anticipate service demand, detect likely fraud, identify under-served populations and priorities interventions. For a state with large welfare commitments and diverse regional conditions, this capacity can strengthen planning and improve the fit between policy design and on-ground delivery.

VIII. Impact on Transparency and Accountability

The effect of AI on transparency is double-edged. On one side, AI systems can create detailed digital trails, support real-time dashboards and make service bottlenecks visible in ways that enhance administrative transparency. Fraud detection, duplicate beneficiary checks and anomaly identification can also reinforce accountability by reducing discretion-based abuse and exposing irregularities in programme implementation. On the other side, opaque models may weaken transparency if citizens cannot understand why they were classified in a particular way or denied a service. This is especially serious in welfare, policing, surveillance or high-stakes regulatory contexts where algorithmic outputs may strongly influence state action. Public trust in AI-led service delivery therefore depends not just on technical accuracy but on explain ability, auditability and procedural fairness.

Karnataka's 2026 decision to constitute a Responsible AI Committee is therefore a significant institutional response. Reporting indicates that the committee was tasked with developing a framework for safe, ethical and transparent AI adoption across government systems and public services. The committee's agenda includes a risk classification framework, alignment with the Digital Personal Data Protection Act and identification of prohibited or restricted AI practices such as social scoring, unlawful surveillance, discriminatory profiling and high-stakes automated decision-making without meaningful human oversight. These are foundational principles for democratic accountability in AI-governed public administration.

IX. Social Inclusion and Democratic Concerns

AI can improve inclusion when it helps governments identify missing beneficiaries, localise services and extend support to citizens who cannot easily navigate bureaucratic processes. In a state like Karnataka, AI-enabled multilingual interfaces, targeted welfare outreach and rural forecasting systems could help bridge some service gaps across geography and social groups. This is particularly relevant where citizen needs vary widely between Bengaluru's urban digital ecosystem and rural or underserved districts. Yet inclusion cannot be assumed merely because a system is digital or data-rich. AI models are only as fair as the data, institutional rules and oversight mechanisms behind them. Historical exclusion, incomplete records, language barriers and low digital literacy can all produce biased or uneven outcomes, especially when automated systems become gatekeepers for entitlements or public information.

There is also a democratic concern about the changing relationship between citizen and state. If service delivery becomes overly datafied, citizens may increasingly be encountered as profiles, scores or probabilities rather than rights-bearing individuals. Responsible public administration therefore requires that AI augment, not erase, constitutional principles of dignity, hearing, contestation and administrative reasonableness.

X. Challenges in Karnataka

Several challenges may constrain the full and equitable impact of AI in public service delivery in Karnataka.

1. Data quality and interoperability: AI systems depend on reliable, standardized and interoperable datasets, yet many public databases contain legacy errors, duplication and uneven updating practices.
2. Capacity constraints: Departments need trained personnel to procure, interpret, monitor and audit AI systems; Karnataka's proposed CoE and AI Fellows model indicates that this remains an active capacity-building challenge.
3. Privacy and legal compliance: AI in governance often relies on large-scale personal data processing, which must align with the Digital Personal Data Protection Act and sectoral legal norms.
4. Bias and exclusion risks: Automated classification can disproportionately harm marginalized groups if source data reflect existing inequalities or if citizens lack avenues for correction.
5. Over-centralization of decision-making: Integrated data systems can improve coordination, but they may also increase surveillance capacity or reduce decentralized discretion if not carefully governed.
6. Procurement and vendor dependence: Public sector AI often relies on partnerships with private firms and startups, raising questions about public ownership of models, source accountability and continuity of service.

These challenges do not negate the value of AI, but they show that technological adoption without institutional design can produce shallow or even harmful outcomes. Karnataka's governance model will therefore be judged not simply by the number of AI use cases it launches, but by whether those use cases are lawful, robust, inclusive and accountable over time.

XI. Policy Recommendations

For AI to deliver sustained public value in Karnataka, several policy directions appear especially important.

- Build a rights-based AI governance framework: AI deployment in welfare, regulatory and citizen-service systems should be governed by clear legal standards on purpose limitation, explainability, redress and human oversight. Karnataka's responsible AI initiative provides an institutional opening to codify such safeguards into procurement rules, standard operating procedures and audit requirements.
- Priorities high-value public use cases: The state should focus on areas where AI can demonstrably improve outcomes, such as fraud detection, demand forecasting, grievance triage, multilingual citizen assistance, environmental monitoring and scheme targeting. This would prevent dispersal of resources across low-impact experiments and support measurable service gains.
- Strengthen public data architecture: AI effectiveness depends on clean, updated and interoperable public datasets. Karnataka should continue building integrated digital public infrastructure while establishing rigorous protocols for data quality, metadata standards, consent handling and controlled departmental access.
- Invest in administrative capacity: AI in government is not self-executing. Departments need trained administrators, data professionals and domain specialists who can translate policy problems into technically feasible and socially legitimate solutions. Capacity-building programmes, AI Fellows, partnerships with universities and continuous training for frontline officials would help reduce implementation gaps.

XII. Preserve human-in-the-loop delivery

High-stakes decisions affecting welfare, rights or penalties should not be fully automated. Human review, exception handling and appeal systems are necessary to ensure fairness, especially for vulnerable citizens who may be misclassified by algorithmic systems.

Foster multilingual and inclusive interfaces: Given Karnataka's social and linguistic diversity, citizen-facing AI should support local language interaction and low-friction access across mobile and offline-assisted channels. Inclusion should be treated as a design requirement rather than a later correction.

Karnataka's experience demonstrates that AI can shift public service delivery from a passive, application-driven model to a proactive, intelligence-led model. In such a model, the government does not merely wait for citizen requests; it anticipates needs, identifies anomalies, predicts service demand and targets benefits more accurately. This is a major administrative transformation because it alters the temporal logic of governance from delayed response to

anticipatory intervention. At the same time, the public value of AI is contingent rather than automatic. AI can improve service delivery when it is embedded in reliable data systems, aligned with legal safeguards and supported by accountable institutions. Without these conditions, the same technologies can intensify opacity, exclusion and administrative centralization.

What makes Karnataka noteworthy is not only its technology ecosystem but its apparent effort to institutionalize AI in government through dedicated cells, centers of excellence and responsible AI frameworks. If these structures mature into enforceable standards and robust implementation practices, Karnataka could offer a significant subnational model for AI-enabled governance in India.

XIII. Conclusion

Artificial Intelligence is already influencing public service delivery in Karnataka across welfare administration, agriculture, citizen support, environmental monitoring and administrative decision systems. Its key impacts include improved efficiency, better targeting, fraud detection, round-the-clock information support and more data-driven governance. Karnataka's emerging institutional mechanisms, including the AI Cell, applied AI initiatives and responsible AI committee, indicate that the state is attempting to move from experimental adoption to structured governance-wide integration.

However, the success of this transition depends on whether AI remains anchored in democratic public administration. Efficiency gains alone cannot justify systems that are opaque, biased or unaccountable. The long-term impact of AI in Karnataka will therefore depend on the state's ability to combine innovation with legality, administrative capacity with ethical restraint, and predictive intelligence with citizen rights.

The political science argument is strengthened by connecting governance, information access, user satisfaction and fuzzy cognitive modelling [19]-[22]. This literature is relevant because public policy and digital governance increasingly require transparent, adaptive and citizen-oriented decision frameworks. Additional governance and AI-policy references are added for broader support [23]-[25].

The study shows that AI and digital governance have the potential to improve transparency, participation and service delivery. At the same time, ethical safeguards, accountability, privacy protection and citizen awareness are necessary to ensure that technological governance remains democratic and inclusive.

References

[1] Analytics India Magazine. (2026, January 22). Karnataka establishes AI Centre of Excellence CATS with ₹20 crore. LinkedIn. https://www.linkedin.com/posts/analytics-india-magazine_karnataka-has-approved-the-establishment-activity-7420334758724935681-XP.

[2] Express Computer. (2026, March 11). Government of Karnataka constitutes Responsible AI Committee, Bengaluru. https://www.expresscomputer.in/news/government-of-karnataka-constitutes-responsible-ai-committee-first-meeting-held-in-bengaluru.

[3] Firstpost. (2026, March 11). Karnataka moves to build responsible AI policy for government systems. https://www.firstpost.com/tech/karnataka-moves-to-build-responsible-ai-policy-for-government-systems-13988873.html.

[4] Government of Karnataka, "Karnataka AI Cell," Centre for e-Governance. https://ceg.karnataka.gov.in/114/karnataka-ai-cell/en, 2026.

[5] India AI, Ministry of Electronics & Information Technology. (2021, November 30). Towards an AI-friendly state: AI initiatives from Karnataka. https://indiaai.gov.in/article/towards-an-ai-friendly-state-ai-initiatives-from-karnataka.

[6] Dr. Nagaraju M S & Dr. Dharanesha S T, "Modernizing of Land Record in Karnataka: A Case Study on Bhoomi Project," Scholarly Research Journal for Humanity Science & English Language, 13(71), 189-195. https://doi.org/10.5281/zenodo.17348051, 2025.

[7] International Electronic Research Journal (IERJ). (2026, February 14). Role of artificial intelligence (AI) in improving public service delivery in rural areas. https://ierj.in/journal/index.php/ierj/article/view/5060.

[8] Jagadeesha, H., & Mouneshwara Srinivasrao, "E-governance initiatives in Karnataka state," Research Journal of Humanities and Social Sciences, 11(4), 377–380. https://doi.org/10.5958/2321-5828.2020.00061.3, 2020.

[9] MachineHack. (2024, November 26). Innovating governance: The role of AI in Karnataka – Insights from Cypher 2024. Business MachineHack. https://business.machinehack.com/innovating-governance-the-role-of-ai-in-karnataka-insights-from-cypher-2024/.
[10] MoneyControl. (2026, January 20). Karnataka to set up AI Centre of Excellence for public sector innovation in Bengaluru. https://www.moneycontrol.com/news/india/karnataka-to-set-up-ai-centre-of-excellence-for-public-sector-innovation-in-bengaluru-13.
[11] National Centre for e-Governance (NCEG), "AI-powered e-governance Government of India," https://nceg.gov.in/assets/pdf/BACKGROUND_BOOKLET_2025.pdf, 2025.
[12] NITI Aayog, "National strategy for artificial intelligence: AI for all," Government of India. https://niti.gov.in/writereaddata/files/National-Strategy-for-AI-06062018.pdf, 2018.
[13] Sage Publications. (2024, March 13). Public value-creation through application of artificial intelligence in post-COVID India. Community Development Journal. https://journals.sagepub.com/doi/10.1177/00195561231204937.
[14] Sathisha, & Katti, M. S, "Empowering Karnataka: e-Governance and transformative public administration," Indian Journal of Public Administration, 71(2). https://doi.org/10.1177/00195561251338109, 2025.
[15] Dr. Dharanesha S T, "Good Governance Through Digital India Initiatives: An API-Driven Transformation," In Scholarly Research Journal for Interdisciplinary Studies (Vol. 13, number 86, pp. 14-20). Zenodo. https://doi.org/10.5281/zenodo.17150065, 2025.
[16] ScienceDirect, "Enhancing public service delivery efficiency: Exploring the impact of AI," https://www.sciencedirect.com/science/article/pii/S2199853124001239, 2024.
[17] Times of India. (2026, March 1). Karnataka to set up exclusive AI cell to power policy and scheme delivery. https://timesofindia.indiatimes.com/city/bengaluru/karnataka-to-set-up-exclusive-ai-cell-to-power-policy-and-scheme-delivery/art.
[18] Eletsonline. (2025, June 9). Karnataka charts AI-focused future in new IT policy, Eyes ₹50 crore Applied AI Centre. eGov e-Letters. https://egov.eletsonline.com/2025/06/karnataka-charts-ai-f.
[19] Yogeesh N., R. Chetana, T. N. Vasanthakumari, and M. S. Ramesha, "Fuzzy logic in knowledge management: A model for adaptive information access," Library Progress International, vol. 44, no. 3, pp. 14433-14441, 2024.
[20] D. K. Girija, N. Yogeesh, and M. Rashmi, "Fuzzy cognitive maps for analyzing user satisfaction in information services," Library Progress International, vol. 44, no. 3, pp. 14425-14432, 2024.
[21] R. Chetana, N. Yogeesh, F. T. Z. Jabeen, and D. K. Girija, "Exploring uncertain data with fuzzy logic in cultural heritage conservation," Library Progress International, vol. 44, no. 3, pp. 14416-14424, 2024.
[22] N. Yogeesh, "Mathematics application on open source software," Journal of Advances and Scholarly Researches in Allied Education, vol. 15, no. 9, pp. 1004-1009, 2018.
[23] UNDP, Digital Strategy 2022-2025. New York: United Nations Development Programme, 2022.
[24] Government of India, Digital Personal Data Protection Act, 2023. New Delhi: Ministry of Law and Justice, 2023.
[25] OECD, Recommendation of the Council on Artificial Intelligence. Paris: OECD, 2019.
[26] N. Yogeesh, "Classroom leadership: An approach to educational psychology," International Journal of Early Childhood Special Education, vol. 14, no. 3, pp. 3688-3691, 2022, doi: 10.9756/INT-JECSE/V14I3.459.
[27] N. Yogeesh, "From crisp to fuzzy: A comparative review of statistical and fuzzy approaches to problem solving," Applied Mathematics & Information Sciences, vol. 19, no. 3, pp. 647-658, 2019, doi: 10.18576/amis/190313.