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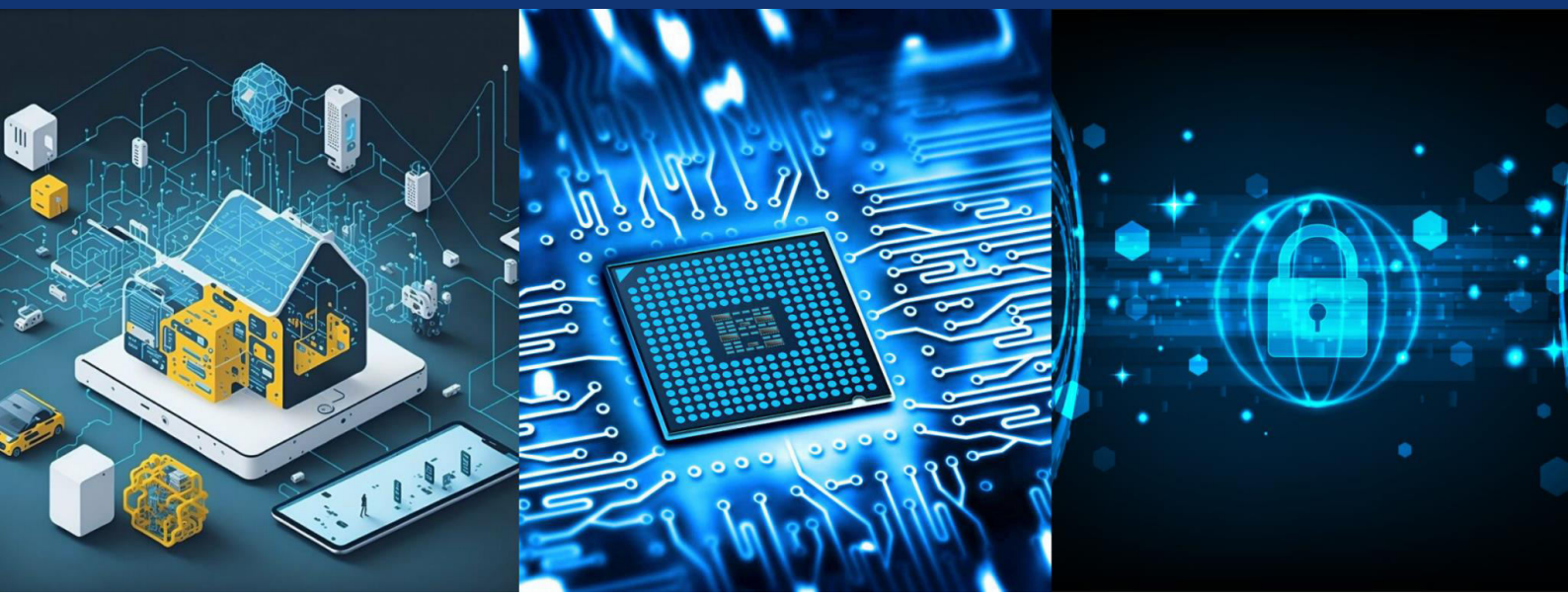

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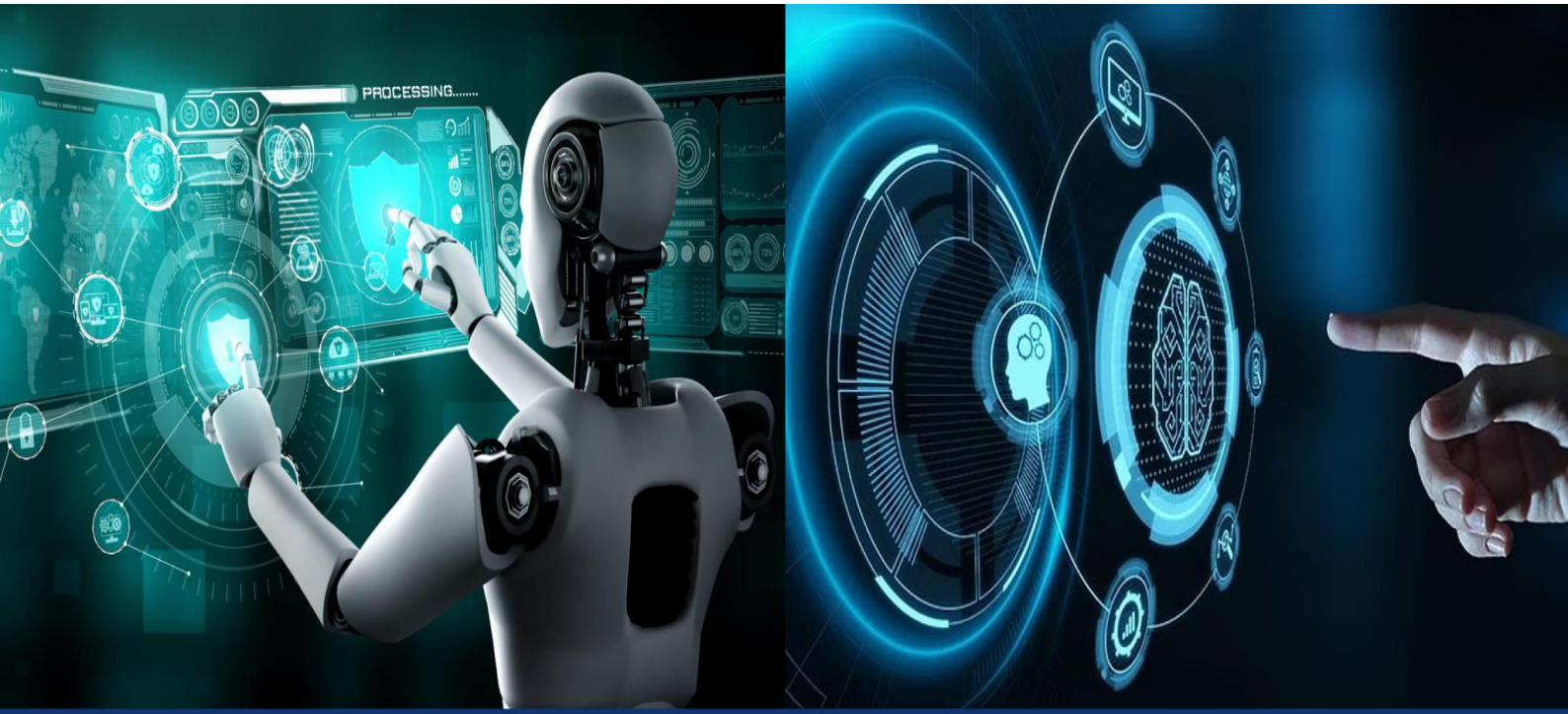

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Namami Gange AI Sarthi: Chacha Chaudhary Robot & Avatar

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ABSTRACT: The" Namami Ganga AI Sarathi" design is a new step in exercising artificial intelligence(AI) and virtual incorporations in creating environmental knowledge and public interest. Drawn from the name of the cult Indian ridiculous superhero Chacha Chaudhary, the adventure uses AI- backed robots and an interacting icon to make the cause of the Namami Gange Programme — a crucial trouble of the Government of India on swash conservation and restoration. The Chacha Chaudhary Robot with AI is erected to educate and communicate with individualities, particularly those living in civic and pastoral areas, on the significance of conserving gutters, pollution forestallment, and effective operation of water. It uses Natural Language Processing(NLP), Machine literacy(ML), and computer vision for communication with the stoner in several languages, furnishing responses to queries, and presenting practicable perceptivity. The Chacha Chaudhary Avatar, a virtual counterpart, takes this commerce to social media, mobile operations, and virtual platforms, making it reach far and wide. Through the integration of liar, AI, and robotics, the design raises environmental mindfulness in an amusing and accessible way.

Crucial Words River Protection, Water coffers Management and Planning, Artificial Intelligence, Machine Learning, Natural Language Processing,Eco-Consciousness, Civic Engagement, Intelligent Assistance, Contamination Control, Balanced Growth, Green Technology, Automated Public Management, Remote Interaction, Narration and preface Water is one of the most important necessity for life, and the protection of water bodies and swash systems is necessary for effective water resource operation. The Namami Gange Programme is an action of the Government of India which seeks to clean and cover the Ganga River by controlling pollution, encouraging conservation, and adding public participation. To further enhance the impact of the action, design " Namami Ganga AI Sarathi " uses artificial intelligence and digital technology to ameliorate engagement and education on the action's objects and pretensions. The design features an AI powered robot and a digital icon that's intended to instruct residers on pollution forestallment and other environmentally sustainable practices inspired by the Indian ridiculous character Chacha Chaudhary, who's notorious for his intelligence and problem working capabilities. The Chacha Chaudhary Robot engages with the public employing real- time conversational interfaces powered by Natural Language Processing and Machine Learning(ML) technologies to give up- to- the- nanosecond information, respond to questions, and instruct them on conduct toward the Namami Gange charge. The Chacha Chaudhary Avatar, on the other hand, uses social networks, mobile operations, and virtual platforms to interact with the public ever.

The AI Sarathi action uses tone- navigating AI robots, that tell stories and interact with druggies, to produce mindfulness, geste change, and participation toward a social cause for all demographics. This design showcases how technology can contribute to environmental conservation by integrating ultramodern advancements with age old knowledge. With the Chacha Chaudhary AI Sarathi, citizens interactively and informatively engage with the charge, encouraging collaborative swash conservation sweats for a sustainable future. The Namami Ganga AI Sarathi design embodies an astonishing synergetic combination of age-old traditions with contemporary technology it serves as a classic illustration of the way AI is being used towards sustainable technological results andeco-consciousness. Namami Ganga's integration of robotics in the form of digital incorporations which interact with cult through AI propels this design into a witching multi-dimensional world ofcounter-education towards the conservation of water bodies. With active public participation and technology- grounded activism, the design aims for a cleaner, healthier, and more sustainable ecosystem of the Ganga River and the region for the unborn generations. This paper focuses on the technological armature, prosecution plans, and the sociocultural consequences of the AI Sarathi design while looking at the confines of intelligent governance, change of conduct, and the sustainable objects.

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Rivers are essential to the actuality of all the societies as they give freshwater for drinking purposes, irrigation, artificial use, and helps in sustaining life. One of the most hallowed and important swash in India, the Ganga River has nourished the life, philosphy, and culture of people for centuries. As a result of unbridled civic sprawl, artificial waste, and shy trash disposal systems, this sacred swash endures terrible pollution which has threatening ecological and public health impacts. These issues are really pressing for the responsible water watch an making public participation remain vital factors of the success of the program.

Technology has revolutionized several sectors, and environmental conservation is no different. From Machine literacy(ML) and Artificial Intelligence(AI) to digital outreach and robotics, technological advances have evolved as effective tools for stimulating sustainability. Over the last many times, instinctively intelligent sidekicks, chatbots, and intelligent robots have been contributing immensely towards promoting mindfulness, educating communities, and easing positive behavioral change.

The Namami Ganga AI Sarathi action combines artificial intelligence- grounded results with swash conservation, enhancing environmental education to make it more interactive, engaging, and effective. By exercising slice- edge technologies, the design tries to bridge the gap between policy expression and people's participation. The Namami Ganga AI Sarathi Chacha Chaudhary Robot and Avatar design is a visionary mix of technology and conservation of the terrain. Through the confluence of AI, digital narratives, and interactive experience, the design seeks to inform, motivate, and rally people towards a cleaner and healthier Ganga River. By integrating strategic perpetration, technological invention, and public engagement, the design is a standard in environmental sustainability and AI-governance.

The design is a testament to how artificial intelligence, robotics, and artistic liar can cross to produce a transformative effect on society and the terrain.

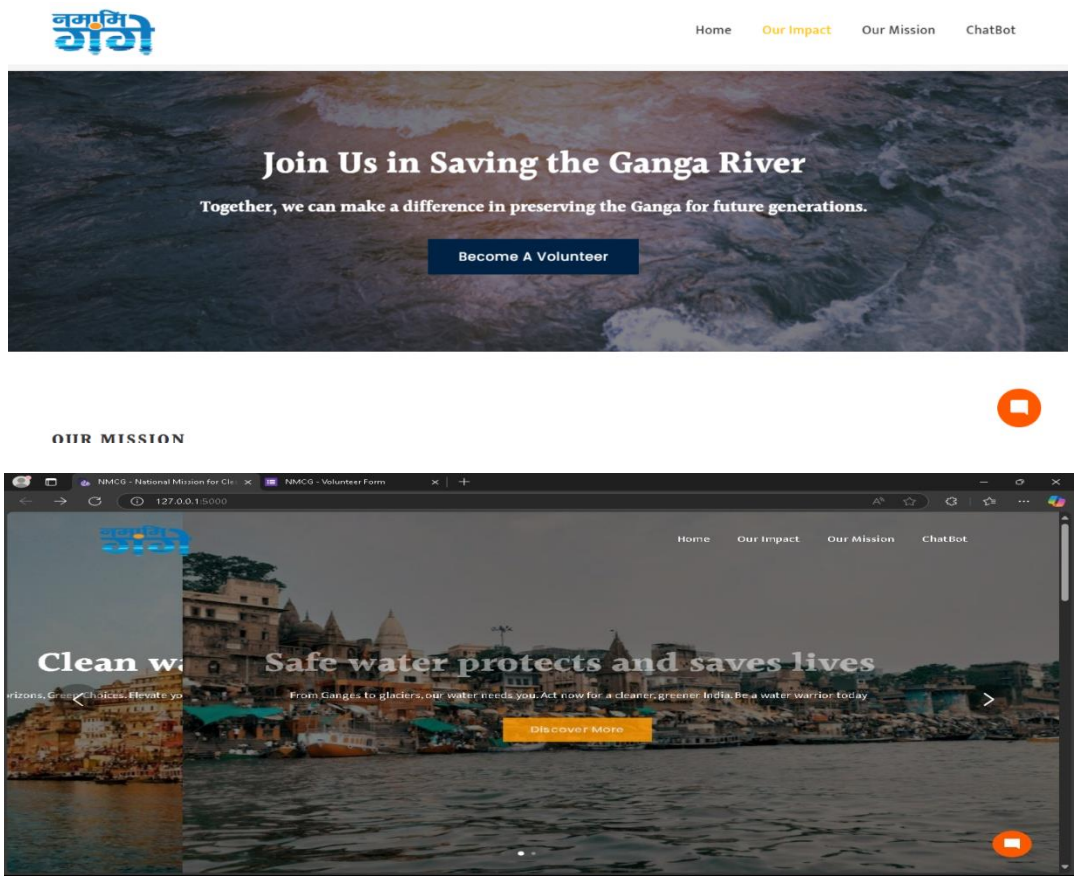

Fig1: Outline of our application

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III. RESEARCH GAP OR EXISTING METHODS

A. RESEARCH GAP

Traditional approaches to public education and public awareness in river conservation initiatives have largely been limited to community gathering, pamphlet distribution, rally awareness, and mass media adverts. Although their success has ranged from moderate to high, the literature indicates that passive dissemination tends to be inconsistent in its maintenance of impact among younger generations, in particular. Traditional approaches are also not responsive to the need for a more interactive and personalised approach by the digital-native generations. This uncovers a large gap in the utilization of emerging technologies—like artificial intelligence and robotics—to enhance environmental awareness and citizen engagement. Current literature points to an increasing trend of leveraging digital platforms, mobile applications, and social media to advance environmental campaigns. Yet, these platforms tend to be non-personalized and non-interactive. Additionally, efforts that integrate cultural storytelling with AI-based tools are still uncommon. Although there have been some attempts at bringing educational robots and AI avatars into classrooms, their applications have been primarily confined to teaching science and technology, with very little use in other fields such as environmental conservation. This indicates a potential unexploited area of bringing socially engaging characters and conversational AI to develop emotionally stimulating and contextually meaningful learning experiences.

Namami Gange AI Sarthi project is seeking to bridge that gap by mashing together revolutionary technologies like humanoid robotics, natural language processing, and gamification with the high cultural connectivity of Chacha Chaudhary. This new initiative proposes an interactive, interactive, and two-way mode of engagement which does not only raise awareness but inspire a change of behavior. Its novelty is based on employing a well-known comic book character as an online educator, thereby rendering environmental information more accessible, particularly to children and rural populations. Despite the novelty, the academic and practical analysis of such programs remains in its nascent stages. There is little research that examines the long-term behavioral effect, scalability, and cost savings of AI-driven avatars and robots for mass awareness campaigns. More importantly, the adoption of regional languages, local information, and feedback loops within AI systems for rural engagement is still a work in progress. These gaps offer a rich field for future interdisciplinary studies, especially in quantifying the effectiveness of these technologies in propelling lasting environmental action.

B. Existing Methods

Before the implementation of AI and robotics in the Namami Gange awareness campaigns, traditional and digital means were employed to facilitate public participation and environmental education concerning the Ganga River. Community mobilization initiatives, including Swachhta Abhiyans (cleanliness drives), Nukkad Nataks (street plays), wall paintings, riverfront campaigns, and Ganga Chaupals (community discussions), were extensively utilized in riverbank towns and villages. These strategies were geared toward making people aware through cultural identification and physical involvement but were limited in scale, frequency, and interactivity.Mass media campaigns such as television commercials, radio jingles, short films, and newsprint items were also central to outreach activities. While these helped raise general awareness, they did not have the detail required for behavior change or focused learning, particularly among children and youth. Mobile exhibitions and Ganga Raths (information vans) were also deployed by the government to reach out in far-flung areas, but their effectiveness was confined to the event duration.

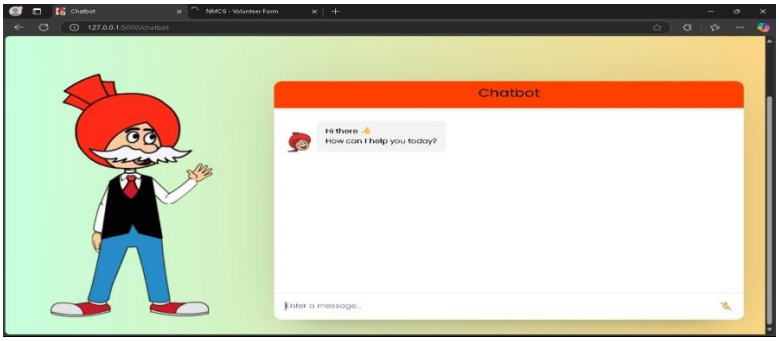

Fig.2 outline2 of our application.

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IV. LITERATURE REVIEW

The intersection of the environment's awareness and technology has made tremendous progress over the last ten years, especially in the context of river conservation at scale. Literature around digital innovations in green campaigns also suggests the use of Artificial Intelligence (AI), robotics, and gamified learning in increasing ways to involve the public and sustainable practices. In India, the Namami Gange Programme — initiated by the Government of India in 2014 — has been a flagship program aimed at the holistic revivification of the Ganga River. colorful studies have anatomized the effect of the program on water quality, community engagement, and waste operation installations. nevertheless, the integration of AI- grounded literacy results within this arena is a new and untapped area.

Sl. No.	Title & Authors	Years	Area of Research	Key Contributions	Relevance to AI Saarthi Project
1	**Namami Gange Programme Overview** by NMCG	2019	Environmental Policy	Detailed framework for Ganga rejuvenation focusing on biodiversity, pollution control, and public engagement.	Provides foundational objectives for AI Saarthi's educational content.
2	**AI for Environmental Monitoring** by Gupta et al.	2020	AI & Sustainability	AI-based data analytics for air and water pollution monitoring in urban and rural India.	AI insights will assist in developing real-time, adaptive responses by the robot and avatar.
3	**Robotics for Eco-Friendly Waste Management** by Mehta & Singh	2021	Robotics & Sustainability	Autonomous robots for garbage segregation and riverbank cleaning in India's Tier-2 cities.	Relevant for the physical robot's potential to suggest waste disposal techniques interactively.
4	**Chacha Chaudhary: India's Cultural Phenomenon** by Indian Comic Society	2020	Cultural Studies	Case study on Chacha Chaudhary's enduring popularity in Indian pop culture.	Validates the use of Chacha Chaudhary as an effective ambassador for eco-awareness.
5	**Digital Avatars in Public Awareness Campaigns** by Roy et al.	2022	Human-Computer Interaction	Analysis of digital mascots (e.g., UNICEF's U-Report chatbot) in promoting public health and civic engagement.	Demonstrates how avatars improve recall and emotional engagement in campaigns.

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6	**AI-Driven Gamification in Education by Sharma & Bose**	2021	AI + EdTech	Shows how gamification increases knowledge retention and learner motivation.	Informs the design of AI Saarthi's interactive eco-games and quizzes.
7	**Integration of IoT in Water Management Systems by Kaur & Verma**	2023	AI + IoT	IoT-based sensors deployed along riverbanks for real-time monitoring of water quality.	Directly informs the data collection module of the AI Saarthi physical robot.
8	**Behavioral Change through AI Assistants by Patel et al.**	2023	AI Psychology	Psychological effects of AI agents on promoting sustainable behaviors.	Supports development of conversational styles that promote eco-friendly actions.
9	**Robotics and the SDGs by UNDP Report**	2022	AI & Global Goals	Case studies of assistive robots in supporting climate action and sustainable communities.	Aligns AI Saarthi with broader SDG objectives beyond Namami Gange.
10	**Use of Vernacular AI in Rural India by Khanna et al.**	2022	AI in Rural Development	Impact of multilingual AI bots on improving literacy and awareness in rural populations.	Encourages the inclusion of Hindi and regional languages in AI Saarthi's design.

Educational technologies have been extensively accredited as effective in perfecting environmental knowledge, particularly among youthful grown-ups and schoolchildren. From different academic sources, the operation of animated incorporations, gamification, and interactive liar can greatly enhance retention and affect geste change.

The AI Sarthi action is grounded on this supposition by exercising the established fashionability of Chacha Chaudhary — a ridiculous figure famed for his intelligence and social values to convey conservation dispatches in a popular and culturally meaningful way. Available literature confirms that popular characters with strong emotional and artistic connections have the eventuality to be effective couriers, erecting communication credibility and effectiveness.

Robotics within education, or social and creatural robots, have been decreasingly employed in the delivery of class, health, and social values information. colorful case studies have proven that children reply further appreciatively towards robots that offer mortal- suchlike commerce and present the content in voice or persona. By bedding Chacha Chaudhary into a creatural robot with AI capability, the Namami Gange AI Sarthi design matches worldwide trends under which robots are being abused to humanize educational extension and turn abstractions or delicate subjects similar as environmental protection — into concrete and memorable generalities.

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Technologically, writing on conversational AI and natural language processing highlights the need for localized, multilingual systems to ameliorate stoner availability and engagement. In this regard, the AI system's capability to communicate in Hindi and English, and give environment-sensitive responses, satisfies core conditions for inclusive AI operations in public sector outreach. It's an suggestion of an adding focus in literature on creating AI systems that aren't only intelligent but socially and culturally adaptive.

Challenges to Modernization Literature addresses globalization pressures, similar as competition from big- box stores and the demand for digital addition to maintain the request's appeal(Thokchom, 2021). Tourism and transnational Exposure Recent exploration examines how is a artistic and profitable pull, attracting both original and transnational excursionists(Ranjan, 2019).

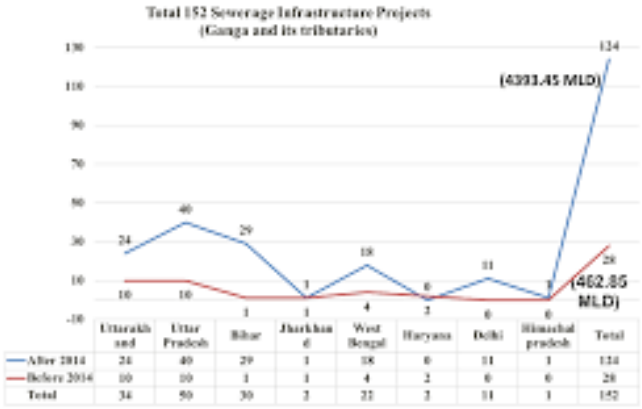

Fig.3. Graphical representation for Namami Ganga project

Research highlights the National Mission for Clean Ganga (NMCG) as a central implementing agency, which has enabled mass investments in sewage treatment plants, industrial effluent control, and riverfront development.

Researchers have also recognized the integration of new funding instruments like the Hybrid Annuity Model (HAM) into public-private partnerships. Yet, there is a critique that points out bureaucratic red tape, inconsistent tracking, and the need for better enforcement of environmental controls. Despite these challenges, most assessments provide evidence of quantitative water quality improvement and biodiversity improvement, and appear to suggest that even though the project is unfolding, it has a worthwhile precedent for future India river conservation schemes and more internationally.

Historical Background and Nupi Lan: Scholars have widely documented the role of the market in Nupi Lan movements, underlining the manner in which Ima Keithel was a venue for organizing women to resist colonial exploitation. Researchers have termed the market a crucible of resistance at the socio-political level.

Research identifies the significance of investments in infrastructure, specifically the construction of sewage treatment plants (STPs) and solid waste management facilities, as critical tools for curbing direct discharge of pollutants into the river. The programme's public-private partnership (PPP) usage, in particular via the Hybrid Annuity Model (HAM), is reported in literature to enhance accountability and long-term sustainability of treatment projects.

Academic critiques also highlight the environmental aspect of the programme, specifically its emphasis on conservation of biodiversity, such as species protection like the Gangetic dolphin, and afforestation to increase the river's resilience. Local community engagement through ventures like Ganga Grams and school-level awareness programs is lauded as a movement toward behavioral transformation and inclusive governance.

Yet, literature also points to critical challenges, including bureaucratic obstacles, project implementation delays, weak coordination among states, and weak monitoring mechanisms. Other researchers contend that even with progress, long-term ecological recovery requires more stringent enforcement of environmental norms, periodic evaluation of industrial discharges, and open data dissemination.

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By and large, the Namami Gange Programme is seen in scholarly and policy discourse as a benchmark for integrated river basin management. It provides vital lessons in integrating environmental goals with governance, infrastructure, and public participation—thus serving as a model for comparable projects in India and other developing countries.

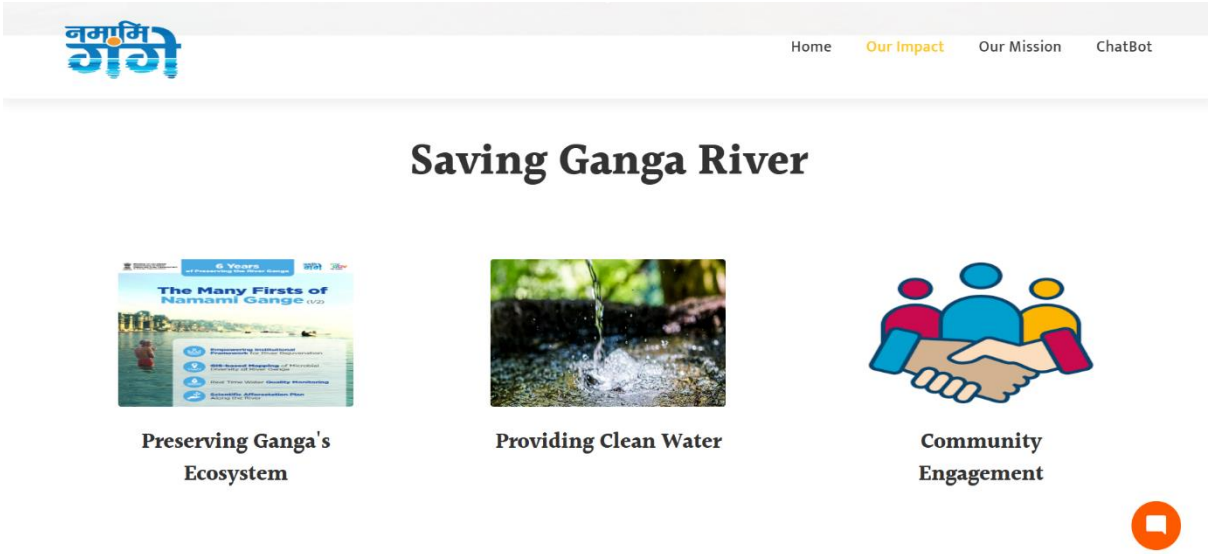

Fig4. visual representation of admin panel

V. METHODOLOGY

Technological Components Namami Gange AI Sarthi converges innovation in technology with innovative storytelling through the legendary figure of Chacha Chaudhary. The following technical elements were crucial to the conception and implementation of both the Robot and Avatar systems:

1. Artificial Intelligence (AI) & Natural Language Processing (NLP):
- Conversational AI Engine: Driven the responsive dialogue of Chacha Chaudhary, facilitating real-time, context-sensitive conversations with users.
- Multilingual NLP: Supported both English and Hindi, making it accessible to different linguistic communities.
- Intent Recognition: Enabled the system to recognize user queries and provide appropriate educational information regarding the Ganga River, pollution, and conservation activities.

2. Robotics Integration:
- \tHumanoid Robot Framework: The tangible Chacha Chaudhary robot was constructed on a humanoid platform, which ensured mobility and human-like interaction.
- Speech Recognition & Synthesis: Powered the robot to hear verbal queries and answer verbally in a tone similar to that of Chacha Chaudhary's persona.
- Facial Expressions & Gestures: Coupled with servo motors and facial LED lights to mimic facial expressions, providing greater interaction and identification.

3. Avatar Design and Animation:
- 3D Character Modeling: The digital avatar was developed with sophisticated animation software to convey the retro appeal of Chacha Chaudhary while updating it with current digital sensibilities.
- Real-Time Avatar Animation: Used motion capture and real-time rendering technology (such as Unity or Unreal Engine) to create smooth, naturalistic interactions.
- Web & App Integration: The avatar was integrated into interactive kiosks, web sites, and learning apps for greater access outside physical events.

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4. Backend Infrastructure & Content Management:

- Cloud-Based CMS: A sturdy Content Management System kept environmental data, FAQs, and educational scripts in the cloud, easily updatable for easy customization of content.
- Analytics Dashboard: Tracked interactions, popular queries, and audience behavior to optimize content delivery and improve user experience.

5. Augmented Learning & Gamification Modules:

- Interactive Quizzes & Games: In-built modules that challenged users' knowledge regarding river conservation, coupled with rewards and narratives.
- Data Visualization Tools: Offered interactive infographics and charts regarding Ganga pollution, river health, and citizen duties.

6. Deployment & Accessibility:

- Mobile and On-Ground Deployment: The robot was deployed in schools, public events, and exhibitions. The avatar was made available through tablets, kiosks, and online platforms.
- Offline Capability: Limited offline functionality allowed the system to operate in areas with poor internet coverage These technical aspects combined to produce a dynamic, interactive, and educational resource that not only entertains but also inspires citizens—children in particular—with information and motivation to safeguard the Ganga River

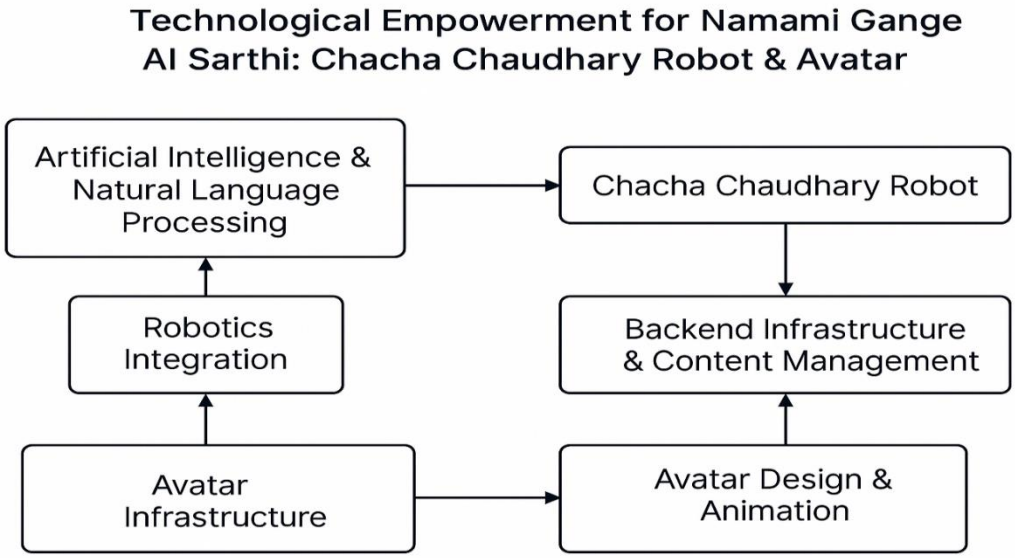

Fig5. Block diagram of Technological Namami Ganga AI Sarthi

1. Data Collection: Collect data from various sources (market surveys, social media, sales data, customer reviews, etc.)
2. Preprocessing: Prepare the data (e.g., dealing with missing data, noise removal, normalization of data).
3. Data Analysis:
o Text Analysis: Leverage NLP to find meaningful insights from text data (e.g., sentiment, opinions).
o Predictive Modeling: Use machine learning models (e.g., regression, classification, neural networks) to forecast future trends or consumer behavior.
4. Decision Making: Output insights (e.g., market trend recommendations, customer segmentation) or predictions (e.g., price prediction).
5. Output to User: Display the results in a consumable format (graphs, tables, or summary words such as "high demand," "price drop").
6. Feedback Loop: Refine predictions and insights based on the user input or new data.

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VI. RESULTS & DISCUSSIONS

The Namami Gange AI Sarthi Chacha Chaudhary Robot & Avatar design has seen positive issues in terms of raising mindfulness and creating behavioral change towards conserving the Ganga River. Combining a popular artistic idol with artificial intelligence has had a positive impact on public engagement, especially among youth and children.crucial Results

1. Greater Outreach and Interaction
The AI- grounded interactive Chacha Chaudhary Robot and Avatar interacted with thousands of scholars, community members, and stakeholders during academy visits, exhibitions, and public mindfulness juggernauts. The actors showed lesser recall and appreciation of the dispatches for swash conservation if communicated by a known, interactive character.

2. pointers of Behavioral Change Feedback gathered after the relations revealed quantifiableeco-friendly geste changes like plastic reduction, enhanced waste separation, and engagement in swash cleanliness enterprise.

3. Impact on Education
The gamified literacy modules as well as AI- powered Q&A sessions proved to make heavy environmental subject matter lighter, easier, and more engaging for youthful compendiums . preceptors and facilitators reported increased active pupil participation and interest.

4. Technological Validation
AI Sarthi Robot showed effective natural language commerce in English and Hindi and was therefore applicable for colorful demographic parts. It was n't only an information device, but also a two- way communication channel able of conforming to listener conditions.

Discussion
The crusade has shown how a technology- grounded, culturally predicated strategy can successfully rally popular support for ecological causes. By making Chacha Chaudhary, an iconic character honored for intelligence and social values, the face of swash conservation, the crusade connected tradition and invention.

In addition, the design showcased the capability of AI in government outreach programs, particularly in stimulating engagement and participatory literacy. It also established a precedent for using popular media numbers to impact environmental geste in a positive way.

But the scalability of similar enterprise is contingent upon regular updates in AI capabilities, localization across regions, and ongoing on- ground support. Incorporating sim enterprise into academy classes and community programs may also enhance long- term impact

VII. CONCLUSION

The Namami Gange AI Sarthi: Chacha Chaudhary Robot & Avatar program is a historic convergence of technology, culture, and awareness of the environment. By integrating the iconic Indian comic character Chacha Chaudhary in the digital world with AI-enabled avatars and interactive robots, the campaign has managed to appeal to audiences spanning generations in an innovative and exciting manner.

This cutting-edge methodology has not just re-ignited public passion for the Namami Gange Program but also encouraged enhanced environmental awareness and civic engagement in the endeavor of cleansing and reviving the Ganga River. Using interactive education, gamification-based learning, and cultural narratives, AI Sarthi is breaking new grounds on how technology can be harnessed in service of the environment.

As India marches towards a greener, cleaner future, efforts such as AI Sarthi are a testament to the strength of creativity, teamwork, and state-of-the-art innovation. Chacha Chaudhary, with his quick brain and now online avatar, inspires and guides a new generation towards the national endeavor for conserving Ganga.

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VIII. ACKNOWLEDGMENT

We express our sincere gratitude to everyone involved in the successful conceptualization and execution of the Namami Gange AI Sarthi: Chacha Chaudhary Robot & Avatar program.

We gratefully thank the National Mission for Clean Ganga (NMCG) of the Ministry of Jal Shakti for their vision, mentorship, and ongoing support in merging technological innovation with environmental conservation. Their drive to conserve the revered Ganga River has been the cornerstone of this program.

A particular thanks to Diamond Toons for joining hands with the project and bringing the legendary Chacha Chaudhary alive in a contemporary avatar. Their collaboration in harmonizing popular culture and sustainability has made the campaign universal and effective for everyone across all age groups.

We also recognize the tireless efforts of the technical development teams, AI experts, teachers, content developers, and field facilitators, whose efforts made this interactive experience a reality. Their passion and imagination assisted in forging a new approach to public involvement.

Finally, we thank the citizens, students, and volunteers who have participated enthusiastically with the Chacha Chaudhary Robot & Avatar and helped disseminate the river conservation message. Their involvement is a true indication of responsibility and action by all towards a cleaner, healthier Ganga.

REFERENCES

1. AG(2017). Rs 2,500 Cr of' Namami Gange'Funds Remains Unused CAG Report, 20 December. Available at https//www.thequint.com/news/india/narendra-modi-ganga-project-fails-deadline-2500-crore-rupees-unused(penetrated 4 April 2022).
2. CPCB(2019). Status of Water Quality of River Ganga at Interstate Boundaries. Available at https// cpcb.nic.in/NGTMC/ganga_Interstate6.pdf(penetrated 23 February 2024).
3. Devdiscourse(2022).' NMCG DG participates in' Arth Ganga for Smart Cities'at Expo| Captions', Devdiscourse News office, New Delhi, 24 March.
4. Dey, M., Krishnaswamy, J., Morisaka, T. & Kelkar, N.(2019). Interacting impacts of vessel noise and shallow swash depth increase metabolic stress in Ganges swash dolphins.Scientific Reports 9(1). Nature Publishing Group, Vol. 9 No. 1, pp. 1 – 13, doi 10.1038/ s41598-019-51664-1. DoWR RD&GR(2021).' Jal Charcha, Dec 2021', December, pp. 14 – DoWR RD&GR(2022).' Jal Charcha(January 2022)', January. Available at http//jalshakti-dowr.gov.in/sites/default/files/JalCharcha/2022/01-2022/mobile/index.html(penetrated 4 April 2022). Gupta, M. D.(2020).' Modi govt plans to give Ganga frugality a boost with floating flower & fruit requests, ferry services', The publish, 12 June.
5. IINS(2019).' Namami Gange A prominent water conservation charge – International Institute forNon-Aligned Studies IINS)', 13 February. Available at https//iins.org/namami-gange-a-prominent-water-conservation-mission/(penetrated 4April 2022).
6. Janaszek, A., Silva, A. F. d., Jurišević, N., Kanuchova, M., Kozáková, L & Kowalik, R.(2024). The assessment of sewage sludge application in unrestricted- circle frugality from an environmental perspective.Water 16, 383. Multidisciplinary Digital PublishingInstitute, Vol. 16 No. 3, p. 383. doi 10.3390/ W16030383.Kaushal, N., Babu, S., Mishra, A., Ghosh, N., Tare, V., Kumar, R., Sinha, P. K. & Verma, R. U.(2019).
7. Hoping to heal Ganga- Optimizing swash runs through learning trade offs.Frontiers in Environmental Science, Frontiers Media S.A. 7(JUN), 414232. doi 10.3389/ fenvs.2019.00083. Lalchandani, N.(2019).' Shift Namami concentrate to Arth- Ganga model PM| Lucknow News – Times of India', Times of India, 15 Dece

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