

AI as Smart Technology is the Effective Solution of Maritime Surveillance for Bangladesh

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Bangladesh, being a maritime nation, has a sea area of 1,18,813 km² with a coastline of 710 km and is connected to the globe through the Indian Ocean. The Bay of Bengal, spanning 2.6 million square kilometers, is bordered by India, Bangladesh, Myanmar, the Andaman and Nicobar Islands, Sri Lanka, and Sumatra. All these nations rely on the bay for fishing, tourism, resource extraction like oil and gas, live resources, as well as maritime transport. However, intrusions like Illegal, Unreported, and Unregulated (IUU) fishing, drug and illegal arms trade, and human trafficking pose significant threats to regional security and stability (Mack, 2005). Bangladesh's maritime economy relies on fishing, shipping, port activities, and maritime resource extraction. In the maritime sector, ensuring safe navigation, protecting fishing grounds, and securing ports and relevant assets are vital. This nation has few maritime surveillance challenges, and that can be mitigated effectively by the optimum use of Artificial Intelligence (AI) and other smart technologies (K. A. Hossain, 2023a). The research and exploration of seas began centuries ago, with the aim of business

and military function. But now, it's an organized discipline and a significant branch of earth sciences (Food and Agriculture Organization of the United Nations, 2024).

Maritime Surveillance Challenges of Bangladesh

IUU Fishing: Today, IUU fishing is well-known to us, and that captures a broad variety of fishing activities. IUU fishing is found in all types and sizes of fisheries. It occurs both on the high seas and even in any areas of national jurisdiction. IUU fishing depletes fish stocks, disrupts ecosystems, and affects livelihoods. According to innovative research that used satellite technology, water observations, and Machine Learning (ML) to track and monitor unreported vessels, a dark fleet of many fishing vessels of a single nation has illegally caught around half a billion USD worth of squid in other nations' waters since 2017 (Hanich & Seto, 2020). Interestingly, the ghost ships that turn off their Automatic Identification System (AIS) exacerbate the problem. AI, ML and other smart technology can be utilized to mitigate IUU fishing issues.

Drug trafficking (the “Ya-ba” Trade): Bangladesh faces a drug epidemic due to the abuse of Ya-ba, a methamphetamine caffeine mixture, and other prominent drugs. Smugglers use Rohingya refugees as carriers of Ya-ba or exploit fishermen to transport drugs. The drug enters Bangladesh through multiple routes including the Bay of Bengal, threatening public health and stability, mainly the young generation. The United Nations Office on Drugs and Crime (UNODC) in Bangladesh undertook the global scheme against trafficking in 2007 for attainment out to strengthen Bangladesh’s ability to fight trafficking on a legal and financial level (United Nations Office on Drugs and Crime, 2020). UNODC also works at a regional scale with the neighbors of Bangladesh on anti-human and narcotics trafficking. However, AI and other smart technology can be utilized to monitor, track and battle against drug trafficking.

Human Trafficking and Smuggling: Today, billions are suffering globally from the consequences of being displaced due to the creation of conflicted states. The Rohingya refugee camps in Southern Bangladesh are facing a rapid rise in serious organized crimes across the Cox’s Bazar (Bangladesh) and Rakhine (Myanmar) border. The influx of Rohingya refugees has led the chance of human trafficking in the Bay of Bengal. Strengthening coastal patrols and intelligence sharing can address this issue. Collaborating with regional partners is vital to combat smuggling networks. AI and other smart technology can help to monitor and track such sensitive matter effectively.

Efforts to Enhancing Maritime Surveillance and Security in Bangladesh

Bangladesh has made progress in its strides towards reducing poverty with the emergence of Millennium Development Goals (MDGs) and the now committing to the Sustainable Development Goals (SDGs) by planning a COVID-19 pandemic recovery national development agenda. Accordingly, the country is committed to Global Goal 16, which talks about ensuring and maintaining peace and security within the national and regional territories. Again, prior to the commitment to Goal 16, the country passed anti-trafficking legislation in 2012, well-known as The Human Trafficking Deterrence and Suppression Act. While the legislation is in place, much utilization of the actual Act 2012 is a challenge. On the other hand, Bangladesh, with its extensive coastline along the Bay of Bengal, recognizes the critical importance of maritime security. Balancing economic interests, environmental concerns, and national security imperatives is essential. The nation has a few key strategies and collaborative efforts aimed at enhancing effective maritime surveillance and security in the country.

Modernizing the Bangladesh Coast Guard: The Government of Bangladesh has unveiled an ambitious plan to transform the Bangladesh Coast Guard into a modern and technologically advanced force for maritime security and development. The visionary plan focuses on equipping the Coast Guard with a state-of-the-art maritime platform, enhancing infrastructure, including smart technology, and developing manpower capabilities. The Bangladesh Coast Guard performs the duty of

maritime border security of Bangladesh. Over the years, the force has grown to include thousands of personnel and 57 vessels. By bolstering the Coast Guard’s capabilities, Bangladesh aims to establish a formidable force that can effectively safeguard valuable resources and protect maritime borders. AI and other smart technology may play a crucial role in developing an effective Coast Guard.

Regional Cooperation: Bangladesh collaborates with neighboring countries and regional forums to address common maritime challenges. Initiatives like the Colombo Security Conclave (CSC), involving Sri Lanka, India, and the Maldives, focus on maritime security, counter-terrorism, and disaster relief. Membership in such regional blocs enhances information sharing, joint exercises, and coordinated responses. Maritime security countering terrorism and other crimes in the Indian Ocean have emerged as a focus area for India as part of its Indo-Pacific Strategy, and the doctrine of security and growth for all in this region (Dhali, 2021).

Multinational Information Sharing: Effective information sharing among littoral states is vital for combating maritime threats. Information sharing has both advantages and costs, and is subject to both enabling factors as well as barriers. Bangladesh actively participates in multinational efforts to exchange intelligence, track vessels, and address security issues. Collaborative platforms enhance situational awareness and response capabilities.

Blue Economy and Sustainable Practices: The ocean is the earth’s life support. Sometimes, human activities have defined a negative relationship with the ocean. Today, we dump too much bad substance in, and we take too much good substance out of ocean. The new “Blue Economy” is the term of art for identifying those activities that improve the human relationship with the ocean, and for aligning our systems of accounting and metrics to both define and enhance our ocean-positive economy. It also allows us to account for ecosystem services. Bangladesh aims to harness its maritime resources like gas, oil, minerals, fish, and other living resources for sustainable development. A modern Coast Guard equipped with cutting-edge technology like AI and ML not only enhances security but also contributes to economic growth. Safeguarding marine ecosystems and promoting responsible practices are integral to long-term maritime security.

Countering Human Trafficking and Smuggling: The influx of Rohingya refugees has led to human trafficking in the Bay of Bengal (Sengupta, 2015). Strengthening coastal patrols, intelligence sharing, and collaboration with regional partners is essential. Bangladesh’s vulnerable geographical location, mainly Myanmar borders, creates a rather porous situation and a hub for human trafficking. Both “push” and “pull” factors are responsible for rising cross-border crimes. Bangladesh is connected to the Gulf region and Asia Pacific via South Asia, which has 20 specific drop-off and pick-up zones for traffickers to use the sites for transporting people across the country’s border areas (Inter-Sector Coordination Group, 2021). Since the

trafficking of narcotics and humans is posing threats to other Bilateral missions in the country, international legal systems and human rights standards need to be at par by making effective use of bilateral agreements that can be universally applied to all trafficked persons. Again, combating smuggling networks requires joint efforts, effective enforcement, and utilization of smart technology for real-time surveillance and monitoring the maritime activities.

AI-Driven Smart Solution for Bangladesh

Bangladesh has been gradually investing in technology-driven solutions to enhance its maritime security capabilities. However, AI-based maritime security in Bangladesh is very limited. The potential initiatives and considerations for AI and other smart technology-based maritime security in Bangladesh are necessary. Bangladesh can utilize AI-driven surveillance systems to monitor its maritime borders, ports, coastal areas, or even Exclusive Economic Zone (EEZ). These systems can analyze data from satellite imagery, radar, AIS, and other sensors to detect anomalies, track vessel movements, and identify potential security threats such as illegal fishing, smuggling, and piracy. Implementing AI algorithms and ML for vessel tracking and identification can improve Maritime Domain Awareness (MDA) in the water of Bangladesh. By analyzing AIS data and satellite images, AI, ML, or Blockchain can help authorities identify and classify vessels, track their trajectories, and detect suspicious activities in real time (K. Hossain, 2023). AI and other smart technology can enhance security measures at Bangladeshi ports by automating the analysis of cargo manifests, screening containers for illicit goods, and detecting unauthorized access to port facilities. Intelligent surveillance cameras equipped with AI algorithms can also help monitor port perimeters, improve surveillance, and identify security breaches promptly. With the progress of smart technology, AI approaches will be progressively applied to maritime research and development, complementing traditional marine and maritime forecasting models and observation techniques to further elaboration and enhancement.

Bangladesh can benefit from establishing partnerships with regional and international organizations to share maritime intelligence and collaborate on AI-based security initiatives. Information sharing platforms powered by AI can facilitate the exchange of real-time data and analysis among maritime stakeholders, enabling more effective responses to maritime security threats. Investing in training programs for maritime personnel on AI technologies and data analytics is essential to maximize the effectiveness of AI-based maritime security solutions. Building local expertise in AI and cyber security will enable Bangladesh to develop and maintain its own AI systems tailored to its specific maritime security needs. Bangladesh should also address legal and ethical considerations related to the use of AI in maritime surveillance

and security, including data privacy, algorithmic bias, and human rights implications (K. A. Hossain, 2023b). Establishing clear guidelines and regulations, governing the responsible use of AI technologies, will help to mitigate potential risks and ensure transparency and accountability. So, AI-driven maritime surveillance is the optimum solution for Bangladesh.

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