

# Harnessing Artificial Intelligence to Combat Green Crimes: A Pathway to Sustainable Future.

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## Abstract:

Recent developments have shown an increase in the use of artificial intelligence in various domains, including medical field, banking, commerce etc. Not only this, artificial Intelligence is being used by various enforcement agencies in India for crime detection and prevention and the reason for the same is to curb the undue burden which is on the enforcement agencies. Green crimes or crime against the environment. Protection of wildlife and environment is of utmost importance and requires immediate attention. Green crime is rather on rise. Even though we have various laws for the protection of environment, yet the enforcement of the same is highly challenging due to vast forest areas and less personal in enforcement agencies. Artificial Intelligence can be a saving grace for the enforcement agencies for the prediction and prevention of green crimes in India. For instance, AI's potential of Machine Learning and Deep Learning can be extremely helpful in detection of epicentre of green crimes, increasing surveillance and policing in such areas. AI based technologies can be used for monitoring, management and the conservation of biodiversity and forest resources just like it is used by policing agencies of various states for the prediction and prevention of crimes in the city. The paper focuses on the implementation of AI induced technologies for prevention of green crimes in India.

**Keywords:** Artificial Intelligence, Green Crimes, Crime Prediction, Wildlife Protection.

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## 1. Introduction

The importance of saving environment has been realised in the past couple of decades. Robust efforts have been made for the same. Protection of environment is not only the concern of political matter anymore but a part of fate, shared by everyone in the world. Artificial intelligence has added a new horizon in this matter. Supporters of Artificial Intelligence suggest that introduction of AI infused

technology can help in curbing the problem of green crimes around the world. However, the critics are of the opinion that AI will pose harm to the humanity in longer term.

AI can be extremely helpful in both prevention and protection of the environment. AI empowered technologies can be used for real time patrolling in all the forest area. This can be done in the remote or high-risk areas where patrolling becomes difficult for the forest authorities and this can be done 24/7 without posing any harm to the forest officers. Technologies like Conservation AI, Global fishing Watch are examples of the same. Conservation AI works on development of Machine Learning for conservation of animals, wildlife, or manmade objects indicative of poaching. Global Fishing has a real time technology which identifies the vessels which are fishing and it pinpoints the real time location of the same. Another AI enabled technology that is Global Forest Watch uses AI to predict and inform about any forest fire. Even the World Wide Fund for Nature uses AI to monitor the health of wildlife, forest and other ecosystem.

## **2. Use of AI in management of environmental resources and protection of biodiversity.**

Environmental crimes are on a rise these days and this is the concern of not only one country, rather this problem is there throughout the globe. Environment related crimes are not of new origin. Rather they have been there since the start of human civilization. However, robust efforts are being made to control the same. The reason is that green crimes are affecting everyone in a similar way keeping aside their financial, social, or economic status. Green crimes or crimes related to the environment refers to illegal activities and intrusions which harms or destructs the environment in any way. The examples of the same includes illegal cutting of trees, poaching, illegally polluting the environment including water, air etc. The arena of green crimes is huge, yet very less discussed.

Activities like illegal logging, wildlife trafficking, illegal fishing, waste dumping, illegal mining, land encroachment are some of the problems affecting the environment adversely. Even though laws have been made to manage the problem of green crimes, however the efficacy of the same remains low. While efforts are been made to combat green crimes yet laws alone do not suffice the need of the hour. Even crime enforcement agencies like forest Wildlife Crime Control Bureau, Central Pollution Control Board etc. falls short to cover the arena of green crimes, and as Artificial Intelligence is being used in every area of work like healthcare, education, finance, it can also be used in combating green crimes in India.

AI can open a plethora of options for curbing green crimes. This may include sophisticated technologies like crime mapping to basic AI enabled technologies like GPS tracking, Facial Recognition, Surveillance patrolling etc. Crime mapping is the process of visualising and evaluating crime-related data in a particular geographic area primarily using GIS and geodatabase tools. By using this technology, mapped crimes may be strategically distributed, enabling analysts and law enforcement to spot trends and patterns. Crime mapping can help identify danger areas, optimise resource distribution, and anticipate the location of specific crimes using artificial intelligence (AI) algorithms by identifying clusters of criminal activity. Crime mapping can use other information, including surveillance footage or eyewitness accounts, to help find the perpetrators in criminal cases.

AI can help in the protection of the environment in many ways. Artificial intelligence, especially convolutional neural networks (CNNs), proficiently identifies significant patterns in satellite imagery, facilitating accurate identification of deforestation, habitat destruction, and land degradation (Ziaul Islam et al., 2024). Further, protection of wildlife remains difficult, no matter the number of forces that is applied for the same. Simple AI enabled technologies like GPS tracking, acoustic surveillance, camera tracking can go a long way in preservation of the wildlife, illegal deforestation, unidentified water pollution. AI can also analyse the change in in land cover and can swiftly identify logging and unsustainable practices without the need of any man power. Even problems like illegal hunting and illegal wildlife trafficking can be controlled using AI enabled technologies like AI enabled facial recognition system can help in identifying offenders which can further help in identification of groups and cartels which are responsible for the same.

### **3. Current position of India in Implementing AI for combating green crimes.**

India is pro- innovation when it comes to use of AI in different sectors. AI infused software are being used in various areas, especially in healthcare, education, infrastructure etc use of AI for curbing green crimes seems a far sight for the country. In a recent report published by NITI Aayog with the hashtag #AIFORALL, the focus of the country is not on crimes or environment per se, rather the focus area for AI intervention is healthcare, agriculture, education, infrastructure, and transportation. On through reading it can be observed that environment conservation, climate protection, wildlife protection etc are not even mentioned in the agenda of the report, making it clear that the government of the country is not much focused on protection of the country against green crimes. However, that does not mean that India is not working towards AI infused technologies. Tools like HAWK app has been developed with an idea of protecting wildlife from the people who constantly harm such species by active monitoring and gathering of information (Gourav Verma et al. 2024). Even portals like BHUVAN which is a geoportal developed by ISRO can be used to detect real time images which can be extremely helpful in curbing crimes like encroachments and other illegal activities. Portals like global forest watch by WRI can also be used to get real time knowledge regarding deforestation activities. Sameer App by Central Pollution Control Board (CPCB) also helps the citizens file reports regarding bad air quality which can be useful to the authorities to know if any illegal activities are taking place causing air pollution. AI and Machine Learning based water quality monitoring is being developed by IIT Madras and Tamil Nadu Pollution Control Board (TNPCB) to monitor water quality in Chennai and prevent illegal dumping of waste in the water bodies. E- eye is an AI infused technology operated by National Tiger Conservation Authority which is a surveillance system which uses infrared cameras to identify poachers and any other illegal activity that may take place in Jim Corbett Forest reserve.

Such advancement in technology and AI clearly shows that India is pro AI and is taking firm steps to utilise AI infused software and technologies to preserve the environment and prevent green crimes.

### **4. Challenges and Ethical Considerations:**

In recent years only there has been increased study with regards to use of AI in prevention of environment. Looking into these studies, it has shown that AI infused technologies will rather show a positive outcome in case of environmental protection than in any other field. In one of the studies, it was observed that amongst the three SDG's (Sustainable Development Goals), namely society,

economy and environment, the environment sector demonstrated more potential with 93% of targets being benefited by AI interaction as compared with the social category wherein 38% of the target shows adverse experience (Gupta et al 2021). This shows the potential that AI carries in case it is used in environment sector. However there has been another study which shows a different picture. In another study, which investigated the impact of using AI to achieve UN's sustainable development goals, realised that 79% of the targets shows a positive outcome however 35% could be negatively affected using AI (Vinuesa et al 2020). This shows that the use of AI is somewhere new and needs to be used with caution.

There are various challenges which can be faced if AI enabled technologies are used for the protection of the environment. Some of the problems can be bifurcated as under:

- i. Dependency on Autonomous system: Depending upon an autonomous system is a problem as it can violate various aspects of human like human rights, social values and as such technologies do not have a human element attached to it.
- ii. Algorithm Decision making: AI enabled technologies are also responsible for decision making. Such decision making is dependent upon the already existing algorithms. In case of predictive policing, decisions must be made before any wrongful act is done. AI data is highly dependent upon the data infused misutilization of the same can lead to chances of Bias as well. If in the case of green crimes, bias decision making happens, it will lead to more wrong than good for which such systems were established. This means a huge responsibility is handed over to a non-human entity which lacks human elements and which may lead to violation of fundamental rights.
- iii. Requirement of high-level scrutiny for AI based surveillance: To avoid any infringement of rights, high level of scrutiny is required so that rights of the citizens are not taken away.
- iv. Expense on government: As comfortable as it sounds, AI driven technologies are not cheap. The government would be requiring a huge amount of investment in the same and considering the conditions of the country, shedding such huge amount would be a huge problem.
- v. Privacy concerns: AI can invade the privacy of humans very easily which directly affects the rights of the citizens raising litigations and burden on justice system for the same. Invasion of privacy can easily be done by AI generated surveillance system, Data mining and collection system which may even pose threat to the national security as well.
- vi. Low research on AI and AI infused technologies: India, per se, is not at a advance level of AI research. Even many centre of excellence have been set up by the country like Government of Kerala has set up centre of excellence in AI in partnership with NASSCOM, however, the major focus is still on the use of AI in agriculture, healthcare, education and infrastructure sector. Use of AI for combating green crimes is still a fra cry. As of now, no, or limited research has been done with this regard, which also questions the plausibility of the same in the country.
- vii. High Cost and low awareness: High end technologies like AI are expensive. For a country like India, expending huge amount on AI seems difficult considering the pover rate of India. Even though according to SBI, extreme poverty will be eradicated in India soon however till then expending a huge amount of AI seems completely unfair.
- viii. Security and Ethical Considerations: As efficient as it sounds, AI still has a long way to go in India. AI processes a huge amount of data and such data is important for the better functioning of AI infused

technologies. However, this raises a security risk imposing threat on the country's security. As huge data is used by AI, that also certainly means that a lot of data regarding people's personal information can also be used by such technologies. This is alarming as personal information like finger prints, iris, facial recognition etc can be mis used as well.

## 5. Control Mechanism on the use of AI

AI has become the need of an hour and there is no area or discipline where AI has yet not been used to enhance the outcomes. However, if AI infused technologies are used for curbing the problem of green crimes, specialised laws should be framed for the same. These laws should contain clear rules regarding the use of AI and at what level AI will function. As green crimes are not limited to one country, data sharing can be done for the same. Intelligence relating to AI infused technologies can be shared with other countries as well so that countries with less advanced technologies can save the environment. Further, laws should be made in such a way that they are in consonance with each other so that cooperation among the countries can be sought without any hurdles with regards to differential laws of the land. It is also to be noted that use of soft AI is always a better option as hard AI imposes a huge risk over mankind.

## 6. Conclusion

Using AI infused technologies have their own strength and weaknesses. While robustus efforts have been made by India to combat green crimes including stringent laws, using advanced technologies and AI infused software to punish the perpetrators however, jumping right into using AI is not the right call. Considering the current position of te country and working of the economy, there are many areas where advancement of technology is needed first than in environmental sector. However, it should also be noted that a balance needs to be maintained so that environmental crimes are curbed before it gets too late. India, even if not proactively but is making huge advances in utilization of AI for combating green crimes. As environment is not limited to one country but is a shared resource, information sharing can also be done so that the law of different lands do no collide with each other or with the international law as well.

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