

JJAIBOT WILDLIFE CONSERVATION

Rapid response and intervention to wildlife threatening situations



OVERVIEW

The 20th century witnessed a dramatic increase in deforestation, climate change and poaching activities. In view of this the world's flora and fauna have been the most affected and sparked major concerns across the globe. The illegal wildlife trade was marked as the fourth best international lucrative criminal business after drugs, human trafficking and illegal arms sale. The world wildlife fund (WWF) and the International Union of Nature Conservation have declared that the trade runs up to over \$23 billion each year from the illegal trade.

Poaching has been termed as the biggest threat in the efforts to protect wildlife. The organized poaching gangs are setting up a strong base and are behind the killings of precious wild animals every year. To illustrate the atrocities of the inhuman poachers; at the start of the 20th century the number of tigers that were in Southeast Asia was estimated to be 100,000 wild tigers.

The Rhinoceros statistics is at a worrying trend with some of the species already declared extinct. The heinous acts of our fellow human beings have seen the scale of poaching escalate each year. It is feared that if the current situation is not handled with urgency in the next 10 years there would be no elephants and rhinos. This will definitely be devastating to humanity.

"Today it is astonishing that the number that remains is less than 4,000 tigers according to World Wildlife Fund. The increase in ivory trade has seen the African elephants drop by more than 65% from the total population within the past century."

- Casselman, A. (2018)

PROBLEM

The new breed of tactical and well-armed poachers has seen the efforts of rangers and wild life service teams stretched to the limit. Their goals to save and conserve wild animals have been hampered with the extensive large sections of game parks and game reserves. The rangers are often overwhelmed with the extensive areas they need to patrol. The teams are forced to use expensive methods such as using helicopters to monitor the areas. This method is not only extremely dangerous but also it becomes expensive to run the expeditions throughout each day and time because poachers are unpredictable yet they pose the biggest threat. Poachers have learnt the skillful tact of evading any speculations of their whereabouts in the thick forests and rough terrains. The patrolling process in the widest deepest parts in the world without any guidelines makes the conservationists' work difficult and poses extra danger to their lives. The Artificial intelligence comes in handy to ensure conservation efforts through various technological incorporated devices are made efficient. Artificial intelligence in essence entails the combination of hardware and software mechanisms that ensure cheaper, thorough and efficient efforts systems put in place to enhance wildlife conservation measures. The high levels of intelligence in AI make them a powerful tool to complete large data sets that would often be impossible to human. The computerized systems of the AI are used to learn patterns of the poachers classify and modify process execution to ensure best outcomes.

JJAIBOT

Initially, the problem of wildlife conservation especially the issue of poaching led to increased development and innovation of new technologies to combat it. One of such technologies is the use of artificial intelligence (AI) like JJAIBOT. Before introduction of JJAIBOT, there were other AI application like PAWs (Protection Assistant for Wildlife Security) which used mainly human patrol resources to combat poaching (Fang et al. 2016). The other one was called SPOT (Systematic Poacher deTector), a novel application that augments conservation drones with the ability to detect poaching and animals in near real time (Bondi, et al., 2016).

Julian Jewels' Artificial Intelligence Bot (JJAIBOT) was created in January 2019 purposely to help in understanding and solving effects of climate change, mental illness and wildlife conservation. In the wildlife conservation action plan, the autonomous system worked by combining the various wildlife research mechanisms to look into the wildlife habitats and secure the existence of the animals. The system involved a series of high intelligent automated processes to stop the action of poachers and reduce the devastating effects of their action. The systems include the Visual and Acoustic recognition component (V-ARC), a Chatbot, predictive analytics engine (PAE) and Emotional processing Unit (EMU).

UTILIZATION

The large wildlife conservation area posed a hard task for the rangers to coordinate and analyze huge data and generated images. Rangers were tasked with identifying anomalies in conservation areas using aerial views. This was inefficient and often created delays in response and obtaining detailed data was impossible. A quick simulation of data was required to enhance and develop a predictive process that always ensured instant response from the ranger teams. The JJAIBOT utilized its abilities and integrative system in Visual and Acoustic recognition component (V-ARC) to interpret data and used it to search various engines to give predictive analysis. The JJAIBOT was able to simulate data and used multiple sources from the extensive data base of the large conservation area to determine and predict insightful information. The multiple sources created a base for JJAIBOT to closely monitor sites and the rangers' database for any new data information.



CAMERAS

Some of the essential features utilized included the high cryptic cameras used to capture the facial images of poachers. The other essential use of the cryptic cameras was that it monitored illegal activities in the wild and sent instant notification to the relevant authorities who were the rangers to get into action. The cryptic cameras used a particular algorithm of image recognition where most endangered species were identified and tracked in the conservation environment. JJAIBOT closely monitored migration and provided accurate data on individual animals. The process of tallying and identifying animals had been made easier through simple tools of surveillance cameras that were deployed into the large conservation area. JJAIBOT action was to ensure instant recognition and identification of individual animals and record data about the individual species for future use.

The process was initialized with an integrated visual device deployment in the large extensive habitat at various points. Surveillance and data collection was then instantly optimized and the JJAIBOT detected and saved the exact number of animals within the area. Images ran into millions and therefore the integrated system quickly identified each animal from the individual photographs to speed up the process of identifying animals and recognizing the species with high accuracy for ease in tracking their movements. This tool was proactive in identifying the exact location of endangered species and instant recognition of danger to certain animals when the JJAIBOT sent notification on missing of an animal or an animal was cornered or in risky areas. This signal enabled the rangers to act fast to save the animal and protect the other animals too.

The camera integrated system also helped the JJAIBOT to send notifications that involved suspicious activities within thick and expansive wildlife conservation area. This included the illegal logging through detecting the sounds of machines such as chain saws used in the process, monitoring unidentified strangers who could most probably be poachers. This was done by high precision process that entailed capturing the details of invaders and their exact locations within the expansive area. The feature of instant face recognition of poachers is what had been utilized to guide the rangers in bringing to book the poachers. Their characteristics and hotspots were monitored by the JJAIBOT and relayed instant data when they recognized any suspicious persons in the protected area.



FIRE

Fire breakout in large conservation areas was anticipated to be disastrous and often could end up wiping out an entire species in the area. The JJAIBOT ensured disasters such as forest fires notifications were quickly relayed to relevant rangers through capturing blaze signals and instantly setting up a notification for emergency response. The internet linked video cameras fed the database of the extensive conservation area with details of visible smoke and instantly the JJAIBOT with its autonomous function recognized the flames and smoke and hastily interpreted the data and exact location. It then instantly sent notification to the rangers and hence facilitated faster response. This was expected to happen at any time of the day including during the wee hours of the night. The intelligent aspect of the JJAIBOT was able to also formulate data on the number of animals under threat from the fire and bring up the extent to which the fire had gone. It also guided the rescuers on their movements by giving exact routes for use during the rescue operation.



POACHING

JJAIBOT helped rangers to learn poachers' activities and behavior activities to better inform animal protection patrols. The processes was made possible with its autonomous and explicit features incorporated within the JJAIBOT system that recognized the changing patterns of poachers' activities through searching the systems to quickly and hastily search the internet and identify suspicious posts of wildlife illegal trade chains. The use of artificial intelligence (AI) like JJAIBOT offered the advantage because it was able to process large amounts of data in a short time and also drew conclusions from the information that would be difficult for humans to comprehend.

JJAIBOT worked through data input of different sources like contour lines, terrain information, base camp location and previous observations; including animals and human activities of the previous patrol tracks. The input data helped in building a model that predicted poacher's activities and also the best routes for rangers. Based on the data, best routes for rangers were developed by computing the optimal patrolling strategies. The developed patrol routes were defined in terms of virtual street maps built as raster pieces. The JJAIBOT worked by scanning through the data and provided clear analytical data that guided the rangers on eminent danger that could result in death of wild animal or atrocities in the wild.

Poachers' actions were determined by animal densities because poachers concentrated in areas where there are many animal species of interest. The high data fused within the system was used to spot poachers before they could strike while in process of locating target animals. The information gathered was interpreted by machine learning technology techniques and it yielded predictive analytics that helped anticipate poachers' activities before they happened.



SOCIAL MEDIA

JJAIBOT has proved effective in protection of endangered species by automatic identification of individual animal by distinct patterns of their coats or by their behaviors. The ability of JJAIBOT to learn emotions and predict has enabled the rangers to record crucial data that had helped in understanding animal species and monitoring of population better. Through image recognition the endangered species were tracked, their number and migration patterns were more accurately measured and studied. JJAIBOT had the ability to tag photos on social media and e-commerce websites that helped in detecting potential wildlife trafficking process. The model reduced the time spent by rangers to monitor online wildlife trafficking activities and was an efficient and escalated tool for conservation measures.

CONCLUSION

The JJAIBOT efficiency was a remarkable invention that until now justifies the need for automated process of conserving wildlife. The artificial intelligence fused to the JJAIBOT and its ability to easily interact with human enables rapid response and intervention to wildlife threatening situations and a better monitoring of large extensive ecosystems instantly. The predictive nature of JJAIBOT offers greater knowledge and situational alertness to rangers in the extensive large areas. The good alert system ensures better response and better preparedness of the rangers. This will result in empowerment and better confidence of the rangers and other conservation agencies and a better chance to operate with factual data and not unidentifiable data. Adoption of JJAIBOT in areas of prominent poaching activities will instantly result in cut off the activities of the poachers. These areas include the African game reserves and parks.

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