

## Global Positioning System Based Real-Time Traffic Monitoring System for Minneriya National Park

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Located in the North Central Plains of Sri Lanka, Minneriya National Park is an ideal eco-tourism location. Annually during the dry season, August to September herds up to 300 elephants get attracted towards the Minneriya reservoir. Due to the large elephant herd that visits the reservoir throughout the year, mostly in the dry season, Minneriya National Park has become a large visitor attraction.

The increasing visitor attraction to witness the elephant gathering in the banks of Minneriya Reservoir has caused adverse effects to the sensitive ecological areas, disturbing the natural habitats. The high number of visitor attraction has caused difficulties in the systematic management of safari rides in the park.

The main objective of this project is to design and develop an android app that tracks the location of vehicles entering the park based on GPS data. The geo-location history of safari jeeps is updated in Firebase Real-Time Database. The park administrators are provided with a web-based system that consists of a customized map that shows the real-time location of all vehicles inside the park. Also, using Firebase Cloud Messaging facility, administrators can message the safari jeep drivers real-time and redistribute the vehicle traffic.

Geo-fences are implemented in the app that marks protected zones. It indicates to the drivers that they are sensitive ecological areas and enter and exit to the areas are marked by an app notification. The app also shows the other safari vehicles in its proximity and the jeep drivers can have an idea of the real-time vehicle traffic.

When implementing the app traffic data of 20 vehicles were collected and identified that grassland habitat occupied the maximum number of vehicles. There were concerns regarding network battery drain. It can be minimized by changing the CPU frequency when the app is inactive in run time.

Through this real-time traffic monitoring system, the park administrators can easily manage and redistribute safari jeep traffic and improve the behavior of safari jeep drivers eliminating disturbance caused to flora and fauna of the national park due to increased vehicle traffic.

*Keywords: Android; Traffic Monitoring; GPS; Geo fences*

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