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National Unified Tracking Service

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Project

The National Unified Tracking Service (NUTS) is actually a software system required by National Parks and Wildlife Service to be used in order to track the native fauna. The main objective of the system is to provide a facility that can employed in order to get accurate real time information by helping in monitoring the declining species as well as their recovery rates

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Importance

- This will also help in order to identify the species which could possibly be endangered in future.
- Data collection requirement of the system will be achieved by deploying remote monitoring units which will be used to gather real time data.
- Another utilization of the system will be to gather and uniform the data of current species tracking systems that will be hence used to provide better information to public and the education systems as well

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Existing Option

- National Parks and Wildlife Service currently do used tracking option which include tagging.
- The limitation of this option is that they are not really effective in terms of getting real time centralized information and also they don’t work on few of the species including reptiles.
- So the new information management system is required to overcome this limitation

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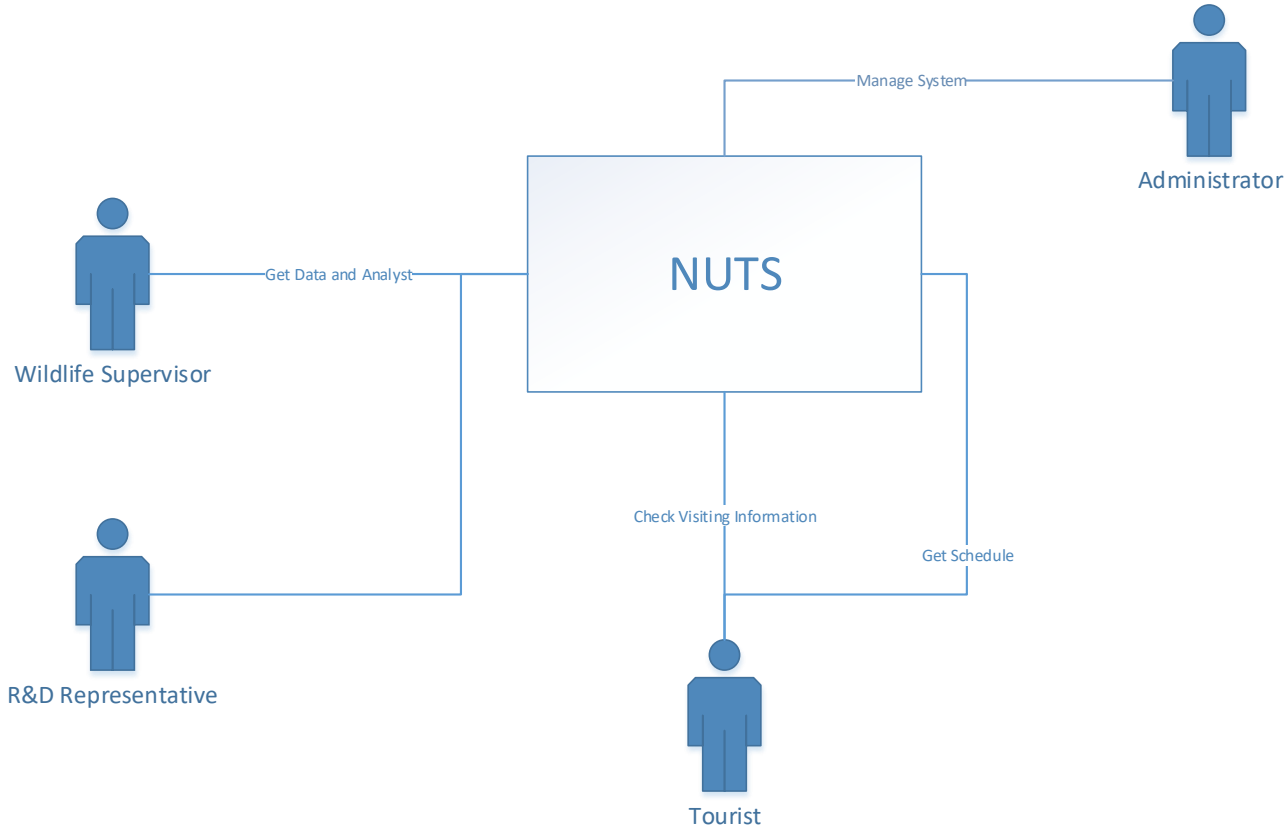
Context Diagram



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System Requirements

- User Registration
- User Authentication (Login/Password)
- User Authorization (Only authorized user should have access to the information)
- System should record any activity and process it to the central server
- System should record audio and video both.
- System should be able to track any activity being done by animals
- Live video/audio streaming shall be transferred to central server via camera
- System should generate information for education system as well

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System Requirements (Cont.)

- Information Management System should allow managing data (Save, Review and Delete)
- Integration with other third party systems
- Any saved data shall be retrieved for further study.
- Alert generation for endangered species.
- Reporting module for management and other stakeholders

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Challenges

There are few of the challenges that can be faced in development of the system.

Foremost of all is the integration with other tracking system to incorporate their data in new system. This requirement has a dependency on other systems in a way that how they will be sharing their data, file based export or database level integration shall be used. These types of question need to be first understood.

Also performance is a great challenge to establish good connectivity for recording audio and video data to central processing server.

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Non-Functional Requirements

Other than functional requirements, there are few non-functional requirements of the system as well, which include

- Performance on top because there should be smooth live streaming of audio and video. Usability so that system is easy to be used by all types of users.
- Security so that there shall be proper security features enabled so that only authorized individuals can delete data which is of new use.
- Scalability, so that system shall be able to be enhanced in future without any re-work required and system should be integrated with any third party system.

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Methodology

The methodology decided to implement the system would be agile, where system will be sub-divided into components and each component will be delivered to customer in the form of iterations.

The possible sub-components of system are;

- Data Collection (Image & Sound)
- Live video and audio streaming
- Image Processing
- Managing data (Audio/Video) in system
- Integration with third party systems and locating system.

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System Architecture

Implementation of this system will be done by using client/server architecture.

Wireless sensor devices will be used.

GPRS Modem, will be used to gather data from GPS and sensors module and then transfer it to the central server for processing

Central Processing Server will be recording any time of incoming to the system

Planning of the system will be done by using Function Points, where each sub-system will be planned separately for Analysis & Design, Development and Testing.

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User Interfaces

- From software perspective there will be multiple user interfaces designed as part of the Analysis and Design phase.
- Interfaces will be first created in the form of prototypes
- For designing the interfaces human computer interaction guidelines will be considered to make them more user friendly and effective.
- Usability, visibility and ease of access will be the key features to be followed.
- Multiple UI shall be designed:
  - Login
  - Admin Panel (User Management)
  - Audio/View Streaming
  - Data Review
  - Data Modification
  - Reports

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Project Plan

System Component	Analysis & Design	Development	Testing	Deployment
Data Collection (Image & Sound)	5 days	7 days	5 days	1 day
Live video and audio streaming	3 days	5 days	2 days	1 day
Image Processing	3 days	7 days	5 days	1 day
Managing data (Audio/Video) in system	4 days	10 days	7 days	1 day
Integration with third party systems and locating system	3 days	5 days	5 days	1 day

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Future Work

Future work that can be done over this project can be creation of a dashboard that will show the stats generated on the basis of species data recorded. Some algorithms can be implemented in the dashboard that will be hence generating reports or alerts beforehand that could cause any unfamiliar activity by the animals