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M A T R I X

★ **SYSTEM FOR DETECTION AND RECOGNITION** ★  
**OF SOUNDS IN THE ENVIRONMENT**



# System for detection and recognition of sounds in the environment

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# Introduction

Industrialization has now reached amazing speeds, and the desire for expansion, the construction of factories and shopping centers has led to mass deforestation which results in killing many animals and many rare species of birds . Left without their natural habitat, these birds and animals are destined to go extinct.

This system was designed not only to record and analyze sounds, but with the big desire to maintain and preserve the natural environment. The sounds can help us detect if the animals are in danger, if reproduction is at normal levels, if the area is healthy and unpolluted etc .

The sounds are not just simple sound waves, they can provide us with valuable information which we can use to detect the presence or not of birds and animals in a particular habitat, whether animals or birds are in danger, and so on, and this information can help us estimate if the area of interest is healthy and unpolluted.

Because sounds can be fingerprints that reveal information about the environment, we designed the system which uses the natural sounds of the environment to identify the activity of animals and birds in the area of interest that we want to protect.

# Concept :

The system is based on the concept of detecting and recognition of sounds made by birds and animals.

Once recorded automatically, the sounds are checked in a database integrated into the system (containing different animal sounds in the natural environment ) .

After recognition was made , recorded sounds are marked with the name and type of bird/animal, and also with the date and the approximate location where it was detected . If the sound is not recognized, it is stored in a separate database, to be further analyzed by experts in the field .

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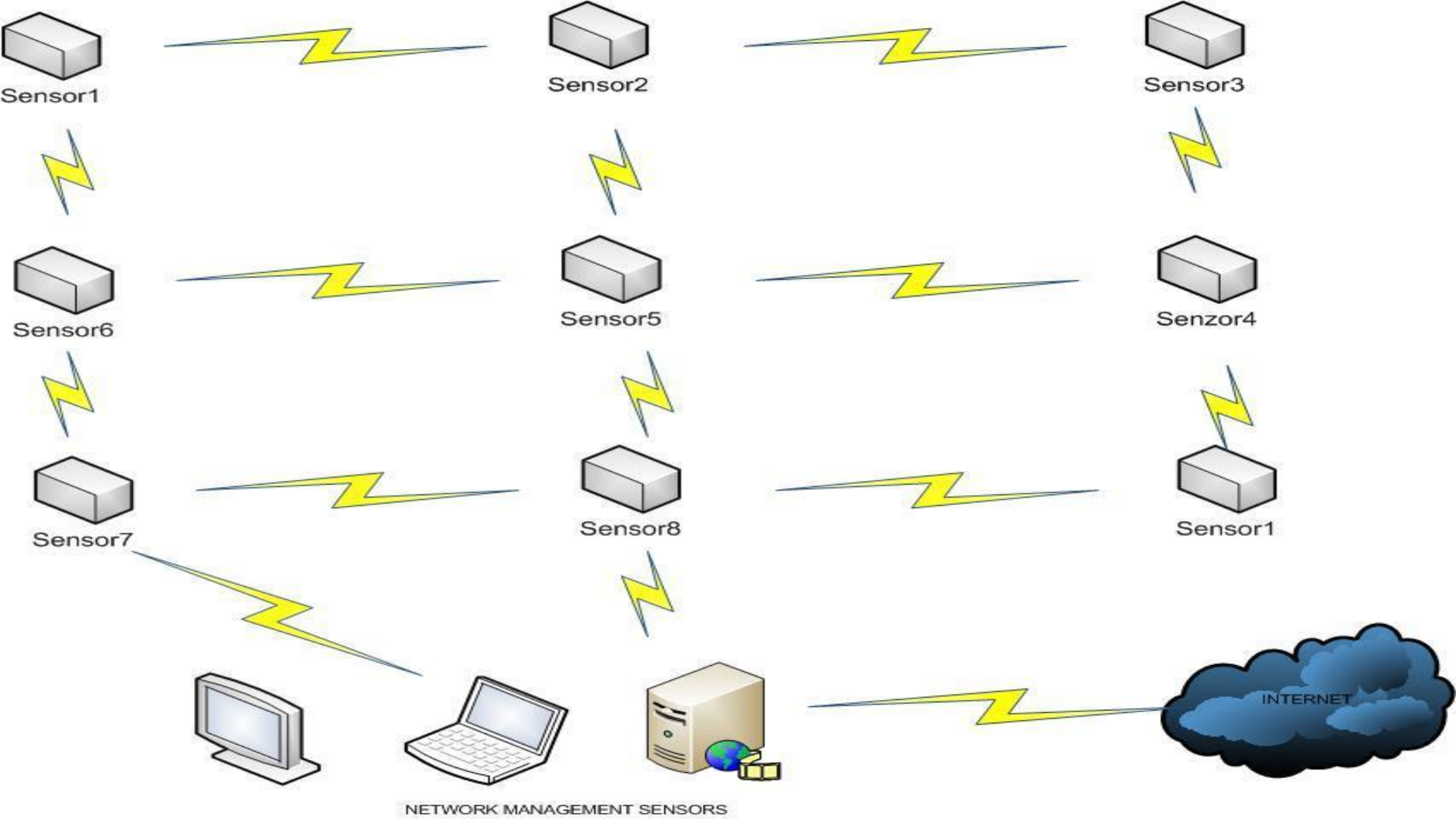
- record the activity of birds and animals in forests or areas of interest
- to detect if rare birds / animals live in certain areas
- to detect if certain areas contain rare birds that are not normally there
- accurately locate populated or sparsely populated areas in the area monitored
- analyze and generate a chart with the heavily populated areas
- record human activity ( eg : native / aboriginal if placed in an equatorial forest, poachers or illegal forest cutters in a protected forest. )
- to enable real-time monitoring on types of animals and birds.

Other tasks that will result from the development project.

# *Technical Specification*

The system relies on a network of sensors that are installed in the area of interest, with WiFi connection between them, allowing the exchange of information with the monitoring station of the area of interest.

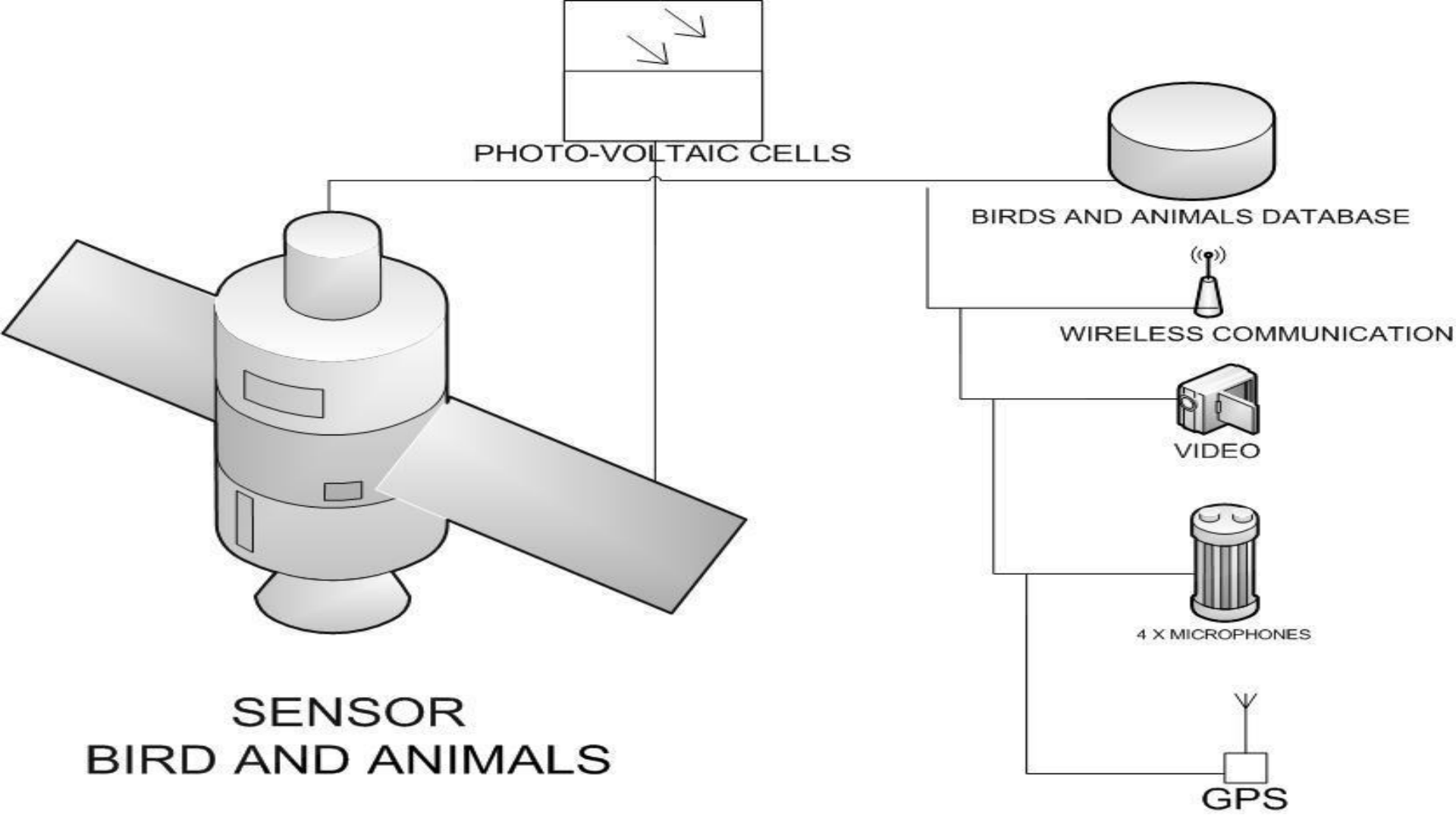
Given that for detecting sounds we will be using directional microphones, we estimate that the average distance between the sensors will be between 1 km and 2km. Basically with a network of 100 sensors we can cover an area of approximately 400 sq. km.





The sensors will be supplied with energy produced by photo-voltaic cells and will be equipped with Li-Ion batteries to ensure normal operation even during the night. Also, each sensor will be equipped with GPS sensor for precise location in the complex.

4 directional microphones targeted by geographical coordinates, and a video camera that will be automatically targeted at the sound source which will be computed using information from the nearby sensors .



## The management station of the System will have Several functions as follows :

- Allows manual or automatic loading of a database of sounds associated with each animal or bird in the area of interest .
- Will display real-time geographic location of interest in the area of birds and animals at night or day
- Will signal the presence of new sources we do not have in the database system and that need to be further analyzed
- Will signal the sounds associated with human presence in the area of interest .

- Will monitor the technical condition of sensors and the overall network and will generate reports and alerts on any technical problems
- Will be able to connect online and automatically update its database of sounds that will help identification of newly found bird and animal species
- Will maintain a database containing all the activities detected so that the information can also be processed offline for a better protection of the area of interest
- Will generate reports with animals and birds identified during the period requested by the user .



Mexican Red Parrot  
2014-04-09 04:14:23.0



Mexican Red Parrot  
2014-04-08 20:03:28.0



Mexican Red Parrot  
2014-04-08 20:06:52.0



Map Satellite

Mexican Red Parrot



X

Borovtsi

815

81

8104

Google

Map data ©2014 Google Terms of Use Report a map error

Insert



2014-04-09 04:14:23.0

Mexican Red Parrot

Their appearance is generally green with the most notable features being a bright red forehead and crown, dark blue streak behind the eyes, and light green cheeks.

YES, we can ...