Early Bird AI Earthquake Prediction System

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Dedicated to emergency rescuers who risk their own lives to save people's lives.

Overview

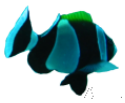
Predicting earthquakes is a complex and challenging problem that has been the subject of much research.

While animal behavior is known to be a possible precursor to earthquakes, the relationship between animal behavior and earthquakes is not well understood.

However, using **Deep Learning,** it is possible to build a model that can learn patterns in animal behavior data and use this information to predict earthquakes.

Abnormal animal behavior before earthquakes

Abnormal animal behavior before earthquakes and other situations in which similar behavior can be observed*

Animal	Pre-earthquake Behavior*	Other Situations Where Behavior Can Be Observed
Cat 	Hiding, refusing to go out	Psychogenic shock
Chicken 	Perching high, huddling, hysteria	Sudden darkness, violent explosion
Dog 	Bark,constantly following the owner from room to room	Area defense and aliens,overly dependent animal
Fish 	Leap out of the water,changing depth in water	Quick turns, charcoal chase,pressure change, swim bladder injury
Mouse 	Wheezing and convulsions	Audiogenic seizure
Mussel 	Clinging to high places by the sea	Water rise before the storm
Pig 	Biting each other's tails	In overcrowded conditions
Rat 	Alertness, anxiety, vertical jumps,movements such as squatting, muscle contractions	Alert response to ground predators,acoustic startle response

*Lee ve ark. 1976 & Anonymous 3.

Goals

I. Saving lives

The most significant benefit of early earthquake detection is that it can save lives. If people receive an early warning, they can take protective measures like evacuating the building, finding a safe place, or taking other precautions to avoid the dangers associated with earthquakes. This can help reduce the risk of injury or death.

II. Reducing damage to infrastructure

An early earthquake warning can also give people time to prepare their buildings and other infrastructure for the earthquake. This can include shutting down gas or electrical systems, securing heavy items, or reinforcing structures. This preparation can reduce the risk of damage and make the recovery process easier.

III. Reducing economic losses

Earthquakes can cause significant economic losses, including damage to infrastructure, buildings, and other property. Early detection can help reduce these losses by providing time to prepare and take protective measures.

IV. Improving emergency response

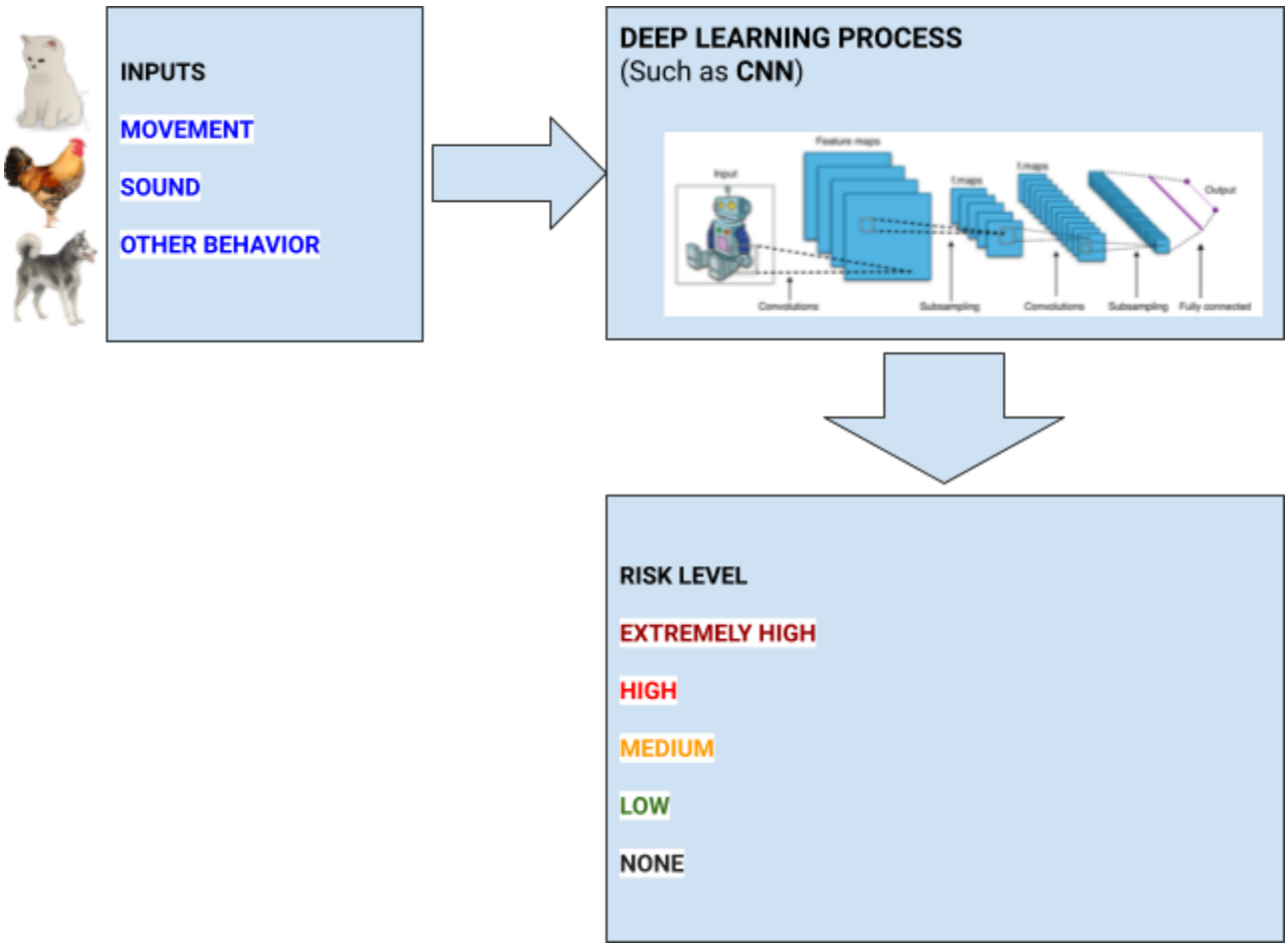
An early warning can also give emergency responders more time to prepare and respond to the earthquake. This can help ensure that resources are in place and ready to go, reducing the time it takes to respond and potentially saving lives.

V. Providing data for research

Early earthquake detection systems can also provide valuable data for researchers studying earthquakes. This data can help improve understanding of the underlying processes and improve earthquake prediction models.

Specifications

Here is a high-level overview of a possible deep learning project for predicting earthquakes based on animal behavior



Milestones

I. Data Collection

Collect data on animal behavior in areas where earthquakes have occurred in the past. This data can include information on animal movement, sound, and other behaviors that may be related to seismic activity.

II. Data Preprocessing

Preprocess the collected data by cleaning, normalizing, and transforming it into a format suitable for deep learning models.

III. Feature Extraction

Extract features from the preprocessed data that capture the patterns and relationships between animal behavior and earthquakes.

IV. Model Development

Develop a deep learning model, such as a convolutional neural network (CNN), that takes the extracted features as input and predicts the likelihood of an earthquake.

V. Model Training

Train the deep learning model using the preprocessed data and a suitable loss function.

VI. Model Evaluation

Evaluate the trained model on a holdout dataset to measure its accuracy and generalization performance.

VII. Model Deployment

Deploy the trained model as a service or application that can provide real-time earthquake predictions based on animal behavior data.

Similar Projects

There have been several projects that have used machine learning and deep learning techniques for earthquake prediction, but **not specifically based on animal behavior**. However, here are a few similar projects that may be of interest:

I. Earthquake Forecasting using Deep Learning

This project developed a deep learning model that can forecast earthquakes up to several months in advance using historical seismic data.

II. Earthquake Prediction using Machine Learning

This project used machine learning algorithms to analyze seismic data and predict the likelihood of earthquakes in a given region.

III. Seismic Anomaly Detection using Machine Learning

This project developed a machine learning model that can detect anomalies in seismic data that may be indicative of an impending earthquake.

IV. Earthquake Early Warning using Machine Learning

This project developed a machine learning-based earthquake early warning system that can provide alerts seconds to minutes before an earthquake strikes.

While these projects are not specifically based on animal behavior, they share the goal of predicting earthquakes and **can provide valuable insights into developing similar projects based on animal behavior data**.

References

References and reports about animals sensing earthquakes:

1. Wikipedia "Earthquake prediction”
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2. Wikipedia "Convolutional neural network”
   https://en.wikipedia.org/wiki/Convolutional_neural_network
3. Deprem ve Anormal Hayvan Davranışları Ali KARADENİZ
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