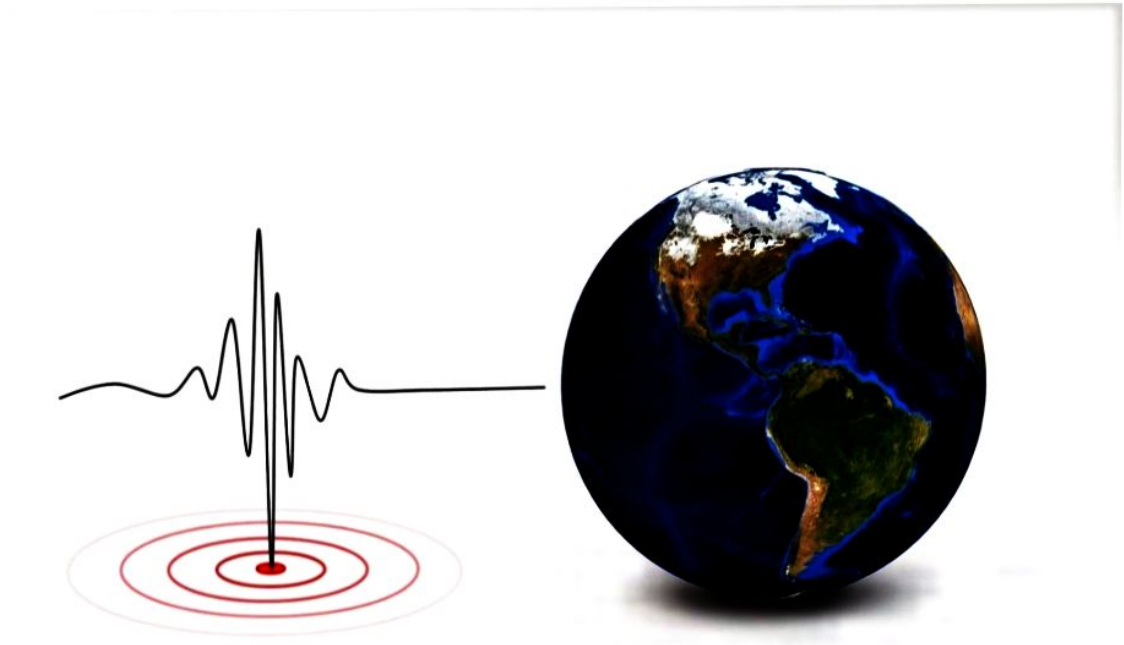
Earthquake prediction is a branch of the science of seismology concerned with the specification of the time, location, and magnitude of future earthquakes within stated limits,[1][a] and particularly "the determination of parameters for the *next* strong earthquake to occur in a region".[2] Earthquake prediction is sometimes distinguished from *earthquake forecasting*, which can be defined as the probabilistic assessment of *general* earthquake hazard, including the frequency and magnitude of damaging earthquakes in a given area over years or decades.[3][b] Not all scientists distinguish "prediction" and "forecast",[*citation needed*] but the distinction is useful.

Prediction can be further distinguished from earthquake warning systems, which, upon detection of an earthquake, provide a real-time warning of seconds to neighboring regions that might be affected.

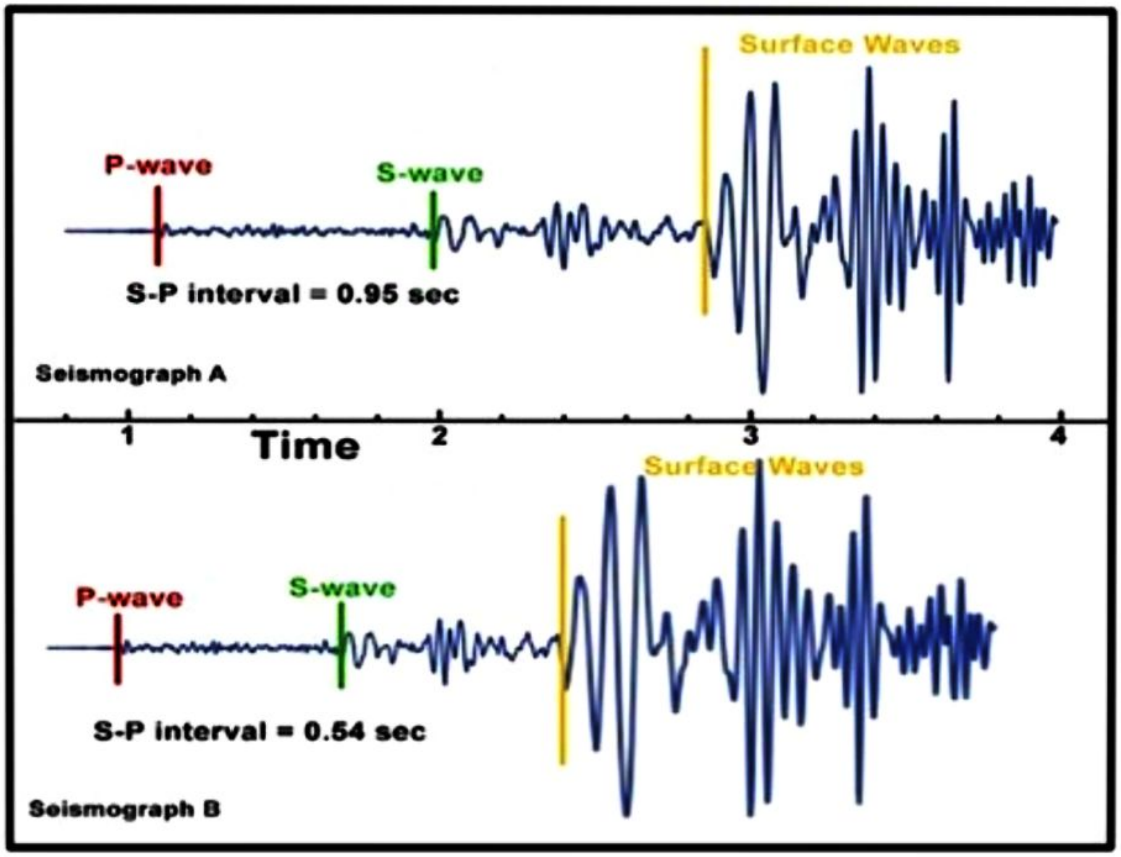
Earthquake Prediction using AI or deep learning



Forecasting earthquakes is an important problem in Earth science, because of their devastating consequences. The success of earthquake prediction can potentially save many lives. Current scientific studies related to earthquake prediction focus on when and where it will occur and its magnitude. Different technologies have been used to address this, such as mathematical analysis, machine learning algorithms like decision trees and support vector machines, and precursors signal study. Since

earthquakes have very dynamic and unpredictable nature, these technologies do not perform well for this task. As the earthquakes are spatially and temporally correlated because of the crust movement, we can predict the earthquakes based on that location's data and the data of larger areas.

Earthquake waves are typically composed of different types: p-waves (compressional waves) travel faster and do less damage. S-waves (translational waves) will land a few seconds later but will do the bulk of the damage.



```
splitted = df['Origin Time'].str.s


df['Date'] = splitted[0]
df['Time'] = splitted[1].str[:-4]

df.drop('Origin Time',
        axis=1,
        inplace=True)
df.head()
```

Output:

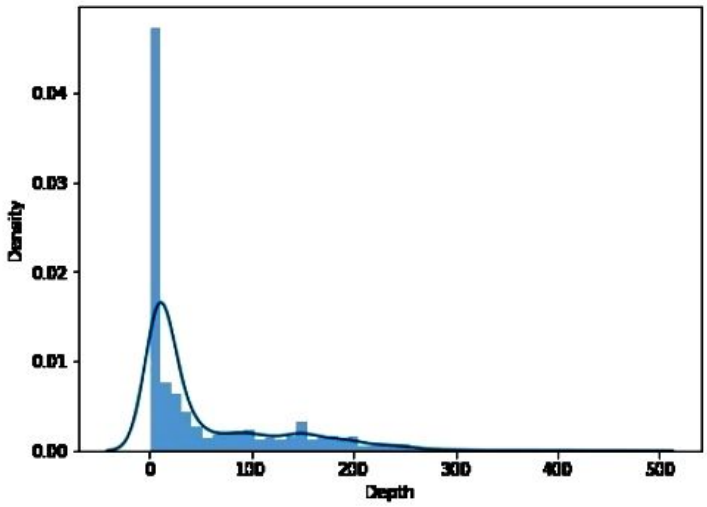
	Latitude	Longitude	Depth	Magnitude	Location	Date	Time
0	29.06	77.42	5.0	2.5	53km NNE of New Delhi, India	2021-07-31	09:43:23
1	19.93	72.92	5.0	2.4	91km W of Nashik, Maharashtra, India	2021-07-30	23:04:57
2	31.50	74.37	33.0	3.4	49km WSW of Amritsar, Punjab, India	2021-07-30	21:31:10
3	28.34	76.23	5.0	3.1	50km SW of Jhajjar, Haryana	2021-07-30	13:56:31
4	27.09	89.97	10.0	2.1	53km SE of Thimphu, Bhutan	2021-07-30	07:19:38

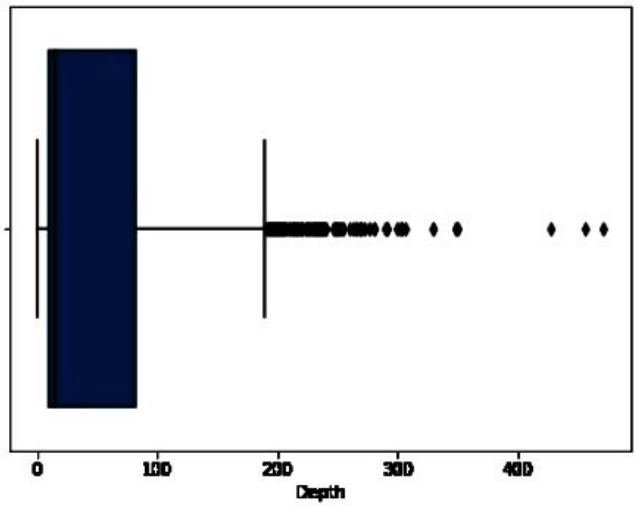
```
plt.subplots(figsize=(15, 5))

plt.subplot(1, 2, 1)
sb.distplot(df['Depth'])

plt.subplot(1, 2, 2)
sb.boxplot(df['Depth'])
plt.show()
```

Output:



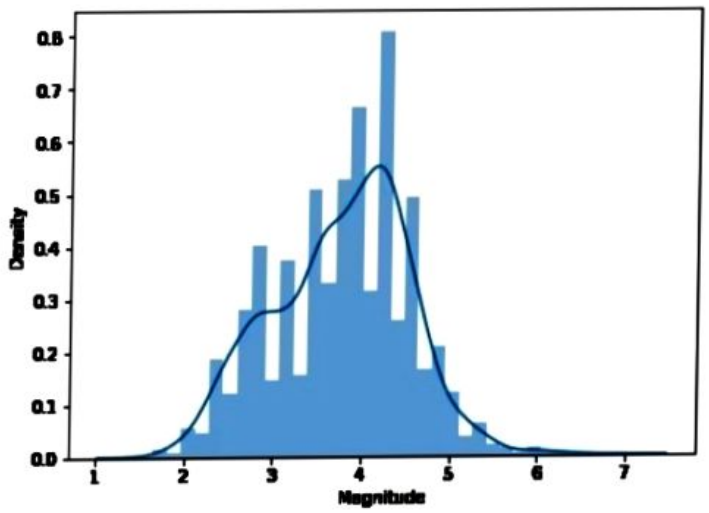


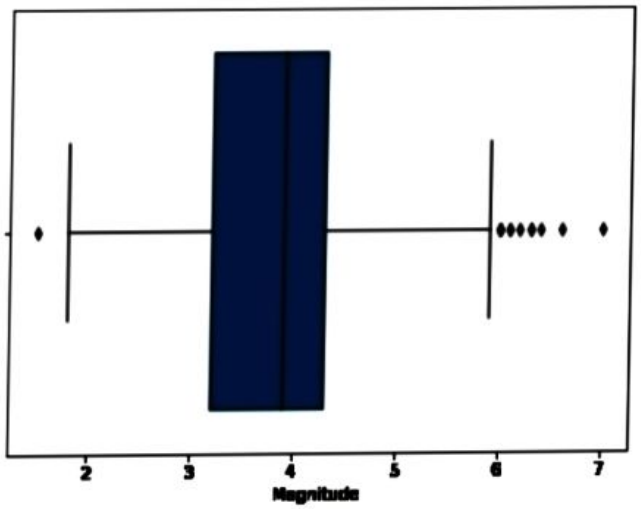
```
plt.subplots(figsize=(15, 5))

plt.subplot(1, 2, 1)
sb.distplot(df['Magnitude'])

plt.subplot(1, 2, 2)
sb.boxplot(df['Magnitude'])
plt.show()
```

Output:





```
splitted = df['Date'].str.split('-

df['day'] = splitted[2].astype('in
df['month'] = splitted[1].astype('
df['year'] = splitted[0].astype('i

df.drop('Date', axis=1,
        inplace=True)
df.head()
```

Output:

	Latitude	Longitude	Depth	Magnitude	Location	Time	day	month	year
0	29.06	77.42	5.0	2.5	53km NNE of New Delhi, India	09:43:23	31	7	2021
1	19.93	72.92	5.0	2.4	91km W of Nashik, Maharashtra, India	23:04:57	30	7	2021
2	31.50	74.37	33.0	3.4	49km WSW of Amritsar, Punjab, India	21:31:10	30	7	2021
3	28.34	76.23	5.0	3.1	50km SW of Jhajjar, Haryana	13:56:31	30	7	2021
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