**Prediction Of Origin and Trajectory of Marine Debris**

Charanya Manivannan1\*, Jovina Virgin1, Shivaani S1, Dr. Vani K1

1Department of Information Science and Technology, College of Engineering, Guindy, Chennai, India

\*charanyamanivannan@gmail.com

***ABSTRACT***

Marine debris is in a constant state of motion, origin identification is hard. Marine debris’ position keeps changing depending on various factors like wind, water speed, weather. Predicting origin of marine debris, and its trajectory in the following weeks, until collection can be done is necessary. For predicting debris origin, data provided by Florida University is used, containing waste (tons) exported by countries, waste destination, beached waste (tons) and origin of beached marine debris of countries. The probable origin countries of marine debris are found using the probability of marine debris beaching, waste (tons) exported by countries, and the distance between marine debris and countries. The nearest countries to the debris along with the countries whose waste reaches these neighbouring countries and the destination countries of debris released from these neighbouring countries are identified. The origin-values for these countries are calculated by giving more importance to distance than to countries’ waste exports, because debris exported is heavily skewed. So, top 10 origin countries are identified by finding top 10 origin values. For predicting marine debris trajectory, open-source buoy data is used. Earth is split into 1\*1 latitude-longitude grid and 52 such transit matrices are created for each week of a year. The probability of the buoy being in each cell of the grid during each week is calculated, and corresponding transit matrices of all buoys are averaged to get 52 transit matrices that depict all buoy data. To find the trajectory, the transit matrix corresponding to the week after the marine debris is found is used. Location of debris in the next week is the neighbouring cell of debris location in the transit matrix with the highest probability.This is verified using existing buoy data.This process is repeated using subsequent transit matrices to get the trajectory.

**Keywords:** Origin of debris, Probability, Trajectory of debris, Transit Matrices.