**Plastic Pollution and Mitigation**

Student Name: Suresh Chinnasamy

Student Number: sbs24038

Date:

Github Link:

A picture containing icon

Description automatically generated

**Table of Contents:**

**Introduction………….………………………………………………………………………………..4**

**Objectives…………….………………………………………………………………………………..4**

**Problem Definition…..………………………………………………………………………………..4**

**Scope……….....………………………………………………………………………………………..4**

**Project data…..………………………………………………………………………………………..4**

**Ethical Considerations………………………………………………………………………………..4**

**References….…………………………………………………………………………………………..4**

**Introduction:**

Plastic is invented in 1907. Plastics production and consumption is increasing exponentially day by day. Though there are awareness on the public about the impacts of using plastics, no clear action is taken to control the production and damages due to plastics.

Everyone needs to understand the severe impact of using plastics on every living and non-living creature on the earth. Immediate corrective measures need to be taken to address the global issue which is growing massively across the globe. Very few sustainable measures like recycling the plastics were taken to address this issue so far.

**Objectives:**

1. Plastic production and usage
2. Impact on Environments due to pollution
3. Controlling measures and Alternative solutions to save our planet.

**Project Scope:**

Main purpose of the project is to understand key factors like Increase in production of plastics every year, Impact of plastics due to pollution and Necessary sustainability measures to overcome the impact on the earth.

Planning to use AI technology to explore the models like Linear regressions, Random Forest and KNN for the historic data analysis and future prediction for plastic pollution. This will help to create universal awareness and take necessary steps to control the plastic pollution and uncover the truth to present the reality.

**Details of Dataset:**

Plastic is cheap and easily available to use in various applications like home appliances, medical instruments, and food packaging. But when plastic waste is not recycled and managed properly, then it kept in sealed landfills, and it becomes an environmental pollutant. One to two million tonnes of plastic enter our oceans yearly, affecting wildlife and ecosystems.

[39058031-en.pdf (oecd-ilibrary.org)](https://www.oecd-ilibrary.org/docserver/39058031-en.pdf?expires=1709367833&id=id&accname=guest&checksum=221864FBF32F1A1C7DB442F6E4CDFD69) page #8

The report uses annual data submissions from 2017 to 2021 for the analysis of global production patterns for plastics.

**Key Challenges:**

Collecting right quantifiable and up to date data as well as choosing the right references is a key challenge. In addition,

**Timeline:**

Below is the tentative timeline to track the different stages of the project.

**Semester one:**

* Detailed study from references: 1 week
* Choosing right model for historic data analysis and future prediction: 3 weeks
* Impact analysis using various smaller datasets: 2 weeks
* Training and Validation of the output: 2 weeks
* Ongoing documentation: 2 weeks

**Semester two:**

* Analysis of key challenges: 2 weeks
* Training the model with larger datasets: 3 weeks
* Validating the accuracy: 3 weeks
* Graphical presentation of the output: 2 weeks
* Ongoing documentation: 2 weeks

**Sustainability and Mitigation Strategy**

1- Rapid increase in Plastic production

The rapid growth in global plastic production didn’t happen until the 1950s. Over the next 70 years, the annual production of plastics has increased nearly 230 times to 460 million tonnes in 2019. Global plastic production has doubled in the last two decades which is massive. [Plastic Pollution (kaggle.com)](https://www.kaggle.com/datasets/imtkaggleteam/plastic-pollution?resource=download)

Are there any such real demands for the massive production?

2- Generation of Plastics waste

Plastic pollution depends on how much of this waste is mismanaged. Non recycled plastic waste is kept in sealed landfills. Mismanagement will result in waste leaking to the environment. The discarded plastics over the days due to sunlight or ocean waves it can release microplastics, tiny particles are mixed with air, food, water, and turning up in tests of human blood.

[Polishing off Plastic Pollution? | Harvard Magazine](https://www.harvardmagazine.com/2023/08/right-now-plastic-pollution)

how much of the waste is managed properly or recycled?

3- Recycling of Plastic waste

Only around 9% of the plastics were recycled so far. Half of the world’s plastic still goes straight to landfill. Another fifth is not recycled and kept in sealed landfills which is risk of being leaked into rivers and the ocean.

Can we reduce the consumption as well as reuse and recycle the plastics?

4- Better plastic waste management

Environmental problem due to Plastic pollution can be solved with the improvement in waste management strategies. Controlled production and planned consumption, recycling and using disposable plastics will heal the damages created so far in the environment.

**Conclusion:**

Everyone need to follow the 3 R’s: Reduce, Reuse, and Recycle the plastics to save the planet for future generations and make it as a better place to live.

Interest in the development of bioplastics has increased in the past decade due to environmental and strategic forces (Gironi & Piermonte, 2011). Increased demand for compostable products will create a higher demand for composting facilities.

Increases in composting facilities will create more jobs and improve waste management process by avoiding landfills. Many big corporations have adopted ecofriendly initiatives in response to global plastic pollution and implementing sustainable initiatives eliminate single use plastics and incorporate bioplastics instead (Sheridan, 2016). Additional large corporations are likely to join the ecofriendly trend as consumers demand it in the marketplace.

**Future Developments**

Research and funding for bioplastics continues to increase, costs to manufacture them will continue to decrease (Tillman & Slater, 2000). Bioplastic companies allocate funds towards research and development to find the most efficient ways to produce bioplastics.

Industry revenue expected to reach over 10 billion in 2020 (ibisworld.com, 2019). Global plastic productions over the next 20 years from plants could double (Coren, 2016). The bioplastic industry is expected to continue to grow at a positive rate as the demand for plastic alternatives increases.

Artificial intelligence (AI) algorithms will vastly increase the power of the research on molecular analyses, rapidly generating predictions about changes to an enzyme’s molecular structure that could potentially speed up its ability to degrade plastic. The researchers will then evaluate the enzyme variants and their different properties in the lab. [Polishing off Plastic Pollution? | Harvard Magazine](https://www.harvardmagazine.com/2023/08/right-now-plastic-pollution)

**Reference list**

Katarina, M. and English (2016). *MODELING HEALTH RISKS OF MICROPLASTICS: AN UNCERTAINTY ANALYSIS A CAPSTONE PROJECT IN THE FIELD OF SUSTAINABILITY AND ENVIRONMENTAL MANAGEMENT SUBMITTED AS A PARTIAL REQUIREMENT FOR THE DEGREE OF MASTER OF LIBERAL ARTS IN EXTENSION STUDIES*. [online] Available at: https://capstone.extension.harvard.edu/files/capstone/files/katarina\_marie\_english.pdf.

www.linkedin.com. (n.d.). *Sustainability Capstone: Plastic and Bio-plastic Comparative Analysis*. [online] Available at: https://www.linkedin.com/pulse/sustainability-capstone-plastic-bio-plastic-analysis-zachary-parrish?trk=public\_profile\_article\_view [Accessed 1 Mar. 2024].