# 1.Introduction(100 words)

Human beings produce electronic waste at an unprecedented pace. Until 2016, the world generated 44.7 million metric tonnes (Mt) of e-waste, and only 20% of this tonnage found its way through proper recycling channels. This number is expected to increase to 52.2 Mt by 2021. India introduced its first set of e-waste management laws in 2011 which were further amended in 2016 and 2018. The responsibility of collection and channelization of e-waste has been given to the producers, manufacturers, and dealers of Electronic and Electrical Equipments. Authorization to these stakeholders is given only if they meet their phase-wise collection targets of e-waste.

# 2. Project concept

# 2.1 Abstract (100 words)

We have become too dependent on technology owing to which the quantity of e-waste produced has increased at a rapid pace. Considering the growing volume of e-waste, the possibilities of these non-biodegradable elements contaminating the atmosphere are towering. To overcome this challenge, a blockchain-based e-waste management technique is proposed. The proposed solution tracks the e-waste produced and motivates people by providing them incentives for channelizing the e-waste via government agencies that dispose of the waste in an environment-friendly way. Henceforth, a partnership model is proposed for the implementation of this method which leads to an increase in jobs as well as proper organization of unplanned setup that is with a large amount of prospective potential.

# 2.2 Objectives (50 words)

The project aims at developing an E-waste management system using Blockchain-based Smart Contracts. The goal is to bring together the government agencies, consumers, and stakeholders on the same blockchain platform which will lead to improved monitoring and higher transparency in the process. We also aim to provide a methodology on how we can slowly shift to the blockchain network.

# 2.3 Literature review(100 words)

The rise in digitization has led to a rise in the amount of e-waste generated throughout the world [1]. A detailed review of different kinds of treatments followed for disposing of e-waste in an environment-friendly manner has been defined in [2]. India also needs to deal with its domestic e-waste as well as imported e-waste. An assessment of e-waste management policies and recycling practices within India has been discussed in [3]. In [4] the effects of untreated e-waste on the environment have been highlighted. Major barriers in the implementation of policies for proper disposal of generated electronic waste have been mentioned in [5].

# 2.4 Problem definition(100 words)

The greatest problem in terms of the Management of e-waste is the tracking of the movement of e-waste. Most of the time, people are not worried about the growing environmental problems or are simply not aware. At other times, they may think that it is a hassle to go towards proper e-waste disposal centers as they are not directly getting anything from it. One solution we could have for this is by having the e-waste tracked via supply-chains under a blockchain and then reward the honest and responsible people with tokens that can be used to earn discounts or simply buy other products.

For this, we will need to have a partner company/organization that would be willing to provide discounts/offers in exchange for our tokens. What we can do is that we can offer those e-waste products back to the companies for recycling.

However, products often have a specific warranty duration or peak/usable lifetime. Beyond that, products may get faulty. On basis of that duration and beyond, if the product is returned, it can provide a chance for discounts, etc. Another situation that could be thought of as a problem by some is that people may try to misuse the blockchain by stealing products from someone else, perform counterfeit or double-spending, etc.

These problems can be easily taken care of if we assign the affiliated company to register and store within their database to who they’ve provided the product (which is very often done in megastores like croma). This eradicates the problem of stealing and counterfeit. As for double-spending, we can deal with that using the carrot and stick method of crypto-economics.

# 2.5 Scope(100 words)

Now, there are a bunch of things that we can do with this idea, some are included in the contents above, like the offering of discounts, etc.

The basic idea is that it can be implemented throughout the world. In the growing age of technology, e-waste will be increasing, hence a widespread adaptation will be key.

It also provides jobs as a validator to multiple people within the industry, not necessarily having knowledge of the blockchain, but can be trained for its utilization.

# 2.6 Technology stack(50 words)

Ethereum Blockchain:

Ethereum is a decentralized, open-source blockchain with smart contract functionality

JavaScript, HTML, CSS

Used to form the user interface

Solidity:

The language used to write the back end code

Remix IDE:

The platform used to test, compile and deploy the backend code

Node.js:

The platform acts as an open-source, cross-platform, back-end JavaScript runtime environment that runs on a V8 engine and executes JavaScript code outside a web browser

Web3.js:

A collection of libraries that will make our lives easier while coding/developing the blockchain

# 2.7 Benefits for the environment and society. (50 words)

Electronic waste contains **toxic components** that are dangerous to human health, such as mercury, lead, cadmium, polybrominated flame retardants, barium, and lithium. The negative health effects of these toxins on humans include brain, heart, liver, kidney, and skeletal system damage.

When e-waste is exposed to heat, toxic chemicals are released into the air damaging the atmosphere; this is one of the biggest environmental impacts of e-waste.

Those toxic materials can then seep into the groundwater, affecting both land and sea animals.

Electronic waste can also contribute to air pollution.

# 2.8 References

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2. S. Jagdale, V. Dindkar, R. Yelawe and S. Patil, ""Present Scenario of E- Waste Disposal: A Review."," International Journal for Science and Advanced Research in Technology, vol. 3, no. 6-june-2017, pp. 5-9, 2017.
3. P. Pathak and R. R. Srivastava, "Assessment of legislation and practices for the sustainable management of waste electrical and electronic equipment in India," Renewable and Sustainable Energy Reviews, vol. 78, pp. 220--232, 2017.
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5. K. Chaudhary, K. Mathiyazhagan and P. Vrat, "Analysis of barriers hindering the implementation of reverse supply chain of electronic waste in India," International Journal of Advanced Operations Management, vol. 9, no. 3, pp. 143-168, 2017.