

# ENVIRONMENTAL SUSTAINABILITY

1.

**TITLE:** Developing applications to help individuals and organizations track and reduce their carbon footprint.

**DOMAIN:** Sustainability

## **DESCRIPTION:**

Carbon footprint is a measure of the total amount of greenhouse gasses released into the atmosphere as a result of an individual's, organisation's, or nation's actions. It's usually measured in tonnes of CO<sub>2</sub>. In reality, the links between greenhouse gas emissions and climate change are too evident and extreme to ignore. Average global temperatures are increasing, extreme weather events are becoming more severe and ocean levels are rising. All of these ecological threats are a result of human activity. By lowering your carbon footprint, you can help contribute to the overall reduction of greenhouse gas emissions.

It's not just about the environment either. Reducing your carbon footprint can help you live a healthier lifestyle, as well as save you money. Whether it's cleaner air, a healthier diet, or reduced energy bills, these benefits of reducing your carbon footprint also mean you're doing your bit to combat climate change.

## **REQUIREMENTS:**

To resolve this issue, you need to develop a solution that will track, monitor, and suggest ways to reduce carbon footprint and help the environment. The solution must inform people about how much carbon they are releasing into the environment and recommend tips to limit their carbon emissions according to their daily lifestyle.

**2.**

**TITLE:**

Designing and implementing data-driven solutions for reducing waste and improving recycling rates.

**DOMAIN:** Sustainability

**DESCRIPTION:**

Waste disposal was a significant challenge faced by the community and government. Customers buy and use goods that produce a considerable amount of waste. Waste management is a major problem since the number of consumers increased due to high wastegeneration. This has resulted in a huge amount of waste, which calls for enormous waste- management policies.

**REQUIREMENTS:**

A growing population and economy, which means increased volumes of waste generated. This puts pressure on waste management facilities, which are already in short supply. Design a smart waste collection system that allows citizens to segregate the various types of solid waste they want to dispose of and the municipal authorities to efficiently collect the same. The system should have two interfaces one for citizens and another for garbage collectors. The system should be mobile app (Android) based.

**PARTICULARS:**

**The following categories of waste are available:**

- Organic waste.
- Recyclable waste.
- Toxic waste.
- Electronic waste.

### 3.

**TITLE:**

Designing and implementing intelligent transportation systems to reduce traffic congestion and promote sustainable transportation options.

**DOMAIN:** Sustainability

**DESCRIPTION:**

Traffic congestion has been increasing in much of the world, developed or not, and is expected to get worse, representing an undoubted menace to the quality of urban life. The main issues are increasing journey times, fuel consumption, operating costs and environmental pollution, as compared with an uninterrupted traffic flow.

**REQUIREMENTS:**

Intelligent transportation systems provide effective and efficient solutions toward the road traffic management and decision-making problems, and thus help to reduce fuel consumption and emission of greenhouse gases. Design and implement an application which will optimize the transportation system and make better decisions to ease traffic. The solution provided should also provide an interface to suggest improvements over the current Intelligent transportation systems if present.

**4.**

**TITLE:**

Developing technologies and applications to help farmers and agricultural businesses adopt more sustainable practices.

**DOMAIN:** Sustainability

**DESCRIPTION:**

Technological change has been the major driving force for increasing agricultural productivity and promoting agriculture development across the globe. In the past, the choice of technologies and their adoption was to increase production, productivity and farm incomes. The technological change now should also meet the sustainability goals.

**REQUIREMENTS:**

The developed technologies should be able to ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding. The solution should also suggest what crops should be used in relation to weather.

**5.**

**TITLE:** Improving Public Transport and Logistics in a sustainable manner.

**DOMAIN:** Sustainability

**DESCRIPTION:**

Transport is at the center of many economic and social development challenges, accounting for about 64% of global oil consumption, 27% of all energy use, and 23% of the world's energy-related carbon dioxide emissions. At the same time, Public transport in many major cities is still not popular than owning private vehicles. Authorities need to promote using of public transport to reduce the carbon footprint generated by people. Additionally, the pandemic significantly harmed the logistics industry, which now needs to survive in a sustainable environment.

**REQUIREMENTS:**

In order to promote Eco-friendly transportation and Logistics in B2B services, the solution should provide methods to promote the need of Environmental friendly Transportation, Improve the current existing systems with greener transportation systems.

# Gender Diversity

1.

**TITLE:** Creating algorithms and machine learning models to identify and address gender bias and discrimination in the workplace.

**DOMAIN:** Gender Diversity

**DESCRIPTION:**

Artificial intelligence is increasingly influencing the opinions and behavior of people in everyday life. However, the over-representation of men in the design of these technologies could quietly undo decades of advances in gender equality. But this can be changed by presenting the facts and statistics that are concluded after careful analysis of the entire data and this can be done with the help of Machine learning algorithms. Machine intelligence learns primarily from observing data that it is presented with. While a machine's ability to process large volumes of data may address this in part, if that data is laden with stereotypical concepts of gender, the resulting application of the technology will be very successful in removing this bias and discrimination at work place.

**REQUIREMENTS:**

In order to identify and decode the Gender bias and discriminations faced, a Machine Learning model has to be built using suitable algorithms. The solution must identify the bias taking into consideration a lot of factors in a way that can be taken action upon. It should be presented with the accurate statistics that were considered before arriving to a conclusion.

2.

**TITLE:** Developing tools and platforms to connect women with mentors, resources, and opportunities in the technology industry.

**DOMAIN:** Gender Diversity

**DESCRIPTION:**

Many young women love engineering and technology but by the time they reach college and the jobmarket, far too many of them have been discouraged to follow their passion and drop out of the field. A mentor can make a huge impact on your career and help you to reach your next career milestone. A proper resource, guidance can go a long way in helping remove the stigma around the subject. These resources can sometimes be very difficult to be accessible for women from little or no access to the technological space.

**REQUIREMENTS:**

The aim of is to tackle gender stereotypes as they relate to women in innovation by promoting, supporting, and connecting women innovators, and raising awareness of the innovations developed by women and for women. Finding and access job training and employment opportunities in the technology industry. Innovating and creating platforms for accessibility of the mentors, content and happenings in the tech industry is the main goal. A separate section in a single platform can be made for handling various issues.

### 3.

**TITLE:** Creating technologies and applications to support and enhance women's health and well-being.

**DOMAIN:** Gender Diversity

**DESCRIPTION:**

Globally women are more likely to experience less favorable social determinants of health (such as over-representation of women in low-paying, insecure employment; lower education and literacy levels amongst rural and immigrant women) than their male counterparts. Women carry the bulk of responsibility for raising children, meeting household obligations and today, work as a full-time employee in various outstanding fields. Technology is being integrated into all aspects of health care. Technology is being invented, repurposed, and optimized in every field of medicine, including obstetrics and gynecology, and women's health care is directly influenced by these technologies. Accessibility to such applications can be beneficial to detect symptoms at an early level, be accessible to women and educate them about various aspects of their health care regime.

**REQUIREMENTS:**

To create applications and technology for a variety of fields pertinent to women's health, including patient communication, physician education, and health care performance. This should be accessible in remote areas and easy UI.



**4.**

**TITLE:** Designing and implementing systems to monitor and address Gender-based violence, Cyber bullying and harassment.

**DOMAIN:** Gender Diversity

**DESCRIPTION:**

With the rise of new technology and social media, gender-based cyber violence is a constantly growing threat with impacts at individual, social and economic levels, on women and girls and on society generally. Harassment against women affects women because of their gender and their intersecting identities and exists on a continuum that extends, reverberates and rebounds online. Online and technology-facilitated violence against women occurs on different platforms and with a variety of tools, both publicly accessible and private, such as social networks, private messaging apps, e-mails, dating apps, forums, media comment sections, video games or videoconferencing platforms. Violence happening online and via new technologies has a serious impact on women's lives, their and their dependents' physical and psychological health, their livelihoods, their reputation, their political participation and their presence online.

**REQUIREMENTS:**

To identify the sources of any sort of bullying or bias from the senders and the receiver's end. To monitor and give a warning message to the sender and receiver that a message is having some terms or texts that have been linked to bullying and are recommended not to be used. A system that can keep this behaviors in check.

## 5.

**TITLE:** Developing technologies and applications to support and enhance women's safety and security, such as by providing access to emergency services and information.

**DOMAIN:** Gender Diversity

### **DESCRIPTION:**

According to statistics, around 736 million women have been victims of physical and/or sexual intimate violence either by partner or non-partner. The number counts for one-third of all women's population worldwide. In 2020 alone, a woman or girl was killed every 11 minutes in their home (let alone the roads and public areas). The number takes it to 81,000 women in a year. 58% of these victims died at the hands of a family member or partner. The stats communicate the need for women's security solutions efficiently in practical language. Undoubtedly a need for developing technologies and applications that can help women feel protected and safe on roads falls on the roof

### **REQUIREMENTS:**

Notify friends or family when the user is in trouble and inform them about the nearby location from the signal. Insights about the medical facilities when in emergency, navigating via the safest path, tracking options, identifying crime hotspot areas based on the previous police data.

# Industry 4.0

1.

**TITLE:** Building a real-time IOT data visualization platform for industrial processes

**DOMAIN:** Industry 4.0

**DESCRIPTION:**

Data is Everywhere! Right from a customer visits a company's website until he signs out, all the data and the behavioural pattern is tracked. All these data becomes useless, unless they serve for a particular purpose. Analysing the data and predicting the future trend and where to focus more are some of the significant benefits it offers. Smart data visualization tools and technologies helps to slice and dice the data to the minute granular level.

**REQUIREMENTS:**

Design a visualization platform that helps the industries to analyze the data received in the form visual format such as a graph, chart, or heat map for better understanding. The solution should include the option to upload the data, able to verify the content before visualization, and variety of chart types.

2.

**TITLE:** Aggregated news for investment

**DOMAIN:** Industry 4.0

**DESCRIPTION:**

Investing is a time-tested way of putting your money to work for you, as you work to earn more of it. By investing money regularly, you may be able to increase it many times over with time. That's why it's important to begin investing as early as possible and as soon as you have some money saved for that purpose. Furthermore, the stock market is a good place to start, Investment varies depending upon on the experience of the Investor. They receive a large number of reports, recommendations and financial news from many different sources and there is currently no platform that can structure and aggregate this data.

**REQUIREMENTS:**

Develop a platform that would consolidate news, information and reports that are relevant to investors based on their needs and investment strategies. This platform should provide investors with industry snapshots, financial news highlights, as well as research reports categorized by topic/analyst.

3.

**TITLE:** Subscription management solution

**DOMAIN:** Industry 4.0

**DESCRIPTION:**

A corporate architecture called subscription management optimizes subscription delivery through tech-driven automation and shared data (where customers pay on a recurring basis for access to your product or service). Improved customer experiences across the purchasing process encourage adoption, renewals, retention, and growth.

**REQUIREMENTS:**

- The idea is to create a mobile app or web platform to empower consumers to better manage their payments for ongoing subscription services like Amazon, Spotify, iCloud, DropBox, and so on.
- The focus of this software or app should be to help detect and manage consumers' subscriptions once they fall into disuse.
- Platform should show the users statistics
- Solution should track the user app usage through parameters like watch hours and suggest them which package or subscription is best for them

**4.**

**TITLE:** Automated Translation in finance

**DOMAIN:** Industry 4.0

**DESCRIPTION:**

Financial institutions produce thousands of reports for their customers which includes Balance sheet, Income Statement and Cash flow statements etc. Although the production of these reports is automated, the translation of these into the customer's local language is manual, costly, and time consuming.

**REQUIREMENTS:**

Develop a semi-automated translation solution for financial institutions that enables efficient review and workflow validation.

- Solution Should generate summary of the reports in customers understandable language
- Solution should validate and describe workflow to the user

5.

**TITLE:** Mobile payments for administering Aid

**DOMAIN:** Industry 4.0

**DESCRIPTION:**

Digital mobile payments are widespread mechanism for delivering aid, but their successful launch would require banks and mobile network operators to partner together. Although there has been widespread adoption of mobile wallets, there has been little focus on adapting this model to the needs of this segment. For example, phones may be limited in a refugee camp, therefore multiple people may depend on the same device. Creating multiple accounts under the same number would be a simple solution.

Smaller NGOs still use paper vouchers as means of payment, which can lead to fraud and violence.

**REQUIREMENTS:**

Find a solution that would enable people in regions requiring emergency aid to make payments and withdraw cash through alternative networks. This solution could combine biometrics with blockchain and crypto currency.

# Cyber Security

1.

**TITLE:** Developing a secure authentication system for online accounts

**DOMAIN:** Cyber Security

## **DESCRIPTION:**

Authentication is a process of validating the identity of a user. Secure authentication prevents several attacks, that can exploit a system or user data. Having a secure authentication process will make it more difficult for an attacker to gain access to the system. Users can trust the system when the organisation provides data security and privacy. User depends highly on the security mechanism of a system.

Providing a secure authentication is a significant challenge. The attackers are in a constant procedure of finding exploits in the system. Some of the major vulnerabilities related to broken authentication

- Vulnerable authentication logic.
- Weak account/password recovery process.
- Using a vulnerable authentication library.
- Insecure session handling.
- Missing rate limiters and lockout process.
- Insecure two-factor authentication.
- Insecure password verification methods.

## **REQUIREMENTS:**

To develop a secure authentication system for online accounts. This can include some of the advanced techniques such as multi-factor, biometric, voice and facial recognition. The participants are free to use any algorithm and are expected to develop an end-to-end architecture for authentication which is uncompromisable with new-age exploits

2.

**TITLE:** Building a data encryption tool for sensitive information

**DOMAIN:** Cyber Security

**DESCRIPTION:**

Digital communication witnessed a noticeable and continuous development in many applications in the Internet. Hence, secure communication sessions must be provided. The security of data transmitted across a global network has turned into a key factor in network performance measures. So, confidentiality and the integrity of data are needed to prevent eavesdroppers from accessing and using transmitted data.

Encryption helps protect private information, sensitive data and can enhance the security of communication between client apps and servers so that an unauthorized person or entity gains access to it. The purpose of encryption is confidentiality—concealing the content of the message by translating it into a code.

**REQUIREMENTS:**

Develop a tool for encrypting the data. The tool should be able to encrypt all types of data such as text, voice and video. The tool should be able to incorporate the following principles:

- Confidentiality - encodes the message's content.
- Authentication - verifies the origin of a message.
- Integrity - proves the contents of a message have not been changed since it was sent.



3.

**TITLE:** Developing a cyber security education program for employees

**DOMAIN:** Cyber Security

**DESCRIPTION:**

Human errors are a massive issue for cybersecurity. Human error in cybersecurity accounts for either unintentional or lack of action that results in a data breach. It includes activities like downloading infected software and keeping a weak password or compromising the IP address that can be checked on What Is My IP and not updating the software.

Empowering your employees to recognize common cyber threats can be beneficial to your organization's computer security. Security awareness training teaches employees to understand vulnerabilities and threats to business operations. Cybersecurity training programs will **reduce the risk of data breaches**. Employees will be better equipped to recognize red flags. This will help prevent any costly mistakes – saving time and money in the long run. To reduce such errors there is a need for educating employees.

**REQUIREMENTS:**

An application incorporating a cyber security education program which is aimed to educating the users about the new age exploits and practices to be followed to reduce the risk of human errors. The program is expected to be efficient, interactive and in micro learnings.

4.

**TITLE:** Creating a system for detecting and preventing phishing attacks

**DOMAIN:** Cyber Security

**Description:**

Phishing attacks are the practice of sending fraudulent communications that appear to come from a reputable source. It is usually done through email. The goal is to steal sensitive data like credit card and login information or to install malware on the victim's machine.

Phishing has two main delivery vehicles: emails and websites. Emails being the foremost of these, are most classically associated with phishing. These often include malicious URLs to direct users towards maliciously crafted content. By obfuscating the real destination of a URL through a few simple manipulations, users can quickly find themselves on unknown and insecure ground. Therefore it is vital to tackle this massive worldwide problem

**REQUIREMENTS:**

Develop a system which is capable of detecting and preventing phishing attacks. The solution should be able to detect user actions which may result in phishing of user information, intimating them and preventing such actions.

5.

**TITLE:** Building a cybersecurity risk assessment tool for organizations

**DOMAIN:** Cyber Security

**Description:**

For many enterprise organizations, administering risk assessments is the first step in building an effective cyber threat management system. The visibility gained from these assessments provides insight that helps guide high-level cybersecurity decisions, making them valuable assets for organizations of all sizes. That said, the effectiveness of cyber risk evaluations is heavily reliant on the tools used to conduct them.

The goal of these assessments is to determine how network assets would be affected in the event of a breach and identify their individual risk level. The insight gained enables comprehensive risk prioritization, improving an organization's ability to quickly respond to network threats.

**REQUIREMENTS:**

Develop a tool that is capable of performing the following steps:

- Determining Information Value
- Identifying and Prioritizing organisational assets
- Identifying Cyber Threats
- Identifying Vulnerabilities



