



A Predictive Analysis to improve the Green and Sustainable Computing in Adhiyamaan Campus

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Abstract-This paper presents the concept of Green and Sustainable computing. Green and Sustainable computing is a work for saving the environment by giving the opportunity of using computers, servers, and associated devices such as monitors, printers, networking, and communication systems in limitation. The main goal of green computing is to use desktops ecofriendly and save the environment. Green computing is a study of the routine utilization of desktops effectively. Green computing will account for less consumption of power and reduce the emission of carbon dioxide. The computer can increase the amount of electricity consumption which in turn increases the carbon dioxide content in the atmosphere. This sustainable computing can build a protected place for work. This paper also presents the range of oxygen production on our campus. This estimate will give us a carbon-free environment.

Keywords: CO₂, O₂, Computer Lab, Emission Heat, Green Computing

1. Introduction

In more recent times the source of CO₂ emissions has increased rapidly due to the distraction of forests, increased usage of desktops, climate change, global warming, earth temperature, and infrared radiation. In 2007, the United Nations intergovernmental panel on climate change (IPPC) given its report on the emission of CO₂ is increasing due to the usage of desktops and in research conducted in late 2009, Del determined the carbon dioxide emission of the business laptops is approximately 350kg CO₂eq when used in the US. These results varied from region to region and now we have calculated the emission of CO₂ inside our college campus ADHIYAMAAN COLLEGE OF ENGINEERING. Normally a tree can produce 260 pounds of oxygen per day, a general survey was taken on account of trees grown on our campus it was approximately 999 trees.

2. Literature Review

Nithin S., et.al (2017) describe virtual machines' use are growing day by way day as human beings are the usage of many clever devices which are noticeably computing and for running them smoothly, required digital machines. Virtualization is the simple method of growing a variety of assets from the on-hand bodily infrastructure. It is the spine of cloud computing technology. This paper attempt to deal with reading a range of techniques, models, and algorithms, for environment-friendly inexperienced cloud computing via the usage of virtualization techniques. It typically entails virtual machines (VMs) consolidation. Power utilization can be decreased using truly deactivating and reactivating bodily machines to meet the modern workload. Power attention in the disbursed devices can be described as figuring out the parameters which decrease the power consumption alongside higher QoS, and SLA. Quite a several techniques mentioned right here are by and large focusing on saving energy and making records facilities extra environment friendly using considering server and network as its scope, on the other hand in the future due to the requirement of excessive bandwidth and community connectivity of records centers, electricity requirement of records core will go past our imagination. To cope with the above-referred subject require true find out about how strength consumption takes place in facts centers, most of the phase of energy are bumped off by using servers, CPU, and switches i.e. community devices. There nevertheless loads of lookup want to be achieved to sketch such modern-day algorithm and methods which reap higher electricity effectivity alongside with consideration of QoS, SLA, and VM consolidation by way of defining VM topologies which are fault-tolerant and additionally help nature, mankind via minimizing Co two emission. Saha, Biswajit. (2018) proposed Green computing more broadly is the practices and processes of designing, manufacturing, the user computing sources in a surroundings pleasant way whilst preserving usual computing performance and subsequently disposing of them in a way that reduces their environmental impact. This capacity discount in use of hazardous materials, maximizing output from the product at some stage in its life whilst minimizing power consumption and additionally reusability or recyclability and biodegradability of used merchandise and wastes. Many company groups are taking initiatives to limit the dangerous effect of their operations on the environment. United Nations Framework Convention on Climate Change (UNFCC) is a worldwide surroundings treaty whose goal is to stabilize the emission of inexperienced residence gases in the surroundings to a degree that would stop unsafe anthropogenic interference with the ecosystem. Sustainable improvement ability grows except unfavorable the necessities of the future generations. That is assembly human improvement desires whilst

keeping herbal sources and ecosystems on which the society depends. This paper is a survey of numerous vital modern-day researches associated with the subject of inexperienced computing which emphasizes the significance of inexperienced computing for sustainable development. Rahman, Nafisur. (2022) explained Green Computing refers to the environment friendly use of computing and allied tools. Various strategies have been devised from specific views to obtain the desires of Green Computing. This chapter captures the essence of, and offers the perception of, some of the essential Green Computing techniques, that exist today, and explores their effect on the current and future utilization of computing resources. First, we introduce the thinking of Green Computing and its significance. Then we discover a range of Green Computing Techniques, section wise, below 4 unique categories. The first class is about Green Design Techniques whereby we supply a glimpse of how some of the layout techniques if employed, can go a lengthy way in defending the environment. It is accompanied by an area on Green Manufacturing Techniques. In this section, we current the approaches of manufacturing that are aimed at minimizing the ecological footprint. Then we cowl Green Utilization Techniques that govern the utilization of computer systems and related assets in an eco-friendly manner. Finally, we talk about Green Disposal Techniques that contain the problems of reuse, recycling, and disposing of computer systems.

3. Proposed Work

The main objective of this research work used to analyze the level of oxygen and carbon dioxide on the campus of Adhiyamaan College of Engineering. The Department of MCA consists of three labs where more the 300+ computers are used for educational purposes. This Work mainly focused on Green Computing where the computer resource emits heat in terms of Carbon dioxide. The amount of heat produced in the Computer lab with the amount of oxygen generated in the Adhiyamaan Campus was calculated and predicted by the analysis of how percentages of the tree must be planted for a healthy and effective Green environment. The Following Figure 1 represents the greenery environment of the Adhiyamaan campus and the computer lab utilized for the educational system is shown below.



Figure 1: Green Computing @ Adhiyamaan College of Engineering

To calculate the carbon dioxide emitted from the desktops in Adhiyamaan college of engineering, consider the usage of power consumption every day to calculate the direct use of the system. It is known that the average estimation of carbon emission from 1 unit of electricity is 950 grams. It should be noted that this variation in emission depends upon the usage of the system. Therefore, we can calculate the emission of carbon dioxide from the system by using the formula: Emission of CO₂ in 1 desktop= P *PC*D(1) P=950 gm of CO₂/unit of PC(approx) PC=Power Consumption/Laptop D=No.Of.days By equation (1), we approximately took a survey in our campus about trees around our labs giving out of oxygen is117.9kg/tree. Here we have approximately 341 trees near our Computer Lab, which gives out the oxygen of 17355 on average.

4. Experimental Work

From the above equation A, the following tables were generated based on the number of systems used in the lab, and the number of trees in the Adhiyamaan College of Engineering, Hosur.

Table 1:Emission of CO₂ from Labs

Lab	No. of Systems	No. of Emission	Trees of O	of CO
Lab 3	109	19518	55	6435

Lab 5	111	19876	72	8424
Lab 7	121	21667	64	7488

We surveyed the emission of heat due to the usage of desktops on our campus, the above table shows the data which includes no of labs, emission of CO₂, and emission of oxygen in and around the lab.

5. Description About Lab

Our department Use three Labs On regular basis which is of Lab3, Lab5, Lab7. Each lab consists of 100laptops approximately. The Following Graph was constructed from the above table which results in Figure 2 consisting of the Emission of CO₂ and O₂

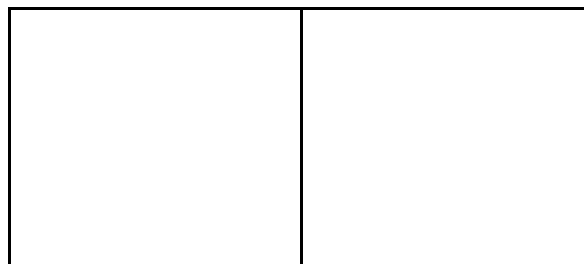


Figure 2: Emission of CO₂ and O₂ Comparison

We have compared both the emissions of CO₂ and O₂ in and around labs and have drafted a graph based on it as follows:

Table 2: Comparison of CO₂ and O₂

Lab	Emission of CO ₂	Emission of O ₂
Lab 3	19518	6435
Lab 5	19876	8424
Lab 7	21667	7488

The following graph was generated from the above table as follows Figure 3: Comparison of CO₂ and O₂ A Predictive Analysis was proposed to determine the healthy, effective green environment of Adhiyamaan college. The following table was generated to predict the greenery environment as follows

Table:3 Predictive Analysis of Green Environment at Adhiyamaan

Lab	Emission of CO ₂	Emission Percentage of O ₂ of Trees to be planted
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Lab 3	19518	6435	34.52
Lab 5	19876	8424	44.38
Lab 7	21667	7488	36.19

The following graph was generated from the above table as shown in Figure 4

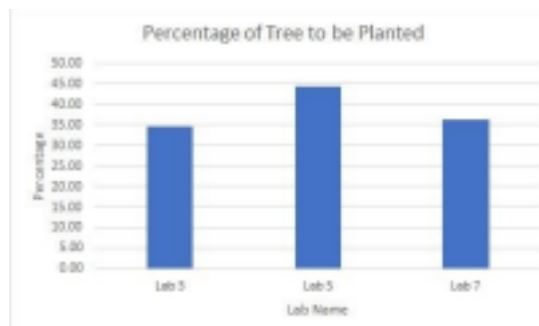


Figure 4: Percentage of Trees to be planted at Adhiyamaan Campus

The above experimental result shows the emission of carbon dioxide on our campus currently is higher than the production of oxygen. It is due to the higher usage of the systems on regular basis including both sleep mode and working hours. This may vary depending on the usage of the systems, browser, printer and we have taken the survey of all the labs on the emission of carbon dioxide and release of oxygen within our campus. Thus, the result shows the emission is continuously increasing. Even though oxygen production is also increasing year by year but it is not an insufficient amount to compensate for the emission of CO₂ to compensate for this emission, we have planned to plant 38% of more trees. Though carbon dioxide is non-toxic and non flammable gas. However, exposure to CO₂ in this higher concentration can induce a risk of life. Continuous exposure to CO₂ with insufficient oxygen may lead to vomiting, nausea, difficulty breathing, unconsciousness, and headache.

6. Ways To Mitigate Co2 Emission

- 1) The usage of desktops will be increasing day by day so we have to grow more trees and plants for the production of oxygen.
- 2) Currently, trees inside our campus are insufficient to produce the required amount of oxygen. So, we are planning to grow more trees.
- 3) Other ways to reduce the emission of CO₂ we use the desktop-only whenever it is needed.
- 4) Use green computing websites which emit CO₂ in less amount.
- 5) E.g. blackle.com, greener Goggle, greener Firefox surfing, vinggreenwithyahoo.Recent Implementation In Green Computing With Pcs:1) Sun Ray thin client,2) Asus Eee Pc and ultraportables,3) Fit-PC4) Zonbu computer Industries That Promote Green Computing Climate Savers Computing Initiatives (Csci): Is An Effort To Reduce The Electric Power Consumption Of PCs In Active And Inactive States. The green electronics council offers the electronic product environmental assessment tool(peat) To Assist In The Purchases Of "Greener" Computing Systems.

7. Conclusion

Green and sustainable computing is the emerging technology that is used to reduce the power consumption of the computer which in turn will reduce the emission of CO₂. We have to implement green computing and promote the growth of more trees in and around the campus to get a pollution-free environment and increase the amount of oxygen. Go for the use of eco-friendly laptops, recycling hardware that will reduce the usage of power consumption may help in a massive reduction of carbon dioxide emission and pave a way for sustainable development. We have selected Adhiyamaan college of Engineering for our Analysis because we are studying in this campus.

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