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(GREEN INFORMATION TECHNOLOGIES)

Yeşil Bilişimin Dünyadaki Önemi ve Yeşil Bilişime Gösterilen Özen.
(The Importance of Green Computing in The World and The Attention Given to Green Computing)

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Contents

1. INTRODUCTION

In the realm of information technology (IT), green computing—also referred to as resilient computing or ecologically conscious computing focuses on the creation and use of environmentally sound technologies and procedures (Saha, 2018). Today's globe places a premium on green computing due to growing worries about climate change, resource depletion, and environmental deterioration. A paradigm shift towards greener options has become necessary in recent years due to the IT industry's exponential expansion as well as the rising energy needs and carbon footprints associated with computer technologies (Saha, 2018). Traditional computing methods and systems have frequently been characterized by high energy usage, poor e-waste management, and a disregard for how technological progress may affect the environment. Green computing, on the other hand, aims to address these important problems by incorporating sustainability principles throughout the whole lifespan of IT goods and services. The core concept behind green computing is shown in Figure 1.

Figure 1. The key concepts of green computing.

Green computing is significant on a global scale and has an impact that is not geography-specific (Dhaini et al., 2021). The demand for sustainable options in the IT industry has never been more pressing due to rising global temperatures, harsh weather, and alarming ecological imbalances. Green computing acts as a catalyst for change by giving people a way to reduce technology's negative effects on the environment while increasing energy efficiency and resource conservation (Kumar Bagla et al., 2022). Furthermore, the painstaking attention given to green computing results from the recognition that technological progress and sustainable development are mutually exclusive. Governments, businesses, and

people are starting to understand that sustainability is not only an ethical requirement but also a tactical necessity (Junaid et al., 2017). As a result, a wide range of stakeholders, including corporations, politicians, researchers, and consumers, have given green computing a lot of attention and support.

The topic of this piece will be the importance of green computing on a global scale, the careful attention it receives, as well as its many benefits and significant effects on both the globe and society.

2. IMPORTANCE OF GREEN COMPUTING

The cornerstone of an evolutionary approach that encourages ecological sustainability is green computing. Traditional computing methods have a negative impact on the environment because they use more energy and produce more electronic waste. Green computing, on the other hand, deals with these problems by raising energy efficiency and switching to energy sources that are renewable (Nafisur, 2021). It offers answers to issues including environmental pollution, efficient utilization of resources, and climate change. A brief explanation of the importance of green computing is displayed in Figure 2. There are an extensive number of crucial facets of green computing around the globe, including:
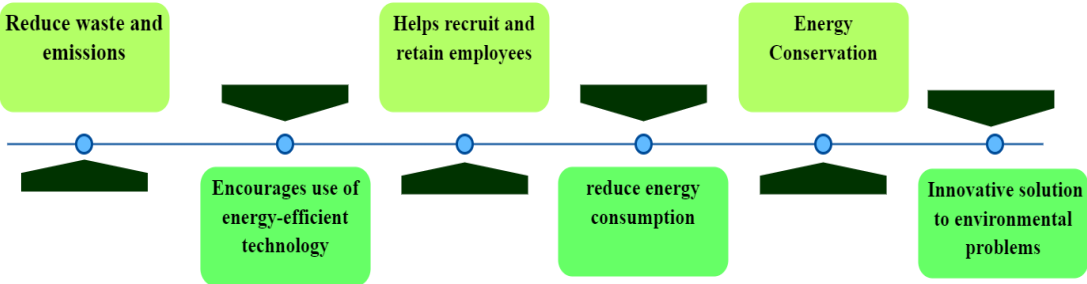

Figure 2. significance of green computing

2.1. Sustainable Environmental Practices

The fact that green computing helps to maintain environmental sustainability is one of the main reasons why it is so important. Traditional computing methods have a reputation for consuming a lot of energy and leaving a big carbon footprint. On the other hand, green computing places a focus on energy efficiency and the use of renewable energy sources

(Junaid et al., 2017). Green computing is essential to decreasing the harmful effects of IT on the environment by maximizing energy efficiency and lowering greenhouse gas emissions. Reduced electronic waste, proper disposal and recycling of gear, and the use of eco-friendly materials in production processes are all examples of this (Wu et al., 2022).

2.2. Resource Conservation

The wise utilization of resources is a key component of green computing. Rare and expensive resources, like minerals and metals, are frequently needed for the creation of IT equipment. Green computing helps conserve precious resources by putting into practice sustainable techniques like extending the lifespan of devices through updates and refurbishing, recycling electronic components (Wu et al., 2022), and employing cloud computing to maximize resource consumption (Kumar Bagla et al., 2022). By promoting a circular economy where resources are reused, recycled, and repurposed, this not only eases the burden on resource extraction but also lessens the demand for raw materials (Nafisur, 2021).

2.3. Efficiency in Energy

Green computing places a strong emphasis on energy efficiency because it directly targets the high energy consumption of IT processes. Green computing lowers the energy needs of IT systems by applying power management strategies, adopting energy-efficient hardware and software solutions (Wu et al., 2022), optimizing data centers, and promoting responsible user behavior (Junaid et al., 2017). This lessens the overall demand for energy, which has a positive influence on the environment and makes for a more sustainable energy future while also saving money for businesses.

2.4. Climate Change Mitigation

Due to its rising energy needs, the IT industry is crucial to the fight against global warming. Green computing offers a practical way to cut the greenhouse gas emissions brought on by IT activities. Green computing may help the IT sector become carbon neutral by embracing energy-efficient practices, harnessing renewable energy sources, and encouraging virtualization and cloud computing (Dhaini et al., 2021). This helps the world's efforts to combat climate change, lessen its impact on the environment, and build a sustainable future for future generations.

2.5. Corporate Social Responsibility

Businesses today understand the value of corporate social responsibility (CSR) and the necessity of operating sustainably. By enabling businesses to lessen their environmental impact, improve their brand image, and achieve sustainability goals, green computing connects with CSR aims. By implementing green IT methods, businesses show their dedication to environmental stewardship, winning over the trust of clients, staff, and investors. As a result, the company has a better reputation, a competitive advantage, and the capacity to draw environmentally sensitive customers.

In a nutshell, the significance of green computing in the modern world cannot be overemphasized. It involves corporate social responsibility, resource conservation, energy efficiency, and environmental sustainability. By embracing green IT ideas and practices, we can build a more sustainable IT sector, reduce our influence on the environment, and help make the world more resilient and green.

3. ATTENTION AND CARE GIVEN TO GREEN COMPUTING

Green technology needs all stakeholders in the IT industry to fulfill their obligations in this sphere. Businesses, government agencies, universities, and individuals must embrace and implement ecological computing. This includes the use of energy-efficient hardware and software, the reduction of the environmental impact of data centers, and the promotion of recycling (Samson et al., 2023). The consideration factors of green computing is depicted in figure 3.

3.1. Initiatives Regarding Business and Public Policy

The efforts made by the IT industry and policymakers to prioritize sustainability reflect the significance placed on green computing. Numerous prominent technology companies have taken proactive steps to integrate eco-friendly practices into their operations after recognizing the significance of green computing (Samson et al., 2023) . This includes investments in the research and development of energy-efficient technologies, the design of products with reduced environmental impact, and the implementation of sustainable supply chain management. In addition, governments and regulatory bodies have implemented policies and incentives to promote the adoption of green computing practices, including tax incentives for energy-efficient IT investments and the establishment of environmental standards for electronic devices (Wu et al., 2022).
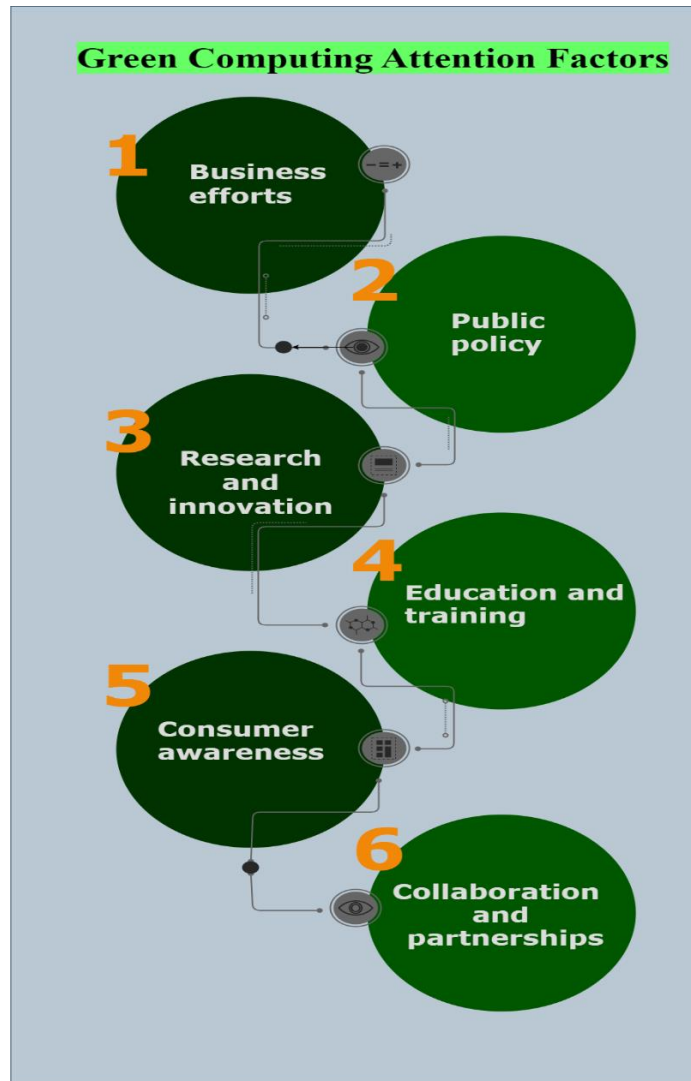
Figure 3. Key attention criteria of green computing

3.2. Research and Innovation

Green computing has stimulated significant research and innovation in the field of information technology. Researchers and academicians are actively investigating new technologies, algorithms, and methodologies to increase energy efficiency, decrease electronic waste, and enhance the sustainability of IT systems (Samson et al., 2023). Numerous research papers, conferences, and specialized research centers are devoted to advancing sustainable computing practices, which demonstrates the importance placed on eco-friendly computing. This dedication to research and innovation enables the development of cutting-edge solutions and continuously advances green computing technologies.

3.3. Education and Training

Educational institutions are recognizing the significance of green computing, resulting in the incorporation of sustainability-focused curricula into IT and computer science programs. Students are exposed to the principles and practices of green computing, which heightens their awareness of the environmental impact of IT and cultivates a sustainable perspective. In addition, training programs and certifications are being developed to equip IT professionals with the knowledge and skills necessary to effectively implement and manage green computing initiatives. The emphasis on education and training demonstrates a commitment to creating a workforce that is well-versed in green computing practices and can promote long-term industry change (Kumar Bagla et al., 2022).

3.4. Consumer Awareness

Consumer awareness plays a significant role in determining the demand for environmentally friendly computing solutions. As environmental awareness increases, consumers pursue eco-friendly products and services more frequently. The preference of consumers for energy-efficient devices, recyclable packaging, and products with eco-label certifications demonstrates their attention to green computing (Wu et al., 2022). This has prompted manufacturers to incorporate eco-friendly attributes into their products and disclose the environmental impact of their goods. Consumer demand and consciousness act as an impetus, compelling businesses to prioritize green computing and invest in sustainable practices (Kumar Bagla et al., 2022).

3.5. Collaboration and Partnerships

Collaboration and partnerships are essential for the advancement of ecological computing. Industry collaborations bring together technology companies, researchers, and policymakers for the purpose of exchanging knowledge, sharing best practices, and addressing environmental challenges collectively. Greater development and implementation of green computing initiatives are facilitated by public-private partnerships. Moreover, collaborations between technology companies and environmental organizations facilitate the exchange of knowledge and resources, resulting in the development of innovative solutions and an increase in environmental stewardship (Samson et al., 2023).

Table 1 briefly overviews the leading green computing actions, highlighting environmentally friendly business practices, sustainable public policies, research

advancements, sustainability-focused training and instruction, customer preference for environmentally friendly products, and cooperative environmental sustainability efforts.

Table 1. Initiatives in Green Computing

Initiatives	Description
Business efforts	Eco-friendly practices by companies
Public policy	Incentives and regulations for sustainability
Research and innovation	Advancing sustainable IT through research
Education and training	Sustainability-focused IT education and training
Consumer awareness	Demand for eco-friendly solutions
Collaboration and partnerships	Joint efforts for environmental sustainability

In the end, the consideration and care given to eco-friendly computing are evident in a variety of sectors and activities. Collectively, industry initiatives, research advancements, educational efforts, consumer awareness, and collaborative partnerships demonstrate an IT industry commitment to sustainability. The increasing focus on green computing reflects a shared awareness of the pressing need to resolve environmental challenges and work toward a more sustainable future. By cultivating and sustaining this focus, we can effect substantial positive change and pave the way for a greener and more environmentally responsible IT ecosystem.

4. CONCLUDING REMARK

Green computing is a strategy that supports energy conservation and conservation of the environment. It offers economic advantages as well as remedies to the world's environmental problems. Green computing, however, needs a societal shift to be widely adopted and effective. To accept and put into practice green computing techniques, individuals, businesses, governmental institutions, and educational organizations must work together. We can work to build a sustainable planet for future generations by doing this.

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