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More Technology? Evaluating the Effectiveness of Smart Thermostats

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ABSTRACT

Climate change has been recognized as a significant threat for over a century, with early predictions by Svante Arrhenius in 1896 and subsequent confirmations by Guy Callendar in 1938, who attributed rising global temperatures to increased CO_2 emissions from industrial activities. This foundational understanding has evolved with modern climate science, emphasizing the ongoing rise in global temperatures and its severe consequences, including frequent climate-related disasters. In this context, the role of technology, particularly computer science (CS), has become increasingly relevant. The pervasive use of technology in daily life, exemplified by near-universal internet access in the UK and the global prevalence of smartphones, offers unique opportunities to address the climate crisis through innovative solutions. This project aims to evaluate several smart thermostats as a case study in CS-based approaches to enhance energy efficiency in buildings. Buildings contribute significantly to global CO_2 emissions, with heating and cooling operations responsible for a substantial portion of these emissions. By optimizing energy usage in building operations, smart technologies can play a crucial role in mitigating climate impact. This project considers the effectiveness, adoption, and integration of smart thermostats, exploring their potential as a scalable solution for reducing emissions while maintaining human comfort and health. The analysis highlights the importance of smart climate control technologies in the broader effort to combat climate change, advocating for increased adoption and further innovation in this field.

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