Software Development for a Smart Radiator Thermostat

Exposé for a Master Project

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October 13, 2025

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1 Problem description

Heating is one of the most CO_2-intensive areas of human life. In Germany, around 210 million tons of the general total of 762 million tons emitted in 2021 came from heating private living spaces. [1] [2]

Effective heating control has an average saving potential of between 8 and 19%, which can be achieved through the use of intelligent heating controllers and smart home systems [3].

Whereas such control systems are sophisticated and widespread in developed countries such as Germany, most of them are fully proprietary. There is currently no project of public domain, which could be used as a base for research, development and production of smart heating controllers.

2 Objectives and research interests

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3 Theoretical foundations and state of the art

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4 Concept presentation

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5 Provisional outline

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6 Time plan

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Bibliography

[1] Statistisches Bundesamt. “Co2-emissionen beim heizen binnen 20 jahren um 12 % gesunken. ”[Online]. Available: https://www.destatis.de/DE/Presse/Pressemitteilungen/Zahl-der-Woche/2024/PD24_05_p002.html

[2] Umweltbundesamt. “Treibhausgasemissionen stiegen 2021 um 4,5 prozent. ”[Online]. Available: https://www.umweltbundesamt.de/presse/pressemitteilungen/treibhausgasemissionen-stiegen-2021-um-45-prozent

[3] M. Kersken, H. Sinnesbichler, and H. Erhorn, “Analyse der einsparpotenziale durch smarthome– und intelligente heizungsregelungen,” *Bauphysik*, vol. 40, no. 5, pp. 276–285, 2018.

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