

CHAPTER-8
RESEARCH PUBLICATIONS

The Chapter elaborates the publications related to the research with their brief description, for the duration of 2014-15.

8.1 Paper Publications (2014-15)

The list for the publications during the research work is as follows-

- Rajesh Singh, Piyush Kuchhal, M.S. Yadav, M.K.Sharma, Sushabhan Choudhury, Anita, **“Optimization and Implementation of Intelligent RF remote controlled Heater System”**, International journal of control and automation, SERSC, Vol.-8, Issue-5, PP: 397-406, May 2015. **(Scopus Indexed) [54]**
- Rajesh Singh, Piyush Kuchhal, M.S.Yadav, Sushabhan Choudhury, Anita, **“Intelligent Integrated RF Remote Control for Fan, Light and Heater”**, International Journal of Applied Engineering Research, Research India Publications, Vol.-10, Issue-3, PP: 6003-6012, April 2015. **(Scopus Indexed) [58]**
- Rajesh Singh, Piyush Kuchhal, Sushabhan Choudhury, Anita, **“Implementation & Evaluation of heating system using PID and Genetic Algorithm”**, Indian journal of science & technology, Vol.-8, Issue-5, PP: 413-418, March 2015. **(Scopus Indexed)[51]**
- Rajesh Singh, Piyush Kuchhal, M.S. Yadav, Sushabhan Choudhury and Anita, **“Hardware Implementation of PID and ACO Based Wireless Heating System”**, International Journal on Electrical Engineering and Informatics - Volume 7, Number 3, September 2015. **(Scopus Indexed)[59]**
- Rajesh Singh, Piyush Kuchhal, Sushabhan Choudhury, Anita, **“Wireless Controlled Intelligent Heating System using HPSO”**, Procedia Computer Science, ELSEVIER, Vol.-48, PP:600-605, May 2015. **(Scopus Indexed)[56]**
- Rajesh Singh, Piyush Kuchhal, Anita Gehlot, Sushabhan Choudhury, **“Energy Efficient RF Remote Control for Dimming the Household**

Appliances”, Indonesian Journal of Electrical Engineering, TELKOMNIKA, Vol.-13, Issue-2, PP:232-237, Feb. 2015. (**Scopus Indexed**)[57]

- Rajesh Singh, Piyush Kuchhal, Sushabhan Choudhury, Anita, “**Design and Experimental Evaluation of PSO and PID Controller based Wireless Room Heating System**”, International Journal of Computer Application, Vol.-107, Issue-5, December 2014. [52]

8.2 Patents (2014-15)

- Rajesh Singh, Piyush Kuchhal, Anita, Bhupendra Singh, “**WPAN based smart remote control for heater**” Ref. no./Application no.- **1405/DEL/2014.**
- Rajesh Singh, Manish Prateek, Sushabhan Choudhry, Anita, Shival Dube, Vivek Kaundal, Jaideep Saharan, Nikhil Gupta, “**Method and apparatus to adjust Dish positioning system with RF remote**”, Application No.- **3796/DEL/2014.**
- Rajesh Singh, Kamal Basal, Sushabhan Choudhury, Anita, Adesh Kumar, Siddharth Sarma, Ayush Bansal, “**Wireless controlled Power Extension Board**”, Application no.- **3926/DEL/2014.**

8.3 Research Contribution

1. Rajesh Singh et. al covers heating system analysis of the research with GA-PID algorithm. Paper explains the process of tuning K_p , K_i and K_d with the digital processor using MATLAB. The heating system is dimmable with sixteen levels and for maintaining the room temperature at predefined temperature feedback from sensor nodes are taken and ambient conditions are maintained. Experiment was carried out for 1KW heater for four hours and result shows energy saving of approximately 12% with the GA-PID w.r.t conventional room heaters [54].

2. Rajesh Singh et al. shows the comparative analysis for GA-PID and PSO-PID with PID tuning method by explaining the difference in values of K_p , K_i and K_d for the system. Sensor nodes are used to check the temperature in the experimental room at different time durations. And comparative analysis clearly shows that PSO-PID is having better energy saving over conventional heater and GA-PID method [58].

3. Rajesh Singh et al. proposes the hybrid approach (HPSO) for energy saving with the combination of PSO and SA algorithms. PSO suffers with the trapping of local optimum value, which is observed when gbest value is not changing for k iterations. To solve the problem SA (Simulated Annealing) algorithm is collaborated with PSO. The experiment is carried out with heater system and results are verified [51].

4. Rajesh Singh et al. discusses the power saving with PID and ant colony optimization for heating system, and results are compared with the PID controller. Result shows more power saving with ACO-PID than PID controller [59].

5. Rajesh Singh et al. covers heating system analysis of the research with PSO-PID algorithm. Paper discusses the role of PSO algorithm with PID tuning method of the system to minimize the energy consumption. The analysis is done for experimental set up in $10 \times 8 \times 10$ room size for two hours for 1KW heater and results shows energy saving of approximately 14 %. The communication mode used for remote control is RF with 30 meters of range [56].

6. Rajesh Singh et al. discusses about the intelligent integrated RF remote control with 2.4 GHz RF modem having 9600 baud rate. The paper describes the components used and process of controlling the system with hybrid remote control. Remote is capable of controlling the appliances in 16 levels and can operate in semiautonomous and autonomous modes. In autonomous mode remote

can maintain the ambient conditions (predefined by user) of a room without human intervention, it is done by taking difference between set value and feedback values from sensor nodes and after taking difference intelligently shifting to appropriate level. In semiautonomous mode user can set the desired value with the switches available on remote control [57].

7. Rajesh Singh et al. discusses about the concept of energy efficient remote control by controlling the dimming levels of household appliances in eight levels. It can be operated in only semiautonomous mode and need human intervention. Communication modes, its limitations and advantages are also discussed in the paper and justified the uses of RF modem over IR remote controls [52].