

Artificial Intelligence Techniques for Energy Management in Smart Buildings.



Thesis submitted in partial fulfillment
for the award of the degree of

Doctor of Philosophy

by

Jayashankara M

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY
(B.H.U)
VARANASI - 221005

Roll No. 20071507

Year 2024


CERTIFICATE

It is certified that the work contained in the thesis titled "*Artificial Intelligence Techniques for Energy Management in Smart Buildings*" by *Jayashankara M* has been carried out under our supervision and this work has not been submitted elsewhere for a degree. It is further certified that the student has fulfilled all requirements of Comprehensive Examination, Candidacy, and SOTA for the award of Ph.D. Degree.

Dr. Prasenjit Chanak

Assistant Professor

Dept. of Computer Science and Engineering
Indian Institute of Technology (BHU) Varanasi


Prof. Sanjay Kumar Singh
Professor

Dept. of Computer Science and Engineering
Indian Institute of Technology (BHU) Varanasi

पर्यवेक्षक/Supervisor
संगणक विज्ञान एवं अभियांत्रिकी विभाग
Department of Computer Sc. & Engg
भारतीय प्रौद्योगिकी संस्थान
Indian Institute of Technology
(काशी हिन्दू विश्वविद्यालय)
(Banaras Hindu University)
वाराणसी, Varanasi-221005

DECLARATION BY THE CANDIDATE

I, **Jayashankara M**, certify that the work embodied in this Ph.D. thesis is my own bonafide work carried out by me under the supervision of **Prof. Sanjay Kumar Singh** and **Dr. Prasenjit Chanak** from **December 2020** to **June 2024** at **Department of Computer Science and Engineering**, Indian Institute of Technology (BHU) Varanasi. The matter embodied in this thesis has not been submitted for any other degree/diploma award. I declare that I have faithfully acknowledged and given credits to the research workers wherever their works have been cited in my work in this thesis. I further declare that I have not wilfully copied any other's work, paragraphs, text, data, results, etc. reported in journals, books, magazines, reports, dissertations, theses, etc., or available at websites and have not included them in this thesis and have not cited as my own work.

Date:

Place: Varanasi

Jayashankara M

CERTIFICATE BY THE SUPERVISOR

This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

Dr. Prasenjit Chanak

Assistant Professor

Dept. of Computer Science and Engineering

Indian Institute of Technology (BHU) Varanasi

Prof. Sanjay Kumar Singh

Professor

Dept. of Computer Science and Engineering

Indian Institute of Technology (BHU) Varanasi

Signature of Head of the Department

आचार्य व विभागाध्यक्ष

Professor & Head

समग्रक विज्ञान एवं अभियांत्रिकी विभाग

Department of Computer Sc. & Engg

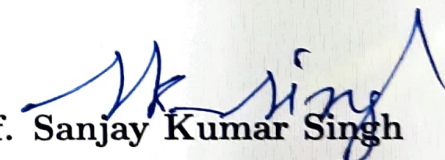
भारतीय प्रौद्योगिकी संस्थान

Indian Institute of Technology

(काशी हिन्दू यूनिवर्सिटी)

(Banaras Hindu University)

Varanasi-221005



समग्रक विज्ञान एवं अभियांत्रिकी विभाग
Department of Computer Sc. & Engg
भारतीय प्रौद्योगिकी संस्थान
Indian Institute of Technology
(काशी हिन्दू विश्वविद्यालय)
(Banaras Hindu University)
वाराणसी/Varanasi-221005

COPYRIGHT TRANSFER CERTIFICATE

Title of the Thesis: Artificial Intelligence Techniques for Energy Management in Smart Buildings.

Name of the Student: Jayashankara M

Copyright Transfer

The undersigned hereby assigns to the Indian Institute of Technology (Banaras Hindu University) Varanasi all rights under copyright that may exist in and for the above thesis submitted for the award of the *Doctor of Philosophy*.

Date:

Place: Varanasi

Jayashankara M

Note: However, the author may reproduce or authorize others to reproduce material extracted verbatim from the thesis or derivative of the thesis for author's personal use provided that the source and the Institute's copyright notice are indicated.