

# Certificate

It is certified that the work contained in this thesis entitled “Mining High Utility Itemsets with Positive and Negative Utility Values” by “Kuldeep Singh” has been carried out under my supervision and that this work has not been submitted elsewhere for a degree.

It is further certified that the student has fulfilled all the requirements of Comprehensive Examination, Candidacy and SOTA for the award of Ph.D. Degree.

Dr. Bhaskar Biswas

Associate Professor

Department of Computer Science and Engineering

Indian Institute of Technology (Banaras Hindu University)

Varanasi-221 005

## COPYRIGHT TRANSFER CERTIFICATE

Title of the Thesis : **Mining High Utility Itemsets with Positive and Negative Utility Values**

Name of the Student : **Kuldeep Singh**

### 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 : April 27, 2018*

*Place : Varanasi*

Signature of the Student

(Kuldeep Singh)

**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.**