

CS836 Rough Sets and Applications

Assignment 1

Available on January 18, 2018

Due date: February 1, 2018

1. Write a one to two pages essay on two aspects of data. (Note: you must cover at least the following points: a) their definitions, b) the importance of separating the two, c) their implications to data processing, and d) their relevance to rough set theory.)
2. Write a one to two pages essay on conceptual versus computational formulations. (Please see the notes in the last question.)
3. Give the basic formulation of rough set approximations:
 - a). Give a definition of an information table.
 - b). Define a description language in an information table.
 - c). Define the family of definable sets.
 - d). Define the rough set approximations.
5. Consider the following information table:

Object	A	B	C
1	a_1	b_1	c_1
2	a_1	b_1	c_2
3	a_2	b_2	c_1
4	a_2	b_3	c_1
5	a_2	b_3	c_1
6	a_2	b_1	c_1
7	a_2	b_3	c_2
8	a_1	b_1	c_2

- a). Construct the family of all definable sets.
- b). Give two undefinable sets and their lower and upper approximations.

5. Prove the following properties of rough set approximations:

- (L1) $\underline{apr}(A \cap B) = \underline{apr}(A) \cap \underline{apr}(B),$
- (U1) $\overline{apr}(A \cup B) = \overline{apr}(A) \cup \overline{apr}(B);$
- (L2) $\underline{apr}(A \cup B) \supseteq \underline{apr}(A) \cup \underline{apr}(B),$
- (U2) $\overline{apr}(A \cap B) \subseteq \overline{apr}(A) \cap \overline{apr}(B);$
- (L3) $A \subseteq B \implies \underline{apr}(A) \subseteq \underline{apr}(B),$
- (U3) $A \subseteq B \implies \overline{apr}(A) \subseteq \overline{apr}(B);$
- (L4) $\underline{apr}(A) \subseteq A,$
- (U4) $A \subseteq \overline{apr}(A);$