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ATTRIBUTE REDUCTION IN POLYCYSTIC OVARY SYNDROME VIA NANO TOPOLOGY USING BASIS

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Abstract

This main intuition behind this paper is to apply topological decrease of attributes in information systems via NANO top spaces. Also we analyse the reason for non pregnancy from married women with different category (differ from age, weight, health, etc) and reduce the reasons by employing the concept of criterion reduction. Here we are utilizing the idea of basis to locate the fundamental side effects of a typical disease "Polycystic ovary syndrome" among ladies. Many authors applied set valued information system for attribute reduction. In particular, Irregular periods, weight gain, Excessive body hair growth, Depression & Acne and Infertility are the symptoms of a disease "PCOS". Finally we conclude that "Irregular periods" and "Infertility" are the core indications with the nearest connection with the malady "PCOS" that draw significantly more factors than other manifestations. An algorithm is developed in terms of NANOtop and it is applied to analyse the real time problems. Most real-life situations need some sort of approximation to fit mathematical models. The beauty of using NANOtop in approximation is achieved and had a wide variety of real life applications.

1. Introduction

"Wellbeing is riches" is a notable saying. Data assumes a significant job in our life. The way toward procuring learning happens alongside scientific medicines, among them is the decrease of data frameworks. Characteristic decrease is an essential issue in rough set research. Attribute reduction is an exceptional commitment made by rough set research in [6]. Pawlak's rough set model is valuable in the investigation of information displayed as far as complete data and choice frameworks. Yuhua Qianab, et al. [7] worked on set-

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valued ordered information systems.

General Topology is tremendous and has a wide range of creations and cooperations with different fields of Mathematics, Computer and Science. The hypothesis of nano topology (by short NANOtop) [3] proposed by Lellis Thivagar and Richard is an expansion of set hypothesis for the investigation of insightful frameworks characterized by in adequate and inadequate data.

Polycystic ovary syndrome (in short, PCOS) is a hormonal issue regular among ladies. The definite reason for PCOS is obscure. PCOS is an issue with hormones that influences ladies amid their childbearing years (ages 15 to 44). Early conclusion and treatment alongside weight reduction may decrease the danger of long haul complexities; for example, type 2 diabetes and coronary illness. Nutrients, supplements and other corresponding medicines are well known among ladies with PCOS. In this paper, by gathering the information from wedded ladies with different categories, the characteristic decrease is finished utilizing NANOtop.

2. Preliminaries

The following recalls requisite ideas and preliminaries necessitated in the sequel of our work

Definition 2.1 [1]**.** Let U be a non-empty finite set of objects called the universe and R be an equivalence relation on U named as the indiscernibility relation. Then U is divided into disjoint equivalence classes. Elements belonging to the same equivalence class are said to be indiscernible with one another. The pair (U, R) is said to be the approximation space. Let $X \subseteq U$.

(i) The lower approximation of X with respect to R is the set of all objects, which can be for certain classified as X with respect to R and is denoted by $L_R(X)$. That is, $L_R(X) = A_{x \in U}\{R(x) : R(x) \subseteq X\}$ where $R(x)$ denotes the equivalence class determined by x.

(ii) The upper approximation of X with respect to R is the set of all objects, which can be possibly classified as X with respect to R and is denoted by $U_R(X)$. That is,

$$U_R(X) = S_{x \in U}\{R(x) : R(x) \cap X \neq \varphi\}.$$

(iii) The boundary region of X with respect to R is the set of all objects which can be classified neither as X nor as not X with respect to R and it is denoted by $B_R(X)$. That is, $B_R(X) = U_R(X) - L_R(X)$.

Definition 2.4 [2]**.** If $\mathfrak{I}_R(X)$ is the nano topology on U with respect to X, then the set $B = \{U, L_R(X), U_R(X)\}$ is the basis for $\mathfrak{I}_R(X)$.

Definition 2.5 [6]**.** A set-valued information system is a quadruple $S = (U, A, V, f)$ where U is a non-empty finite set of objects, A is a finite set of attributes, $V \in \bigcup Va$ where Va is a domain of the attribute $f : U * A \to P(V)$ is a function such that for every $x \in U$ and $a \in A$, $f(x, a) \subseteq Va$. Also we assume that $f(x, a) \geq 1$. The attribute set A is divided into two subsets a set C condition attributes and a decision attribute, d where $C \bigcap \{d\} = \varphi$.

Definition 2.6 [8]**.** An information system is of the form $(U, A, \{Va\}, f_a)$ where, U is a non-empty finite set of objects, called the universe; A is a finite non-empty set of attributes; Va is the attribute value set of an attribute $a \in A$ and $f_a : U \to V_\alpha$ is called the information function. If $f_a(x)$ is equal to a missing value for some $x \in U$ and $a \in A$, then the information system is called an incomplete information system (IIS). Otherwise, it is a complete information system (CIS). A missing value is denoted by '$*$'. That is, an IIS is of the form (U, a, Va, f_a) where $a \in A$ and $* \in \bigcup Va$. An IIS can also be denoted just by (U, A).

Definition 2.7 [4]**.** A sub-base for the topology $\mathfrak{I}$ on U is given by $S_R = \bigcup_{r \in R} S_r$ and a base for is given by $\beta_r = \bigcap_{Sx \in SR} Sx$ (with maximality of each Sx taken into consideration).

Definition 2.8 [5]**.** In an information system, not all condition attributes depict the decision attribute. The decision depends not on the whole set of condition attributes but on a subset of it is called the CORE.

3. Application of NANOtop in Attribute Reduction

Remark 2.1. Through the whole of paper, lower approximation of a set symbolize as $\underline{A}S$, upper approximation of a set symbolize as $\overline{A}S$, boundary region represent as $B_R(A)$, attribute depict as attr, objects as objs, basis demonstrate as bas and minimal reduct constitute as min.rdt.

Stage 1. *Gn* a limited universe *U*, a limited set *A* of attr which is partitioned into two classes, *P* of prerequisite attr and *D* of declaration attr, an identicalness relation *R* on *U* corresponding to *P* and a subset *X* of *U* which speak to the information as a data table, columns of which are marked by attr and rows by objs and passages of the table are attr estimations.

Stage 2. Find the $\underline{A}S$, $\overline{A}S$ and the $B_R(A)$ with regard to *R*.

Stage 3. Generate the NANOtop $\mathfrak{J}_p(X)$ on *U* and its bas $\beta_P(X)$.

Stage 4. Remove an attr *X* from *P* and discover $\underline{A}S$, $\overline{A}S$ and the $B_R(A)$ corresponding to $P - \{x\}$.

Stage 5. Generate the NANOtop $J_{P-\{x\}}(X)$ on *U* and its bas $\beta_{P-\{x\}}(X)$.

Stage 6. Repeat stages 3 and 4 for all attr in *P*.

Stage 7. Those attr in *P* for which $\beta_{P-\{x\}}(X) \neq \beta_P(X)$ from the center.

Consider the accompanying table giving data about married women counseling a specialist with one or other of the manifestations of PCOS, in particular, irregular periods, weight increase, excessive body hair growth (hirsutism), depression and acne and infertility.

Table 1. Set of data among women with some symptoms of PCOS.

Set of Married Women	Irregular Periods (IP)	Weight gain (WG)	Excessive hair growth & Male baldness (EM)	Depression & Acne (DA)	Infertility (IF)	Polycystic Ovary syndrome
MW1	Sure	Sure	Sure	Nope	Sure	Assure
MW2	Sure	Nope	Nope	Sure	Sure	Assure
MW3	Nope	Sure	Sure	Nope	Nope	Assure
MW4	Sure	Sure	Sure	Nope	Nope	Disapprove
MW5	Nope	Sure	Sure	Nope	Nope	Disapprove
MW6	Nope	Sure	Sure	Nope	Sure	Disapprove
MW7	Sure	Nope	Sure	Nope	Sure	Assure
MW8	Sure	Nope	Sure	Sure	Nope	Disapprove

The segments of the table speak to the indications for "PCOS" and the columns speak to the arrangement of Married women. The passages in the table are attr values. The given data framework is finished and is given by (U, A). Here $U = \{MW_1, MW_2, MW_3, MW_4, MW_5, MW_6, MW_8\}$ the set of married women and $A = \{$Irregular periods, Weight Gain, Excessive body hair development (hirsutism), Depression and Acne and Infertility$\}$ which is isolated into two classes $P = \{IP, IF, EM, DA, WG\}$ and $D = \{$Polycystic ovary syndrome$\}$. irregular periods, weight increase, excessive body hair development (hirsutism), depression and acne and infertility are the prerequisite attr and polycystic ovary disorder is the declaration attr. The Women MW_3 is described by the side effects (Irregular periods, Nope), (Weight gain, Sure), (Excessive body hair development (hirsutism), Sure), (Depression & Acne, Nope) and (Infertility, Sure) which gives data about the women MW_3. In the table, the Married women MW_1, MW_2, MW_3, MW_7 are disjointed as for the attr Irregular time frames. The attr Irregular periods create two equality classes in particular, $\{MW_1, MW_2, MW_4, MW_7, MW_8\}$ and $\{MW_3, MW_5, MW_6\}$ The group of equality classes, U/P Corresponding to P is given by $U/R(P) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_6\}, \{MW_5\}, \{MW_7\}, \{MW_8\}\}$.

Case 1. (Women with PCOS) Let X be the set of Married women diagnosed with PCOS. That is, $U = \{MW_1, MW_2, MW_3, MW_3, MW_7\}$. Then the $\underline{A}S$, $\overline{A}S$ and the $B_R(A)$ are given by $\underline{A}S(X) = \{MW_2, MW_7\}$, $\overline{A}S(X) = \{MW_1, MW_2, MW_3, MW_4, MW_6, MW_7\}$ and $B_{R_P}(X) = \{MW_1, MW_3, MW_4, MW_6\}$. Therefore, the NANO top on U is Gn by $\mathfrak{I}_P(X) = \{U, \Phi, \{MW_2, MW_7\}, \{MW_1, MW_2, MW_3, MW_4, MW_6, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}$. The bas is Gn by $\beta_P(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\}$.

The issue is to locate the key ascribes important to choose whether a women have PCOS issue or not.

When the attr IP is excluded from $P, U/R(P - IP) = \{MW_1, MW_4, MW_5\}, \{MW_2\}, \{MW_3, MW_6\}, \{MW_7\}, \{MW_8\}\}$ and hence the $\underline{A}S$, $\overline{A}S$ and the

$B_R(A)$ are Gn by $\underline{A}_{P\{IP\}}(X) = \{MW_2, MW_7\}$, $\overline{A}_{P-\{IP\}}(X) = \{MW_1, MW_2, MW_3, MW_4, MW_5, MW_6, MW_7\}$ and $B_{RP-\{IP\}}(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6\}$. Therefore the corresponding NANO top and its bas are given by $\Im_{P-\{IP\}}(X) = \{U, \Phi, \{MW_2, MW_7\}, \{MW_1, MW_2, MW_3, MW_4, MW_5, MW_6, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\}$ and $\beta_{P-\{IP\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_5, MW_6\}\} \neq \beta_P(X)$.

As the attr WG is eliminate from $C, U/R(P - WG) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_6\}, \{MW_5\}, \{MW_7\}, \{MW_8\}\}$ and hence the $\underline{A}S, \overline{A}S$ and the $B_R(A)$ corresponding to $P - \{WG\}$ are Gn by $\underline{A}_{P-\{WG\}}(X) = \{MW_2, MW_7\}$, $\overline{A}_{P-\{WG\}}(X) = \{MW_1, MW_2, MW_3, MW_4, MW_6, MW_7\}$ and $B_{RP-\{PG\}}(X) = \{MW_1, MW_3, MW_4, MW_6\}$. Therefore the corresponding NANO top and its bas are Gn by $\Im_{P-\{WG\}}(X) = \{U, \Phi, \{MW_2, MW_7\}, \{MW_1, MW_2, MW_3, MW_4, MW_6, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\}$ and $\beta_{P-\{WG\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\} = \beta_P(X)$.

Whilst the attr EM is neglect from P, $U/R(P - \{EM\}) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_6\}, \{MW_5\}, \{MW_7\}, \{MW_8\}\}$ and hence the $\underline{A}S$, $\overline{A}S$ and the $B_R(A)$ corresponding to $P - \{EM\}$ corresponding to $P - \{EM\}$ are Gn by $\underline{A}_{P-\{EM\}}(X) = \{MW_2, MW_7\}$, $\overline{A}_{P-\{EM\}}(X) = \{MW_1, MW_2, MW_3, MW_4, MW_6, MW_7\}$ and $B_{RP-\{WM\}}(X) = \{MW_1, MW_3, MW_4, MW_6\}$. Therefore the corresponding NANO top and its bas are Gn by $\Im_{P-\{EM\}}(X) = \{U, \Phi, MW_2, MW_7\}, \{MW_1, MW_2, MW_3, MW_4, MW_6, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\}$ and $\beta_{P-\{EM\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\} = \beta_P(X)$.

During the time the attr DA is ignored from P, $U/R(P - \{DA\}) = \{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_6\}, \{MW_5\}, \{MW_7\}, \{MW_8\}\}$ and hence $\underline{A}S$, $\overline{A}S$ and the $B_R(A)$ corresponding to $P - \{DA\}$ are Gn by $\underline{A}_{P-\{DA\}}(X) = \{MW_2, MW_7\}$, $\overline{A}_{P-\{DA\}}(X) = \{MW_1, MW_2, MW_3, MW_4, MW_6, MW_7\}$ and $B_{RP-\{DA\}}(X) =$

$\{MW_1, MW_3, MW_4, MW_6\}$. Therefore the corresponding NANO top and its bas are Gn by $\Im_{P-\{DA\}}(X) = \{U, \Phi, \{MW_2, MW_7\}, \{MW_1, MW_2, MW_3, MW_4, MW_6, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}$ and $\beta_{P-\{DA\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\} = \beta_P(X)$.

While the attr IF is uninserted from P, $U/R(P - \{IF\}) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_5, MW_6\}, \{MW_7\}, \{MW_8\}\}$ and hence $\underline{A}S$, $\overline{A}S$ and the $B_R(A)$ corresponding to $P - \{IF\}$ are Gn by $\underline{A}_{P-\{IF\}}(X) = \{MW_2, MW_7\}$, $\overline{A}_{P-\{IF\}}(X) = \{MW_1, MW_2, MW_3, MW_4, MW_5, MW_6, MW_7\}$, and $B_{RP-\{IF\}}(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6\}$. Therefore the corresponding NANO top and its bas are Gn by $\Im_{P-\{IF\}}(X) = \{U, \Phi, \{MW_2, MW_7\}, \{MW_1, MW_2, MW_3, MW_4, MW_5, MW_6, MW_7\}, \{MW_1, MW_3, MW_4, MW_5, MW_6\}\}$ and $\beta_{P-\{IF\}}(X) = \{U, \{MW_1, MW_3, MW_4, MW_5, MW_6\}\} \neq \beta_P(X)$.

Step 2. Let $M = P - \{WG\} = \{IP, EM, DA, IF\}$, then $\beta_M(X) = \beta_P(X)$. Consider $U/R(M - \{IP\}) = \{\{MW_1, MW_4, MW_6\}, \{MW_2\}, \{MW_3, MW_6, MW_7\}, \{MW_8\}\}$; $\underline{A}_{M-\{IP\}}(X) = \{MW_2\}$; $\overline{A}_{M-\{IP\}}(X) = \{MW_1, MW_2, MW_3, MW_4, MW_5, MW_6, MW_7\}$; $B_{RM-\{IP\}}(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7\}$ and hence the bas of the corresponding NANO top is $\beta_{M-\{IP\}}(X) = \{U, MW_2\}, \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7\} \neq \beta_P(X)$.

When EM is elide from M, the family of equclasses, $\underline{A}S$, $\overline{A}_S$, $B_R(A)$ and the bas of the NANO top corresponding to $M - \{EM\}$ are given by $U/R(M - \{EM\}) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3\}, \{MW_6\}, \{MW_5\}, \{MW_7\}, \{MW_8\}\}$; $\underline{A}_{M-\{IP\}}(X) = \{MW_2, MW_7\}$; $\overline{A}_{M-\{EM\}}(X) = \{MW_1, MW_2, MW_3, MW_4 MW_6, MW_7\}$, $B_{RM-\{EM\}}(X) = \{MW_1, MW_3, MW_4, MW_6\}$ and $\beta_{M-\{EM\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\} = \beta_P(X)$.

Consider $M - DA$ is strike out from M, Then $U/R(M - \{DA\}) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_6\}, \{MW_5\}, \{MW_7\}, \{MW_8\}\}$; $\underline{A}_{M-\{DA\}}(X) = \{MW_2,$

$MW_7\}$; $\overline{A}_{M-\{DA\}}(X) = \{MW_1, MW_2, MW_3, MW_4, MW_6, MW_7\}$; $B_{RM-\{DA\}}(X) = \{MW_1, MW_3, MW_4, MW_6\}$ and $\beta_{M-\{DA\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\} = \beta_P(X)$.

When IF is miss out from $M, U/R(M-\{IF\}) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_5, MW_6\}, \{MW_7\}, \{MW_8\}\}$; $\underline{A}_{M-\{IF\}}(X) = \{MW_2, MW_7\}$; $\overline{A}_{M-\{IF\}}(X) = \{MW_1, MW_2, MW_3, MW_4, MW_5, MW_6, MW_7\}$; $B_{RM-\{IF\}}(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6,\}$ and $\beta_{M-\{IF\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_5, MW_6\}\} \neq \beta_P(X)$.

Operation 3. Let $M_1 = M - \{EM\} = \{IP, DA, IF\}$, then $\beta_M = \beta_C$ and $U/R(M_1 - \{IP\}) = \{\{MW_1, MW_4, MW_5\}, \{MW_2\}, \{MW_3, MW_6, MW_7\}, \{MW_8\}\}$; $\beta_{M-\{IP\}}(X) = \{U, \{MW_2\}, \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7\} \neq \beta_C(X)$.

Also $U/R(M-\{IP\}) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_6\}, \{MW_5\}, \{MW_7\}, \{MW_8\}\}$; $\beta_{M-\{DA\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\} = \beta_C$ $U/R(M-\{IF\}) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_5, MW_6\}, \{MW_7\}, \{MW_8\}\}$; $\beta_{M-\{IF\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_5, MW_6\}\} \neq B_P(X)$.

Stage 4. When $M_1 = M_1 - \{DA\} = M - \{EM\} - \{DA\} = C - \{WG\} - \{EM\} - \{DA\} = \{IP, IF\}$, then $\beta_M = \beta_P$. And $U/R(M_1 - \{DA\}) = \{\{MW_1, MW_4, MW_5\}, \{MW_2\}\}, \{MW_3, MW_6, MW_7\}, \{MW_8\}\}$; $\beta_{M_{1-\{DA\}}}(X) = \{U, \{MW_2\}, \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7\}\} \neq \beta_C(X)$.

Also $U/R(M_1 - \{IF\}) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_5, MW_6\}, \{MW_7\}, \{MW_8\}\}$; $\beta_{M_1-\{IF\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_5, MW_6\}\} \neq \beta_P(X)$. Therefore, $M_1 = \{IP, IF\}$ is a min. rdt.

Process 5. When $M = C - 0\{EM\} = \{IP, WG, DA, IF\}$ then $\beta_N = \beta_P$. But $U/R(N-\{IP\}) = \{\{MW_1, MW_4, MW_5\}, \{MW_2\}, \{MW_3, MW_6, MW_7\}, \{MW_8\}\}$; $\underline{A}_{N-\{IP\}}(X) = \{MW_2\}$, $\overline{A}_{N-\{IP\}}(X) = \{MW_1, MW_2, MW_3, MW_4, MW_6, MW_7\}$; $B_{RN-\{IP\}}(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7\}$ and $\beta_{N-\{IP\}}(X) = \{U,$

$\{MW_2\}, MW_7\}, \{MW_1, MW_3, MW_4, MW_5, MW_6\}\} = \beta_P(X)$. $U/R(N-\{WG\}) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_6\}, \{MW_5\}, \{MW_7\}, \{MW_8\}\}$ and $\beta_{N=\{WG\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\} = \beta_P(X)$. $U/R(N-\{DA\}) = \{\{MW_1, MW_4\}, \{MW_2, MW_7\}, \{MW_3, MW_6\}; \{MW_5\}, \{MW_8\}\}$ and $\beta_{N-\{DA\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\} = \beta_P(X)$. $U/R(N-\{IF\}) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_5, MW_6\}, \{MW_7\}, \{MW_8\}\}$ and $\beta_{N-\{IF\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_2, MW_3, MW_4, MW_6\}\} \neq \beta_P(X)$.

Procedure 6. Let $N_1 = N - \{WG\} = \{IP, DA, IF\}$, then $\beta_{N_1} = \beta_P$. And $U/R(N_1 - \{IP\}) = \{\{MW_1, MW_4, MW_5\}, \{MW_2\}, \{MW_3, MW_6, MW_7\}, \{MW_8\}\}$; $\beta_{N_1-\{IP\}}(X) = \{U, \{MW_2\}, \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7\}\} \neq \beta_C(X)$. Also $U/R(N_1 - \{DA\}) = \{\{MW_1, MW_4, MW_8\}, \{MW_2\}, \{MW_3, MW_6\}, \{MW_5\}, \{MW_7\}\}$; $\beta_{N_1-\{DA\}}(X) = \{U, \{MW_2, MW_7\}, \{MW_1, MW_3, MW_4, MW_6\}\} = \beta_P(X)$ and $U/R(N_1 - \{IF\}) = \{\{MW_1, MW_4\}, \{MW_2, MW_8\}, \{MW_3, MW_5, MW_6\}, \{MW_7\}\}$; $\beta_{N_1-\{IF\}}(X) = \{U, \{MW_7\}, \{MW_1, MW_2, MW_3, MW_4, MW_5, MW_8\}\} \neq \beta_P(X)$.

Task 7. When $N_1 = N_{1-\{DA\}} = N - \{WG\} - \{DA\} = C - \{EM\} - \{WG\} - \{DA\} = \{IP, IF\}$, then $\beta_{N_1} = \beta_P$. And $U/R(N_1 - \{IP\}) = \{\{MW_1, MW_4, MW_5, MW_8\}, \{MW_2\}, \{MW_3, MW_6, MW_7\}\}$; $\beta_{N_1-\{IP\}}(X) - \{IP\}(X) = \{U, \{MW_2\}, \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7\}\} \neq \beta_P(X)$.$\beta_{N_1-\{IP\}}(X) - \{IP\}(X) = \{U, \{MW_2\}, \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7\}\} \neq \beta_P(X)$. Also $U/R(N_1 - \{IF\}) = \{\{MW_1, MW_4\}, \{MW_2\}, \{MW_3, MW_5, MW_6\}, \{MW_7, MW_8\}\}$; $\beta_{N_1-\{IF\}}(X) = \{U, \{MW_2\}, \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7\}\} \neq \beta_P(X)$. Therefore, $N_1 = \{IP, IF\}$ is a min.rdt.

Similarly as in the previous steps, we shown that if $O = C - \{DA\}$, $O_1 = O - \{WG\}$ and $O_1 = O_1 - \{EM\}$. Thus if $O_1 = O_1 - \{EM\} = \{IP, IF\}$, we can show that $\beta_{O_1} \neq \beta_P$ for all $O_1 = \{IP, IF\}$ is a minimal reduct.

Case 2. (Women not with PCOS). Let $U = \{MW_4, MW_5, MW_6, MW_8\}$, the set of married women without PCOS. Then, $\underline{A}_P(X) = \{MW_5, MW_8\}$,

$\overline{A}_P(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_8\}$ and $B_{R_P}(X) = \{MW_1, MW_3, MW_4, MW_6\}$. Therefore, $\beta_P = \{U, \{MW_5, MW_8\}, \{MW_1, MW_3, MW_4, MW_6\}\}$. When the attr in P are excluded one by one, we get the following $\underline{A}_{P-\{IP\}}(X) = \{\{MW_1, MW_4, MW_5\}, \{MW_2\}, \{MW_3, MW_6\}, \{MW_7\}, \{MW_8\}\}$ $\overline{A}_{P-\{IP\}}(X) = \{MW_8\}$ and $B_{RN-\{IP\}}(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7\}$. Thus $\beta_{P-\{IP\}}(X) = \{U, \{MW_8\}, \{MW_1, MW_3, MW_4, MW_5, MW_6\}\} \neq \beta_P$. $\overline{A}_{P-\{WG\}}(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_8\}.\underline{A}_{P-\{WG\}}(X) = \{MW_5, MW_8\}$ and $B_{RP-\{WG\}}(X) = \{MW_1, MW_3, MW_4, MW_6\}$. Thus $\beta_{P-\{WG\}}(X) = \{U, \{MW_5, MW_8\}, \{MW_1, MW_3, MW_4, MW_6\}\} = \beta_P(X)$. $\overline{A}_{P-\{EM\}}(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_8\}$; $\underline{A}_{P-\{EM\}}(X) = \{MW_5, MW_8\}$ and $B_{RP-\{EM\}}(X) = \{MW_1, MW_3, MW_4, MW_6\}$. Thus $\beta_{P-\{EM\}}(X) = \{U, \{MW_5, MW_8\}, \{MW_1, MW_3, MW_4, MW_6\}\} = \beta_P(X)$. $U_{C-\{DA\}}(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_8\} L_{C-\{DA\}}(X) = \{MW_5, MW_8\}$ and $B_{C-\{DA\}}(X) = \{MW_1, MW_3, MW_4, MW_6\}$. Thus $\beta_{P-\{DA\}}(X) = \{U, \{MW_5, MW_8\}, \{MW_1, MW_3, MW_4, MW_6\} = \beta_P . U_{P-\{IF\}}(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7, MW_8\}$; $L_{P-\{IF\}}(X) = \{MW_8\}$ and $B_{P-\{IF\}}(X) = \{MW_1, MW_3, MW_4, MW_5, MW_6, MW_7\} = \beta_P$. Thus $P - \{WG\} = \{IP, EM, DA, IF\}$, $P - \{EM\} = \{IP, WG, DA, IF\}$ and $P - \{DA\} = \{IP, WG, EM, IF\}$ are the rdt.

As in the previous case, it can be shown that $[P - \{WG\}] \cap [P - \{EM\}] \cap [P - \{DA\}] = \{IP, IF = CORE\}$

3. Conclusion

In this paper, the concept of NANOtop has been employed and the attr rtd had done by utilizing the basis. Since from case 1 and case 2, CORE = {IP, IF}, we finish up "Irregular Periods" and "Infertility" are the key indications with close association with the malady "Polycystic ovary disorder" that draw significantly more consideration than different manifestations. Legitimate nourishment diet and Regular medicinal consideration help to lessen more inconvenience of illness.

References

[1] M. Lellis Thivagar and Carmel Richard, On nano forms of weakly open sets, International Journal of Mathematics and Statistics Invention 1(1) (2013), 31-37.

[2] M. Lellis Thivagar and Carmel Richard, On nano continuity, Mathematical Theory and Modeling 3(7) (2013), 32-37.

[3] M. Lellis Thivagar and Carmel Richard, Note on nano topological spaces, (communicated).

[4] M. Lellis Thivagar and Carmel Richard, A new topological reduction of incomplete information systems in medical diagnosis, Mathematical Sciences International Research Journal 1(2) ISSN 2278-8697.

[5] Nirmala Rebecca Paul, Decision making in an information system via a new topology, Annals of Fuzzy Mathematics and Informatics (9) (2016), 1-10.

[6] Z. Pawalk, Rough sets, Theoretical Aspects of Reasoning about Data, Kluwer Academic Publishers, Boston, 1991.

[7] Yuhua Qian, Chuangyinn Dang, Jiyeh Liang and Dawei Tang, Set valued ordered information systems, Information Sciences (179) (2009), 28092793.

[8] Zuqiang Meng and Zhongzhi Shi, A fast approach to attribute reduction in incomplete decision systems with tolerance relation-based rough sets, Information Sciences (179) (2009), 7-10.