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# Elimination of Attributes in Peptic Ulcers in Human Being Via Nono Topology

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**ABSTRACT:**

In this paper, a distinct approach in Nona topology is used as the perception to reduce conditional attributes. We also find the major symptoms to diagnosis peptic ulcers in Human beings through Nona topology.

**Keywords:** Nano topological spaces, basis, attributes, lower approximation, upper approximation, boundary region, core.

## 1. Introduction:

A peptic ulcer is known as gastric ulcer. It occurs when acid in the digestive tract eats away at the inner surface of the stomach or small intestine. Gastric ulcers are round to oval with a smooth base. It may involve the lower esophagus, distal duodenum, or jejunum. An ulcer extends beyond the muscularis mucosa. The common causes for peptic ulcers are

- Helicobacter pylori (H.Pylori).
- Nonsteroidal anti- inflammatory drugs (NSADs).

The symptoms of the diseases are Abdominal pain, Heart burn, Nausea and vomiting, Loss of appetite Weight loss, Dark stool Feeling faint.Lellis Thivagar and C. Richard introduced the concept of Nano topological spaces with respect to a subset *X* of a universe *U*. The topology introduced here is named Nano topology because of its size, since it has at most 5 elements. In this paper we identify the impact factor of Peptic ulcers in Human being via Nano topology.

## 2. Preliminaries:

**Definition: 2.1**

Let U be a non-empty finite set of subject called the "universe" and $\Re$ be an equivalence relation on U named as the indiscernibility relation elements belonging to the same equivalence class are said to be indiscernible with one another. The pair (U, $\Re$ ) is said to be approximate space.

Let $X \subseteq$ U.

**1. Lower approximation**:

The lower approximation of X with respect to $\Re$ is the set of all objects which can for certain classified as X with respect to $\Re$ and it is denoted by $LR_{\Re}(X)$.

(i.e.) $LR_{\Re}(X) = \bigcup_{x \in U} \{\Re(X) : \Re(X) \subseteq X\}$

Where $\Re$ (x) denotes the equivalence class determined by x.

**2. Upper approximation:**

The upper approximation of X with respect to $\Re$ is the set of all objects which can be possibly classified as x with respect to $\Re$ and it is denoted by $UR_{\Re}(X)$.

(i.e.) $$UR_{\Re}(X) = \bigcup_{x \in U} \{\Re(X) : \Re(X) \cap X \neq \phi\}$$

**3. Boundary:**

The boundary region of X with respect to $\Re$ is the set of all objects which can classified neither as x nor as not x with respect to $\Re$ and it is denoted by $BR_{\Re}(X)$.

(i.e.) $$BR_{\Re}(X) = UR_{\Re}(X) - LR_{\Re}(X)$$

**4. Nano topology:**

Let U be a non-empty, finite universe of objects and $\Re$ be an equivalence relation U. Let $X \subseteq U$ and $\tau_{\Re}(X) = \{U, \phi, LR_{\Re}(X), UR_{\Re}(X), BR_{\Re}(X)\}.$

Then $\tau_{\Re}(X)$ is a topology on U, called as the Nano topology on U with respect to X.

Elements of the Nano topology are known as the Nano open sets in U and $(U, \tau_{\Re}(X))$ are called the Nano topological spaces.

**Definition:2.2**

Let U be a finite set and $X \subseteq U$ then the basis of Nano topology $\tau(X)$ is given by, $\beta_{\Re}(X) = \{U, LR_{\Re}(X), BR_{\Re}(X)\}.$

## 3. Applications of Nano topology.

**Algorithm:**

Step**:** 1 For a limited universe U, a limited set of attributes K which is partitioned in to two class M and D and an equivalence relation $\Re$ on U corresponding to M.

Step: 2 Find the lower boundary, upper boundary and boundary region with respect to $\Re$.

Step: 3 Generate the Nano topology $\tau_M(X)$ and its basis $\beta_M(X)$.

Step: 4 Eliminate an attributes Z from M and determine lower boundary, upper boundary and boundary region for M-Z

Step: 5 Generate the Nano topology $\tau_{M-Z}(X)$ and its basis $\beta_{M-Z}(X)$.

Step: 6 Repeat steps 4 and 5 for each attribute.

Step: 7 The CORE attributes are those for which $\beta_M(X) = \beta_{M-Z}(X)$.

Step:8 Eliminate an attribute not CORE. Repeat steps 4 and 7 and determine the CORE in all the cases.

Step: 9 The attributes in CORE are the risk factors that cause the disease.

**INFORMATION TABLE**

| Human Being | Abdominal Pain | Heart burn | Nausea and vomiting | Loss of appetite | Weight loss | Dark stool | Feeling faint | Decision |
|---|---|---|---|---|---|---|---|---|
| $H_1$ | ✓ | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ | ✓ |
| $H_2$ | ✓ | ✗ | ✗ | ✓ | ✗ | ✓ | ✓ | ✓ |
| $H_3$ | ✓ | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| $H_4$ | ✓ | ✗ | ✗ | ✗ | ✓ | ✓ | ✗ | ✓ |
| $H_5$ | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ | ✗ |
| $H_6$ | ✓ | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $H_7$ | ✓ | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| $H_8$ | ✓ | ✗ | ✗ | ✗ | ✓ | ✓ | ✗ | ✗ |
| $H_9$ | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ | ✗ |
| $H_{10}$ | ✓ | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $H_{11}$ | ✗ | ✓ | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ |
| $H_{12}$ | ✗ | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| $H_{13}$ | ✓ | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ | ✗ |
| $H_{14}$ | ✗ | ✓ | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ |
| $H_{15}$ | ✓ | ✗ | ✗ | ✓ | ✗ | ✓ | ✓ | ✓ |
| $H_{16}$ | ✓ | ✗ | ✗ | ✗ | ✓ | ✓ | ✗ | ✗ |
| $H_{17}$ | ✓ | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $H_{18}$ | ✓ | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| $H_{19}$ | ✓ | ✓ | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| $H_{20}$ | ✗ | ✓ | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ |

$$U = \bigcup_{i=1}^{20} H_i$$

Here is the Human with the disease.

$U = \{H_1, H_2, H_3, H_4, H_5, H_6, H_7, H_8, H_9, H_{10}, H_{11}, H_{12}, H_{13}, H_{14}, H_{15}, H_{16}, H_{17}, H_{18}, H_{19}, H_{20}\}$ and K= {Abdominal pain, Heart burn, Nausea and vomiting, Loss of appetite Weight loss, Dark stool, Feeling faint}

K is classified into two classes M = {AP, HB, NV, LA, WL, DS, FF } and F = {Peptic ulcers}. The family of equivalence classes U/M corresponding to M is given by

$$U/\Re(X) = \left\{ \begin{matrix} \{H_{1,} H_3, H_7, H_{18}, H_{19}\}, \{H_2, H_{15}\}, \{H_4, H_8, H_{16}\}, \{H_5, H_9, H_{13}\}, \{H_6, H_{10}, H_{19}\}, \{H_{11}, H_{14}, H_{20}\}, \\ \{H_{12}\} \end{matrix} \right\}.$$

**CASE I: HUMAN BEINGS WITH PEPTIC ULCERS**

Here the set of Human beings with Peptic ulcers is X= $\{H_1, H_{2,} H_4, H_{15,} H_6, H_{10,} H_{17}\}.$

Then,

$$LR_{\Re}(X) = \{H_2, H_{15}, H_6, H_{10}, H_{17}\}.$$

$$UR_{\Re}(X) = \{H_{1,} H_3, H_7, H_{18}, H_{19}, H_2, H_{15}, H_6, H_{10}, H_{17}, H_4, H_8, H_{16}\}.$$

$$BR_{\Re}(X) = \{H_{1,} H_3, H_7, H_{18}, H_{19}, H_4, H_8, H_{16}\}.$$

Therefore the Nano topology is given by,

$$\tau_M(X) = \left\{ \begin{matrix} U, \phi, \{H_2, H_{15}, H_6, H_{10}, H_{17}\}, \{H_{1,} H_3, H_7, H_{18}, H_{19}, H_2, H_{15}, H_6, H_{10}, H_{17}, H_4, H_8, H_{16}\}, \\ \{H_{1,} H_3, H_7, H_{18}, H_{19}, H_4, H_8, H_{16}\} \end{matrix} \right\}$$

$$\beta_M(X) = \{U, \{H_2, H_{15}, H_6, H_{10}, H_{17}\}, \{H_{1,} H_3, H_7, H_{18}, H_{19}, H_4, H_8, H_{16}\}\}$$

**STEP I:**

When the attribute “Abdominal pain (AP)” is removed from M

$$U/\Re_{(M-AP)}(X) = \left\{ \begin{matrix} \{H_{1,} H_3, H_7, H_{18}, H_{19}, H_{12}\}\{H_2, H_{15}\}, \{H_4, H_8, H_{16}\}, \{H_5, H_9, H_{13}\}, \{H_6, H_{10}, H_{17}\}, \\ \{H_{11}, H_{14}, H_{20}\} \end{matrix} \right\}$$

Then,

$$LR_{(M-AP)}(X) = \{H_2, H_{15}, H_6, H_{10}, H_{17}\}$$

$$UR_{(M-AP)}(X) = \{H_{1,} H_3, H_7, H_{18}, H_{19}, H_2, H_{15}, H_6, H_{10}, H_{17}, H_4, H_8, H_{16}, H_{12}\}.$$

$$BR_{(M-AP)}(X) = \{H_{1,} H_3, H_7, H_{18}, H_{12}, H_{19}, H_4, H_8, H_{16}\}.$$

Then the Nano topology is given by,

$$\tau_{(M-AP)}(X) = \left\{ \begin{matrix} U, \phi, \{H_2, H_{15}, H_6, H_{10}, H_{17}\}, \{H_{1,} H_3, H_7, H_{18}, H_{19}, H_2, H_{15}, H_6, H_{10}, H_{17}, H_4, H_8, H_{16}, H_{12}\}, \\ \{H_{1,} H_3, H_7, H_{18}, H_{12}, H_{19}, H_4, H_8, H_{16}\} \end{matrix} \right\}.$$

$$\beta_{(M-AP)}(X) = \{U, \{H_2, H_{15}, H_6, H_{10}, H_{17}\}, \{H_{1,} H_3, H_7, H_{18}, H_{12}, H_{19}, H_4, H_8, H_{16}\}\}$$

$$Hence,\ \tau_{(M-AP)}(X) \neq \tau_M(X) and\ \beta_{(M-AP)}(X) \neq \beta_M(X).$$

**STEP II:**

When the attribute “Heart burn (HB)” is removed from M.

$$U/\Re_{(M-HB)}(X) = \left\{ \begin{matrix} \{H_{1,} H_3, H_7, H_{18}, H_{19}\}, \{H_2, H_{15}\}, \{H_4, H_8, H_{16}\}, \{H_5, H_9, H_{13}\}, \{H_6, H_{10}, H_{17}\}, \\ \{H_{11}, H_{14}, H_{20}\}, \{H_{12}\} \end{matrix} \right\}.$$

Then,

$$LR_{(M-HB)}(X)=\{H_2,H_{15},H_6,H_{10},H_{17}\}$$

$$UR_{(M-HB)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16}\}.$$

$$B_{(M-HB)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}.$$

Then the Nan topology is given by,

$$\tau_{(M-HB)}(X)=\begin{Bmatrix}U,\phi,\{H_2,H_{15},H_6,H_{10},H_{17}\},\{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\end{Bmatrix}.$$

$$\beta_{(M-HB)}(X)=\{U,\{H_2,H_{15},H_6,H_{10},H_{17}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\}.$$

$$Hence,\ \tau_{(M-HB)}(X)=\tau_M(X)\ and\ \beta_{(M-HB)}(X)=\beta_M(X).$$

**STEP III:**

When the attribute "Nausea vomiting (NV)" is removed from M.

$$U/\Re_{(M-NV)}(X)=\begin{Bmatrix}\{H_1,H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16}\},\{H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\\ \{H_{11},H_{14},H_{20}\},\{H_{12}\}\end{Bmatrix}.$$

Then,

$$LR_{(M-NV)}(X)=\{H_2,H_{15},H_6,H_{10},H_{17}\}$$

$$UR_{(M-NV)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16}\}.$$

$$BR_{(M-NV)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}.$$

Then the Nano topology is given by,

$$\tau_{(M-NV)}(X)=\begin{Bmatrix}U,\phi,\{H_2,H_{15},H_6,H_{10},H_{17}\},\{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\end{Bmatrix}.$$

$$\beta_{(M-NV)}(X)=\{U,\{H_2,H_{15},H_6,H_{10},H_{17}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\}.$$

$$Hence,\ \tau_{(M-NV)}(X)=\tau_M(X)\ and\ \beta_{(M-NV)}(X)=\beta_M(X).$$

**STEP IV:**

When the attribute "Loss of appetite (LA)" is removed from M.

$$U/\Re_{(M-LA)}(X)=\begin{Bmatrix}\{H_1,H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16}\},\{H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\\ \{H_{11},H_{14},H_{20}\},\{H_{12}\}\end{Bmatrix}.$$

Then,

$$LR_{(M-LA)}(X)=\{H_2,H_{15},H_6,H_{10},H_{17}\}.$$

$$UR_{(M-LA)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16}\}.$$

$$BR_{(M-LA)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}.$$

Then the Nano topology is given by,

$$\tau_{(M-LA)}(X)=\begin{Bmatrix}U,\phi,\{H_2,H_{15},H_6,H_{10},H_{17}\},\{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\end{Bmatrix}.$$

$$\beta_{(M-LA)}(X)=\{U,\{H_2,H_{15},H_6,H_{10},H_{17}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\}.$$

$$Hence,\ \tau_{(M-LA)}(X)=\tau_M(X) and\ \beta_{(M-LA)}(X)=\beta_M(X).$$

**STEP V:**

When the attribute "Weight loss (WL)" is removed from M.

$$U/\Re_{(M-WL)}(X)=\left\{\begin{matrix}\{H_1,H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16}\},\{H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\\ \{H_{11},H_{14},H_{20}\},\{H_{12}\}\end{matrix}\right\}.$$

Then,

$$LR_{(M-WL)}(X)=\{H_2,H_{15},H_6,H_{10},H_{17}\}.$$

$$UR_{(M-WL)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16}\}.$$

$$BR_{(M-WL)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}.$$

Then the Nano topology is given by,

$$\tau_{(M-WL)}(X)=\left\{\begin{matrix}U,\phi,\{H_2,H_{15},H_6,H_{10},H_{17}\},\{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\end{matrix}\right\}.$$

$$\beta_{(M-WL)}(X)=\{U,\{H_2,H_{15},H_6,H_{10},H_{17}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\}.$$

$$Hence,\tau_{(M-WL)}(X)=\tau_M(X) and\ \beta_{(M-WL)}(X)=\beta_M(X).$$

**STEP VI:**

When the attribute " Dark stool (DS)" is removed from M.

$$U/\Re_{(M-DS)}(X)=\left\{\begin{matrix}\{H_1,H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16},H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\\ \{H_{11},H_{14},H_{20}\},\{H_{12}\}\end{matrix}\right\}.$$

Then,

$$LR_{(M-DS)}(X)=\{H_2,H_{15},H_6,H_{10},H_{17}\}.$$

$$UR_{(M-DS)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16},H_5,H_9,H_{13}\}.$$

$$BR_{(M-DS)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13}\}.$$

Then the Nano topology is given by,

$$\tau_{(M-DS)}(X)=\left\{\begin{matrix}U,\phi,\{H_2,H_{15},H_6,H_{10},H_{17}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16},H_5,H_9,H_{13}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13}\}\end{matrix}\right\}.$$

$$\beta_{(M-DS)}(X)=\{U,\{H_2,H_{15},H_6,H_{10},H_{17}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13}\}\}.$$

$$Hence,\ \tau_{(M-DS)}(X)\neq\tau_M(X) and\ \beta_{(M-DS)}(X)\neq\beta_M(X).$$

**STEP VII:**

When the attribute "Feeling faint (FF)" is removed from M.

$$U/\Re_{(M-FF)}(X)=\left\{\begin{matrix}\{H_1,H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16}\},\{H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\\ \{H_{11},H_{14},H_{20}\},\{H_{12}\}\end{matrix}\right\}.$$

Then,

$$LR_{(M-FF)}(X)=\{H_2,H_{15},H_6,H_{10},H_{17}\}.$$

$$UR_{(M-FF)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16}\}.$$

$$BR_{(M-FF)}(X)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}.$$

Then the Nano topology is given by,

$$\tau_{(M-FF)}(X)=\left\{\begin{matrix}U,\phi,\{H_2,H_{15},H_6,H_{10},H_{17}\},\{H_1,H_3,H_7,H_{18},H_{19},H_2,H_{15},H_6,H_{10},H_{17},H_4,H_8,H_{16}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\end{matrix}\right\}$$

$$\beta_{(M-FF)}(X)=\{U,\{H_2,H_{15},H_6,H_{10},H_{17}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\}.$$

$$Hence,\tau_{(M-FF)}(X)=\tau_M(X)and\ \beta_{(M-FF)}(X)=\beta_M(X).$$

Therefore,

CORE (K)={Abdominal pain, Dark stool}

**CASE II: HUMAN BEINGS WITHOUT PEPTIC ULCERS**

The family of equivalence classes U/M corresponding to M is given by

$$U/\Re(Z)=\left\{\begin{matrix}\{H_1,H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16}\},\{H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\{H_{11},H_{14},H_{20}\},\\ \{H_{12}\}\end{matrix}\right\}.$$

Assume the set of Human beings without Peptic ulcers is Z= $\{H_3,H_7,H_5,H_9,H_{13}\}.$

Then,

$$LR_{\Re}(Z)=\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$UR_{\Re}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$BR_{\Re}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}$$

Then the Nano topology is given by,

$$\tau_M(Z)=\left\{\begin{matrix}U,\phi,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\end{matrix}\right\}$$

$$\beta_M(Z)=\{U,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\}$$

**STEP I:**

When the attribute “Abdominal pain (AP)” is removed from M.

$$U/\Re_{(M-AP)}(Z)=\left\{\begin{matrix}\{H_1,H_3,H_7,H_{18},H_{19},H_{12}\}\{H_2,H_{15}\},\{H_4,H_8,H_{16}\},\{H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\\ \{H_{11},H_{14},H_{20}\}\end{matrix}\right\}$$ Then,

$$LR_{(M-AP)}(Z)=\{H_5,H_9,H_{13},H_{11},H_{14},H_{20}\}$$

$$UR_{(M-AP)}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$BR_{[M-AP]}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_{12}\}$$

Then the Nano topology is given by,

$$\tau_{(M-AP)}(Z)=\left\{\begin{matrix}U,\phi,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_{12}\}\end{matrix}\right\}$$

$$\beta_{(M-AP)}(Z)=\{U,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_{12}\}\}$$

$$Hence,\ \tau_{(M-AP)}(Z)\neq\tau_M(Z) and\ \beta_{(M-AP)}(Z)\neq\beta_M(Z).$$

**STEP II:**

When the attribute "Heart burn (HB)" is removed from M.

$$U/\Re_{(M-HB)}(Z)=\left\{\begin{matrix}\{H_1,H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16}\},\{H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\{H_{11},H_{14},H_{20}\},\\ \{H_{12}\}\end{matrix}\right\}.$$

Then,

$$LR_{(M-HB)}(Z)=\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$UR_{(M-HB)}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$BR_{(M-HB)}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}$$

Then the Nano topology is given by,

$$\tau_{(M-HB)}(Z)=\left\{\begin{matrix}U,\phi,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\end{matrix}\right\}$$

$$\beta_{(M-HB)}(Z)=\{U,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\}$$

$$Hence,\ \tau_{(M-HB)}(Z)=\tau_M(Z)\ and\ \beta_{(M-HB)}(Z)=\beta_M(Z).$$

**STEP III:**

When the attribute "Nausea and vomiting (NV)" is removed from M.

$$U/\Re_{(M-NV)}(Z)=\left\{\begin{matrix}\{H_1,H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16}\},\{H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\{H_{11},H_{14},H_{20}\},\\ \{H_{12}\}\end{matrix}\right\}.$$

Then,

$$LR_{(M-NV)}(Z)=\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$UR_{(M-NV)}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$BR_{(M-NV)}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}$$

Then the Nano topology is given by,

$$\tau_{(M-NV)}(Z)=\left\{\begin{matrix}U,\phi,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\end{matrix}\right\}$$

$$\beta_{(M-NV)}(Z)=\{U,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\}$$

$$Hence,\ \tau_{(M-NV)}(Z)=\tau_M(Z)\ and\ \beta_{(M-NV)}(Z)=\beta_M(Z).$$

**STEP IV:**

When the attribute "Loss of appetite (LA)" is removed from M.

$$U/\Re_{(M-LA)}(Z)=\left\{\begin{matrix}\{H_1,H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16}\},\{H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\\ \{H_{11},H_{14},H_{20}\},\{H_{12}\}\end{matrix}\right\}.$$ Then,

$$LR_{(M-LA)}(Z)=\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$UR_{(M-LA)}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$BR_{(M-LA)}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}$$

Then the Nano topology is given by,

$$\tau_{(M-LA)}(Z)=\left\{\begin{matrix}U,\phi,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\end{matrix}\right\}$$

$$\beta_{(M-LA)}(Z)=\{U,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\}$$

$$Hence,\ \tau_{(M-LA)}(Z)=\tau_M(Z)\ and\ \beta_{(M-LA)}(Z)=\beta_M(Z).$$

**STEP V:**

When the attribute "Weight loss (WL)" is removed from M.

$$U/\Re_{(M-WL)}(Z)=\left\{\begin{matrix}\{H_1,H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16}\},\{H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\\ \{H_{11},H_{14},H_{20}\},\{H_{12}\}\end{matrix}\right\}.$$

Then,

$$LR_{(M-WL)}(Z)=\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$UR_{(M-WL)}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$BR_{(M-WL)}(Z)=\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}$$

Then the Nano topology is given by,

$$\tau_{(M-WL)}(Z)=\left\{\begin{matrix}U,\phi,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\end{matrix}\right\}$$

$$\beta_{(M-WL)}(Z)=\{U,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\{H_1,H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\}$$

$$Hence,\ \tau_{(M-WL)}(Z)=\tau_M(Z)\ and\ \beta_{(M-WL)}(Z)=\beta_M(Z).$$

**STEP VI:**

When the attribute "Dark stool (DS)" is removed from M.

$$U/\Re_{(M-DS)}(Z)=\left\{\begin{matrix}\{H_1,H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16},H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\\ \{H_{11},H_{14},H_{20}\},\{H_{12}\}\end{matrix}\right\}.$$

Then,

$$LR_{(M-DS)}(Z)=\{H_{11},H_{14},H_{20},H_{12}\}$$

$$UR_{(M-DS)}(Z)=\{H_{1,}H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$BR_{(M-DS)}(Z)=\{H_{1,}H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13}\}$$

Then the Nano topology is given by,

$$\tau_{(M-DS)}(Z)=\left\{\begin{matrix}U,\phi,\{H_{11},H_{14},H_{20},H_{12}\},\\ \{H_{1,}H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_{1,}H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13}\}\end{matrix}\right\}$$

$$\beta_{(M-DS)}(Z)=\{U,\{H_{11},H_{14},H_{20},H_{12}\},\{H_{1,}H_3,H_7,H_{18},H_{19},H_4,H_8,H_5,H_9,H_{13},H_{16}\}\}$$

$$Hence,\ \tau_{(M-DS)}(Z)\neq\tau_M(Z) and\ \beta_{(M-DS)}(Z)\neq\beta_M(Z).$$

**STEP VII:**

When the attribute "Feeling faint (FF)" is removed from S.

$$U/\Re_{(M-FF)}(Z)=\left\{\begin{matrix}\{H_{1,}H_3,H_7,H_{18},H_{19}\},\{H_2,H_{15}\},\{H_4,H_8,H_{16}\},\{H_5,H_9,H_{13}\},\{H_6,H_{10},H_{17}\},\\ \{H_{11},H_{14},H_{20}\},\{H_{12}\}\end{matrix}\right\}.$$

Then,

$$LR_{(M-FF)}(Z)=\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$UR_{(M-FF)}(Z)=\{H_{1,}H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\}$$

$$BR_{(M-FF)}(Z)=\{H_{1,}H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}$$

Then the Nano topology is given by,

$$\tau_{(M-FF)}(Z)=\left\{\begin{matrix}U,\phi,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_{1,}H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16},H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\\ \{H_{1,}H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\end{matrix}\right\}$$

$$\beta_{(M-FF)}(Z)=\{U,\{H_5,H_9,H_{13},H_{11},H_{14},H_{20},H_{12}\},\{H_{1,}H_3,H_7,H_{18},H_{19},H_4,H_8,H_{16}\}\}$$

$$Hence,\ \tau_{(M-FF)}(Z)=\tau_M(Z)\ and\ \beta_{(M-FF)}(Z)=\beta_M(Z).$$

Therfore,

CORE (K)={Abdominal pain, Dark stool}

## 4. Conclusion:

We conclude that, "Abdominal pain, Dark stool", are the most impact factors for "PEPTIC ULCERS IN HUMAN BEINGS". Also, The Concepts of Nano topology can be applied in various fields namely, Medical field, Academic related field, Marketing fields, Business sectors and so on.

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