Annals of R.S.C.B., ISSN: 1583-6258, Vol. 25, Issue 6, 2021, Pages. 1136-1146
Received 25 April 2021; Accepted 08 May 2021.

FINANCIAL ANALYSIS OF MACHINE LEARNING (ML) AND NANO CLASS APPLICATIONS FOR CLOSED SETS

[1]Dr.Makarand Upadhyaya, 2S.PREMA, 3Dr. Pavithra G., [4]M S MUTHURAMAN, [5]S.Balamuralitharan*, [6]A.PANDI,

[1]Associate Professor-Marketing, University of Bahrain,
Department of Management & Marketing, College of Business Administration,
Bahrain-32038
E-mail: makarandjaipur@gmail.com
[2]Assistant Professor
Department of Mathematics, Rajalakshmi Institute of Technology
Chennai 600124, Tamilnadu, India.
[3]Associate Professor, Electronics & Communication Engg Dept. (ECE),
Dayananda Sagar College of Engg. (DSCE),
Block No. 17,Room No. 17205, Kumaraswamy Layout,
Shavigemalleshwara Hills, Bangalore- 560078, Karnataka, India.
[4]PROFESSOR, DEPARTMENT OF MATHEMATICS, PSNA COLLEGE OF ENGINEERING AND TECHNOLOGY, DINDIGUL.
[5]Department of Mathematics, College of Engineering and Technology,
SRM Institute of Science and Technology, Kattankulathur-603 203,
Chengalpattu District, Tamilnadu, INDIA.
[6]ASSISTANT PROFESSOR,
DEPARTMENT OF MATHEMATICS,
RATHINAM TECHNICAL CAMPUS, POLLACHI MAIN ROAD, EACHANARI,
COIMBATORE-21. TAMILNADU, INDIA.
*Corresponding Author Email: balamurs@srmist.edu.in

Abstract:

In today's modern economy, stock market for financial data forecasting and analysis play a vital role. The stock market process is obviously full of uncertainty, and it is strongly influenced by a lot of factors. This grew to be a powerful factor in business and finance. There are numerous types of algorithms used for predicting. An analysis of neural network and Machine Learning techniques for stock market price forecasting is discussed in this paper. In this paper, we introduce a (i,j)*-NΩ-closed sets in Nano bi-topological spaces. This class lies between (i,j)*-N$\ddot{g}_{\alpha}$-cld sets and (i,j)*-Nαg-cld sets.

Keywords: NNM, MI, (i,j)*-Ng̈-cld, (i,j)*-Nω-cld, (i,j)*- N$\ddot{g}_{\alpha}$-cld, (i,j)*-NΩ-cld.

1. INTRODUCTION

Merger and acquisition play a vital role in the transformation of India's manufacturing sector and service sector [1]. Mergers and acquisitions grow in the phenomenon of the World of Modern city. Merging means that two companies are merged to form a new company, where one company is taken over as the acquisition over the other company [2]. M&A is one of the main factors for corporate finance world. The value generated from this process is one of the major reasons to inspire

Annals of R.S.C.B., ISSN: 1583-6258, Vol. 25, Issue 6, 2021, Pages. 1136-1146
Received 25 April 2021; Accepted 08 May 2021.

and motivate the companies of M&A [3]. The companies are going through M&A for the main objective of wealth profit maximization, larger market share and a few several areas. M&A can take place for many methods; some are by buying the company's common stock, buying the company's specific target investment, and so on. M&A's major reason is to extend the risk, increase the company's market share, increase the size of the factory and improve the performance of the business [4]. Merger is of two or more entities by acquisition through which the existence of one entity arise and the other entity is dissolved [5]. Essentially, the factors behind the merger deals with market share benefit, competitive advantage, increased sales and risk and market expansion [6]. Mergers and acquisitions have always been a concern for strategic managers and financial analyses, which contribute to the strong competition resulting from the quickly evolving market, has resulted in a situation in which businesses find it challenging to stay competitive. Several works have been made out in developing and developed countries to examine the impact of mergers and acquisition on financial results of companies [7]. The M&A decision is considered to be one of the main decisions on corporate finance, and its effect on the performance of the business and on overall corporate achievement is important. M&A is conducted from the synergy perspective and the revenue of the acquisition company is typically expected to increase the market share and enhance productivity and the distribution capability [8]. It is expected that the post-merger and cost burden of the company will be minimized by improved management, by staying away from duplication of resources and by reducing the cost of capital. In the long run, it is believed that a corporation would benefit from the tax advantages of M&A. It is widely predicted that the profitability of the company will increase after M&A, and the survival likelihood of the firm will increase [9].

According to Healy, the resulting risks and benefits of mergers and acquisitions are truly a corporate issue and could have a positive or negative impact on the performance of the company [10]. The company's shareholders and their agents also are faced with other issues to determine whether this awareness about the effects and decisions will ultimately improve the financial performance of the company. Although, looking at the issue of mergers and acquisitions has been seen as a very difficult issue for the company employees. They introduced generalized closed sets in general topology as a generalization of closed sets. They introduced the concepts of bitopological spaces. They introduce on Nano generalized pre closed sets and Nano pre generalized closed sets in Nano topological spaces. They was introduced some modifications of Nano bi-topological spaces. In this paper, we introduce a (i,j)*-NΩ-cld sets in nano bitopological spaces (briefly NBTS). This class lies between (i,j)*-N$\ddot{g}_{\alpha}$-cld sets and (i,j)*-Nαg-cld sets [11].

2. PRELIMINARIES

Throughout this paper NBTS U represent nano bitopological spaces on which no separation axioms are assumed unless otherwise mentioned.

Definition 2.1 [9]
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. 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 $X \subseteq U$.

Annals of R.S.C.B., ISSN: 1583-6258, Vol. 25, Issue 6, 2021, Pages. 1136-1146
Received 25 April 2021; Accepted 08 May 2021.

1. 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 it is denoted by $L_R(X)$. That is, $L_R(X) = \cup_{x \in U} \{R(x): R(x) \subseteq X\}$, where R(x) denotes the equivalence class determined by x.

2. 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 it is denoted by $U_R(X)$. That is, $U_R(X) = \cup_{x \in U} \{R(x): R(x) \cap X \neq \phi\}$.

3. 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 2.2 [6] Let U be the universe, R be an equivalence relation on U and $\tau_R(X) = \{U, \phi, L_R(X), U_R(X), B_R(X)\}$ where $X \subseteq U$. Then by the τ_R(X) satisfies the following axioms:

1. U and $\phi \in \tau_R(X)$,

2. The union of the elements of any sub collection of $\tau_R(X)$ is in $\tau_R(X)$,

3. The intersection of the elements of any finite subcollection of $\tau_R(X)$ is in $\tau_R(X)$.

That is, $\tau_R(X)$ is a topology on U called the nano topology on U with respect to X. We call $(U, \tau_R(X))$ as the nano topological space. The elements of $\tau_R(X)$ are called as nano open sets and $[\tau_R(X)]^c$ is called as the dual nano topology of $[\tau_R(X)]$.

Remark 2.3 [6] If $[\tau_R(X)]$ is the nano topology on U with respect to X, then the set $B = \{U, \phi, L_R(X), B_R(X)\}$ is the basis for $\tau_R(X)$.
Throughout this paper, (U, $N\tau_{Ri,j}$(X)) (briefly, U) will denote NBTS.

Definition 2.4 [8]
Let S be a subset of U. Then S is said to be $N\tau_{Ri,j}$(X)-open if $S = P \cup Q$ where $P \in N\tau_{Ri}(X_i)$ and $Q \in N\tau_{Rj}(X_j)$.

The complement of $N\tau_{Ri,j}$(X)-open set is called $N\tau_{Ri,j}$(X)-closed.

Definition 2.5 [8]
Let S be a subset of a NBTS U. Then
(i) the nano $\tau_{Ri,j}$(X)-closure of S, denoted by $N\tau_{Ri,j}$(X)-cl(S), is defined as $\cap$ {F : $S \subseteq F$ and F is $N\tau_{Ri,j}$(X)-closed}.

(ii) the nano $\tau_{Ri,j}$(X)-interior of S, denoted by $N\tau_{Ri,j}$(X)-int(S), is defined as $\cup$ {F : $F \subseteq S$ and F is $N\tau_{Ri,j}$(X)-open}.

Definition 2.6
A subset H of a NBTSspace U is called

(i) (i,j)*-Nsemi-open (briefly (i,j)*-Nsemi-opn) set [4] if H $\subseteq$ N$\tau_{Ri,j}$-cl(N$\tau_{Ri,j}$-int(H));
(ii) (i,j)*-Nα-open (briefly (i,j)*-Nα-opn) set [2] if H $\subseteq$ N$\tau_{Ri,j}$-int(N$\tau_{Ri,j}$-cl(N$\tau_{Ri,j}$-int(H)));

The complements of the above mentioned open sets are called their respective closed sets.

The (i,j)*-Nsemi-closure (resp. (i,j)*-Nα-closure) of a subset H of U, denoted by (i,j)*-Nscl(H) (resp. (i,j)*-Nαcl(H)) is defined to be the intersection of all (i,j)*-Nsemi-closed (resp. (i,j)*-Nα-cld) sets of U containing H. It is known that (i,j)*-Nscl(H) (resp. (i,j)*-Nαcl(H)) is a (i,j)*-Nsemi-closed (resp. (i,j)*-Nα-cld) set.

Definition 2.7
A subset H of a NBTSspace U is called

(i) (i,j)*-Ng-closed (briefly (i,j)*-Ng-cld) set [1] if N$\tau_{Ri,j}$-cl(H) $\subseteq$ U whenever H $\subseteq$ U and U is N$\tau_{Ri,j}$(X)-open in U.

(ii) (i,j)*-Nsg-closed (briefly (i,j)*-NSg-cld) set [4] if (i,j)*-Nscl(H) $\subseteq$ U whenever H $\subseteq$ U and U is (i,j)*-Nsemi-opn in U.

(iii) (i,j)*-Ngs-closed (briefly (i,j)*-Ngs-cld) set [8] if (i,j)*-Nscl(H) $\subseteq$ U whenever H $\subseteq$ U and U is N$\tau_{Ri,j}$(X)-opn in U.

(iv) (i,j)*-Nαg-closed (briefly (i,j)*-Nαg-cld) set [8] if (i,j)*-Nαcl(H) $\subseteq$ U whenever H $\subseteq$ U and U is N$\tau_{Ri,j}$(X)-opn in U.

(v) (i,j)*-Nω-closed (briefly (i,j)*-Nω-cld) set [8] if N$\tau_{Ri,j}$-cl(H) $\subseteq$ U whenever H $\subseteq$ U and U is (i,j)*-Nsemi-opn in U.

(vi) (i,j)*-Nψ-closed (briefly (i,j)*-Nψ-cld) set [8] if (i,j)*-Nscl(H) $\subseteq$ U whenever H $\subseteq$ U and U is (i,j)*-Nsg-opn in U.

The complements of the above mentioned closed sets are called their respective open sets.

3. MACHINE LEARNING

Machine learning is a branch of computer science that developed from artificial intelligence's pattern recognition and computational learning theory [12]. Machine learning is the analysis and development of algorithms that can learn from and forecast data. Rather than following purely static programmer instructions, such algorithms construct a model from example inputs in order to make data-driven predictions or decisions [13]. Machine learning is closely related to and often contrasts with, quantitative statistics, an area that often focuses on making predictions. Machine learning is highly correlated to, and often overlaps with, computational statistics, a field that focuses on making predictions [14]. It has close connections to mathematical optimization, which provides the field with tools, theory, and application domains. Machine learning is used in a number of application domains that explicit algorithms are difficult to design and database. Data mining and machine learning are often confused, but data mining focuses mostly on exploratory data processing. Both machine learning and pattern recognition are dimensions of the same field.

4. (i,j)*-NΩ-CLOSED SETS

We introduce the following definitions.

Definition 4.1
A subset H of a NBTS U is called

(i) (i,j)*-Nβ-open (briefly (i,j)*-Nβ-opn) set if H $\subseteq$ N$\tau_{Ri,j}$-cl(N$\tau_{Ri,j}$-int(N$\tau_{Ri,j}$-cl(H))).

(ii) (i,j)*-N$\ddot{g}$-closed (briefly (i,j)*- N$\ddot{g}$-cld) set if N$\tau_{Ri,j}$-cl(H) $\subseteq$ U whenever H $\subseteq$ U and U is (i,j)*-Nsg-opn in U.

(iii) (i,j)*-NΩ-closed (briefly (i,j)*-NΩ-cld) if (i,j)*-Nαcl(H) $\subseteq$ U whenever H $\subseteq$ U and U is (i,j)*-NΩ-opn in U.

(iv) (i,j)*-N$\ddot{g}_{\alpha}$-closed (briefly (i,j)*-N$\ddot{g}_{\alpha}$-cld) set if (i,j)*-Nαcl(H) $\subseteq$ U whenever H $\subseteq$ U and U is (i,j)*-Nsg-opn in U.

(v) (i,j)*-Ngsp-closed (briefly (i,j)*-Ngsp-cld) set if (i,j)*-Nspcl(H) $\subseteq$ U whenever H $\subseteq$ U and U is N$\tau_{Ri,j}$-opn in U.

The complements of the above mentioned closed sets are called their respective open sets.

Proposition 4.2
Any N$\tau_{Ri,j}$-cld set is (i,j)*-N$\ddot{g}$-cld.

Proof
If H is a N$\tau_{Ri,j}$-cld subset of U and G is any (i,j)*-Nsg-opn set containing H, then G $\supseteq$ H = N$\tau_{Ri,j}$-cl(A). Hence H is (i,j)*-N$\ddot{g}$-cld in U.

The converse of Prop 3.2 need not be true as seen from the following example.

Example 4.3 Let U = {p, q, r, s} with U/R_i={{p}, {q}, {r, s}}and X_i={p, q}. Then Nτ_{Ri}(X_i)={{ϕ, U, {p, q}}, U/R_j={{p}, {s}, {q, s}}and X_j= {q, r}. Then Nτ_{Rj}(X_j) = {ϕ, U, {q, r}}. Then N$\tau_{Ri,j}$(X)={ϕ, U, {p, q}, {q, r}, {p, q, r}}. Here {q, s} is a (i,j)*-N$\boldsymbol{\ddot{g}}$-cld but it is not a N$\tau_{Ri,j}$-cld.

Proposition 4.4
Any (i,j)*-N$\ddot{g}$-cld set is (i,j)*-N$\ddot{g}_{\alpha}$-cld.

Annals of R.S.C.B., ISSN: 1583-6258, Vol. 25, Issue 6, 2021, Pages. 1136-1146
Received 25 April 2021; Accepted 08 May 2021.

Proof

If H is a (i,j)*-N$\ddot{g}$-cld subset of U and G is any (i,j)*-Nsg-opn set containing H, then G $\supseteq$ N$\tau_{Ri,j}$-cl(H) $\supseteq$ (i,j)*-Nαcl(H). Hence H is (i,j)*-N$\ddot{g}_\alpha$-cld in U.

The converse of Prop 3.4 need not be true as seen from the following example.

Example 4.5

Let U = {p, q, r, s} with U/R_i={{p}, {q}, {r, s}}and X_i={p, q}. Then Nτ_{Ri}(X_i) = {ϕ, U, {p, q}}, U/R_j ={{p}, {q, r}, {s}}and X_j= {q, r}. Then Nτ_{Rj}(X_j)={{ϕ, U, {q, r}}. Then N$\tau_{Ri,j}$($X_{i,j}$) ={ϕ, U, {p, q}, {q, r}, {p, q, r}}. Here {p} is an (i,j)*-N$\ddot{g}_\alpha$-cld but not a (i,j)*-N$\ddot{g}$-cld set in U.

Proposition 4.6

Any (i,j)*-N$\ddot{g}$-cld set is (i,j)*-Nψ-cld.

Proof

If H is a (i,j)*-N$\ddot{g}$-cld subset of U and G is any (i,j)*-Nsg-opn set containing H, then G $\supseteq$ N$\tau_{Ri,j}$ -cl(H) $\supseteq$ (i,j)*-Nscl(H). Hence H is (i,j)*-Nψ-cld in U.

The converse of Proposition 3.6 need not be true as seen from the following example.

Example 4.7

In Ex 3.5, {r} is a (i,j)*-Nψ-cld but not a (i,j)*-N$\ddot{g}$-cld set in U.

Proposition 4.8

Any (i,j)*-N$\ddot{g}$-cld set is (i,j)*-Nω-cld.

Proof

Suppose that H $\subseteq$ G and G is (i,j)*-Nsemi-opn in U. Since Any (i,j)*-Nsemi-opn set is (i,j)*-Nsg-opn and H is (i,j)*-N$\ddot{g}$-cld, therefore N$\tau_{Ri,j}$-cl(H) $\subseteq$ G. Hence H is (i,j)*-Nω-cld in U.

The converse of Proposition 3.8 need not be true as seen from the following example.

Example 4.9

In Ex 3.5, {p, r} is a (i,j)*-Nω-cld but not a (i,j)*-N$\ddot{g}$-cld set in U.

Proposition 4.10

Any (i,j)*-Nα-cld set is (i,j)*-N$\ddot{g}_\alpha$-cld.

Proof

If H is a (i,j)*-Nα-cld subset of U and G is any (i,j)*-Nsg-opn set containing H, we have (i,j)*-Nαcl(H) = H $\subseteq$ G. Hence H is (i,j)*-N$\ddot{g}_\alpha$-cld in U.

The converse of Prop 3.10 need not be true as seen from the following example.

Example 4.11

In Example 3.5, {p, r, s} is an (i,j)*-N$\ddot{g}_\alpha$-cld but not an (i,j)*-Nα -cld set in U.

Annals of R.S.C.B., ISSN: 1583-6258, Vol. 25, Issue 6, 2021, Pages. 1136-1146
Received 25 April 2021; Accepted 08 May 2021.

Remark 4.12
(i,j)*-Nω-cld set is different from (i,j)*-NΩ-cld.

Example 4.13
(i) In Exam 3.5. Then {p} is (i,j)*-NΩ-cld set but not (i,j)*-Nω-cld.
(ii) In Exam 3.5. Then {p, r} is (i,j)*-Nω-cld set but not (i,j)*-NΩ-cld.

Proposition 4.14
Any (i,j)*-N$\ddot{g}$-cld set is (i,j)*-Ng-cld.

Proof
If H is a (i,j)*-N$\ddot{g}$-cld subset of U and G is any N$\tau_{Ri,j}$-opn set containing H, since any N$\tau_{Ri,j}$-opn set is (i,j)*-Nsg-opn, we have G $\supseteq$ N$\tau_{Ri,j}$-cl(H). Hence H is (i,j)*-Ng-cld in U.

The converse of Prop 3.14 need not be true as seen from the following example.

Example 4.15
In Exam 3.5, {p, q, s} is a (i,j)*-Ng-cld but not a (i,j)*-N$\ddot{g}$-cld set in U.

Proposition 4.16
Any (i,j)*-NΩ-cld set is (i,j)*-Nαg-cld.

Proof
If H is a (i,j)*-NΩ-cld subset of U and G is any N$\tau_{Ri,j}$-opn set containing H, since any N$\tau_{Ri,j}$-opn set is (i,j)*-NΩ-opn, we have (i,j)*-$N\alpha$-cl(H) $\subseteq$ U. Hence H is (i,j)*-Nαg-cld in U.

The converse of Prop 3.16 need not be true as seen from the following example.

Example 4.17
In Exam 3.5, {q, s} is (i,j)*-Nαg-cld set but not (i,j)*-NΩ-cld.

Proposition 4.18
Any (i,j)*-N$\ddot{g}$-cld set is (i,j)*-Nαg-cld.

Proof
If H is a (i,j)*-N$\ddot{g}$-cld subset of U and G is any N$\tau_{Ri,j}$-opn set containing H, since any N$\tau_{Ri,j}$-opn set is (i,j)*-Nsg-opn, we have G $\supseteq$ N$\tau_{Ri,j}$-cl(H) $\supseteq$ (i,j)*-Nαcl(H). Hence H is (i,j)*-Nαg-cld in U.

The converse of Prop 3.18 need not be true as seen from the following example.

Example 4.19
In Exam 3.5, {r} is an (i,j)*-Nαg-cld but not a (i,j)*-N$\ddot{g}$-cld set in U.

Annals of R.S.C.B., ISSN: 1583-6258, Vol. 25, Issue 6, 2021, Pages. 1136-1146
Received 25 April 2021; Accepted 08 May 2021.

Proposition 4.20
Any (i,j)*-N$\ddot{g}$-cld set is (i,j)*-Ngs-cld.

Proof
If H is a (i,j)*-N$\ddot{g}$-cld subset of U and G is any N$\tau_{Ri,j}$-opn set containing H, since any N$\tau_{Ri,j}$-opn set is (i,j)*-Nsg-opn, we have G $\supseteq$ N$\tau_{Ri,j}$-cl(H) $\supseteq$ (i,j)*-Nscl(H). Hence H is (i,j)*-Ngs-cld in U.

The converse of Prop 3.20 need not be true as seen from the following example.

Example 4.21
In Exam 3.5, {q, r, s} is a (i,j)*-Ngs-cld but not a (i,j)*-$N\ddot{g}$-cld set in U.

Proposition 4.22
Any (i,j)*-N$\ddot{g}$-cld set is (i,j)*-Nsg-cld.

Proof
If H is a (i,j)*-N$\ddot{g}$-cld subset of U and G is any (i,j)*-Nsemi-opn set containing H, since any (i,j)*-Nsemi-opn set is (i,j)*-Nsg-opn, we have G $\supseteq$ N$\tau_{Ri,j}$-cl(H) $\supseteq$ (i,j)*-Nscl(H). Hence H is (i,j)*-Nsg-cld in U.

The converse of Prop 3.22 need not be true as seen from the following example.

Example 4.23
In Exam 3.5, {r} is a (i,j)*-Nsg-cld but not a (i,j)*-N$\ddot{g}$-cld set in U.

Proposition 4.24
Any (i,j)*-N$\ddot{g}_{\alpha}$-cld set is (i,j)*-NΩ-cld.

Proof
If H is an (i,j)*-N$\ddot{g}_{\alpha}$-cld subset of U and G is any (i,j)*-NΩ-opn set containing H, since any (i,j)*-NΩ-opn set is (i,j)*-Nsg-opn, we have (i,j)*-Nαcl(H) $\subseteq$ G. Hence H is (i,j)*-NΩ-cld in U.

The converse of Prop 3.24 need not be true as seen from the following example.

Example 4.25
In Exam 3.5, {p, q, s} is (i,j)*-NΩ-cld set but not (i,j)*-N$\ddot{g}_{\alpha}$-cld.
Proposition 4.26
Any (i,j)*-Nα-cld set is (i,j)*-NΩ-cld.

Proof
If H is an (i,j)*-Nα-cld subset of U and G is any (i,j)*-NΩ-opn set containing H, we have (i,j)*-Nαcl(H) = H $\subseteq$ G. Hence H is (i,j)*-NΩ-cld in U.

The converse of Prop 3.26 need not be true as seen from the following example.

Example 4.27

In Exam 3.5, {p, r, s} is (i,j)*-NΩ-cld set but not (i,j)*-Nα-cld.

Proposition 4.28
Any (i,j)*-Nψ-cld set is (i,j)*-Nsg-cld.

Proof
Suppose that H $\subseteq$ G and G is (i,j)*-Nsemi-opn in U. Since any (i,j)*-Nsemi-opn set is (i,j)*-Nsg-opn and H is (i,j)*-Nψ-cld, therefore (i,j)*-Nscl(H) $\subseteq$ G. Hence H is (i,j)*-Nsg-cld in U.

The converse of Prop 3.28 need not be true as seen from the following example.

Example 4.29
Let U = {p, q, r} with U/R_i={{p}, {q, r}}and X_i = {a}. Then Nτ_{Ri}(X_i)={ϕ, U, {p}}, U/R_j={{p}, {q, r}}and X_j= {q, r}. Then Nτ_{Rj}(X_j) = {ϕ, U, {q, r}}. Then N$\tau_{Ri,j}$($X_{i,j}$) ={ϕ, U, {p}, {q, r}}. Here {p, r} is a (i,j)*-Nsg-cld but not a (i,j)*-Nψ-cld set in U.

Proposition 4.30
Any (i,j)*-N$\ddot{g}$-cld set is (i,j)*-Ngsp-cld.

Proof
If H is a (i,j)*-N$\ddot{g}$-cld subset of U and G is any N$\tau_{Ri,j}$-opn set containing H, since any N$\tau_{Ri,j}$-opn set is (i,j)*-Nsg-opn, we have G $\supseteq$ N$\tau_{Ri,j}$-cl(H) $\supseteq$ (i,j)*-Nspcl(H). Hence H is (i,j)*-Ngsp-cld in U.

The converse of Prop 3.30 need not be true as seen from the following example.

Example 4.31
In Exam 3.5, {p, q} is a (i,j)*-Ngsp-cld but not a (i,j)*-N$\ddot{g}$-cld set in U.

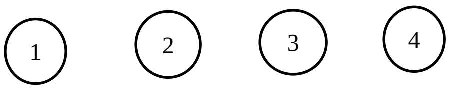
Proposition 4.32
Any (i,j)*-Nω-cld set is (i,j)*-Nsg-cld.

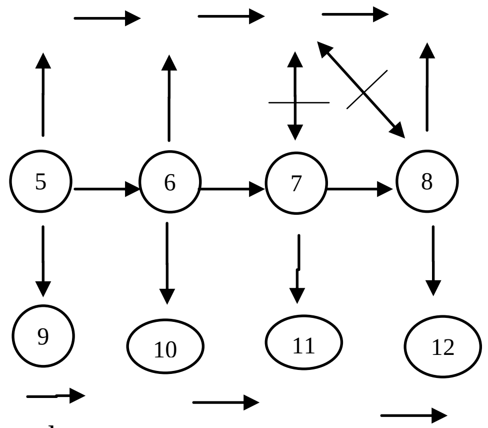
Proof
If H is a (i,j)*-Nω-cld subset of U and G is any (i,j)*-Nsemi-opn set containing H, then G $\supseteq$ N$\tau_{Ri,j}$-cl(H) $\supseteq$ (i,j)*-Nscl(H). Hence H is (i,j)*-Nsg-cld in U.

The converse of Prop 3.32 need not be true as seen from the following example.

Example 4.33
In Exam 3.5, {p} is a (i,j)*-Nsg-cld but not a (i,j)*-N$\hat{g}$-cld set in U.

Remark 4.34
We obtain the following diagram, where A $\rightarrow$ B (resp. A $\nleftrightarrow$ B) represents A implies B but not conversely (resp. A and B are independent of each other).





where
(1) (i,j)*-Nα -cld
(2) (i,j)*-N$\ddot{g}_\alpha$-cld
(3) (i,j)*-NΩ-cld
(4) (i,j)*-Nαg-cld
(5) N$\tau_{R i,j}$-cld
(6) (i,j)*-N$\ddot{g}$-cld
(7) (i,j)*-Nω-cld
(8) (i,j)*-Ng-cld
(9) (i,j)*-Nsemi-cld
(10) (i,j)*-Nψ-cld
(11) (i,j)*-Nsg-cld
(12) (i,j)*-Ngs-cld

Remark 4.35
The concepts of (i,j)*-Nω-cld sets and (i,j)*-Ng-cld sets are independent.

Example 4.36
(i) In Exam 3.5, {a, c} is (i,j)*-Ng-cld set but it is not (i,j)*-NΩ-cld set.
(ii) In Exam 3.5, {c} is (i,j)*-NΩ-cld set but it is not (i,j)*-Ng-cld set.

REFERENCE

[1] K. Bhuvaneswari and K. Karpagam. ” Nano generalized closed sets in nano bitopological space”. International Journal of Mathematics And its Applications, 4(1-B)(2016), 149-153.

[2] K. Bhuvaneswari and H. Rasya Banu. “On nano (1,2)*-generalized α-closed sets in nano bitopological space”. International Journal of Science and Research, 5(4),(2016), 1292-1295.

[3] K. Bhuvaneswari and R. Srividhya “On nano pre generalized closed sets in nano bitopological spaces”. International Journal of Engineering Science and Computing, 6(3)(2016), 3084-3087.

[4] K.Bhuvaneswari and J.Sheeba Priyadharshini. “On nano (1,2)*- semi-generalized closed sets in nano bitopological spaces”. International Journal of Applied Mathematics and Statistical Sciences (IJAMSS), 5(3)(2016), 19-30.

[5] J.C.Kelly. “Bitopological spaces”. Proc.London Math.Soc., 3(13)(1963), 71-89.

[6] 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.

[7] N. Levine. ”Generalized closed sets in toplogy”.Rend.Circ.Mat.Palermo, 19(2)(1970), 89-96.

[8] A. Pandi. “Some modifications of nano bitopological spaces”. International Journal of Research in Advent Technology, 6(9)(2018), 2496-2499.

[9] Z. Pawlak. “Rough sets”. International journal of computer and Information Sciences, 11(5)(1982), 341-356.

[10] Rana Khudhair Abbas Ahmed “Artificial Neural Networks in E-Learning Personalization: A Review” International Journal of Intelligent Information Systems 2016; 5(6): 104-108 ISSN: 2328-7675, doi: 10.11648/j.ijiis.20160506.14

[11] Nihal P. et al., Instant E-Learning: A Chat Room Concept for Education, International Journal of Engineering Innovation & Research, Volume 4, Issue 6, 2012, pp. 820-822.

[12] AG Farizawani, M Puteh, Y Marina, A Rivaie,” A review of artificial neural network learning rule based on multiple variant of conjugate gradient approaches**”,** Journal of Physics: Conference Series **1529** 022040,pp.1-13. (11)

[13] Paul M.HealyKrishna G.PalepuRichard S.Ruback, “Does Corporate Performance Improve After Mergers”, Journal of Financial Economics, Volume 31, Issue 2, April 1992, Pages 135-175

[14] Pradeep Kumar Gupta, “Mergers and acquisitions (m&a): the strategic concepts for the nuptials of corporate sector,” Innovative Journal of Business and Management,ISSN:2277-4947, 4 July – Aug (2012) 60 – 68