Advances in Nonlinear Variational Inequalities
ISSN: 1092-910X
Vol 27 No. 3 (2024)

Facebook Addiction: Advanced Vogel's Approximation Method of Unbalanced Fuzzy Transportation Problems.

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Article History:

Received: *18-02-2024*

Revised: *28-04-2024*

Accepted: *20-05-2024*

Abstract

In this article, we discuss the Advanced Vogel's Approximation Method (AVAM), a revolutionary solution for an imbalanced fuzzy transportation problem that avoids making it balanced. Notably, Facebook is the social network that is most popular and well-known globally. Some have characterized it as an invaluable resource for leisure and cross-cultural communication. Conversely, excessive use and a lack of self-control lead to Facebook addiction, which negatively affects the daily lives of many users, mostly young people. Facebook use appears to be connected to the drive to fit in, affiliate with people, and present oneself. Excessive Facebook use and addiction may also be linked to reward and pleasure systems.

Keywords: AVAM, Facebook, Internet Addiction, Social Networks., unbalanced fuzzy transportation problem.

1. Introduction

The transportation problem is a crucial network structure in linear programming (LP). It frequently appears in various situations and has rightfully garnered significant attention in literature. Finding the lowest total cost of transportation for a good in order to meet destination demands while utilizing origin supplies is the main idea behind the problem. Network challenges encompass a diverse array of scenarios, including scheduling, production, investment, plant location, inventory control, and job scheduling, among others. Human life depends on networks, which also serve as a major engine for social and economic advancement. To arrive at an optimal solution for the transportation challenges, it is essential to first identify a basic, workable answer. This study investigates the connection between social capital generation and maintenance and the use of Facebook, a well-known online social networking site. We examine a component of social capital called maintained social capital, which measures an individual's capacity to keep relationships with people in a community that they have previously lived in, in addition to bonding and bridging social capital [1].People's lifestyles are changing, and new social dynamics are emerging as a result of widespread internet access and the adoption of new digital technology like smartphones. Social networks make it possible to search for, find, and send any type of verbal, video, or image message with just one click, facilitating instant contact. Because Facebook is currently the most widely used social network globally, with 1.4 billion active members, academics are beginning to examine a few of its characteristics. In addition to examining the benefits and drawbacks of social media use, the survey also looked at respondents' perceptions of any changes in student performance or attitude. The study's findings demonstrated that university staff members—particularly academics and clinicians—were sluggish to embrace social media for usage in the workplace, with the exception of Facebook, LinkedIn, blogs, and online forums [2]. The idea that excessive use of the internet and social networks, such as Facebook, can lead to addiction is still debatable, even though many researchers have defended it [5, 12, 17, 23, 26, 27], and the DSM-5 did not classify them as addiction disorders. The current paper's goal in this regard is to provide an overview of the state of the art concerning the usage of Facebook, including its overuse, and to investigate the possibility of Facebook addiction. Examined include assessment instruments and conceptualizations, prevalence, and related variables in adults and adolescents. The following is revealed by the results: First off, there is no universally accepted classification system for Internet addiction—21 distinct instruments have been established [3]. Youth Facebook usage has increased, which has sparked worries about Facebook addiction. This is due to the fact that addictive behavior is defined as excessive, obsessive, uncontrollable, and physically or mentally harmful behavior. According to a survey, 29% of young people between the ages of 18 and 34 check Facebook on their phone even before getting out of bed, and 58% of them log on as soon as they wake up. This reveals a form of Facebook addiction that shows an incapacity to survive or operate in its absence. Teens who are addicted to Facebook may experience negative outcomes. Include a decline in their academic performance, an inability to engage in offline social situations, low self-esteem, and physical issues. Several of the fundamental presumptions, practices, and conclusions about benefits and uses have been called into question by the introduction of new conceptual and operational techniques, as well as new variables, through internet research. These results haven't, however, been included in a thorough study [4]. Given the prevalence of Facebook addiction in the current digital era, figuring out the causes of Facebook addiction is seen as essential. Thus, the purpose of this study is to investigate the psychological traits of Facebook users, such as shyness, loneliness, and locus of control, as well as the gratifications they pursue, including content, social, process, and technological gratifications, and the potential causes. The basis for comprehending and evaluating player differences and the relationships between play motives and age, gender, usage patterns, and in-game behaviors is an empirical model of player motivations in online games. The current study developed an empirical model of player motives using a factor analytic technique [5]. And for real-world transportation issues, the suggested approach is incredibly simple to comprehend and implement. Existing techniques, such as Vogel's approximation method (VAM), which finds an initial basic workable solution, and the Modified Distribution (MODI) method, which finds the ideal solution, are compared. Numerical examples are also used to explain the techniques [6]. The main goal of this research is to find the best solution to an unbalanced, fuzzy Facebook transportation problem without changing it into a balanced one. The Advanced Vogel's Approximation Method (AVAM), a new and straightforward strategy for handling unbalanced fuzzy transportation issues, is presented in this study. The suggested approach uses fuzzy triangles to represent supply, demand, and transportation costs. Numerical examples are solved to demonstrate the suggested method, and the outcomes are compared with those of other current methods [7]. An appropriate number of examples is provided to illustrate the algorithm of the approach. By using sample substitution, further comparison research between the new method and other current algorithms is established.by means of the fuzzy structural element method, which yields the best solution. The linear programming issue found its first and most successful application in the transportation problem (TP). Unbalanced transportation challenges are a reflection of supply chain and logistics realities, wherein the supply of commodities may not always precisely meet the demand at various locations [8].

II.BASIC DEFINITION

Definition: 2.1 (unbalanced transportation problem)

A situation where supply and demand are not equal is known as an imbalanced transportation dilemma. To make this kind of problem balanced, either a dummy row or dummy column is introduced, depending on the situation. Then, the problem can be solved using the same strategy as the balanced problem.

$$\sum_{i=1}^{l} ei \neq \sum_{j=1}^{m} fj .$$

III. ALGORITHM

Step 1: Write the absolute row and column difference after determining the two lowest costs in each row and column of the provided cost matrix. These variations are referred to as penalties.

Step 2: Find the row or column that has the highest penalty and set the minimum supply and demand for that cell. If the maximum penalty for two or more columns or rows is the same, we can select the one that works best for us.

Step 3: Delete the related row if the previous assignment satisfied the supply at the origin. Remove the related column if it meets the need at that location.

Step 4: If every origin's supply is zero, meaning that every supply has been used up, and every destination's demand is zero, meaning that every demand has been met, then stop the process. If not, start with step 1 and go through the previous stages again.

IV. APPLICATION

Only the regular, current common districts of Thanjavur, Madurai, Sivaganga, and Kanchipurm are taken into consideration in this study. Based on the Facebook Network in the world district name composition tables and their value, actual data were gathered, and the number of products was noted. Each district name is assigned a triangular fuzzy number that represents the minimum, normal, and maximum content of Thanjavur, Madurai, Sivaganga, and Kanchipurm, respectively.

Case study:

Min Z = R (1,11 ,21) a11 + R (2,12,22) a12 +R (5,15,25) a13 +R (11,21,31)a14+ R (3,13,23) a21 + R (7,17,27) a22 +R (8,18,28) a23 + R (9,19,29) a24 +R(6,16,26)a31+R (4,14,24) a32 +R(10,20,30) a33 +R (12,22,32) a34

TABLE: 4.1

DISTRICTS NAMES	THANJAVUR	MADURAI	SIVAGANGA	KANCHI PURAM	SUPPLY
NAVANEE	(1,11 ,21)	(2,12,22)	(5,15,25)	(11,21,31)	(29,30,36)
SUBATHRA	(3,13,23)	(7,17,27)	(8,18,28)	(9,19,29)	(38,41,43)
GOWTHAM	(6,16,26)	(4,14,24)	(10,20,30)	(12,22,32)	(49,52,58)
DEMAND	(20,21,22)	(23,25,27)	(24,27,32)	(30,33,35)	

Since $\sum_{i-1}^{3} ai$ = (116,123,137) ≠ $\sum_{j-1}^{4} bj$ = (97,106,116).

The ranking for the cost xij in Table 4.1 is calculated as

R(1,11 ,21) a11 =1, R(2,12,22) a12 =2, R (5,15,25)13=5, R (11,21,31)a14=11, R (3,13,23) a21 =3, R (7,17,27) a22 =7,R(8,18,28) a23 =8, R (9,19,29) a24 =9, R(6,16,26)a31=6,R (4,14,24) a32 =4,R(10,20,30) a33=10, R (12,22,32) a34 =12.

We also calculate supply and demand by applying the ranking method.

Supply

R (29,30,36)=29, R (38,41,43)=38,R(49,52,58)=49.

Demand

R(20,21,22)=20,R(23,25,27)=23,R(24,27,32)=24,R(30,33,35)=30.

TABLE: 4.2

DISTRICTS NAMES	THANJAVUR	MADURAI	SIVAGANGA	KANCHI PURAM	SUPPLY
NAVANEE	1	2	5	11	29
SUBATHRA	3	7	8	9	38
GOWTHAM	6	4	10	12	49
DEMAND	20	23	24	30	119 /97

Solution

DISTRICTS NAMES	THANJAVUR	MADURAI	SIVAGANGA	KANCHI PURAM	VELLORE	SUPPLY
NAVANEE	1	2	24/5	5/11	0	29
SUBATHRA	20/ 3	7	8	18 / 9	0	38
GOWTHAM	6	23/ 4	10	7/ 12	19/ 0	49
DEMAND	20	23	24	30	19	119 /119

R (1,11,21) a11 =11, R (2,12,22) a12 =12, R (5,15,25)13=15, R (11,21,31)a14=21, R (3,13,23) a21 =13, R (7,17,27) a22 =17,R (8,18,28) a23 =18, R (9,19,29) a24 =19, R(6,16,26)a31=16,R (4,14,24) a32 =14,R(10,20,30) a33=20, R (12,22,32) a34 =22.

We also calculate supply and demand by applying the ranking method.

Supply

R (29,30,36)=30, R (38,41,43)=41,R(49,52,58)=52.

Demand

R(20,21,22)=21,R(23,25,27)=25,R(24,27,32)=27,R(30,33,35)=33.

TABLE: 4.3

DISTRICTS NAMES	THANJAVUR	MADURAI	SIVAGANGA	KANCHI PURAM	SUPPLY
NAVANEE	11	12	15	21	30
SUBATHRA	13	17	18	19	41
GOWTHAM	16	14	20	22	52
DEMAND	21	25	27	33	123/106

Solution:

DISTRICTS NAMES	THANJAVUR	MADURAI	SIVAGANGA	KANCHI PURAM	VELLORE	SUPPLY
NAVANEE	11	12	27 / 15	3 / 21	0	30
SUBATHRA	21 / 13	17	18	20 / 19	0	41
GOWTHAM	16	25/ 14	20	10 / 22	17 / 0	52
DEMAND	21	25	27	33	17	123/123

R (1,11,21) a11 =21, R (2,12,22) a12 =22, R (5,15,25)13=25, R (11,21,31)a14=31, R (3,13,23) a21 =23, R (7,17,27) a22 =27,R (8,18,28) a23 =28, R (9,19,29) a24 =29, R(6,16,26)a31=26,R (4,14,24) a32 =24, R(10,20,30) a33=30, R (12,22,32) a34 =32.

We also calculate supply and demand by applying the ranking method.

Supply

R (29,30,36)=36, R (38,41,43)=43,R(49,52,58)=58.

Demand

R(20,21,22)=22,R(23,25,27)=27,R(24,27,32)=32,R(30,33,35)=35.

TABLE: 4.4

DISTRICTS NAMES	THANJAVUR	MADURAI	SIVAGANGA	KANCHI PURAM	SUPPLY
NAVANEE	21	22	25	31	36
SUBATHRA	23	27	28	29	43
GOWTHAM	26	24	30	32	58
DEMAND	22	27	32	35	137 /116

Solution

DISTRICTS NAMES	THANJAVUR	MADURAI	SIVAGANGA	KANCHI PURAM	VELLORE	SUPPLY
NAVANEE	21	22	32/ 25	4/ 31	0	36
SUBATHRA	22/ 23	27	28	21/ 29	0	43
GOWTHAM	26	27/ 24	30	10/ 32	21 / 0	58
DEMAND	22	27	32	35	21	137/137

TABLE: 4.5 (solutions obtained by all tables)

DISTRICTS NAMES	THANJAVUR	MADURAI	SIVAGANGA	KANCHI PURAM	VELLORE	SUPPLY
NAVANEE	(1,11,21)	(2,12,22)	(24,27,32) (5,15,25)	(5,3,4) (11,21,31)	(0,0,0)	(29,30,36)
SUBATHRA	(20,21,22) (3,13,23)	(7,17,27)	(8,18,28)	(18,20,21) (9,19,29)	(0,0,0)	(38,41,43)
GOWTHAM	(6,16,26)	(23,25,27) (4,14,24)	(10,20,30)	(7,10,10) (12,22,32)	(19,17,21) (0,0,0)	(49,52,58)
DEMAND	(20,21,22)	(23,25,27)	(24,27,32)	(30,33,35)	(19,17,21)	(116,123,137)

V. RESULTS AND DISCUSSION

Min z = (24,27,32) (5,15,25) +(5,3,4) (11,21,31) +(20,21,22) (3,13,23) + (18,20,21) (9,19,29)+ (23,25,27) (4,14,24) + (7,10,10) (12,22,32) + (19,17,21) (0,0,0)

=573 + 1691 +3007

= 5271

Min z = Rs 5271.

VI. CONCLUSION OF FEATURE WORK

By using fuzzy transportation, the size of the network problem table can be reduced. Treatment and research efforts are already heavily focused on internet addiction and excessive social network use. Though Facebook is the best platform for amusement, preserving relationships, and passing the time, some people may become addicted to it since using social networks makes them feel better or more confident (which can lead to an increase in excitement or a sense of escape). Facebook addiction may be linked to reward and pleasure systems in the brain, and it appears to be more common in those who exhibit certain personality traits and emotional states, such as anxiety, sadness, narcissism, low self-esteem, and a need to elevate their mood.a particular kind of internet addiction or an addiction to the internet.

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