A Study on Miracles through the Holy Bible Using Fuzzy Cognitive Maps (FCMs)

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Abstract: This paper aims at studying at length the various reasons for miracles with incidents from the holy bible adopting the Fuzzy cognitive Maps. This technique is the fusion of the advances of the fuzzy logic and cognitive maps theories. The content gives preliminaries FCMs with a descriptive account of the problem and the various miracles witnessed in the Bible using FCMs. The data acquired is collated to conclude on the most essential component that results in the discharge of miracles in various instances. This paper has six sections, first section gives the introduction about miracles second section gives preliminaries of fuzzy cognitive maps, in section three we explain about the miracles in bible, in section four we explain the method of determining their hidden pattern, in section five, we give the concept of the problem, final section gives the conclusion based on our studies

Key words: FCMs, hidden pattern, miracles, unsupervised Bible.

1. Introduction

In today's world the term "Miracle" has been so casually used in statements or comments like "It's a miracle that I was able to get a ticket" or "It's a miracle that the driver survived that terrible accident". These comments describe the occurrence as highly unlikely or even totally unexpected. However, the Holy Bible details Miracles as very specific divine actions. Four Greek terms used in the Greek New Testament very beautifully bring out the true meaning of the term "Miracle": they are "*Dunamis*" (Acts 2:22, Romans 15:19), which means Power, "*Saymeion*" (Matt 12:38,39, Acts 6:8) which means a Sign, "*Terata*" (Acts 2:19) which means wonders and "*Erga*" (John 5:20.36) which translates to Work. Hence, Miracles as explained by the scriptures are events that are beyond the capabilities of man and beyond the regular workings of the universe.The Merriam-Webster Dictionary defines "Miracle" as an extraordinary event manifesting divine intervention in human affairs. The scripture in John 2:18 and Matthew 12:38 describes a true miracle as an event in the external world caused by the immediate agency or simple volition of God, operating without the use of means capable of being discerned by the senses and designed to authenticate the divine commission of a religious teacher and the truth of his message.

Miracles are seals of a mission of divine origin or intervention that call everyone's attention to God and are rationally found to be unexplainable by probability or natural sciences. The miracles in the Holy scriptures were proof that scriptural writers, prophets and all workers were messengers of God. The credibility of these miracles is further fortified by those who witness them and by the testimony of

witnesses. A Miracle is an event that apparently contradicts known scientific laws and is *hence thought to be due to* supernatural causes especially to an act of god. Miracles in the new testament had a purpose - miracles were performed to confirm the word (Mark 16:20), to create faith in Jesus Christ (John 20:30-31), to demonstrate that God is with Jesus (John 3:2), to prove that Jesus is the Christ, the Son of God, as prophesied (Matt 8:16-17). The New Testament narrates about thirty nine miracles performed by Jesus [1]. These miracles can be classified as Miracles of nature, Miracles of healing, and Miracles of resurrection. in 1965, L. A. zadeh has introduced a mathematical model called fuzzy cognitive maps. After a decade in the year 1976, political scientist r. axelord used this fuzzy model to study decision making in social and political systems. Then B. kosko enhanced the power of cognitive maps considering fuzzy values for the concepts of the cognitive map and fuzzy degrees of interrelationships between concepts. Fcms can successfully represent knowledge and human experience, introduced concepts to represent the essential elements and the cause and effect relationships among the concepts to model the behavior of any system. It is a very convenient simple and powerful tool, which is used in numerous fields such as social economical and medical etc. in this paper. we recall the notion of fuzzy cognitive maps (fcms), which was introduced by bart kosko in the year 1986.this work is based on expert opinion collected throughout chennai. The data was collected and assimilated from the people using a linguistic questionnaire and this linguistic was transformed into fuzzy data. it is important to note that, while doing fuzzy mathematical models, the fuzzy matrix make take its entries from the interval [-1, 1]. Even then, they are known as fuzzy matrices. Therefore, it is understood that fuzzy tools alone have the capacity to analyze these concepts further substantiating the choice of this method.

2. Preliminaries

Fuzzy cognitive maps (FCMs) are more applicable when the data in the first place is an unsupervised one. The FCMs work on the opinion of experts. FCMs model the worlds as a collection of classes and causal relation between classes.

Definition 2.1: An FCM is a directed graph with concepts like policies, events etc. As nodes and causalities as edges. It represents causal relationship between concepts.

Definition 2.2: When the nodes of the FCM are fuzzy sets then they are called as fuzzy nodes.

Definition 2.3: FCMs with edge weights or causalities fro m the set {-1, 0, 1} are simple.

Definition 2.4: The edges e_{ij} take values in the fuzzy causal interval [-1, 1]. $e_{ij} = 0$ indicates no causality $e_{ij} > 0$ indicates causal increase C_j increases as C_i increases (or C_j Decreases as C_i Decreases). $E < 0$ indicates causal decrease or negative causality. C decreases as C increases (And or C_j increases as C_i Decreases). Simple FCMs have edge values in {-1, 0, 1}. Then if causality occurs, it occurs to a maximal positive or negative degree. Simple FCMs provide a quick first approximation to an expert stand or printed causal knowledge. If increase (or decrease) in one concept leads to increase (or decrease) in another, then we give the value 1.If there exists to relation between the two concepts, the value 0 is given. If increase (or decrease) in one concept decreases (or increases) another, then we gives the value -1. Thus FCMs are described in this way. Consider the or concepts $C_1, ..., C_n$ of the FCM. Suppose the directed graph is drawn using edge weight $e_{ij} \in \{0, 1, -1\}$. The matrix E be defined by $E= (e_{ij})$, Where the e_{ij} is the weight of the directed edge C_i, C_j. E is called the adjacency matrix of the FCM, also known as the connection matrix of the FCM. It is important to note that all matrices associated with an FCM are always square matrices with diagonal entries as zero.

Definition 2.5: Let $C_1, C_2, ... C_n$ be the nodes of an FCM. Let $A = (a_1, a_2,...., a_n)$, where $a_i \in \{0, 1\}$. A is called the instantaneous state vector and it denoted the on off position of the node at an instant

$$a_i =0 \qquad \text{if } a_i \text{ is off}=1$$

$$a_i = 1 \qquad\qquad \text{if } a_i \text{ is on, where } i = 1, 2, \ldots, n.$$

Definition 2.6: Let C_1, C_2 , …, C_n be the nodes of an FCM. Let $C_1 C_2$, $C_2 C_3$, …, $C_i C_j$, be the edges of the FCM ($i \neq j$). Then, the edges form a directed cycle. An FCM s said to be cyclic if it possesses a directed cycle. An FCM is said to be a cyclic if it does not possess any directed cycle.

Definition 2.7: An FCM with cycles is said to have a feedback.

Definition 2.8: Where there is a feedback in an FCM, i.e., When the causal relations flow through a cycle in a revolutionary way, The FCM is called a dynamical system.

Definition 2.9: Let $C_1 C_2$, $C_2 C_3$, …, $C_i C_j$, be a cycle when C_i is switched on and if the causality flows through the edges of a cycle and if it again causes C_i, We say that the dynamical system goes round and round. This is true for any node C_i, for $i = 1, 2, \ldots, n$. The equilibrium state for this dynamical system is called the hidden pattern.

Definition 2.10: If the equilibrium state of a dynamical system is a unique state vector, then it is called a fixed point. Consider a FCM with C_1, C_2, …, C_N as nodes. For example let us start the dynamical system by switching on C. Let us assume that the FCM settles down with C_1 and C_n on, i.e. the state vector remains as (1, 0, 0, …, 0, 1). This state vector (1, 0, 0, …, 0, 1) is called the fixed point.

Definition 2.11: If the FCM settles down with a state vector repeating in the form $A_1 \rightarrow A_2 \rightarrow \ldots A_I \rightarrow A_1$. Then this equilibrium is called limit cycle [2]-[4].

3. A Study on Miracles through Holy Bible Using FCMs

For that, using linguistic questionnaire and the expert's opinion we have taken the following eleven concepts $\{C1, C2, \ldots, C11\}$ [5], [6].

The following concepts are taken as the main nodes for our problem.

C_1 - Endurance through prayer

C_2 - Faith

C_3 - Humility

C_4 - Repentance

C_5 - Obedience

C_6 - Hearing the word of god

C_7 - Authority in the spiritual realm

C_8 - God's Compassion

C_9 - love

C_{10} - Patience

C_{11} - Forgiving/ Forgiveness

C_1 - Perseverance through prayer Perserverance is anything undertaking continued pursuit or prosecution of any business or enterprise begin, in theology, persistence means continuance in a state of grace to a state of glory.

C_2 - Faith refers to the trust one puts in god at all times. It is total surrender to god with full belief without any need for logical proof or material evidence, faith makes us to encounter god directly, it demands to place our full trust in god.

C_3 - Humility is the prerequisite for honor (Prov 15:33; 18:12; 22:4; 29:23) and physical blessing (Psalm 37:11; Matt 5:5). Intimately associated with the fear of the Lord (Psalms 25:9 Psalms 25:12-14 ; Prov 15:33), it may provide the key to wealth and life (Prov 22:4); but even when blessings are postponed, a humble spirit is necessary (Prov 16:18-19 ; cf. Romans 12:14 Romans 12:16-17). It is the gateway to eternal life (Matt 5:3; 18:1-4), not necessarily physical reward (5:10-12).

C_4 - Repentance is a change of heart repentance infuses a deep sense of humility in people repentance

brings about inner healing; it takes up the broken chains of communication with god and with one another on a sound footing.

C_5 - Obedience refers to being ready to subject ourselves to the commands, wishes and guidelines of others. Obedience teaches us to deny ourselves. It prompts to act in accordance with another wish .obedience gives moral and spiritual power and strength to command. The more one obeys the more one rule.

C_6 - Hearing the word of god The Bible claims to be the Word of God and by staking this claim the Bible simply but plainly declares its divine authority, complete infallibility and absolute sufficiency.

C_7 - Authority in the spiritual realm The authority that the lord gives to his church-spiritual authority (not in the natural realm but spiritual.

C_8- God's compassion It simply says that compassion means sympathetic consciousness of others' distress along with a desire to alleviate it.

C_9 - Love urges us to diffuse its fragrance on others love triggers off an emotional response leading to action.

C_{10} - patience

An active endurance of opposition, not a passive resignation. Patience is endurance, steadfastness, long suffering, and forbearance.God is patient (Romans 15:5). He is slow to anger in relation to the Hebrews (Exodus 34:6; Numbers 14:18, Nehemiah 9:17; Psalms 86:15; Isaiah 48:9; Hosea 11:8-9).

C_{11} - forgiveness

An act of God's grace to forget forever and not hold people of faith accountable for sins they confess; to a lesser degree the gracious human act of not holding wrong acts against a person. Forgiveness has both divine and human dimensions. In the divine relationship, it is first of all, the gracious act of God by which believers are put into a right relationship to God and transferred from sp*iritual death to spiritual life* through the sacrifice of Jesus. Jesus is the perfect and final Sacrifice through which God's forgiveness is mediated to every person (Romans 3:25; Hebrews 10:11-12) [7].

4. Method of Determining Hidden Pattern [8]

Let C_1, C_2, ..., C_n be the nodes of an FCM, With feedback. Let E be the associated adjacency matrix. Let us find the hidden pattern when C_1 is switched on. When an input is given as the vector A_1= (1, 0, 0, ..., 0), the data should pass through the relation matrix E. this is done by multiplying A_1 by the matrix E. Let $A_1 E$= $(a_1, ..., a_n)$ with the threshold operation that is by replacing a_i by 1 if $a_i > k$ and a_i by 0 if $a_i < k$ (k is a suitable positive integer). We update the resulting concept; the concept C_1 is included in the updated vector by making the first coordinate as 1 in the resulting vector. Suppose $A_1 E \rightarrow A_2$ then consider $A_2 E$ and repeat the same procedure. This procedure is repeated till we get a limit cycle or a fixed point.

5. Concept of the Problem

Using the linguistic questionnaire and the expert's opinion we have taken the following nine concepts {C_1, C_2, ..., C_{11}} .

C_1 - Endurance through prayer

C_2 - Faith

C_3 - Humility

C_4 - Repentance

C_5 - Obedience

C_6 - Hearing the word of god

C_7 - Authority in the spiritual realm

C_8 - God's Compassion

C_9 - love

C_{10} - Patience

C_{11} - Forgiving/ Forgiveness

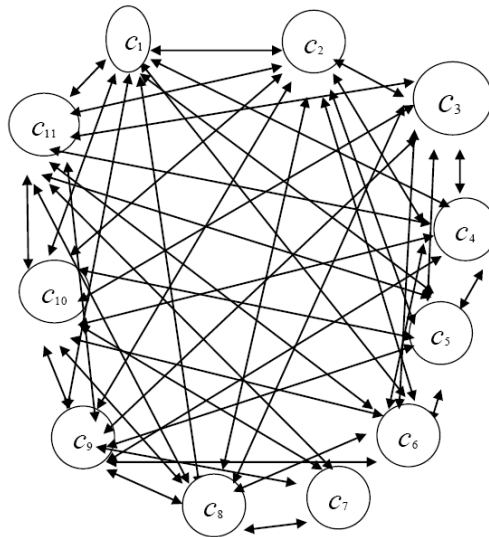Now we proceed on to apply the effect of FCM of equal length .Let us consider eleven concepts

Fig. 1. Directed graph.

Based on the expert's opinion, (laymen) the directed diagram is drawn and corresponding matrix *M* is given as

$$
A = \begin{array}{c|ccccccccccc}
 & C_1 & C_2 & C_3 & C_4 & C_5 & C_6 & C_7 & C_8 & C_9 & C_{10} & C_{11} \\
\hline
C_1 & 0 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 \\
C_2 & 1 & 0 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 \\
C_3 & 1 & 1 & 0 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 \\
C_4 & 1 & 1 & 1 & 0 & 1 & 1 & 0 & 1 & 1 & 1 & 1 \\
C_5 & 1 & 1 & 1 & 1 & 0 & 1 & 0 & 1 & 1 & 1 & 1 \\
C_6 & 1 & 1 & 1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 1 \\
C_7 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\
C_8 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 \\
C_9 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 0 & 1 & 1 \\
C_{10} & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 0 & 1 \\
C_{11} & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 0 \\
\end{array}
$$

Now using the matrix *A*, We determine our study. Let the initial input vector be

$$X = (\ 0\ \ 1\ \ 0\ \ 0\ \ 0\ \ 0\ \ 0\ \ 0\ \ 0\ \ 0\ \ 0\ )$$

then

$$Ax = (1\ 0\ 1\ 1\ 1\ 1\ 0\ 1\ 1\ 1\ 1) \rightarrow (1\ 1\ 1\ 1\ 1\ 1\ 0\ 1\ 1\ 1\ 1) = X_1$$

$$AX_1 = (9\ 9\ 9\ 9\ 9\ 9\ 1\ 9\ 9\ 8\ 9) \rightarrow (1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1) = X_2$$

$$AX_2 = (9\ 9\ 9\ 9\ 9\ 9\ 1\ 10\ 9\ 9\ 9) \rightarrow (1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1) = X_3$$

$$X_2 = X_3.$$

where $\rightarrow$ denotes the resultant vector is thersholding and updating)

X_3 is a fixed point of the dynamical system.

6. Conclusion

While analyzing FCM, When the concept C_2 Faith is in the on state, the other concepts C_1, C_3, C_4, C_5, C_6, C_7, C_9, C_{10}, C_{11} are in the on state, Faith according to the Bible is the assurance of things hoped for, the conviction of things not seen (Hebrews 11:1). And for whosoever seeks to draw near to God, faith in Him is paramount and it is impossible to please God without faith (Hebrews 11:6). Having faith signifies a hope in a hopeless situation, which in turn means, being completely convinced that God will do what He promised to do (Romans 4: 18-21). When people have faith, they can access the favour or grace of God (Romans 5:2). There can be no other way to please God but by Faith (Hebrews 11:6). Faith is key to releasing Miracles, which are seals of a divine mission. The credibility of these miracles is established due to the Faith of those who experience these miracles, by those who witness the miracles first hand and by others who bear testimony to the miracles performed. A review of the numerous miracles recorded in the New Testament, be it the restoration of sight or hearing (Matt. 9:27-31, Mark 7: 31-37, Mark 8: 22-26), curing of diseases (Luke 14:1-6, Luke 17:11-19, Luke 13:11-17), resurrection of the dead (John 11:38-44, Luke 7: 11-180), abundant provision during drought (Matt. 15:32, Mark 8;1, John 21:1-40), etc show that all these miracles were possible because of the Faith of the individual/s vested on Jesus and the Disciples of Jesus. Faith leading to dispensation of miracles further fortifies the strength of the individual in the Maker, enabling them to thrust forward with renewed vigour.

6.1. Factors to Increase Faith

The Holy Bible clearly outlines how individual faith index can be enhanced. Faith comes from hearing and hearing the word of Christ (Romans 10:17). As an individual continues to hear God's word, Faith sets in (Romans 10:14). This leads to the edifying of good conscience which holds this faith (1Timothy 1:19).

This planted faith starts growing and flourishing within as one continuously seeks the Maker wholeheartedly (Jeremiah 29:13). A diligent search will lead to the Maker (Proverbs 8:19). This search enriches knowledge of God (Proverbs 2:5). Growing in His knowledge enables an individual to produce the fruit of good deeds (Colossians 1:10). This results in the perfecting of Faith (James 2:22). The key is in never wavering, never having misgivings but to be continually deeply rooted and grounded in our faith (Colossians 1:23).

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