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A MIMO-OFDM method for optimizing PAPR in communication channel using hybrid WSA-MPA optimization Algorithm

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Abstract: Peal -to-signal-Average Power ratio (PAPR) will seem as ablock or interference onMultiple input and Multiple output orthogonal frequency division Multiplexing (MIMO-OFDM) in 5G communication Network system. The PAPR values are high in this Network to minimize this value here proposed a partial transmit sequence (PTS) and an optimization algorithm known as hybrid Water strider and Marine Predator Optimization algorithm (WSA-MPA). The partial Transmit sequence (PTS) will minimize the interference and decreases the highest value of PAPR and the increases the performance in the 5G communication Network channel. The objective of this manuscript is to diminish the value of PAPR and bit error ratio maximizes the transmission throughput. Then the Proposed hybrid algorithm with give the optimized value and increase the system through put. The Simulation performance are done on MATLAB platform and experimental results of proposed system shows the PAPR 54%, 67%,Bit error rate (BER)73% and 76% is lowerthan the existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) respectively. Therefore, the general performance of the proposed MIMO-OFDM-PTS-WSA-MPA method is improved in an efficient way with less complexity, error rate and processing delay.

Keywords: MIMO-OFDM systems, Bit-error rate, partial transmit sequence (PTS) and hybrid Water strider and Marine Predator algorithm (WSA-MPA) algorithm.

1. INTRODUCTION

Now a day's wireless sensor network is used in wide range due to the increased use of network systems, due to this to avoid interference Multiple input multiple output (MIMO) systems are frequently utilized. In this MIMO-OFDM [1,2] is used on 5G communication Network systems[3,4] based on the need of 5th generation wireless networks with decreasing inter symbol interference (ISI). The OFDM method will turn frequency-flat subchannels into different subcarriers and make to simple tap channel equalization to mimic multipath effect [5, 6]. In the wireless communication system the MIMO-OFDM plays a vital role in the spectrum and fulfill the user needs. This OFDM signals use large number of bottle neck, it will cause high Peal -to-signal-Average Power ratio (PAPR) interference[6,7]. To avoid this effect in MIMO-OFDM [9] channel a signal detector is used between transmission antennas and the sub carrier orthogonal degradation system[8,9]. In the literature doppler effect and compressors are applied in linear frequency modulation technique and to calculate the doppler shift [10, 11]. Then it will restore the group of data in to a buffer before the demodulation process will happen, here this process does not meet the real time communication system [12, 13]. Then the value of PAPR is high it will not allow the signal to transmitted side. So by adding a partial transmit sequence (PTS) in this method to decrease or to minimize the PAPR value and to calculate the BER. The MIMO-OFDM system contains following problems and it has an effect of bit error rate. To optimize this problem an hybrid Water strider and Marine Predator Optimization algorithm (WSA-MPA)is proposed.

In this manuscript partial transmit sequence (PTS) [18] in the MIMO-OFDM frame work to reduce the PAPR value in the communication signals. In this the main purpose of this manuscript is to of this paper is to decrease the value of BER and maximize the transmission throughput. To optimize this problem ahybrid optimization algorithm is proposed such as Water strider optimization algorithm and Marine Predator Optimization Algorithm.

The main contribution of this work is summarized as follows:

In this manuscript, to propose a partial transmit sequence (PTS) [18] in the MIMO-OFDM frame work to reduce the PAPR value in the communication signals..

- The objective is to improve of this paper is to decrease the value of BER and maximize the transmission throughput.
- To optimize the Bit Error Rate (BER) and to diminish PAPR value a hybrid optimization algorithm is proposed such as hybrid Water strider optimization algorithm and Marine Predator Optimization Algorithm (WSA-MPA).
- The proposed system operates in two easy steps. On transmitter side, a data symbol is modulated by a weighting coefficients group into a group of adjacent subcarriers. [17, 18].
- The use of optimal hybrid Water strider optimization algorithm and Marine Predator Optimization Algorithm (WSA-MPA)helps to find the optimized weights for mitigating the effects caused by PAPR, BER. Therefore, the overall performance of proposed MIMO-OFDM communication Network system

The rest of this manuscript is mentioned as below. Section 2 delineates that literature survey. Section 3 explains that proposed system section 3.1 deals with MIMO-OFDM systems using partial transmit sequence (PTS). Section 3.2 explains the optimal solution of MIMO-OFDM framework using hybrid optimization algorithm such as Water strider optimization algorithm and Marine Predator Optimization Algorithm (WSA-MPA) Section 4 demonstrates the result and discussion. Finally, Section 5 concludes the manuscript with some references.

2. LITERATURE SURVEY

In 2016 Pham et al. [21] have introduced a repetitive structure of channel estimation and data detection for MIMO-OFDM systems through an inappropriate cyclic prefix (CP) and a restricted number of pilot subcarriers. The interference corrupts the pilot subcarriers utilized for channel estimation and involves detection process. The simulation outcome demonstrates that root mean square error of channel estimate converges with Cramer-Rao Bound (CRB) after some iteration. Furthermore, the BER may arrive enough CP case; still the delay spread is much larger than CP.

In 2017 Pachori et al. [22] has introduced multilevel coding for MIMO scheme. To conquer the challenges, next-generation wireless communication systems are based on MIMO schemes that given enhanced capacity devoid of sacrificing power and bandwidth. This manuscript focuses on the computational complexity of multilevel MIMO scheme and examines the efficiency of multilevel MIMO scheme under several channel conditions. Furthermore, the MLSTTC-OFDM, MLSM-OFDM and HML-OFDM multilevel MIMO-OFDM systems also compared.

In 2019 Sun et al. [23] has introduced the major disadvantage of multi-carrier signals is great envelope fluctuations, i.e., a high PAPR. The aim of this manuscript is to introduce a neural network-based active gradient project sequence, a computationally well-organized hybrid system for diminishing PAPR on MIMO-OFDM system without sacrificing BER efficiency. The simulation outcomes demonstrate that the introduced system not only outperforms other conventional systems, but also offers minimum computation complexity.

In 2020 Dharavathu, et al. [24] has introduced the efficient transmission of encrypted image through MIMO-OFDM system with different encryption systems. It is critical for protecting data on financial, defense, healthcare, government and marketing services. The efficiency of the Crypto-MIMO-OFDM system is compared to efficiency of original MIMO-OFDM system with no encryption algorithm. For the entire variants of Crypto-MIMO-OFDM systems, the Rubik's Cube encryption algorithm demonstrates an important enhancement in excess of DES and AES.

In 2017 Hakobyan et al. [25] has presented a new signal processing strategy for OFDM radar and communication systems that exceeds OFDM Doppler sensitivity. Doppler robustness of the proposed strategy open novel viewpoint of system parameterization, enable radar concepts that were previously not feasible. The OFDM-MIMO radar measurement prototype was employed for authenticating the presented strategy and displays their efficiency on real-time applications.

In 2019 Hussein et al. [26] has introduced an innovative fully generalized spatial index (FGSI) light-emitting diode (LED) modulation system of the MIMO-OFDM optical system. The FGSI was spectral efficient (SE) visible light communication (VLC) modulation system on LED indices demoralizedon new way for addressing, not just the difficulty of domain configuration of time or frequency of OFDM signal , it also provides an additional spatial modulation domain (SM). The simulation effects outperform the FGSI by providing superior improvement on BER and attainable rate compared to latest generation OFDM-LED index modulation system.

3. PROPOSED METHOD TO DECREASETHE PAPR AND BER MIMO-OFDM COMMUNICATION CHANNEL USING PTS- HYBRID WSA-MPA OPTIMIZATION ALGORITHM

Figure 1 portrays that block diagram of MIMO-OFDM in 5G communication Network system. The objective of this paper is to decrease the value of PAPR and BER maximize the transmission throughput. In this the input signal is send to the serial or parallel convertor (S/P) conversion method, then the signal is sent to the Inversed Fast Fourier Transform (IFFT) to find the sum and then the signal is sent to the partial Transmit sequence (PTS) will minimize the interference and decreases the Highest value of PAPR and BER to increases the throughput performance in the 5G communication Network channel.

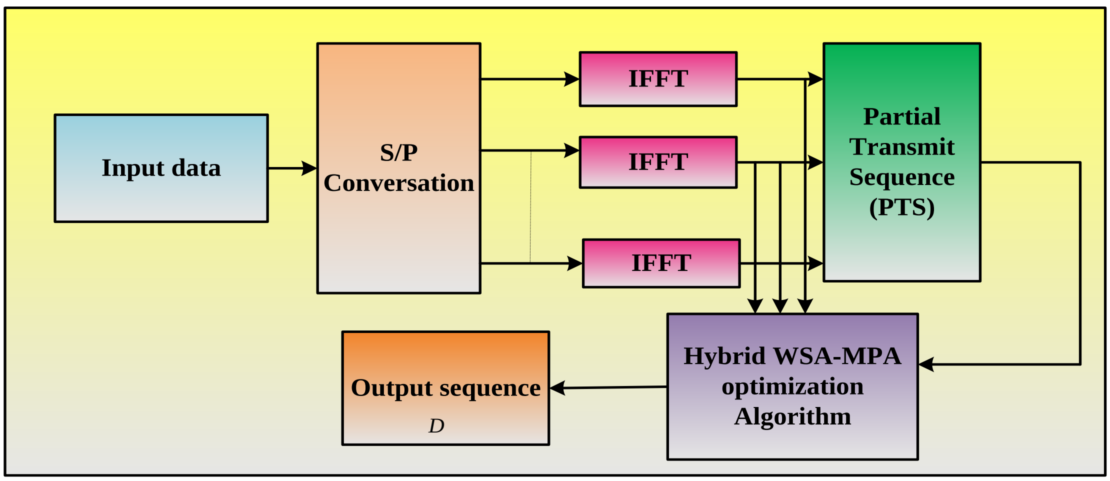

Figure 1: Block diagram for MIMO-OFDM-PTS-WSA-MPA method

3.1. MIMO-OFDM-PTS method

The MIMO-OFDM Network is used to connect the signal in high information signals in the remate area destination. In this process, the PAPR value is high due to the interference, so the Partial Transmission Sequence (PTS) system is used for decreasing or minimizing the PAPR value and to calculate the BER. The MIMO-OFDM system consists offollowing problems and it has an effect of bit error rate.To optimize this problem a hybrid Water strider and Marine Predator Optimization algorithm (WSA-MPA) is proposed.

In this OFDM network, a high-rate data torrent using V low-rate torrent is transmitting through the sub carriers. Where V is the quantity of the subcarriers each subcarrier is regulated by Phase Shift Key (PSK) or Quadrature Amplitude Modulation (QAM). Then the Inverse discrete Fourier Transform (IDFT) forms to transmit OFDM signal and it is given as

$$A = \left[A_{0,\ldots.} A_{V-1}\right]^R \tag{1}$$

In this each sign in A modulates one sub carrier of $T_0,..T_{V-1}$ then the V subcarriers are orthogonal and it is given as

$$T_v = v\Lambda T \tag{2}$$

Where $\Lambda T = 1/VF$ and T is the image time frame. Then the communicated OFDM signal for one image schedule is provided as

$$a(f) = \frac{1}{\sqrt{V}} \sum_{v=0}^{V=1} A_v e^{j2\pi t_v f}, 0 \le f \le VF \tag{3}$$

Then the $PAPR1a(f)$ is depicted as the proportion of the highest instant volume to the usual force is given as

$$PAPR1 = \frac{\max_{0 \le f \le VF} i \; |a(f)|^2}{L\left[|a(f)|^2\right]} \quad (4)$$

Where

$$L\left[|a(f)|^2\right] = \frac{1}{VF}\int_0^{VF}\left[|a(f)|^2\right]dt \quad (5)$$

Then the discrete time flags of OFDM signal is given as

$$a(H) = \frac{1}{\sqrt{V}}\sum_{v=0}^{V-1} A_v e^{\frac{j2\pi t_v h}{PV}}, h = 0,1,\ldots PV-1, \quad (6)$$

Where P is the oversampled factor and it is given as $P = 5$ is used to calculate the PAPRon MIMO-OFDM signals at communication system. Then the Cumulative distribution function (CDF) is employed for measuring the execution time in the signals and used to reduce the PAPR value and BER and it is represented as $PAPR1_0$ and then the Cumulative distribution function (CDF) given as

$$CDF1 = P1R1(PAPR1 > PAPR1_0) \quad (7)$$

3.2 Partial transmit sequence (PTS)

To get the reduced PAPR value partial transmit sequence (PTS) is used, and it is formulated as PTS is denoted as O_P, Therefore it is given as

$$O_p = \sum_{a=1}^{A} O_p^{(a)} \quad (8)$$

Where

$$O_p^{(a)} = \left[O_0^{(a)}, O_1^{(a)}, \ldots . O_{F-1}^{(a)}\right] a(0 \le a \le A) \quad (9)$$

Then the signal is implemented with Inverse Fast Fourier Transform (IFFT) and linearity possessions of the partial transmit sequence is given as

$$O_0^{(a)'} = IFFT\left\{\sum_{a=1}^{A} s_a A^{(a)}\right\} \quad (10)$$

Where

$$S_a \in \left\{e^{j\frac{2\pi H}{D}}, H = 1,2,\ldots D-1\right\} \quad (11)$$

S_a is the set of signal factors used in the cub-channel. Then the value of D is given as

$$D = 2(S_a \in \{+1\}) or \; D = 2(S_a \in \{+1 + j\}) \quad (12)$$

In this the PAPR and BER value is reduced and to get the optimized value here used hybrid water striders and the marine predators (WSA-MPA) optimization Algorithm

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3.3 Step by Step procedure based on hybrid WSA- MPA optimization Algorithm:

The weight parameters are efficiently optimized in the proposed approach by using a hybrid water strider and Marine Predator Optimization Algorithm (WSA-MPA).The meta-heuristic algorithms used in the existing methods faces pre-mature convergence and do not optimize the weight parameters efficiently in providing better performance. Therefore, a novel meta-heuristic based is Employed in the proposed work to optimize the weight parameters ρ, η, μ efficiently by obtaining optimal best solution with improvement in CIR value, thereby achieving the better performance.

The WSA-MPA begins with primary population known as waterstrider (WS). Among the population, the number of best WS is separated.. The common steps of this evolutionary algorithm are assumed with mating of male WSs (Key stone) and Female WSs, Depending upon the imitating sound of the male WSs. The below fig 3 illustrates the flowchart model of WSA-MPA.

Step 1. Initialization and random generation

In this initialization stage the water striders and the marine predators are the population based algorithms. From this water striders (WSs) born with eggs and supplied in water area. Then the random generation for supplied egg is given below

$$W_1S_1A_u^0 = Ia + ran(Ia - Pa), u = 1,2,3,\ldots vwsa \quad (13)$$

Where, $W_1S_1A_u^0$ denotes the initialization of the i^{th} position of the water strider, Ia and Pa represent the upper and lower limits equivalent with provided values maximal and minimal. ran is the random variable among 0 and 1, $vwsa$ impliesseries of random variable in water strider algorithm (WSA).

The initialization of marine predators are given as

$$Z_0 = Z_{\min i} + ran(Z\max i - Z\min i) \quad (14)$$

Where, $Z\max i andZ\min i$ is the variables of lower and upper limit and ran implies uniform random vector on range 0 t0 1.

Step 2. Estimate the fitness function

The initialized water strider algorithm (WSA) and marine predators Algorithm (MPA) are calculated using the intention function and estimate the fitness of its position above water surface. In this marine predator's matrix is calculated as Elites and the array of matrix can be find the prey is given by the position of Prey's position.

$$Elites = \begin{bmatrix} Z_{1,1}^{1} & Z_{1,2}^{1} & \ldots & Z_{1,f}^{1} \\ Z_{2,1}^{1} & Z_{2,1}^{1} & \ldots & Z_{2,f}^{1} \\ . & . & \ldots & . \\ Z_{v,1}^{1} & Z_{v,2}^{1} & \ldots & Z_{v,f}^{1} \end{bmatrix}_{v\times f} \tag{15}$$

Where Z^1 denotes the top predictor vector and the replicated v times for constructing the Elite matrix and v impliesseries of search agents and f implies dimensions. In this predator and prey implies search agents, since of predator are looking for their prey and prey is searching their food. At last, each iterationsof Elite will be upgraded by top predator I substitute to get the best predator. From equation 3 replacing Elites as prey and update the equations as

$$\Pr ey = \begin{bmatrix} Z_{1,1} & Z_{1,2} & \ldots & Z_{1,f} \\ Z_{2,1} & Z_{2,1} & \ldots & Z_{2,f} \\ . & . & \ldots & . \\ Z_{v,1} & Z_{v,2} & \ldots & Z_{v,f} \end{bmatrix}_{v\times f} \tag{16}$$

From equation 4 $Z_{u,y}$ denotes the y^{th} dimensions and u^{th} prey. Then it is used for the optimization process.

Step 3: Territory formation

Water strider algorithm is used to preserve the territories to live, mate, and to feed. For managing vr number of territories and then given to the fitness function and divided in to $\frac{vwsa}{vr}$ sets arranged in correct order. Then the y^{th} member of each set will assign to y^{th} territory, where $y = 1,2,3\ldots vr$. Then the $\frac{vwsa}{vr}$ number of water striders live inside the territory. Then female water striders will search the best position to feed. Then the male is denoted as keystone

Step 4: Mating

Mating is the prominent progression on water strider life. Then the foundation will send out courtship call ripples and then the female strider will reactthrough sending the attraction or ripple sound. Then the probability of sending an attraction response is assumed similarly with $(1-L)$ probability will remind revolting sound. Then the sound response of female is not resoluted, the assume L=50%. Whereas females replied the attraction sound they will move each other and then mate. Then the keystone will mate or repelled, then the novel position of key stone will be computed is given in below equation.

$$T = W_1 S_1 A_D^{r-1} - W_1 S_1 A_u^{r-1} \tag{17}$$

Step 5: Feeding

In the process of mating have occur successfully or not and they consume more energy. So a new position will occur in this state and water strider need food resources. Then the food needs are calculated as objective function. Now the objective function is more than the previous section, then it will find the food otherwise it will move towards the best selection and have the highest fitness. Then the transferring new position is denoted as

$$W_1 S_1 A_u^{u+1} = W_1 S_1 A_u^{r} + 2ran.(W_1 S_1 A_{AP}^{r} - W_1 S_1 A_u^{r}) \tag{18}$$

Step 6: Death and Succession

In this process of obtaining food, the intention function is calculated and compared to best location. Now that new fitness condition is lower, the water strider will die due to food and battle danger in the territory destination. Now the recently mature larvae do well the dead water strider from keystone and location of the male WS is arbitrarily initialized within the territory, otherwise the keystone will remain alive.

$$W_1 S_1 A_u^{u+1} = PA_y^{r} + 2ran.(IA_y^{r} - PA_y^{r}) \tag{19}$$

Where $IA_y^r andPA_y^r$ represent the values of maximal and minimal water strider's position within the y^{th} territory and calculate the boundaries of died water strider's territory.

Step 7: MPA Optimization methods.

In this optimization process (i.e.) MPA optimization gives better result than the water strider algorithm. In this three different phases are used to predict the prey movement and imitating the movement of predict the prey in nature.

Step 8: Phase 1 High velocity ratio

In the high velocity ratio as well as predator is moving quicker than the prey. In this method the first repetitions of optimization will explore the issues. Then, ratio is calculated as $(n \geq 10)$ for the best position of predator is not moving. Then it is formulated as:

$$Whileitera < \frac{1}{3} Maxi\_itera \tag{20}$$

$$\overrightarrow{stepsize_u} = \overrightarrow{T_A} \otimes (\overrightarrow{Elites} - \overrightarrow{T_A} \otimes \overrightarrow{\mathrm{Prey}_u}), u = 1,2,\ldots v \quad (21)$$

$$\overrightarrow{\mathrm{Prey}_u} = \overrightarrow{\mathrm{Prey}_u} + P.\vec{T} \otimes \overrightarrow{stepsize_u} \quad (22)$$

Where, T_A is the vector random numbers with normal distribution denotes Brownian motion. The notation $\otimes$ denotes the input multiplications. The multiplication T_A is the prey represents the movement as prey L=0.5 is constant; T implies uniform random variable numbers [0, 1]. The step size of first third iterations and the velocity of actions is high or low examinations.

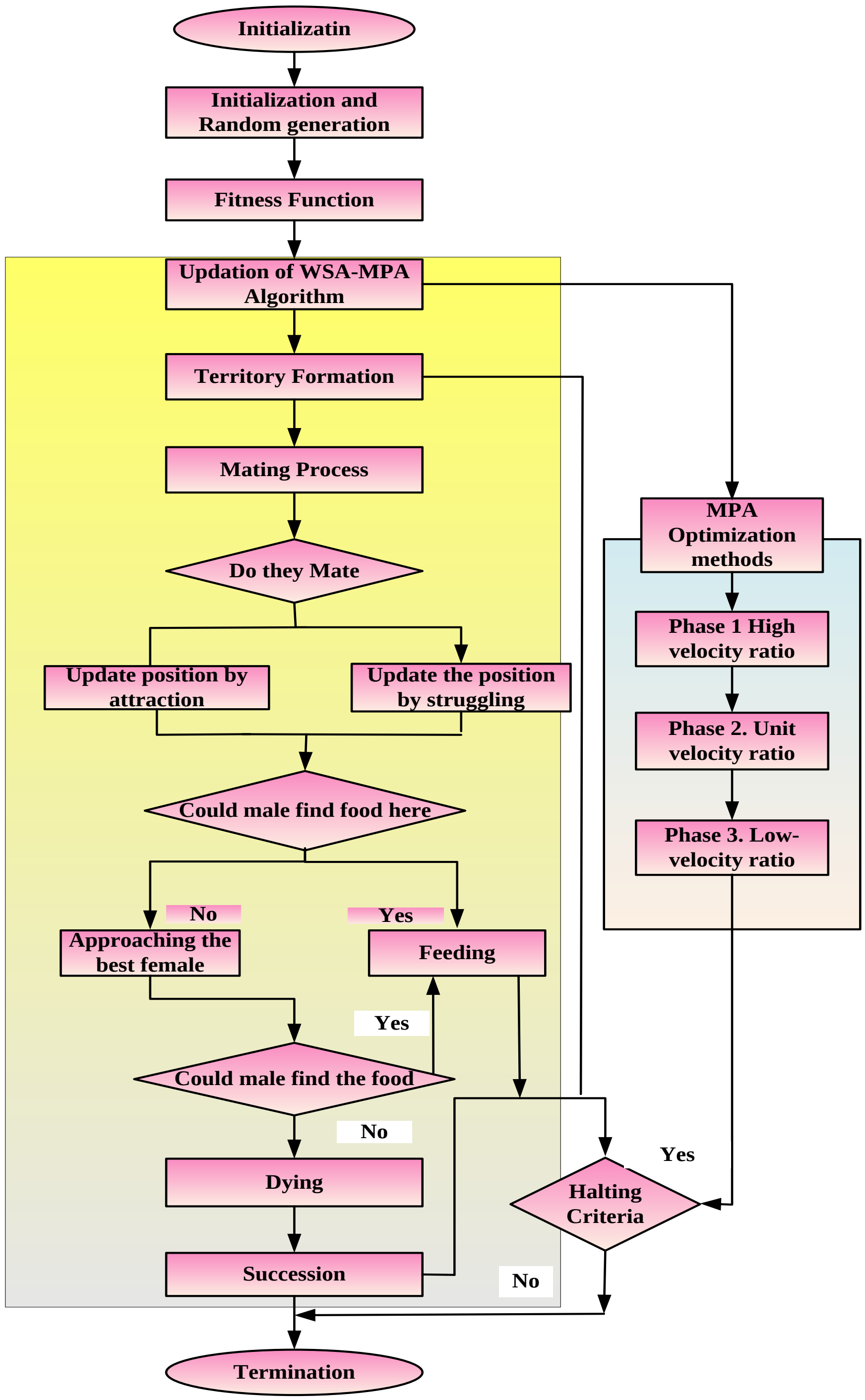

Figure 2: Flow chart for WSA-MPA Algorithm

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Step 9: Phase 2. Unit velocity ratio

In this case predator and prey are in similar position and they are looking for the prey and behave as the intermediate position. In this both the manipulation and examination are divided into half of their designation process. In this prey is denoted as manipulation and predator is represented as examination. As per unit velocity ratio $v \approx 1$

$$While itera < \frac{1}{3} Maxi\_itera < \frac{2}{3} Maxi\_Itera \quad (23)$$

For the first half of the population

$$\overrightarrow{stepsize_u} = \overrightarrow{T_P} \otimes (\overrightarrow{Elites_u} - \overrightarrow{T_P} \otimes \overrightarrow{Prey_u}), u = 1,2,\ldots\frac{v}{2} \quad (24)$$

$$\overrightarrow{Prey_u} = \overrightarrow{Prey_u} + P.\vec{T} \otimes \overrightarrow{stepsize_u} \quad (25)$$

Where $\overrightarrow{T_P}$ is the vector of random variable and then by adding the step size prey is simultaneously move towards to the next prey.

Then the second half is given as

$$\overrightarrow{stepsize_u} = \overrightarrow{T_A} \otimes (T_A \otimes \overrightarrow{Elites} - \overrightarrow{Prey_u}), u = 1,2,\ldots v \quad (26)$$

$$\overrightarrow{Prey_u} = \overrightarrow{Prey_u} + P.KD \otimes \overrightarrow{stepsize_u} \quad (27)$$

Where $KD = \left(1 - \frac{itera}{\max i\_itera}\right)^{\left(2\frac{itera}{\max i\_itera}\right)}$ is the adaptive parameter for controlling the step size in predator moments of the multiplication T_A and Elites simultaneously predict the movements and update the position of the prey on Brownian motion.

Step 10: Phase 3. Low- velocity ratio

In this Predator is moving quicker to prey and the optimization is based on highly manipulation capacity. Then the velocity is represented by $n = 0.1$ and it is represented as

$$While itera > \frac{2}{3} Maxi\_Itera \quad (28)$$

$$\overrightarrow{stepsize_u} = \overrightarrow{T_p} \otimes (T_p \otimes \overrightarrow{Elites} - \overrightarrow{Prey_u}), u = 1,2,\ldots v \quad (29)$$

$$\overrightarrow{Prey_u} = \overrightarrow{Prey_u} + P.KD \otimes \overrightarrow{stepsize_u} \quad (30)$$

In this the multiplication of T_p and Elites simultaneously predict the moments of predator and including stepsize to Elites position of movements for updating the prey location.

Step 11. Termination of WSA-MPA

The partial Transmit sequence (PTS) and Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA)can resolve the objective and to decrease the value of PAPR and BER and maximize the transmission throughput. Then optimize the BER and enhancing the throughput.

4. RESULTS AND DISCUSSION

In this section a simulation analysis is done for decreasing the value of PAPR and BER and maximize the transmission throughputthe proposed MIMO-OFDM-PTS-WSA-MPAsystem in 5G communication Network system.MIMO-OFDM-PTS-WSA-MPAframework is simulated using MATLAB platform on windows 2007 system by Intel (R) Core (TM) i7-4790 3.6 GHz CPU with 8 GB of RAM. Then the simulation values PAPR and BERand the proposed method The partial Transmit sequence (PTS) based Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA)is compared with the existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO). The simulation parameters are explained on Table 1 as follows:

Table 1: Simulation Parameters

Parameter	**MIMO-OFDM-PPSO**	**MIMO-OFDM-PTS-WSA-MPA**
No. of sub carriers	512	512
No. of symbols	2000	2000
Frequency offset (FO)	0.15 and 0.25	0.15 and 0.25
Channel model	AWGN	Inverse Fast Fourier Transform
FFT/IFFT size	512	--
Modulation system	QAM and QPSK	QAM and QPSK
Constellation points	4,8,16,.......and so on	4,8,16,.......and so on
Cyclic prefix (CP)	1	No CP
Transmitted power	1 watt	1 watt
Bandwidth performance	1b/s/Hz	10 b/s/Hz

4.1 Simulation phase 1: performance comparison of various methods

Figure 3 and 4 shows the simulation result for the MIMO-OFDM in 5G communication Network system. The various evaluation metrics like PAPR and BER is given below. Here, the performance of the proposed method the partial Transmit sequence (PTS) and Hybrid water strider

Algorithm and Marine Predator Algorithm (WSA-MPA) **is** compared with the existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO).

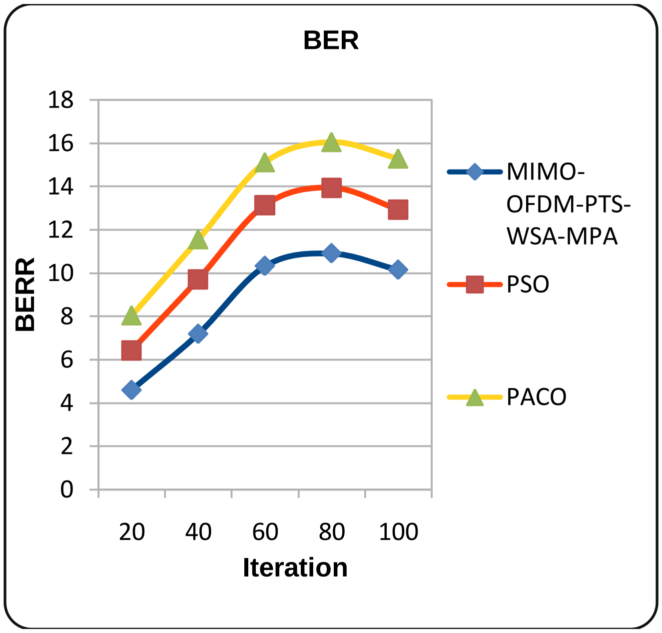

Figure 3: Simulation Performance of PAPR

Figure 3 shows the node delay performance, at node 20, the proposed Partial Transmit sequence (PTS) and Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA)shows node PAPR 55.47 %, 38.58 % lower than existing method like Parallel PSO and PACOmethod respectively. At node 40, the proposed Partial Transmit sequence (PTS) and Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA) shows node PAPR shows node delay 41.71%, 29.13% lower than existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) method respectivelymethod respectively. At node 60, the proposed Partial Transmit sequence (PTS) and Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA) shows node delay 36.63%, 32.71% lower than existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) method respectivelymethod respectively. At node 80, the proposed Partial Transmit sequence (PTS) and Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA) shows node delay 28.34%, 22.96% lower than existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) method respectively method respectively. At node 100, the proposed Partial Transmit sequence (PTS) and Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA) shows node delay 7.24%, 7.65% lower than existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) method respectivelymethod respectively.

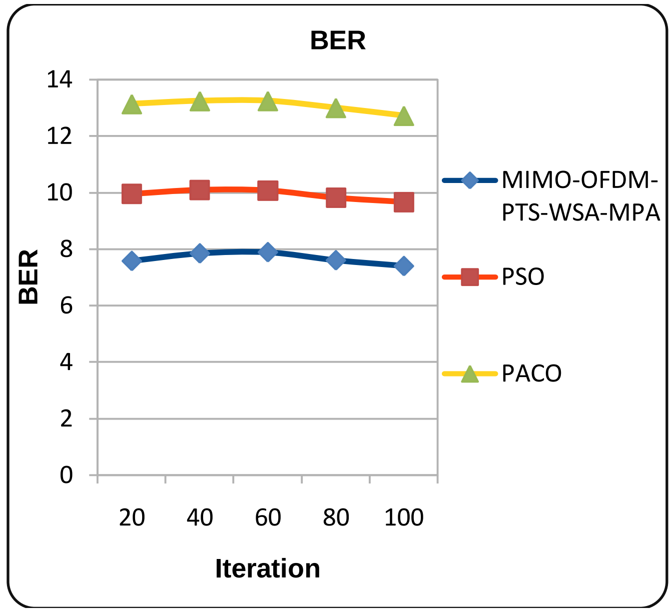

Figure 4: Simulation Performance of BER

Figure 4 shows the node delay performance, at node 20, the proposed Partial Transmit sequence (PTS) and Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA) shows node BER65.4 %, 28.5 % lower than existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) method respectively. At node 40, the proposed Partial Transmit sequence (PTS) and Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA) shows node PAPR shows node delay 31.1%, 19.1% lower than existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) method respectively method respectively. At node 60, the proposed Partial Transmit sequence (PTS) and Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA) shows node delay 6.6%, 2.7% lower than existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) method respectively method respectively. At node 80, the proposed Partial Transmit sequence (PTS) and Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA) shows node delay 8.3%, 2.6% lower than existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) method respectively method respectively. At node 100, the proposed Partial Transmit sequence (PTS) and

Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA) shows node delay 5.24%, 3.65% lower than existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) method respectively method respectively.

5. CONCLUSION

In this work, the partial Transmit sequence (PTS) based Hybrid water strider Algorithm and Marine Predator Algorithm (WSA-MPA) is proposed to decrease the value of PAPR and BER and maximize the transmission throughput.From the simulation outcomes, it is clearly identified that proposed MIM0-OFDM-PTS-WSA-MPA method possesses low PAPR and BER of 68%, 76%, 38% and 75% when compared to the existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) method. The proposed method achieves the good performance of throughput in 5G communication and decreasing the value of PAPR and BER and compared with the existing method like Parallel Particle swarm Optimization Algorithm (PPSO) and Parallel Ant Colony Optimization Algorithm (PACO) respectively.

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