| S.No | Name of the paper | Journal /Conference name & year | Parameters considered of AP selection | Network Considered | ML algorithm / Other method used | Outcome of the paper | Future Enhancement given in the Paper |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | Real-time throughput prediction for cognitive Wi-Fi networks | Journal of Network and Computer Applications  18 November 2019 | no. stations connected to AP(Load of the AP  ), signal strength at each station, modulation scheme, data rates, inter-arrival time, packet arrival rate, number of retransmissions and channel parameter | Wi-Fi networks in varying environmental and network conditions | * Multi-layer perceptrons * Support vector regressor * Decision tree * Random forest | MLP offers highest accuracy over both models  Model1=96.2%, Model2=94.4% | The selected algorithm has poor performance when the assumptions made are not met in a real scenario. |
| 2 | Decentralized AP Selection in Large-Scale Wireless LANs Considering Multi-AP Interference | 17 Aug 2016 | RSS, Probe request and probe response | 802.11 network | 1. DL-SINR AP Selection Algorithm. 2. Optimal AP Selection Algorithm (OPASA) | Selecting AP based on SINR reduces the effect of interference among basic service sets (BSS).  These algorithm provides significant gain in aggregate throughput while taking AP interference into account |  |
| 3 | A supervised learning approach to Cognitive Access Point Selection | December 2011 | signal to noise ratio  probability of failure  business ratio  average beacon delay  number of detected stations | IEEE 802.11 | Multi-layer Feed-forward Neural Network (MFNN) | Chooses AP with high signal to noise ratio and AP which is less loaded and closer. | When the signal to noise ratio(SNR) is highly varying a situation arises where the SNR is greatest of the AP hence this AP is selected. This is not effective as this network is highly unstable. |
| 4 | **Graph Neural Network** Based Access Point Selection for Cell-Free Massive MIMO Systems | 27 Sep 2021 | reference signal received power (RSRP)  Distance between Devices to all AP’s and distance between AP to all other access point | cell-free massive multiple-input multiple-output (MIMO) system | Graph Neural Network | average precision is above 0.8  Area under curve is above 0.9 | The proposed method is capable of predicting the potential links to the UE, up to a precision and a recall of 0.83 and 0.68  As no. of AP increases the scalability is limited. |
| 5 | Access point selection in the network of Internet of things (IoT) considering the strategic behavior of the things and users | 10 May 2021 | Transmission rate, delay ratio | Hybrid Wi-Fi/Li-Fi environment | Markov game | Achieved high data rate compared to others.  Delay did not significantly affect the data rate | Add parameters like calculation overhead, degree of fairness on the network |
| 6 | ML‑Based Handover Prediction and AP Selection in Cognitive Wi‑Fi Networks | 31 July 2022 | Clients  RSSI  Noise level  MAC queue  Time stamp | Cognitive Wi‑Fi Networks | random forest  Multi-layer Perceptron (MLP) and SVR | RF algo is good for making decisions for handover.  MLP provides better accuracy for throughput and  reduces the unnecessary handovers by 60% and 50% | ML applications running over mobile devices can be challenging, the new edge computing paradigm is to be used to meet requirements. |
| 7 | A Multicriteria Decision-Making Framework for Access Point Selection in Hybrid LiFi/WiFi Networks Using Integrated AHP–VIKOR Technique | 23 January 2023 |  | Hybrid LiFi/WiFi |  |  |  |
| 8 | Machine learning-based approaches for user association and access  point selection in heterogeneous fixed wireless networks | 23 July 2022 | Frequency band, AP height, connected users, antenna streams, received signal strength, client connection quality (CCQ) | Fixed wireless network (FWN) | * Nearest Neighbour * Deep Nearest Neighbour | AP selection done based on deep learning  Accuracy of 94% |  |
| 9 | Facilitating Access Point Selection in IEEE 802.11 Wireless Network | Internet Measurement Conference 2005 | Potential bandwidth(which the end host would receive if it were affiliated with the access point)  Load of the AP | IEEE 802.11 wireless networks | Beacon frames are used (broadcasts by individual APs) | Actual Bandwidth -4.06 Mbps  Potential Bandwidth -3.74 Mbps | Work must be done to do the same in a noisy environment as well  Beacon frames must have same priority as data frames |
| 10 | MAPS: Indoor Localization Algorithm Based on Multiple AP Selection | Mobile Networks and Applications (2021)  1 February 2020 | RSSI, CSI (Channel State Information), | Indoor localized networks | * Clustering algorithm(k-means) * Index is chosen for each AP and thresholding is done for it |  | * Further development of multiple AP selection algorithms * Multiply AP selection algorithm can be used in other indoor localization algorithms as well. |
| 11 | A Machine Learning Model to Resource Allocation Service for Access Point on Wireless Network |  | Distance location, channel number, frequency, signal range, transmit power, antenna gain, antenna height, stations number in range, stations associated and bandwidth. | Heterogenous wireless networ-ks | Random forest algorithm  Naive bayes  Decision tree |  |  |
| 12 | A Self-Adaptive AP Selection Algorithm Based on Multiobjective Optimization for Indoor WiFi Positioning | IEEE INTERNET OF THINGS JOURNAL  FEBRUARY 1, 202 | Signal Strength and connection quality | Wifi within an indoor environment | AP selection algorithm based on multiobjective optimization | the performance of the self-adaptive AP selection algorithm is at least a few decimeters better than classical algorithms in terms of RMSE of position estimation | To do more investigations on WiFi positioning with scanning frequencies much lower than 1Hz in the future |
| 13 | A dynamic access point allocation algorithm for dense wireless LANs using potential game | 10 November 2019 | channel gain, number of flows, Link capacity, Bandwidth, Bit rate, | A wifi network containing both AP’s and stations | Game theory  Best response strategy  Better response strategy | AP allocation is performed by the SDWN controller that plays the game internally for all the active flows in the network |  |
| 14 | AP selection in Cell-Free Massive MIMO system using Machine Learning Algorithm | IEEE, March 2021 |  | Massive multiple-input multiple-output network | K-means++ clustering |  |  |
| 16 | Effective Channel Gain-Based Access Point Selection in Cell-Free Massive MIMO Systems | June 5, 2020  IEEE | Effective channel gain and channel quality | Massive multiple-input multiple-output network | Effective channel gain based algorithm | our proposed algorithm offers better performance when the ratio of number of users to number of APs is high |  |
| 17 | WiGig access point selection using non‑contextual and contextual multi‑armed bandit in indoor environment | 19 January 2022 | Available bandwidth, time duration of data transmission, time req for beamforming training | IEEE 802.11 | a multi-armed bandit (MAB), upper confdence bound approach | CMAB schemes show better performance and faster convergence rates than their context-free counterparts. | multi-user- multi-APs association will be considered. In this case multi-player MAB game will be proposed while considering load balance and interference management among the installed APs |
| 18 | Matched-Decision AP Selection for User-Centric Cell-Free Massive MIMO Networks | IEEE Transactions on Vehicular Technology  11 January 2023 | Channel gain ,threshold gain | User equipments | competitive mechanism that considers a matched decision among UEs(user equipments) and APs. | , our method can increase the SEs of the 95% likely UEs up to 163% and 100% in distributed and centralized implementations, respectively | Analyze to consider aspects such as non-reciprocity and limited fronthaul/backhaul capacity |
| 19 | A Traveling Distance Prediction Based Method to Minimize Unnecessary Handovers from Cellular Networks to WLANs | IEEE COMMUNICATIONS LETTERS, VOL. 12, NO. 1, JANUARY 2008 | **RSS change rate** | IEEE 802.11 | Traveling Distance Prediction Based on RSS Change Rate ,Distance Threshold Estimation for Minimizing Handover  Failures | our system is designed  to keep the probability of handover failures or unnecessary  handovers below preset levels, even though the speed of the  MT increases, the probabilities remain the same |  |

| * no. stations connected to AP, * Signal strength at each station, * data rates, * RSS, * Distance between Devices to all AP’s and distance between AP to all other access point, Transmission rate, * RSSI * signal range, * Available bandwidth, * **RSS change rate** |
| --- |

Current: param ->

✅Ssid

✅Rssi = RSSI is a measure of the strength of the signal received by a wireless device

✅Freq = Frequency of AP (2.4 / 5 GHz)

✅link speed = maximum theoretical speed between your device and your local Wi-Fi router

✅Secured = Security of Wifi (WEP, WPA, and WPA2 )

✅channel bandwidth = Channel bandwidth refers to the range of frequencies available for data transmission within a communication channel. ✅

✅Rxbytes = ✅

✅Rxpackets =✅

✅Txbytes = ✅

✅Txpackets = ✅

higher values for rxbytes and txbytes indicate higher data transfer rates and faster network speeds, while higher values for rxpackets and txpackets indicate more efficient use of network resources.

✅No of prev times connected (Count)

✅Level = API divide RSSI in segments and gives a level from 1-5 depending on the strength

✅no. stations connected to AP (AP Load)

**RSS change rate = RSS change rate, on the other hand, measures the rate at which the received signal strength is changing over time**

✅Distance between Devices to all AP’s and distance between AP to all other access point

Signal strength at each station

**Formula**

**score = pow((100+RSSI)/10),2) + freq/1000 + secured + channelBandwidth + (1/distance)**

**trafficScore = (ln(rxbytes) + ln(rxpackets) + ln(txbytes) + ln(txpackets))/10**

**FinalScore = score + trafficScore**