IEEE 802.11n/ac/ax Hot Zone Traffic Evaluation with Neural Compute Stick Based RNN Methods

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Abstract: The longer than twenty-two-year success marching of the IEEE 802.11 communication technology continues in the next years with new standard editions having transfer rate in the multi Gbit/s range. Realistic evaluation of the WiFi controller supervised hot zone service level becomes more and more critical because of the very high number of frames transmitted per unit of time. Online evaluation of the content transmission efficiency on radio channel is affected by several conditions including environment reflection characteristics, multipath influences, movement behaviour of the users and time dependence of the mobile terminals population in the service area. Based on our anterior investigations we found that in special places of the coverage area with WiFi hot zone service high ratio of transmitted frames are temporarily control and management frames even in case of communications with low level of the radio signals. To scan and evaluate IEEE 802.11/n/ac/ax channel usage efficiency we developed a complex scanner and evaluator tool based on neural network stick hardware. The software prototype developed utilize Long-Short Term Memory and Gated Recurrent Unit functions to determine periodically the percent of data frames of the total transmitted radio frames. Constant number of frames and constant time intervals, respectively are applied as two basic approaches of our evaluation methods. Advantages, weaknesses and usability cases in practice of the proposed solutions will be given in the paper.

Keywords: *Internet of Things (IoT), Wireless Fidelity (WiFi) Hot Zone, Quality of Service (QoS), Recurrent Neural Network (RNN), Long-Short Term Memory (LSTM), Gated Recurrent Unit (GRU), Convolutional Network, routing, clustering, time series classification.*

MSC: 65C60, 60G35, 91A28

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