Table 2: Results of detection of nodes in SAODV

Total Nodes	Normal Nodes	Idle Normal Nodes	Blackhole nodes	True Positive	True Negative	False Positive	False negative
30	25	3	2	1	0	2	0
40	30	5	5	4	1	3	0
50	35	8	7	5	2	6	1
60	40	10	10	9	1	8	0
80	45	12	13	12	1	11	0

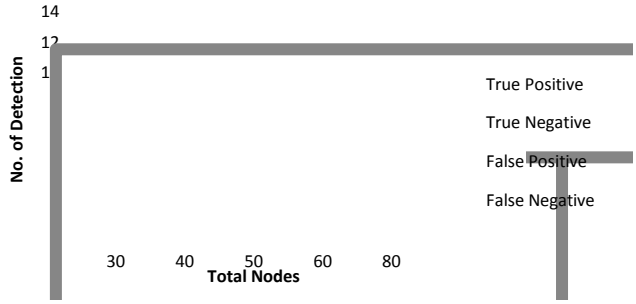

Figure 2: Behaviour of SAODV in blakhole node detection

As we can see clearly that in case of True Positive SAODV works efficiently. But from table and graph we can see the as the number of node increases the False Positive detection rate also increase in SAODV. In this case the reliability of the SAODV is decrease as the number of idle normal nodes increase.

6. Proposed Modification in SAODV

1. Analyze DRI entry to identify the black node
2. **If (BlackHole(IN))**

{
Ack= send(Sample Packet, IN)
If(Ack !== NULL)
{
Set Route=secure
Set IN.Blackhole=False
}
Else
{
3. **Set Route=Insecure**
4. **Set IN.Blackhole=True**
5. **Black all node the communication with IN**

} }

To decrease the false positive detection rate in SAODV we don some minor change in the blackhole detection technique. As above we see that in SAODV blackhole detection is base on The DRI table. In the process of detection every node checks own DRI table entry for the next node on the path. Also from the above discussion we have see that the DRI entry for any blackhole node and normal idle node is same on the every node. This is caused for the false positive rate in SAODV. To decrease the false positive rate of the blackhole detection, we did some changes in algorithm. In this when the any node analyze the DRI table entry for the next node in the path, if it found the symptoms of blackhole detection then it should confirm the node by sending e sample packet to it. If packet dropped and acknowledge doesn't come then it is confirmed the node is blackhole but if node is normal idle node then it will send acknowledge. If the sender node gets acknowledgement then confirm it as a normal node. After the modification in the SAODV algorithm we measure the behavior of the modified SAODV for the same setup given above in the table. we have seen the large decrement in the false positive rate of blackhole detection. The resuls are shown in the table .The modification in SAODV algorithm given in section above.

7. Experiments Results for Improved SAODV

For the same parameters and setup used in simulation of AODV we simulate modified SAODV against the blackhole detection. And the results are given in table below.

Table 3: Results of detection of nodes in Modified SAODV

Total Node	*Normal Nodes*	*Idle Normal Nodes*	*Black hole nodes*	*True (+)*	*True (-)*	*False (+)*	*False (-)*
30	25	3	2	1	2	1	0
40	30	5	5	5	0	1	1
50	35	8	7	6	1	2	0
60	40	10	10	10	0	2	1
80	45	12	13	11	1	3	2

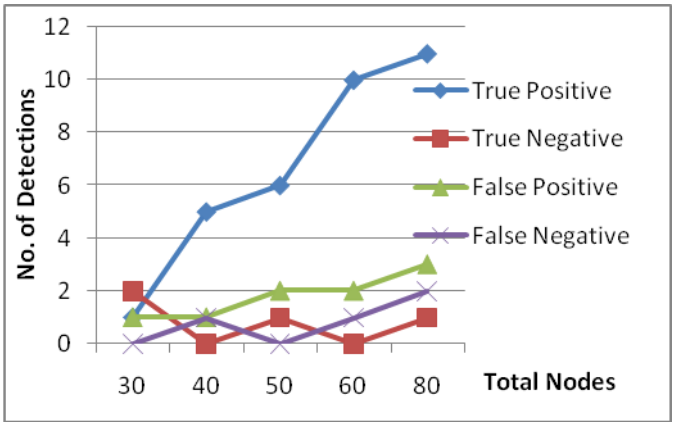

Figure 4: Behavior of Modified SAODV in blakhole node detection

8. Comparison of SAODV and Modified SAODV

As the tables 2 and 3 shows that the false detection rate in SAODV is decreases as the number of nodes increase. From fig.2 and fig 3 we can see the rates for detections against the blackhole node. In this modification our objective was to decrease the false positive detection of the blackhole node. from fig. 4 we can see the comparative graph for False positive in SAODV and Modified SAODV.

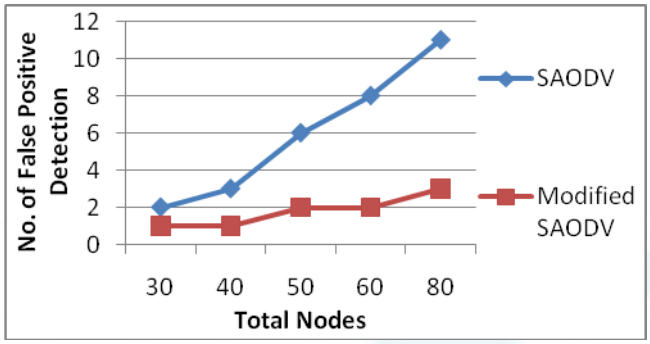

Figure 5: Comparision of SAODV and Modified SAODV against false positive detection

9. Conclusion

The presented work is defined as the improvement over the existing AODV protocol to provide the reliable and safe communication. The presented work has provided the solution to problem of false positive detection of blackhole nodes in SAODV. This improved SAODV protocol is called Modified SAODV protocol used the concept of DRI table based mapping to identify black hole nodes and provide the reliable and safe route over the network. The presented work has observed the network nods under reliability parameters and generate the effective communication route. In this work, at the first level, the reliable node identification is done by proving the node identity.

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