Failover is a procedure by which a system automatically transfers control to a duplicate system when it detects a fault or failure. Wi-Fi has better performance in terms of energy as compared to Bluetooth but also has disadvantage that it increases the power consumption as in this mode Wi-Fi interface is always put in in high power state reducing the battery life of the phones. The failover routing prevents the stoppage of transmission if the transmitting node about to fail. It will pass its control to another node and allow it to transmit instead of it. The on-demand routing provides the suitable route to transmit. When one node stops while transmitting, it will send the frame sets to the other node and ask it to send the remaining frame sets. In this work I have created a failover routing that works when a master node about to fail while transmitting packets to a slave node due to low energy then it transfers its control to the other node and request that node to transfer the remaining packets to the slave node on its behalf. Hence by this we can assure the data transmission.

A tethernet is formed with few nodes. All the nodes are tethering Smartphones and together they share their Wi-Fi network interface. For QoS routing, a connection table is required for each node to establish a route. The connection table stored in each master device contains the essential information, which includes the nodes connected, the master address, the bridge address and the slave. The QoS routing mechanism uses the connection table to find the destination. When it locates the destination address in the table, it checks it's either a master or slave. Then, it searches the routing table and the data packet can be sent to the destination. Using the routing table, a source can decide the path that the data packet can be transmitted and meet the QoS requirements. This table helps the routing mechanism dynamically find the better path even if one master holds the less power or battery. To establish a route to meet the QoS requirements, the route discovery protocol is used. As for the on-demand routing protocols, there are some QoS requirements and no complete route information can be used for routing. Thus, a route discovery packet (RDP) is flooded into the network to find the destination.
Upon receiving the first RDP, the destination sends a route reply packet (RRP) back to the source along the route. While the source receives the first RRP, it knows that this is the shortest route. And accompanying with the feedback of the RRP, point-to-point Tethering links are created to connect the devices along the new route and at the same time the routing tables of these devices are filled in with the information about the new discovered route. When the RRP arrives at the source device, the route is also ready for transmitting data packets from the source to the destination.

In this proposed work, the transmitting node will send frame sets to the other node after it has stopped due to all the nodes are tethering Smartphones and together they share their Wi-Fi network interface. In this work I will be creating a failover routing that works when a node about to fail while transmitting packets to another node due to low energy then it transfers its control to the other node in the same SSID and request that node to transfer the remaining packets to the receiving node on its behalf. Hence by this we can assure the data transmission and thus acquires QoS.

4.4 The Proposed QoS Routing

For forming a route in this QoS routing, the tethering devices use many tables like a connection table which is stored in device containing the important information including the connected nodes, the addresses, in the scatternet.

When scatternet is formed, it is assumed that the connection table is filled and stored in device. To find destination, the connection table can be used by QoS routing. After locating the address of the destination in the table, it looks for the routing table and send the data packet to destination.

For QoS routing, there is a need of a routing table. With this, the data packet path is decided by the source to transmit it. Also, the utilization of bandwidth is more efficient as the routing table dynamically locates the much efficient path. The following figure 7 depicts the scatternet communication model. It consists of several number of nodes having different amount of battery or power capacities. The model exhibits which is the better way or option to go for in order to fulfills the transmission requirements and hence it can be done successfully.

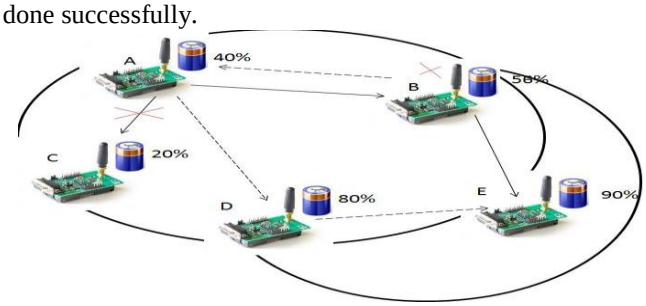

Figure 7: Scatternet Communication Model

To establish a route meeting the QoS requirements, the route discovery protocol can be used. To find the destination, a RDP is swamped into the network. A route reply packet (RRP) is sent by the destination after getting the first RDP along the route to the source. On the receipt of the first RRP, it implies to be the shortest route. To connect the devices, tethering links are created along the new route filling the routing tables with the information of the new route. On the arrival of RRP at the source, route is ready to transmit data packets.

The received RDP is broadcasted again but in advance, the relay device checks whether it is being visited earlier or not and then forms an item in the routing table for new route request. The following Table 2 shows the working of RDP. The source 0D wants to send a packet to destination 5D. In order to find device 5D, 0D sends the RDP. The other device in the range will then matches the BD_ADDR with the field in its connection table. If it does not matches then it implies that it is not the destination, the QoS information will be recorded into its routing table and the moves to the next device.

Table 2: Working Mechanism of RDP

Destination device	*QoS*		*Hop_Count*	*Next_device*
	Bandwidth	*Delay*		
5D	30K	0.2ms	1	1D
	30K	1.2ms	2	2D
	30K	2.2ms	3	3D
	25K	3.2ms	4	4D
	25K	5.2ms	5	5D

The RRP is transmitted back along the route as soon as destination gets a RDP. The RRP coming back quickly to the source implies that the RRP navigates a shorter route. The device approves the route establishment and its connection table and routing table are updated as soon as it gets the RRP.

4.5 Energy efficient Routing Mechanism

Suppose there are few nodes that are tethering enabled smartphones connected into the same SSID. When a request is send to a node to have an access to a file by the browser created, the RDP is sent and with the reception of RRP by the source, the connection is established. Now, if while transmitting the data packets the transmitting node halts due to power failure then the transmitting node will pass on the request to the neighboring node by using the RDP. The browser will look into the RDP and request is sent to the next node. The same procedure follows and the connection is established. The frame sets of the file that has been sent before the first node gets faulty is provided to the next transmitting device and then it will send the remaining file to the source.

5. Conclusion

Tethernet is a network that allows sharing of internet connection of phones with other devices such as laptops. Failover is a procedure by which a system automatically transfers control to a duplicate system when it detects a fault or failure. Wi-Fi has better performance in terms of energy as compared to Bluetooth but also has disadvantage that it increases the power consumption as in this mode Wi-Fi interface is always put in in high power state reducing the battery life of the phones. The failover routing prevents the stoppage of transmission if the transmitting node about to fail. It will pass its control to another node and allow it to transmit instead of it. The on-demand routing provides the suitable route to transmit. When one node stops while transmitting, it will send the frame sets to the other node and ask it to send the remaining frame sets.

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