(54) Title: SYSTEM FOR BROADCAST AND RE-TRANSMISSION OF REAL TIME PROGRAMMING ON A LOCAL NETWORK

(57) Abstract: A system for broadcasting information derived from at least one originating signal and for retransmitting the at least one originating signal, the system comprising: an originating device, the originating device generating the at least one originating signal and transmitting it to like devices; whereby, in use, the at least one originating signal is transmitted wirelessly to the like devices and rebroadcast by like devices in a range of one another; and whereby an item of communication generated by a party associated with the originating device and included in the information is communicated to parties associated with the like devices. Also disclosed is a method of communicating an item of communication; said method comprising: initiating a first broadcast signal from an originating device; wherein the first broadcast signal contains the item of communication; receiving the first broadcast signal by a like device; the like device broadcasting locally the item of communication derived from the first broadcast signal; the like device also rebroadcasting the first broadcast signal containing the item of communication as a rebroadcast signal for reception by further like devices.
SYSTEM FOR BROADCAST AND RETRANSMISSION OF REAL TIME PROGRAMMING ON A LOCAL NETWORK

TECHNICAL FIELD
[0001] The present invention relates to a broadcast and retransmission system and, more particularly although not exclusively, to such a system adapted for use by portable digital devices such as smart phones.

BACKGROUND
[0002] Transmission of real-time data and especially audio data in real-time over an extended network is well known in the art. It is the basis of the cellular mobile phone network. The ability to conference call many people on many devices into the one conversation is also well known and commonly practised in the art.

[0003] In a conference call situation, the participants are commonly routed through one central controlling facility or system and then distributed in a hub and spoke manner to the participants.

[0004] The practise of repeating transmission data to expand the reach of a network is also well known in the art. This practise commonly involves receiving a transmission, verifying its integrity and then retransmitting the data. The common benefit of this practise is to allow data to be distributed great distances without a terminal deterioration in the strength of the carrier signal used as the basis of network transmission.

[0005] However, these solutions often rely on large established infrastructures of transmission and re-transmission equipment and do not lend themselves to ad-hoc network situations where the distribution network is only needed for a small amount of time or for a small specific purpose.

[0006] Additionally, ad-hoc networks such as radio band/ walkie talkie networks do not commonly allow for the re-transmission of audio or other data to allow distributed distribution to other devices not within transmission range of the original broadcast source.

[0007] The disclosed invention is designed to address this issue.
NOTES

[0008] The term "comprising" (and grammatical variations thereof) is used in this specification in the inclusive sense of "having" or "including", and not in the exclusive sense of "consisting only of.

[0009] The above discussion of the prior art in the Background of the invention, is not an admission that any information discussed therein is citable prior art or part of the common general knowledge of persons skilled in the art in any country.

SUMMARY OF INVENTION

[0010] In a broad form of the invention there is provided a system for broadcasting information derived from at least one originating signal and for retransmitting the at least one originating signal, the system comprising: an originating device, the originating device generating the at least one originating signal and transmitting it to like devices; whereby in use, the at least one original signal is transmitted wirelessly to the like devices and rebroadcast by like devices in a range of one another.

[0011] Preferably the like device chooses the signal to rebroadcast based on signal strength.

[0012] Preferably the like device chooses the signal to rebroadcast based on signal quality.

[0013] Preferably the device is a smart phone.

[0014] Preferably the originating signal is in the form of a telephone call.

[0015] Preferably signal transmission is one way.

[0016] Preferably wherein signal transmission is two way.

[0017] In a further form of the invention there is provided a broadcast system that involves at least one communication, the communication within range of at least one receiving device being broadcast to multiple other nearby devices using a wireless distribution and redistribution based network.

[0018] Preferably wireless communication is peer to peer.
[0019] Preferably local output is in the form a speaker.

[0020] Preferably the system has a single broadcast stream wherein the originating device establishes a broadcast network identity and subsequent devices are used to subscribe to that network identity and redistribute that network content using the same broadcast identity as a repeating device.

[0021] Preferably the initial broadcast from an initial device is shared by subsequent devices on networks of a different identity, but where the programming is passed through that network and the devices on that network so that the original program content and data is shared with networks and devices outside the transmission range of the original transmitting device.

[0022] In another broad form of the invention, there is provided a system for broadcasting information derived from at least one originating signal and for retransmitting the at least one originating signal, the system comprising: an originating device, the originating device generating the at least one originating signal and transmitting it to like devices; whereby, in use, the at least one originating signal is transmitted wirelessly to the like devices and rebroadcast by like devices in a range of one another; and whereby an item of communication generated by a party associated with the originating device and included in the information is communicated to parties associated with the like devices.

[0023] In yet a further broad form of the invention, there is provided a method of communicating an item of communication; said method comprising: initiating a first broadcast signal from an originating device; wherein the first broadcast signal contains the item of communication; receiving the first broadcast signal by a like device; the like device broadcasting locally the item of communication derived from the first broadcast signal; the like device also rebroadcasting the first broadcast signal containing the item of communication as a rebroadcast signal for reception by further like devices.

[0024] Preferably, the item of communication comprises visual data.

[0025] Preferably, the item of communication comprises audio data.

[0026] Preferably, the like device chooses the signal to rebroadcast based on signal strength.
[0027] Preferably, the like device chooses the signal to rebroadcast based on signal quality.

[0028] Preferably, the device is a smart phone.

[0029] Preferably, the originating signal is in the form of a telephone call.

[0030] Preferably, signal transmission is one way.

[0031] Preferably, signal transmission is two way.

[0032] Preferably, the originating signal and the rebroadcast signal(s) are transmitted wirelessly.

[0033] Preferably, wherein the originating signal and the rebroadcast signal(s) are transmitted wirelessly by means of a Bluetooth-technology-based signal.

[0034] Preferably, the originating signal and the rebroadcast signal(s) are transmitted wirelessly by means of a Wi-Fi-based signal.

[0035] Preferably, the originating signal and the rebroadcast signal(s) are transmitted wirelessly by means of an NFC (Near Field Communication)-based signal.

BRIEF DESCRIPTION OF DRAWINGS

[0036] Figure 1 illustrates an example embodiment of a localized broadcast network

[0037] Figure 2 illustrates an example of signal strength selection process of the example embodiment

DESCRIPTION OF EMBODIMENTS

[0038] Figure 1 shows an example embodiment of the invention in use in a social setting where a conversation in one part of a room is desired to be broadcast and re-broadcast in real-time to various places in the room.

[0039] A user with a device 11 using the system 100 is sitting at a table 10 that is at one end of a room. The user wishes to broadcast the conversation at that table 10 to other people within the
near vicinity or room. In this example people sitting at a nearby table 12 and a table a bit further away 19 wish to listen in to the conversation at the original table 10.

[0040] The original transmitting device 11 uses its own local wireless and network transmission capability to transmit the conversation at that table to others in the room 13, 14, 17 who also each have a device 15, 18 that is using the system 100.

[0041] The closest device 15 receives the signal 13 from the initial broadcasting device 11 and verifies its quality. It then publishes that broadcast out of its own speaker so that people sitting at the table 12 can hear the conversation occurring in real-time at table 10.

[0042] After verifying the quality of the signal from the original broadcasting device 11, the closest device 15, then re-broadcasts the signal 16 to other devices in the room including a device 18 that is further away from the initial broadcasting device 11 and which may not be able to pick up a reliable transmission signal from the initial broadcast device 11.

[0043] In this example embodiment the signal 14, 17 from the initial broadcasting device is not strong enough to reliably be received by the device 18 that is further away. The transmission from the initial broadcasting device is strong initially 14 but starts to reduce in strength 17 as the distance between the two devices is increased.

[0044] Even though the device 18 at the furthest table 19 can detect the two signal transmissions 13, 14/17, the signal from the closer device 15 is used by the invented system on the device 18 as a source for the transmitted programming and then publishes that broadcast on its own speaker.

[0045] In turn this device 18 would re-transmit to other devices in the room.

[0046] Figure 2 shows how the process of the example embodiment in selecting which source of a broadcast is used for publishing through its local speaker and for re-broadcasting to other devices.

[0047] An original device is used to initiate a broadcast 30 with real time audio in the form of a real-time conversation as the program content. That content and data is broadcast to other devices 31 using the original devices wireless network transmitting capability. In this example embodiment and for the sake of clarity the content being broadcast is being distributed in one way using an
intercom announcement model however an alternative embodiment could include the two way synchronous audio data of a real time conversation or video conference. Other device's that are able to receive the broadcast from the initial device begin to detect and identify the signal from the initial device 32.

[0048] The signal strength and quality is then assessed 35 and then if the quality and strength are reliable enough for consistent reception the device starts publishing the program content in the form of a real-time audio conversation to the device's local speaker 36. Subsequently but without a perceptible delay the broadcast is then re-transmitted out to other nearby devices 33 which then in turn will attempt to connect to the program content 32 and again attempt to publish 36 and re-transmit 33 and so on.

[0049] If a subsequent device is able to receive the broadcast 32 from the initial device broadcast 30, the subsequent device will begin to detect and identify the signal from the initial device 32, then assess its signal strength and quality 35. If the signal quality and or strength is not good enough for reliable reception, the device looks for other broadcasts 37 of the same broadcast program or content but with a better quality of signal or signal strength 32, 35.

[0050] In summary, each device being used to access the broadcast content or programming intelligently selects between all the available transmission signals including the original device transmission and other subsequent re-transmissions of the same program by other devices, to select the best available reception signal quality and strength while also selecting devices that are as physically close to the original broadcasting device to minimize latency.

[0051] The above describes only some embodiments of the present invention and modifications, obvious to those skilled in the art, can be made thereto without departing from the scope of the present invention.

Alternative Embodiments

[0052] The example embodiment describes a broadcast system that involves a single audio conversation within range of one receiving device being broadcast to multiple other nearby devices using a peer to peer wireless distribution and redistribution based network.

[0053] The example embodiment uses a speaker as a local output for the system on the receiving device. Any output can be used for local output of received broadcast including but not
limited to the device screen for video broadcast output and Bluetooth or direct connect headset for output of audio broadcast material.

[0054] Other embodiments may include any type of data formats including but not limited to real-time video from a single broadcast location. Another embodiment may include multiple sources of broadcast devices all sharing the same broadcast channel which are themselves distributed and redistributed using a peer to peer distributed network model.

[0055] The example embodiment uses a single broadcast stream where the original device establishes a broadcast network identity and subsequent devices are used to subscribe to that network identity and redistribute that network content using the same broadcast identity as a repeating device.

[0056] An alternative embodiment may see an initial broadcast from an initial device being shared by subsequent devices on networks of a different identity, but where the programming is passed through that network and the devices on that network so that the original program content and data is shared with networks and devices outside the transmission range of the original transmitting device.

IN USE

[0057] Firstly, with reference to the inset of Figure 1, a non-limiting example of a device suitable for providing the broadcast and rebroadcast capability is a digital device such as a smart phone incorporating a microprocessor 110 in communication with a memory 111 and in communication with a communications module 112. The microprocessor 110 is programmed by instructions from memory 111 to decode and broadcast locally, as either data on display screen 113 or an audio signal via speaker 114, the item of communication 115 embedded in the originating signal 116. By this means, in use, an item of communication 115, for example, spoken by a user into device 11, is transmitted to and picked up by like device 15, where it is both broadcast locally - for example, as either audio data or visual data - and is also rebroadcast for reception and on-transmission (and local playback) by a like device 18, and so on.

INDUSTRIAL APPLICABILITY

[0058] Embodiments of the present invention as described above can operate over a local network in such a way that the initial broadcast from an initial device is shared by subsequent
devices on networks of a different identity, but where the programming is passed through that network and the devices on that network so that the original program content and data is shared with networks and devices outside the transmission range of the original transmitting device. In this manner, a local communication by a user of a first device is reproduced multiple times and retransmitted multiple times over a defined area.
CLAIMS

1. A system for broadcasting information derived from at least one originating signal and for retransmitting the at least one originating signal, the system comprising:
   an originating device, the originating device generating the at least one originating signal and transmitting it to like devices;
   whereby, in use, the at least one originating signal is transmitted wirelessly to the like devices and rebroadcast by like devices in a range of one another.

2. The system of claim 1 wherein the like device chooses the signal to rebroadcast based on signal strength.

3. The system of claim 1 wherein the like device chooses the signal to rebroadcast based on signal quality.

4. The system according to claim 1 wherein the device is a smart phone.

5. The system according to claim 1 wherein the originating signal is in the form of a telephone call.

6. The system according to claim 1 wherein signal transmission is one way.

7. The system according to claim 1 wherein signal transmission is two way.

8. A broadcast system that involves at least one communication, the communication within range of at least one receiving device being broadcast to multiple other nearby devices using a wireless distribution and redistribution based network.

9. The system according to claim 8 wherein wireless communication is peer to peer

10. The system according to claim 8 wherein local output is in the form a speaker

11. The system according to claim 8 having a single broadcast stream wherein the originating device establishes a broadcast network identity and subsequent devices are used to subscribe to that
network identity and redistribute that network content using the same broadcast identity as a repeating device.

12. The system of claim 11 wherein initial broadcast from an initial device is shared by subsequent devices on networks of a different identity, but where the programming is passed through that network and the devices on that network so that the original program content and data is shared with networks and devices outside the transmission range of the original transmitting device.

13. A system for broadcasting information derived from at least one originating signal and for retransmitting the at least one originating signal, the system comprising:
an originating device, the originating device generating the at least one originating signal and transmitting it to like devices;
whereby, in use, the at least one originating signal is transmitted wirelessly to the like devices and rebroadcast by like devices in a range of one another; and
whereby an item of communication generated by a party associated with the originating device and included in the information is communicated to parties associated with the like devices.

14. The system of claim 13 wherein the item of communication comprises visual data.

15. The system of claim 13 wherein the item of communication comprises audio data.

16. The system of claim 13 wherein the like device chooses the signal to rebroadcast based on signal strength.

17. The system of claim 13 wherein the like device chooses the signal to rebroadcast based on signal quality.

18. The system according to claim 13 wherein the device is a smart phone.

19. The system according to claim 13 wherein the originating signal is in the form of a telephone call.

20. The system according to claim 13 wherein signal transmission is one way.
21. The system according to claim 13 wherein signal transmission is two way.

22. The system according to claim 13 wherein the originating signal and the rebroadcast signal(s) are transmitted wirelessly.

23. The system according to claim 13 wherein the originating signal and the rebroadcast signal(s) are transmitted wirelessly by means of a Bluetooth-technology-based signal.

24. The system according to claim 13 wherein the originating signal and the rebroadcast signal(s) are transmitted wirelessly by means of a Wi-Fi-based signal.

25. The system according to claim 13 wherein the originating signal and the rebroadcast signal(s) are transmitted wirelessly by means of an NFC (Near Field Communication)-based signal.

26. A method of communicating an item of communication; said method comprising:
   - initiating a first broadcast signal from an originating device; wherein the first broadcast signal contains the item of communication;
   - receiving the first broadcast signal by a like device; the like device broadcasting locally the item of communication derived from the first broadcast signal;
   - the like device also rebroadcasting the first broadcast signal containing the item of communication as a rebroadcast signal for reception by further like devices.
Start Local Broadcast

Audio and or data programming is broadcast to one or more receiving devices

Subsequent wireless device picks up broadcast signal

Device looks for secondary source of transmission of the same broadcast stream with stronger signal

Broadcast programming is re-transmitted using devices own local wireless transmission capability

Is signal strong enough?

No

Yes

Device broadcasts audio on its own speaker or headset and displays related data

Figure 2