

configuring the short TTI scheduling information into a data field associated with the first target long TTI and configuring location information of the short TTI scheduling information into a control signaling associated with the first target long TTI, where the location information of the short TTI scheduling information is used to indicate a storage location of the short TTI scheduling information in the data field associated with the current long TTI.

[0009] Optionally, configuring the short TTI scheduling information into the control signaling associated with the first target long TTI includes:

configuring scheduling information of all short TTIs in a long TTI into the control signaling associated with the first target long TTI; or

configuring scheduling information of a first short TTI in a long TTI into the control signaling associated with the first target long TTI, where the scheduling information of the first short TTI further includes indication information to indicate that the first short TTI includes scheduling information of a subsequent short TTI.

[0010] Optionally, when the first target long TTI is configured with scheduling information of all short TTIs in a long TTI, scheduling the one or more short TTIs in the second target long TTI according to the short TTI scheduling information includes:

[0011] according to the scheduling information, sequentially scheduling each of the one or more short TTIs within the second target long TTI and sequentially allocating a HARQ feedback resource for each of the one or more short TTIs.

[0012] Optionally, when a control signaling associated with the first target long TTI includes scheduling information of a first short TTI in a long TTI, scheduling the one or more short TTIs in the second target long TTI according to the short TTI scheduling information includes:

according to the scheduling information of the first short TTI, scheduling the first short TTI in the second target long TTI; and allocating a HARQ feedback resource for the first short TTI;

for the first short TTI to a penultimate short TTI, sequentially performing following operations:

configuring scheduling information of a subsequent short TTI into a sub-control signaling associated with a current short TTI; where the scheduling information of the current short TTI includes at least length information, location information of HARQ feedback resource and indication information; and

according to the scheduling information of the subsequent short TTI, scheduling the subsequent short TTI, and allocating a HARQ feedback resource for the subsequent short TTI.

[0013] Optionally, configuring the location information of HARQ feedback resource of a

information of the current short TTI includes at least length information, location information of HARQ feedback resource and indication information; and

the scheduling unit is to schedule the subsequent short TTI and allocate a HARQ feedback resource for the subsequent short TTI according to the scheduling information of the subsequent short TTI.

[0024] Optionally, the configuring module includes:

a first resource configuring sub-module, to configure a HARQ feedback resource of a short TTI to be immediately adjacent to a tail of the short TTI; or

a second resource configuring sub-module, to an original HARQ feedback resource configured for the long TTI to a last one of the one or more short TTIs. when the long TTI has redundant resources after one or more short TTIs are scheduled in the long TTI.

[0025] According to a fourth aspect of the present disclosure, an apparatus for transmitting HARQ feedback is provided, which is applied in second equipment. The apparatus includes:

a scheduling information obtaining module, to obtain short TTI scheduling information from a first target long TTI, where the short TTI scheduling information includes at least location information, length information, quantity information and location information of HARQ feedback resource of a short TTI, the HARQ feedback resource of a short TTI is configured to transmit HARQ feedback of the short TTI to first equipment from the second equipment; and

a feedback sending module, to sequentially analyze each of short TTIs from a second target long TTI and send HARQ feedback to the first equipment through a HARQ feedback resource of each of the short TTIs according to the short TTI scheduling information.

[0026] Optionally, the scheduling information obtaining module includes:

a monitoring sub-module, to monitor whether each of long TTIs includes the short TTI scheduling information to obtain a monitoring result;

a first target determining sub-module, to determine a current long TTI as the first target long TTI when the monitoring result indicates that the current long TTI includes the short TTI scheduling information; and

an analyzing sub-module, to analyze the short TTI scheduling information from the first target long TTI.

[0027] Optionally, the feedback sending module includes:

a second target determining sub-module, to determine the second target long TTI which is scheduled with the short TTIs according to the location information of the short TTIs;

a short TTI obtaining sub-module, to obtain each of the short TTIs in the second target

short TTI is scheduled for the second target long TTI and a HARQ feedback resource is allocated for the first short TTI.

[00116] At step 132, for the first short TTI to a penultimate short TTI, following operations are sequentially performed: configuring scheduling information of a subsequent short TTI in a sub-control signaling associated with a current short TTI; and according to the scheduling information of the subsequent short TTI, scheduling the subsequent short TTI and allocating a HARQ feedback resource for the subsequent short TTI.

[00117] The scheduling information of the current short TTI includes at least length information, location information of HARQ feedback resource and indication information.

[00118] For example, take a case that three short TTIs are to be scheduled in one long TTI as an example, and the scheduling information of the first short TTI is as shown in above Table 4. FIG. 6 is a flowchart of another method of obtaining HARQ feedback according to an example. The above step 132 may specifically include:

[00119] At step 1321, scheduling information of the second short TTI is configured in a sub-control signaling associated with the first short TTI.

[00120] As shown above, after the first equipment scheduled the first short TTI in the 23rd long TTI according to the scheduling information shown in Table 4, the first equipment may configure the scheduling information of the second short TTI in the sub-control signaling associated with the first short TTI.

[00121] The scheduling information of the second short TTI may be the same as the information shown in Table 4, or the location information and the quantity information are omitted, as shown in Table 5:

Length information	1ms
Location information of HARQ feedback resource	Immediately adjacent to the tail of the short TTI
Indication information	Y

Table 5

[00122] Compared with Table 4, in Table 5, the data volume of the scheduling information is reduced, and thus the data volume of the sub-control signaling may be reduced, thereby saving channel transmission resources.

[00123] At step 1322, the second short TTI is scheduled in the second target long TTI and a HARQ feedback resource is allocated according to the scheduling information of the second short TTI.

[00124] At step 1323, scheduling information of the third short TTI is configured in a sub-control signaling associated with the second short TTI.

indicate that the first short TTI includes scheduling information of a subsequent short TTI.

[00186] FIG. 15 is a block diagram of another apparatus for obtaining HARQ feedback according to an example. Based on the example shown in FIG. 11, the scheduling module 33 may include:

[00187] a first scheduling sub-module 331 configured to, when the first target long TTI is configured with scheduling information of all short TTIs in a long TTI, according to the scheduling information of all short TTIs, sequentially schedule each of the short TTIs within the second target long TTI and sequentially allocate a HARQ feedback resource for each of the short TTIs.

[00188] FIG. 16 is a block diagram of another apparatus for obtaining HARQ feedback according to an example. Based on the example shown in FIG. 11, the scheduling module 33 may include:

[00189] a second scheduling sub-module 332, to when a control signaling associated with the first target long TTI includes scheduling information of a first short TTI in a long TTI, according to the scheduling information of the first short TTI, schedule the first short TTI in the second target long TTI and allocate a HARQ feedback resource for the first short TTI; and

[00190] a third scheduling sub-module 333, to sequentially trigger a nested configuring unit 3331 and a scheduling unit 3332 from the first short TTI to a second last short TTI.

[00191] The nested configuring unit 3331 is to configure scheduling information of a subsequent short TTI in a sub-control signaling associated with a current short TTI; where the scheduling information of the current short TTI includes at least length information, location information of HARQ feedback resource and indication information.

[00192] The scheduling unit 3332 is to schedule the subsequent short TTI and allocate a HARQ feedback resource for the subsequent short TTI according to the scheduling information of the subsequent short TTI.

[00193] FIG. 17 is a block diagram of another apparatus for obtaining HARQ feedback according to an example. Based on the example shown in FIG. 11, the configuring module 31 may include:

[00194] a first resource configuring sub-module 313 to configure a HARQ feedback resource of each short TTI to be immediately adjacent to a tail of the short TTI; or

[00195] a second resource configuring sub-module 314, to assigning a last one of the one or more short TTIs a HARQ feedback resource originally configured for the long TTI when the long TTI has redundant resources after one or more short TTIs are scheduled in the long TTI.

[00196] In addition, the present disclosure further provides an apparatus for transmitting

CLAIMS

1. A method of obtaining hybrid automatic repeat request (HARQ) feedback, which is applied in first equipment, the method comprising:

5 configuring short transmission time interval (TTI) scheduling information into a first target long TTI according to service requirements, wherein the short TTI scheduling information includes at least location information of the short TTI, length information of the short TTI, quantity information of the short TTI, and location information of HARQ feedback resource of a short TTI, the HARQ feedback resource of the short TTI is configured to send HARQ feedback of the short TTI to the first equipment from second equipment;

10 sending the short TTI scheduling information to the second equipment through the first target long TTI;

scheduling one or more short TTIs in a second target long TTI according to the short TTI scheduling information, and sending service data in the scheduled one or more short TTIs to the second equipment; and

15 receiving HARQ feedback from the second equipment, wherein the HARQ feedback corresponds to each of the service data in the one or more short TTIs within the second target long TTI which is sequentially analyzed by the second equipment.

2. The method in accordance with claim 1, wherein configuring the short TTI scheduling information into the first target long TTI according to service requirements comprises:

20 monitoring a low-latency service request when data is being transmitted through long TTIs; and

in response to determining that the low-latency service request is monitored, configuring the short TTI scheduling information into the first target long TTI, wherein low-
25 latency service data is to be transmitted in short TTIs.

3. The method in accordance with claim 2, wherein configuring the short TTI scheduling information into the first target long TTI comprises:

30 configuring the short TTI scheduling information into a control signaling associated with the first target long TTI; or

configuring the short TTI scheduling information into a data field associated with the first target long TTI and configuring location information of the short TTI scheduling information into a control signaling associated with the first target long TTI, wherein the location information of the short TTI scheduling information is used to indicate a storage
5 location of the short TTI scheduling information in the data field associated with the current long TTI.

4. The method in accordance with claim 3, wherein configuring the short TTI scheduling information into the control signaling associated with the first target long TTI comprises:

10 configuring scheduling information of all short TTIs in a long TTI into the control signaling associated with the first target long TTI; or

configuring scheduling information of a first short TTI in a long TTI into the control signaling associated with the first target long TTI, wherein the scheduling information of the first short TTI further comprises indication information for indicating that the first short TTI
15 comprises scheduling information of a subsequent short TTI.

5. The method in accordance with claim 1, wherein when the first target long TTI is configured with scheduling information of all short TTIs in a long TTI, scheduling the one or more short TTIs in the second target long TTI according to the short TTI scheduling information comprises:

20 according to the scheduling information,

sequentially scheduling each of the one or more short TTIs within the second target long TTI; and

sequentially allocating a HARQ feedback resource for each of the one or more short TTIs.

25 6. The method in accordance with claim 1, wherein when a control signaling associated with the first target long TTI comprises scheduling information of a first short TTI in a long TTI, scheduling the one or more short TTIs in the second target long TTI according to the short TTI scheduling information comprises:

30 according to the scheduling information of the first short TTI,

scheduling the first short TTI in the second target long TTI; and

allocating a HARQ feedback resource for the first short TTI;

for the first short TTI to a penultimate short TTI, sequentially performing following operations:

5 configuring scheduling information of a subsequent short TTI in a sub-control signaling associated with a current short TTI; wherein the scheduling information of the current short TTI comprises at least length information of the subsequent short TTI, location information of HARQ feedback resource, and indication information for indicating that the current short TTI comprises the scheduling information of the subsequent short TTI; and

10 according to the scheduling information of the subsequent short TTI,
 scheduling the subsequent short TTI, and
 allocating a HARQ feedback resource for the subsequent short TTI.

7. The method in accordance with claim 1, wherein configuring the location information of
15 HARQ feedback resource of a short TTI in the first target long TTI comprises:

 configuring a HARQ feedback resource of each short TTI to be immediately adjacent to a tail of the short TTI; or

 when a long TTI has redundant resources after one or more short TTIs are scheduled in the long TTI, assigning a last one of the one or more short TTIs a HARQ feedback resource
20 originally configured for the long TTI.

8. A method of transmitting HARQ feedback, which is applied in second equipment, the method comprising:

 obtaining short TTI scheduling information from a first target long TTI, wherein the
25 short TTI scheduling information comprises at least location information of the short TTI, length information of the short TTI, quantity information of the short TTI, and location information of HARQ feedback resource of a short TTI, the HARQ feedback resource of a short TTI is configured to transmit HARQ feedback of the short TTI to first equipment from the second equipment; and

according to the short TTI scheduling information, sequentially obtaining each of short TTIs from a second target long TTI and transmitting HARQ feedback to the first equipment through a HARQ feedback resource of each of the short TTIs.

5 9. The method in accordance with claim 8, wherein obtaining the short TTI scheduling information from the first target long TTI comprises:

monitoring whether each of long TTIs comprises the short TTI scheduling information to obtain a monitoring result;

10 determining a current long TTI as the first target long TTI when the monitoring result indicates that a current long TTI comprises the short TTI scheduling information; and

analyzing the short TTI scheduling information from the first target long TTI.

15 10. The method in accordance with claim 8, wherein according to the short TTI scheduling information, sequentially obtaining each of short TTIs from the second target long TTI and transmitting the HARQ feedback to the first equipment through the HARQ feedback resource of each of the short TTIs comprises:

determining the second target long TTI which is scheduled with the short TTIs according to the location information of the short TTIs;

20 obtaining each of the short TTIs in the second target long TTI according to the length information and the quantity information of the short TTIs;

performing error detection on a data packet of each of the short TTIs to generate HARQ feedback corresponding to the short TTI; and

25 transmitting the HARQ feedback of each of the short TTIs to the first equipment through a corresponding HARQ feedback resource according to the location information of the HARQ feedback resource.

11. The method in accordance with claim 10, wherein obtaining each of the short TTIs in the second target long TTI according to the length information and the quantity information of the short TTIs comprises:

when the quantity information indicates 1, obtaining a first short TTI in the second target long TTI according to the length information; and

starting from the first short TTI, sequentially performing following operations:

5 determining whether scheduling information of a current short TTI comprises indication information, wherein the indication information is used to indicate that the current short TTI comprises scheduling information of a subsequent short TTI;

in response to determining that the scheduling information of the current short TTI comprises the indication information,

10 analyzing the scheduling information of the subsequent short TTI from the obtained current short TTI, and

analyzing the subsequent short TTI from the second target long TTI according to the scheduling information of the subsequent short TTI; and

15 in response to determining that the scheduling information of the current short TTI does not comprise the indication information, stopping analyzing the short TTI from the second target long TTI.

12. An apparatus for obtaining HARQ feedback, which is applied in first equipment, the apparatus comprising:

20 a configuring module, to configure short TTI scheduling information into a first target long TTI according to service requirements, wherein the short TTI scheduling information includes at least location information of the short TTI, length information of the short TTI, quantity information of the short TTI, and location information of HARQ feedback resource of a short TTI, the HARQ feedback resource of the short TTI is configured to send HARQ feedback of the short TTI to the first equipment from second equipment;

25 a scheduling information sending module, to send the short TTI scheduling information to the second equipment through the first target long TTI;

a scheduling module, to schedule one or more short TTIs in a second target long TTI according to the short TTI scheduling information and send service data in the scheduled one or more short TTIs to the second equipment; and

30 a receiving module, to receive HARQ feedback from the second equipment, wherein

the HARQ feedback corresponds to each of the service data in the one or more short TTIs within the second target long TTI which is sequentially analyzed by the second equipment.

13. The apparatus in accordance with claim 12, wherein the configuring module comprises:

5 a monitoring sub-module, to monitor a low-latency service request when data is being transmitted through long TTIs; and

a scheduling information configuring sub-module, to configure the short TTI scheduling information into the first target long TTI in response to determining that the low-latency service request is monitored, wherein low-latency service data is to be transmitted in short TTIs.

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14. The apparatus in accordance with claim 13, wherein the scheduling information configuring sub-module comprises:

a first configuring unit, to configure the short TTI scheduling information into a control signaling associated with the first target long TTI; or

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a second configuring unit, to configure the short TTI scheduling information into a data field associated with the first target long TTI and configure location information of the short TTI scheduling information into a control signaling associated with the first target long TTI, wherein the location information of the short TTI scheduling information is used to indicate a storage location of the short TTI scheduling information in the data field associated with current long TTI.

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15. The apparatus in accordance with claim 14, wherein the first configuring unit comprises:

a first configuring sub-unit, to configure scheduling information of all short TTIs in a long TTI into the control signaling associated with the first target long TTI; or

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a second configuring sub-unit, to configure scheduling information of a first short TTI in a long TTI into the control signaling associated with the first target long TTI, wherein the scheduling information of the first short TTI further comprises indication information for indicating that the first short TTI comprises scheduling information of a subsequent short TTI.

16. The apparatus in accordance with claim 12, wherein the scheduling module comprises:

a first scheduling sub-module, to when the first target long TTI is configured with scheduling information of all short TTIs in a long TTI, according to the scheduling information, sequentially schedule each of the one or more short TTIs within the second target long TTI and sequentially allocate a HARQ feedback resource for each of the one or more short TTIs.

17. The apparatus in accordance with claim 12, wherein the scheduling module comprises:

a second scheduling sub-module, to a second scheduling sub-module, to when a control signaling associated with the first target long TTI comprises scheduling information of a first short TTI in a long TTI, according to the scheduling information of the first short TTI, schedule the first short TTI in the second target long TTI and allocate a HARQ feedback resource for the first short TTI; and

a third scheduling sub-module, to sequentially trigger a nested configuring unit and a scheduling unit from the first short TTI to a second last short TTI; wherein

the nested configuring unit is to configure scheduling information of a subsequent short TTI into a sub-control signaling associated with a current short TTI; wherein the scheduling information of the current short TTI comprises at least length information of the subsequent short TTI, location information of HARQ feedback resource, and indication information for indicating that the current short TTI comprises the scheduling information of the subsequent short TTI; and

the scheduling unit is to schedule the subsequent short TTI and allocate a HARQ feedback resource for the subsequent short TTI according to the scheduling information of the subsequent short TTI.

18. The apparatus in accordance with claim 12, wherein the configuring module comprises:

a first resource configuring sub-module, to configure a HARQ feedback resource of each short TTI to be immediately adjacent to a tail of the short TTI; or

a second resource configuring sub-module, to assign a last one of the one or more short TTIs a HARQ feedback resource originally configured for a long TTI.

19. An apparatus for transmitting HARQ feedback, which is applied in second equipment, the apparatus comprising:

a scheduling information obtaining module, to obtain short TTI scheduling information from a first target long TTI, wherein the short TTI scheduling information comprises at least location information of the short TTI, length information of the short TTI, quantity information of the short TTI, and location information of HARQ feedback resource of a short TTI, the HARQ feedback resource of a short TTI is configured to transmit HARQ feedback of the short TTI to first equipment from the second equipment; and

a feedback sending module, to sequentially analyze each of short TTIs from a second target long TTI and send HARQ feedback to the first equipment through a HARQ feedback resource of each of the short TTIs according to the short TTI scheduling information.

20. The apparatus in accordance with claim 19, wherein the scheduling information obtaining module comprises:

a monitoring sub-module, to monitor whether each of long TTIs comprises the short TTI scheduling information to obtain a monitoring result;

a first target determining sub-module, to determine a current long TTI as the first target long TTI when the monitoring result indicates that the current long TTI comprises the short TTI scheduling information; and

an analyzing sub-module, to analyze the short TTI scheduling information from the first target long TTI.

21. The apparatus in accordance with claim 19, wherein the feedback sending module comprises:

a second target determining sub-module, to determine the second target long TTI which is scheduled with the short TTIs according to the location information of the short TTIs;

a short TTI obtaining sub-module, to obtain each of the short TTIs in the second target long TTI according to the length information and the quantity information of the short TTIs;

a detecting sub-module, to perform error detection on a data packet of each of the short TTIs to generate HARQ feedback corresponding to the short TTI; and

a sending sub-module, to transmit the HARQ feedback of each of the short TTIs to the first equipment through a corresponding HARQ feedback resource according to the location information of the HARQ feedback resource.

5 22. The apparatus in accordance with claim 21, wherein the short TTI obtaining sub-module comprises:

a first short TTI obtaining unit, to obtain a first short TTI in the second target long TTI according to the length information when the quantity information indicates 1; and

10 a polling executing unit, to sequentially trigger a determining sub-unit, a polling scheduling sub-unit or a termination executing sub-unit starting from the first short TTI;

wherein the determining sub-unit is to determine whether scheduling information of a current short TTI comprises indication information, wherein the indication information is used to indicate that the current short TTI comprises scheduling information of a subsequent short TTI;

15 wherein the polling scheduling sub-unit is to, in response to determining that the scheduling information of the current short TTI comprises the indication information, analyze the scheduling information of the subsequent short TTI from the obtained current short TTI and analyze the subsequent short TTI from the second target long TTI according to the scheduling information of the subsequent short TTI; and

20 wherein the termination executing sub-unit is to, in response to determining that the scheduling information of the current short TTI does not comprise the indication information, stop analyzing the short TTI from the second target long TTI.

23. An apparatus for obtaining HARQ feedback, being applied in first equipment, comprising:

25 a processor; and

a memory to store instructions executable by the processor;

wherein the processor is to:

30 configure short TTI scheduling information into a first target long TTI according to service requirements, wherein the short TTI scheduling information includes at least location information of the short TTI, length information of the short TTI, quantity information of the

short TTI, and location information of HARQ feedback resource of a short TTI, the HARQ feedback resource of a short TTI is configured to send HARQ feedback of the short TTI to the first equipment from second equipment;

5 send the short TTI scheduling information to the second equipment through the first target long TTI;

 schedule one or more short TTIs in a second target long TTI according to the short TTI scheduling information;

 send service data in the scheduled one or more short TTIs to the second equipment; and

10 receive HARQ feedback from the second equipment, wherein the HARQ feedback corresponds to each of the service data in the one or more short TTIs within the second target long TTI which is sequentially analyzed by the second equipment.

24. An apparatus for transmitting HARQ feedback, being applied in second equipment, comprising:

15 a processor; and

 a memory to store instructions executable by the processor;

 wherein the processor is to:

20 obtain short TTI scheduling information from a first target long TTI, wherein the short TTI scheduling information includes at least location information of the short TTI, length information of the short TTI, quantity information of the short TTI, and location information of HARQ feedback resource of a short TTI, the HARQ feedback resource of a short TTI is configured for transmitting HARQ feedback of the short TTI to first equipment from the second equipment;

 according to the short TTI scheduling information,

25 sequentially obtain each of short TTIs from a second target long TTI; and

 transmit HARQ feedback to the first equipment through a HARQ feedback resource of each of the short TTIs.