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Interference prediction with network configuration information

Abstract

Methods, systems, and devices for wireless communications are described. A device such as a user equipment (UE) may receive, via network signaling, an assistance information message that includes network configuration information corresponding to one or more inputs of an interference-prediction machine learning model. The network configuration information may include a set of parameters associated with one or more neighboring cell configurations. The UE may then generate, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The UE may then communicate with a network entity based on the generated channel interference prediction.

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Background/Summary

FIELD OF TECHNOLOGY
(1) The following relates to wireless communications, including interference prediction with network configuration information.
BACKGROUND
(2) Wireless communications systems are widely deployed to provide various types of communication content such as voice, video, packet data, messaging, broadcast, and so on. These systems may be capable of supporting communication with multiple users by sharing the available system resources (e.g., time, frequency, and power). Examples of such multiple-access systems include fourth generation (4G) systems such as Long Term Evolution (LTE) systems, LTE-Advanced (LTE-A) systems, or LTE-A Pro systems, and fifth generation (5G) systems which may be referred to as New Radio (NR) systems. These systems may employ technologies such as code division multiple access (CDMA), time division multiple access (TDMA), frequency division multiple access (FDMA), orthogonal FDMA (OFDMA), or discrete Fourier transform spread orthogonal frequency division multiplexing (DFT-S-OFDM). A wireless multiple-access communications system may include one or more base stations, each supporting wireless communication for communication devices, which may be known as user equipment (UE).
SUMMARY
(3) The described techniques relate to improved methods, systems, devices, and apparatuses that support interference prediction with network configuration information. For example, the described techniques provide for enhanced use of machine learning for interference prediction at a user equipment (UE). A UE may receive, via signaling from a network (e.g., a network entity), an assistance information message that includes network configuration information that the UE may use as inputs to a configured machine learning model used for interference prediction. In some examples, the network configuration information may include a set of parameters associated with one or more neighboring cell configurations including one or more changes in a neighboring cell configuration, scheduling status of a neighboring cell, activity status, or any combination thereof.

The UE may then generate, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message and based on channel measurements performed by the UE. The UE may then communicate with a network entity based on the generated channel interference prediction.

(4) A method for wireless communication at a UE is described. The method may include receiving an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations, generating, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message, and communicating with a network entity based on the channel interference prediction.

(5) An apparatus for wireless communication at a UE is described. The apparatus may include a processor, memory coupled with the processor, and instructions stored in the memory. The instructions may be executable by the processor to cause the apparatus to receive an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations, generate, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message, and communicate with a network entity based on the channel interference prediction.

(6) Another apparatus for wireless communication at a UE is described. The apparatus may include means for receiving an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations, means for generating, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message, and means for communicating with a network entity based on the channel interference prediction.

(7) A non-transitory computer-readable medium storing code for wireless communication at a UE is described. The code may include instructions executable by a processor to receive an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations, generate, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message, and communicate with a network entity based on the channel interference prediction.

(8) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for identifying one or more input values indicated by the network configuration information, where the channel interference prediction may be generated based on the one or more input values and one or more channel state information (CSI) measurements.

(9) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving, via the assistance information message, an indication of one or more modifications to the interference-prediction machine learning model based at least in part on the network configuration information,

where the channel interference prediction may be generated in accordance with the one or more modifications to the interference-prediction machine learning model.

(10) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the one or more modifications to the interference-prediction machine learning model include one or more parameters associated with the interference-prediction machine learning model that may have been modified, an algorithm configuration of the interference-prediction machine learning model that may have been modified, or both.

(11) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the interference-prediction machine learning model includes a first interference-prediction machine learning model candidate of a set of multiple interference-prediction machine learning model candidates and the method, apparatuses, and non-transitory computer-readable medium may include further operations, features, means, or instructions for receiving an indication of the set of multiple interference-prediction machine learning model candidates including the first interference-prediction machine learning model candidate, each of the set of multiple interference-prediction machine learning model candidates corresponding to a respective network configuration and selecting the first interference-prediction machine learning model candidate based on the network configuration information.

(12) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving an indication of one or more changes to the network configuration information and selecting a second interference-prediction machine learning model candidate from the set of multiple interference-prediction machine learning model candidates based on the one or more changes to the network configuration information.

(13) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving an indication of one or more changes to the network configuration information and transmitting a message that requests an updated interference-prediction machine learning model based on the one or more changes to the network configuration information.

(14) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving, via the assistance information message, an indication of a transmission timing pattern associated with active and inactive states of one or more devices of neighboring cells and applying the transmission timing pattern to the one or more inputs of the interference-prediction machine learning model to generate the channel interference prediction.

(15) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the interference-prediction machine learning model includes a first interference-prediction machine learning model and the method, apparatuses, and non-transitory computer-readable medium may include further operations, features, means, or instructions for receiving, via the assistance information message, a transmission timing pattern associated with active and inactive states of one or more interfering devices and switching between the first interference-prediction machine learning model and a second interference-prediction machine learning model in accordance with the transmission timing pattern, where the channel interference prediction may be generated based on the active and inactive states of the one or more interfering devices.

(16) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, receiving the assistance information message may include operations, features, means, or instructions for receiving the assistance information message via a medium access control-control element (MAC-CE), a radio resource control (RRC) message, a downlink control information (DCI) message, or any combination thereof, where the assistance information message indicates values of the one or more inputs of the interference-prediction machine learning model.

(17) In some examples of the method, apparatuses, and non-transitory computer-readable medium

described herein, the network configuration information includes a load level associated with one or more neighboring cells, a load distribution associated with the one or more neighboring cells, an active status or inactive status of the one or more neighboring cells, duty cycle information, scheduling behavior information, or any combination thereof.

(18) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, generating the channel interference prediction may include operations, features, means, or instructions for generating a prediction of future channel interference associated with one or more beams, one or more beam groups, one or more transmission-reception points, or a combination thereof.

(19) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, generating the channel interference prediction may include operations, features, means, or instructions for performing one or more CSI measurements associated with the one or more communication links at the UE and generating the channel interference prediction based on the network configuration information and the one or more CSI measurements.

(20) A method for wireless communication at a network entity is described. The method may include transmitting, to a UE, an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model at the UE, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations, receiving, with a CSI report, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message, and communicating with the UE based on the channel interference prediction.

(21) An apparatus for wireless communication at a network entity is described. The apparatus may include a processor, memory coupled with the processor, and instructions stored in the memory. The instructions may be executable by the processor to cause the apparatus to transmit, to a UE, an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model at the UE, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations, receive, with a CSI report, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message, and communicate with the UE based on the channel interference prediction.

(22) Another apparatus for wireless communication at a network entity is described. The apparatus may include means for transmitting, to a UE, an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model at the UE, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations, means for receiving, with a CSI report, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message, and means for communicating with the UE based on the channel interference prediction.

(23) A non-transitory computer-readable medium storing code for wireless communication at a network entity is described. The code may include instructions executable by a processor to transmit, to a UE, an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model at the UE, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations, receive, with a CSI report, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message, and communicate with the UE based on the channel interference prediction.

(24) Some examples of the method, apparatuses, and non-transitory computer-readable medium

described herein may further include operations, features, means, or instructions for transmitting, via the assistance information message, an indication of one or more modifications to the interference-prediction machine learning model based at least in part on the network configuration information and receiving the channel interference prediction in accordance with the one or more modifications to the interference-prediction machine learning model.

(25) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the one or more modifications to the interference-prediction machine learning model include one or more parameters associated with the interference-prediction machine learning model that may have been modified, an algorithm configuration of the interference-prediction machine learning model that may have been modified, or both.

(26) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the interference-prediction machine learning model includes a first interference-prediction machine learning model candidate of a set of multiple interference-prediction machine learning model candidates and the method, apparatuses, and non-transitory computer-readable medium may include further operations, features, means, or instructions for transmitting an indication of the set of multiple interference-prediction machine learning model candidates including the first interference-prediction machine learning model candidate selected for the UE, each of the set of multiple interference-prediction machine learning model candidates corresponding to a respective network configuration.

(27) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, transmitting the assistance information message may include operations, features, means, or instructions for transmitting an indication of one or more changes to the network configuration information and receiving a message that requests an updated interference-prediction machine learning model based on the one or more changes to the network configuration information.

(28) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for transmitting, via the assistance information message, an indication of a transmission timing pattern associated with active and inactive states of one or more devices of neighboring cells to be applied to the one or more inputs of the interference-prediction machine learning model.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
(1) FIGS. **1**, **2**, and **3** illustrate examples of wireless communications systems that support interference prediction with network configuration information in accordance with one or more aspects of the present disclosure.
(2) FIG. **4** illustrates an example of a process flow that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure.
(3) FIGS. **5** and **6** illustrate block diagrams of devices that support interference prediction with network configuration information in accordance with one or more aspects of the present disclosure.
(4) FIG. **7** illustrates a block diagram of a communications manager that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure.
(5) FIG. **8** illustrates a diagram of a system including a device that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure.

(6) FIGS. **9** and **10** illustrate block diagrams of devices that support interference prediction with network configuration information in accordance with one or more aspects of the present disclosure.

(7) FIG. **11** illustrates a block diagram of a communications manager that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure.

(8) FIG. **12** illustrates a diagram of a system including a device that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure.

(9) FIGS. **13** through **15** illustrate flowcharts showing methods that support interference prediction with network configuration information in accordance with one or more aspects of the present disclosure.

DETAILED DESCRIPTION

(10) Wireless communications networks may employ artificial intelligence (AI) and machine learning at network devices or user devices, or both, to enhance performance and increase device integration. For example, some machine learning models may be configured for interference prediction, and may help a device such as a user equipment (UE) accurately predict interference based on previous channel measurements and network states. Such machine learning models may rely on inputs of channel state information (CSI) measurements performed at the UE, along with network configuration information, such as the configuration and load of nearby nodes, as well as UE or device locations within the network (e.g., the location of one or more wireless repeaters in a cell). Using this information, the machine learning model may predict the future interference level of beams used for communication.

(11) In some implementations, however, a network configuration may be relatively dynamic in some communications systems (e.g., communications systems operating in relatively high radio frequency spectrum bands), and certain aspects of the network configuration (such as network node configuration and network load, to name a few) may change over time. Further, such communications systems may include a relatively large number nodes, such as repeaters, small cells, relays, and so on, which may have both active and inactive periods that vary according to a predictable scheduling pattern. While these changes in network configurations may increase coverage and energy savings in the network, they also may pose challenges for accurately using machine learning to predict interference.

(12) To support accurate interference prediction using machine learning in dynamic systems, a UE may receive assistance information signaling from the network that notifies the UE of network configuration information. The UE may then use the network configuration information to perform interference prediction via a machine learning model. For example, the assistance information may include configuration information for other cells including on/off status information of the cells, duty cycle information, cell load information, or scheduling information. In some examples, the network may notify the UE (e.g., via configured signaling) of network configuration information that the UE may use as inputs to the machine learning model.

(13) In some other examples, the network may instruct the UE to switch between different machine learning models or algorithms based on the network information. In such cases, the network may send updated parameters or algorithm information for the machine learning model, or the network may configure multiple different machine learning model candidates at the UE, and then may instruct the UE to switch between the different machine learning model candidates based on the network configuration.

(14) Aspects of the disclosure are initially described in the context of wireless communications systems. Aspects of the disclosure are further illustrated by and described with reference to a process flow, apparatus diagrams, system diagrams, and flowcharts that relate to interference prediction with network configuration information.

(15) FIG. **1** illustrates an example of a wireless communications system **100** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The wireless communications system **100** may include one or more network entities **105**, one or more UEs **115**, and a core network **130**. In some examples, the wireless communications system **100** may be a Long Term Evolution (LTE) network, an LTE-Advanced (LTE-A) network, an LTE-A Pro network, a New Radio (NR) network, or a network operating in accordance with other systems and radio technologies, including future systems and radio technologies not explicitly mentioned herein.

(16) The network entities **105** may be dispersed throughout a geographic area to form the wireless communications system **100** and may include devices in different forms or having different capabilities. In various examples, a network entity **105** may be referred to as a network element, a mobility element, a radio access network (RAN) node, or network equipment, among other nomenclature. In some examples, network entities **105** and UEs **115** may wirelessly communicate via one or more communication links **125** (e.g., a radio frequency (RF) access link). For example, a network entity **105** may support a coverage area **110** (e.g., a geographic coverage area) over which the UEs **115** and the network entity **105** may establish one or more communication links **125**. The coverage area **110** may be an example of a geographic area over which a network entity **105** and a UE **115** may support the communication of signals according to one or more radio access technologies (RATs).

(17) The UEs **115** may be dispersed throughout a coverage area **110** of the wireless communications system **100**, and each UE **115** may be stationary, or mobile, or both at different times. The UEs **115** may be devices in different forms or having different capabilities. Some example UEs **115** are illustrated in FIG. **1**. The UEs **115** described herein may be capable of supporting communications with various types of devices, such as other UEs **115** or network entities **105**, as shown in FIG. **1**.

(18) As described herein, a node of the wireless communications system **100**, which may be referred to as a network node, or a wireless node, may be a network entity **105** (e.g., any network entity described herein), a UE **115** (e.g., any UE described herein), a network controller, an apparatus, a device, a computing system, one or more components, or another suitable processing entity configured to perform any of the techniques described herein. For example, a node may be a UE **115**. As another example, a node may be a network entity **105**. As another example, a first node may be configured to communicate with a second node or a third node. In one aspect of this example, the first node may be a UE **115**, the second node may be a network entity **105**, and the third node may be a UE **115**. In another aspect of this example, the first node may be a UE **115**, the second node may be a network entity **105**, and the third node may be a network entity **105**. In yet other aspects of this example, the first, second, and third nodes may be different relative to these examples. Similarly, reference to a UE **115**, network entity **105**, apparatus, device, computing system, or the like may include disclosure of the UE **115**, network entity **105**, apparatus, device, computing system, or the like being a node. For example, disclosure that a UE **115** is configured to receive information from a network entity **105** also discloses that a first node is configured to receive information from a second node.

(19) In some examples, network entities **105** may communicate with the core network **130**, or with one another, or both. For example, network entities **105** may communicate with the core network **130** via one or more backhaul communication links **120** (e.g., in accordance with an S1, N2, N3, or other interface protocol). In some examples, network entities **105** may communicate with one another via a backhaul communication link **120** (e.g., in accordance with an X2, Xn, or other interface protocol) either directly (e.g., directly between network entities **105**) or indirectly (e.g., via a core network **130**). In some examples, network entities **105** may communicate with one another via a midhaul communication link **162** (e.g., in accordance with a midhaul interface protocol) or a fronthaul communication link **168** (e.g., in accordance with a fronthaul interface

protocol), or any combination thereof. The backhaul communication links **120**, midhaul communication links **162**, or fronthaul communication links **168** may be or include one or more wired links (e.g., an electrical link, an optical fiber link), one or more wireless links (e.g., a radio link, a wireless optical link), among other examples or various combinations thereof. A UE **115** may communicate with the core network **130** via a communication link **155**.

(20) One or more of the network entities **105** described herein may include or may be referred to as a base station **140** (e.g., a base transceiver station, a radio base station, an NR base station, an access point, a radio transceiver, a NodeB, an eNodeB (eNB), a next-generation NodeB or a giga-NodeB (either of which may be referred to as a gNB), a 5G NB, a next-generation eNB (ng-eNB), a Home NodeB, a Home eNodeB, or other suitable terminology). In some examples, a network entity **105** (e.g., a base station **140**) may be implemented in an aggregated (e.g., monolithic, standalone) base station architecture, which may be configured to utilize a protocol stack that is physically or logically integrated within a single network entity **105** (e.g., a single RAN node, such as a base station **140**).

(21) In some examples, a network entity **105** may be implemented in a disaggregated architecture (e.g., a disaggregated base station architecture, a disaggregated RAN architecture), which may be configured to utilize a protocol stack that is physically or logically distributed among two or more network entities **105**, such as an integrated access backhaul (IAB) network, an open RAN (O-RAN) (e.g., a network configuration sponsored by the O-RAN Alliance), or a virtualized RAN (vRAN) (e.g., a cloud RAN (C-RAN)). For example, a network entity **105** may include one or more of a central unit (CU) **160**, a distributed unit (DU) **165**, a radio unit (RU) **170**, a RAN Intelligent Controller (RIC) **175** (e.g., a Near-Real Time RIC (Near-RT RIC), a Non-Real Time RIC (Non-RT RIC)), a Service Management and Orchestration (SMO) **180** system, or any combination thereof. An RU **170** may also be referred to as a radio head, a smart radio head, a remote radio head (RRH), a remote radio unit (RRU), or a transmission reception point (TRP). One or more components of the network entities **105** in a disaggregated RAN architecture may be co-located, or one or more components of the network entities **105** may be located in distributed locations (e.g., separate physical locations). In some examples, one or more network entities **105** of a disaggregated RAN architecture may be implemented as virtual units (e.g., a virtual CU (VCU), a virtual DU (VDU), a virtual RU (VRU)).

(22) The split of functionality between a CU **160**, a DU **165**, and an RU **170** is flexible and may support different functionalities depending on which functions (e.g., network layer functions, protocol layer functions, baseband functions, RF functions, and any combinations thereof) are performed at a CU **160**, a DU **165**, or an RU **170**. For example, a functional split of a protocol stack may be employed between a CU **160** and a DU **165** such that the CU **160** may support one or more layers of the protocol stack and the DU **165** may support one or more different layers of the protocol stack. In some examples, the CU **160** may host upper protocol layer (e.g., layer 3 (L3), layer 2 (L2)) functionality and signaling (e.g., Radio Resource Control (RRC), service data adaption protocol (SDAP), Packet Data Convergence Protocol (PDCP)). The CU **160** may be connected to one or more DUs **165** or RUs **170**, and the one or more DUs **165** or RUs **170** may host lower protocol layers, such as layer 1 (L1) (e.g., physical (PHY) layer) or L2 (e.g., radio link control (RLC) layer, medium access control (MAC) layer) functionality and signaling, and may each be at least partially controlled by the CU **160**. Additionally, or alternatively, a functional split of the protocol stack may be employed between a DU **165** and an RU **170** such that the DU **165** may support one or more layers of the protocol stack and the RU **170** may support one or more different layers of the protocol stack. The DU **165** may support one or multiple different cells (e.g., via one or more RUs **170**). In some cases, a functional split between a CU **160** and a DU **165**, or between a DU **165** and an RU **170** may be within a protocol layer (e.g., some functions for a protocol layer may be performed by one of a CU **160**, a DU **165**, or an RU **170**, while other functions of the protocol layer are performed by a different one of the CU **160**, the DU **165**, or the

RU **170**). A CU **160** may be functionally split further into CU control plane (CU-CP) and CU user plane (CU-UP) functions. A CU **160** may be connected to one or more DUs **165** via a midhaul communication link **162** (e.g., F1, F1-c, F1-u), and a DU **165** may be connected to one or more RUs **170** via a fronthaul communication link **168** (e.g., open fronthaul (FH) interface). In some examples, a midhaul communication link **162** or a fronthaul communication link **168** may be implemented in accordance with an interface (e.g., a channel) between layers of a protocol stack supported by respective network entities **105** that are in communication via such communication links.

(23) In wireless communications systems (e.g., wireless communications system **100**), infrastructure and spectral resources for radio access may support wireless backhaul link capabilities to supplement wired backhaul connections, providing an IAB network architecture (e.g., to a core network **130**). In some cases, in an IAB network, one or more network entities **105** (e.g., IAB nodes **104**) may be partially controlled by each other. One or more IAB nodes **104** may be referred to as a donor entity or an IAB donor. One or more DUs **165** or one or more RUs **170** may be partially controlled by one or more CUs **160** associated with a donor network entity **105** (e.g., a donor base station **140**). The one or more donor network entities **105** (e.g., IAB donors) may be in communication with one or more additional network entities **105** (e.g., IAB nodes **104**) via supported access and backhaul links (e.g., backhaul communication links **120**). IAB nodes **104** may include an IAB mobile termination (IAB-MT) controlled (e.g., scheduled) by DUs **165** of a coupled IAB donor. An IAB-MT may include an independent set of antennas for relay of communications with UEs **115**, or may share the same antennas (e.g., of an RU **170**) of an IAB node **104** used for access via the DU **165** of the IAB node **104** (e.g., referred to as virtual IAB-MT (vIAB-MT)). In some examples, the IAB nodes **104** may include DUs **165** that support communication links with additional entities (e.g., IAB nodes **104**, UEs **115**) within the relay chain or configuration of the access network (e.g., downstream). In such cases, one or more components of the disaggregated RAN architecture (e.g., one or more IAB nodes **104** or components of IAB nodes **104**) may be configured to operate according to the techniques described herein.

(24) For instance, an access network (AN) or RAN may include communications between access nodes (e.g., an IAB donor), IAB nodes **104**, and one or more UEs **115**. The IAB donor may facilitate connection between the core network **130** and the AN (e.g., via a wired or wireless connection to the core network **130**). That is, an IAB donor may refer to a RAN node with a wired or wireless connection to core network **130**. The IAB donor may include a CU **160** and at least one DU **165** (e.g., and RU **170**), in which case the CU **160** may communicate with the core network **130** via an interface (e.g., a backhaul link). IAB donor and IAB nodes **104** may communicate via an F1 interface according to a protocol that defines signaling messages (e.g., an F1 AP protocol). Additionally, or alternatively, the CU **160** may communicate with the core network via an interface, which may be an example of a portion of backhaul link, and may communicate with other CUs **160** (e.g., a CU **160** associated with an alternative IAB donor) via an Xn-C interface, which may be an example of a portion of a backhaul link.

(25) An IAB node **104** may refer to a RAN node that provides IAB functionality (e.g., access for UEs **115**, wireless self-backhauling capabilities). A DU **165** may act as a distributed scheduling node towards child nodes associated with the IAB node **104**, and the IAB-MT may act as a scheduled node towards parent nodes associated with the IAB node **104**. That is, an IAB donor may be referred to as a parent node in communication with one or more child nodes (e.g., an IAB donor may relay transmissions for UEs through one or more other IAB nodes **104**). Additionally, or alternatively, an IAB node **104** may also be referred to as a parent node or a child node to other IAB nodes **104**, depending on the relay chain or configuration of the AN. Therefore, the IAB-MT entity of IAB nodes **104** may provide a Uu interface for a child IAB node **104** to receive signaling from a parent IAB node **104**, and the DU interface (e.g., DUs **165**) may provide a Uu interface for a parent IAB node **104** to signal to a child IAB node **104** or UE **115**.

(26) For example, IAB node **104** may be referred to as a parent node that supports communications for a child IAB node, or referred to as a child IAB node associated with an IAB donor, or both. The IAB donor may include a CU **160** with a wired or wireless connection (e.g., a backhaul communication link **120**) to the core network **130** and may act as parent node to IAB nodes **104**. For example, the DU **165** of IAB donor may relay transmissions to UEs **115** through IAB nodes **104**, or may directly signal transmissions to a UE **115**, or both. The CU **160** of IAB donor may signal communication link establishment via an F1 interface to IAB nodes **104**, and the IAB nodes **104** may schedule transmissions (e.g., transmissions to the UEs **115** relayed from the IAB donor) through the DUs **165**. That is, data may be relayed to and from IAB nodes **104** via signaling via an NR Uu interface to MT of the IAB node **104**. Communications with IAB node **104** may be scheduled by a DU **165** of IAB donor and communications with IAB node **104** may be scheduled by DU **165** of IAB node **104**.

(27) In the case of the techniques described herein applied in the context of a disaggregated RAN architecture, one or more components of the disaggregated RAN architecture may be configured to support interference prediction with network configuration information as described herein. For example, some operations described as being performed by a UE **115** or a network entity **105** (e.g., a base station **140**) may additionally, or alternatively, be performed by one or more components of the disaggregated RAN architecture (e.g., IAB nodes **104**, DUs **165**, CUs **160**, RUs **170**, RIC **175**, SMO **180**).

(28) A UE **115** may include or may be referred to as a mobile device, a wireless device, a remote device, a handheld device, or a subscriber device, or some other suitable terminology, where the "device" may also be referred to as a unit, a station, a terminal, or a client, among other examples. A UE **115** may also include or may be referred to as a personal electronic device such as a cellular phone, a personal digital assistant (PDA), a tablet computer, a laptop computer, or a personal computer. In some examples, a UE **115** may include or be referred to as a wireless local loop (WLL) station, an Internet of Things (IoT) device, an Internet of Everything (IoE) device, or a machine type communications (MTC) device, among other examples, which may be implemented in various objects such as appliances, or vehicles, meters, among other examples.

(29) The UEs **115** described herein may be able to communicate with various types of devices, such as other UEs **115** that may sometimes act as relays as well as the network entities **105** and the network equipment including macro eNBs or gNBs, small cell eNBs or gNBs, or relay base stations, among other examples, as shown in FIG. **1**.

(30) The UEs **115** and the network entities **105** may wirelessly communicate with one another via one or more communication links **125** (e.g., an access link) using resources associated with one or more carriers. The term "carrier" may refer to a set of RF spectrum resources having a defined physical layer structure for supporting the communication links **125**. For example, a carrier used for a communication link **125** may include a portion of a RF spectrum band (e.g., a bandwidth part (BWP)) that is operated according to one or more physical layer channels for a given radio access technology (e.g., LTE, LTE-A, LTE-A Pro, NR). Each physical layer channel may carry acquisition signaling (e.g., synchronization signals, system information), control signaling that coordinates operation for the carrier, user data, or other signaling. The wireless communications system **100** may support communication with a UE **115** using carrier aggregation or multi-carrier operation. A UE **115** may be configured with multiple downlink component carriers and one or more uplink component carriers according to a carrier aggregation configuration. Carrier aggregation may be used with both frequency division duplexing (FDD) and time division duplexing (TDD) component carriers. Communication between a network entity **105** and other devices may refer to communication between the devices and any portion (e.g., entity, sub-entity) of a network entity **105**. For example, the terms "transmitting," "receiving," or "communicating," when referring to a network entity **105**, may refer to any portion of a network entity **105** (e.g., a base station **140**, a CU **160**, a DU **165**, a RU **170**) of a RAN communicating with another device (e.g., directly or via one

or more other network entities **105**).

(31) Signal waveforms transmitted via a carrier may be made up of multiple subcarriers (e.g., using multi-carrier modulation (MCM) techniques such as orthogonal frequency division multiplexing (OFDM) or discrete Fourier transform spread OFDM (DFT-S-OFDM)). In a system employing MCM techniques, a resource element may refer to resources of one symbol period (e.g., a duration of one modulation symbol) and one subcarrier, in which case the symbol period and subcarrier spacing may be inversely related. The quantity of bits carried by each resource element may depend on the modulation scheme (e.g., the order of the modulation scheme, the coding rate of the modulation scheme, or both), such that a relatively higher quantity of resource elements (e.g., in a transmission duration) and a relatively higher order of a modulation scheme may correspond to a relatively higher rate of communication. A wireless communications resource may refer to a combination of an RF spectrum resource, a time resource, and a spatial resource (e.g., a spatial layer, a beam), and the use of multiple spatial resources may increase the data rate or data integrity for communications with a UE **115**.

(32) The time intervals for the network entities **105** or the UEs **115** may be expressed in multiples of a basic time unit which may, for example, refer to a sampling period of $T.sub.s = 1/(\Delta f.sub.max.Math.N.sub.f)$ seconds, for which $\Delta f.sub.max$ may represent a supported subcarrier spacing, and $N.sub.f$ may represent a supported discrete Fourier transform (DFT) size. Time intervals of a communications resource may be organized according to radio frames each having a specified duration (e.g., 10 milliseconds (ms)). Each radio frame may be identified by a system frame number (SFN) (e.g., ranging from 0 to 1023).

(33) Each frame may include multiple consecutively-numbered subframes or slots, and each subframe or slot may have the same duration. In some examples, a frame may be divided (e.g., in the time domain) into subframes, and each subframe may be further divided into a quantity of slots. Alternatively, each frame may include a variable quantity of slots, and the quantity of slots may depend on subcarrier spacing. Each slot may include a quantity of symbol periods (e.g., depending on the length of the cyclic prefix prepended to each symbol period). In some wireless communications systems **100**, a slot may further be divided into multiple mini-slots associated with one or more symbols. Excluding the cyclic prefix, each symbol period may be associated with one or more (e.g., N.sub.f) sampling periods. The duration of a symbol period may depend on the subcarrier spacing or frequency band of operation.

(34) A subframe, a slot, a mini-slot, or a symbol may be the smallest scheduling unit (e.g., in the time domain) of the wireless communications system **100** and may be referred to as a transmission time interval (TTI). In some examples, the TTI duration (e.g., a quantity of symbol periods in a TTI) may be variable. Additionally, or alternatively, the smallest scheduling unit of the wireless communications system **100** may be dynamically selected (e.g., in bursts of shortened TTIs (sTTIs)).

(35) Physical channels may be multiplexed for communication using a carrier according to various techniques. A physical control channel and a physical data channel may be multiplexed for signaling via a downlink carrier, for example, using one or more of time division multiplexing (TDM) techniques, frequency division multiplexing (FDM) techniques, or hybrid TDM-FDM techniques. A control region (e.g., a control resource set (CORESET)) for a physical control channel may be defined by a set of symbol periods and may extend across the system bandwidth or a subset of the system bandwidth of the carrier. One or more control regions (e.g., CORESETs) may be configured for a set of the UEs **115**. For example, one or more of the UEs **115** may monitor or search control regions for control information according to one or more search space sets, and each search space set may include one or multiple control channel candidates in one or more aggregation levels arranged in a cascaded manner. An aggregation level for a control channel candidate may refer to an amount of control channel resources (e.g., control channel elements (CCEs)) associated with encoded information for a control information format having a given

payload size. Search space sets may include common search space sets configured for sending control information to multiple UEs **115** and UE-specific search space sets for sending control information to a specific UE **115**.

(36) A network entity **105** may provide communication coverage via one or more cells, for example a macro cell, a small cell, a hot spot, or other types of cells, or any combination thereof. The term "cell" may refer to a logical communication entity used for communication with a network entity **105** (e.g., using a carrier) and may be associated with an identifier for distinguishing neighboring cells (e.g., a physical cell identifier (PCID), a virtual cell identifier (VCID), or others). In some examples, a cell also may refer to a coverage area **110** or a portion of a coverage area **110** (e.g., a sector) over which the logical communication entity operates. Such cells may range from smaller areas (e.g., a structure, a subset of structure) to larger areas depending on various factors such as the capabilities of the network entity **105**. For example, a cell may be or include a building, a subset of a building, or exterior spaces between or overlapping with coverage areas **110**, among other examples.

(37) A macro cell generally covers a relatively large geographic area (e.g., several kilometers in radius) and may allow unrestricted access by the UEs **115** with service subscriptions with the network provider supporting the macro cell. A small cell may be associated with a lower-powered network entity **105** (e.g., a lower-powered base station **140**), as compared with a macro cell, and a small cell may operate using the same or different (e.g., licensed, unlicensed) frequency bands as macro cells. Small cells may provide unrestricted access to the UEs **115** with service subscriptions with the network provider or may provide restricted access to the UEs **115** having an association with the small cell (e.g., the UEs **115** in a closed subscriber group (CSG), the UEs **115** associated with users in a home or office). A network entity **105** may support one or multiple cells and may also support communications via the one or more cells using one or multiple component carriers.

(38) In some examples, a carrier may support multiple cells, and different cells may be configured according to different protocol types (e.g., MTC, narrowband IoT (NB-IoT), enhanced mobile broadband (eMBB)) that may provide access for different types of devices.

(39) In some examples, a network entity **105** (e.g., a base station **140**, an RU **170**) may be movable and therefore provide communication coverage for a moving coverage area **110**. In some examples, different coverage areas **110** associated with different technologies may overlap, but the different coverage areas **110** may be supported by the same network entity **105**. In some other examples, the overlapping coverage areas **110** associated with different technologies may be supported by different network entities **105**. The wireless communications system **100** may include, for example, a heterogeneous network in which different types of the network entities **105** provide coverage for various coverage areas **110** using the same or different radio access technologies.

(40) Some UEs **115**, such as MTC or IoT devices, may be low cost or low complexity devices and may provide for automated communication between machines (e.g., via Machine-to-Machine (M2M) communication). M2M communication or MTC may refer to data communication technologies that allow devices to communicate with one another or a network entity **105** (e.g., a base station **140**) without human intervention. In some examples, M2M communication or MTC may include communications from devices that integrate sensors or meters to measure or capture information and relay such information to a central server or application program that uses the information or presents the information to humans interacting with the application program. Some UEs **115** may be designed to collect information or enable automated behavior of machines or other devices. Examples of applications for MTC devices include smart metering, inventory monitoring, water level monitoring, equipment monitoring, healthcare monitoring, wildlife monitoring, weather and geological event monitoring, fleet management and tracking, remote security sensing, physical access control, and transaction-based business charging.

(41) The wireless communications system **100** may be configured to support ultra-reliable communications or low-latency communications, or various combinations thereof. For example,

the wireless communications system **100** may be configured to support ultra-reliable low-latency communications (URLLC). The UEs **115** may be designed to support ultra-reliable, low-latency, or critical functions. Ultra-reliable communications may include private communication or group communication and may be supported by one or more services such as push-to-talk, video, or data. Support for ultra-reliable, low-latency functions may include prioritization of services, and such services may be used for public safety or general commercial applications. The terms ultra-reliable, low-latency, and ultra-reliable low-latency may be used interchangeably herein.

(42) In some examples, a UE **115** may be configured to support communicating directly with other UEs **115** via a device-to-device (D2D) communication link **135** (e.g., in accordance with a peer-to-peer (P2P), D2D, or sidelink protocol). In some examples, one or more UEs **115** of a group that are performing D2D communications may be within the coverage area **110** of a network entity **105** (e.g., a base station **140**, an RU **170**), which may support aspects of such D2D communications being configured by (e.g., scheduled by) the network entity **105**. In some examples, one or more UEs **115** of such a group may be outside the coverage area **110** of a network entity **105** or may be otherwise unable to or not configured to receive transmissions from a network entity **105**. In some examples, groups of the UEs **115** communicating via D2D communications may support a one-to-many (1:M) system in which each UE **115** transmits to each of the other UEs **115** in the group. In some examples, a network entity **105** may facilitate the scheduling of resources for D2D communications. In some other examples, D2D communications may be carried out between the UEs **115** without an involvement of a network entity **105**.

(43) The core network **130** may provide user authentication, access authorization, tracking, Internet Protocol (IP) connectivity, and other access, routing, or mobility functions. The core network **130** may be an evolved packet core (EPC) or 5G core (5GC), which may include at least one control plane entity that manages access and mobility (e.g., a mobility management entity (MME), an access and mobility management function (AMF)) and at least one user plane entity that routes packets or interconnects to external networks (e.g., a serving gateway (S-GW), a Packet Data Network (PDN) gateway (P-GW), or a user plane function (UPF)). The control plane entity may manage non-access stratum (NAS) functions such as mobility, authentication, and bearer management for the UEs **115** served by the network entities **105** (e.g., base stations **140**) associated with the core network **130**. User IP packets may be transferred through the user plane entity, which may provide IP address allocation as well as other functions. The user plane entity may be connected to IP services **150** for one or more network operators. The IP services **150** may include access to the Internet, Intranet(s), an IP Multimedia Subsystem (IMS), or a Packet-Switched Streaming Service.

(44) The wireless communications system **100** may operate using one or more frequency bands, which may be in the range of 300 megahertz (MHz) to 300 gigahertz (GHz). Generally, the region from 300 MHz to 3 GHz is known as the ultra-high frequency (UHF) region or decimeter band because the wavelengths range from approximately one decimeter to one meter in length. UHF waves may be blocked or redirected by buildings and environmental features, which may be referred to as clusters, but the waves may penetrate structures sufficiently for a macro cell to provide service to the UEs **115** located indoors. Communications using UHF waves may be associated with smaller antennas and shorter ranges (e.g., less than 100 kilometers) compared to communications using the smaller frequencies and longer waves of the high frequency (HF) or very high frequency (VHF) portion of the spectrum below 300 MHz.

(45) The wireless communications system **100** may utilize both licensed and unlicensed RF spectrum bands. For example, the wireless communications system **100** may employ License Assisted Access (LAA), LTE-Unlicensed (LTE-U) radio access technology, or NR technology using an unlicensed band such as the 5 GHz industrial, scientific, and medical (ISM) band. While operating using unlicensed RF spectrum bands, devices such as the network entities **105** and the UEs **115** may employ carrier sensing for collision detection and avoidance. In some examples,

operations using unlicensed bands may be based on a carrier aggregation configuration in conjunction with component carriers operating using a licensed band (e.g., LAA). Operations using unlicensed spectrum may include downlink transmissions, uplink transmissions, P2P transmissions, or D2D transmissions, among other examples.

(46) A network entity 105 (e.g., a base station 140, an RU 170) or a UE 115 may be equipped with multiple antennas, which may be used to employ techniques such as transmit diversity, receive diversity, multiple-input multiple-output (MIMO) communications, or beamforming. The antennas of a network entity 105 or a UE 115 may be located within one or more antenna arrays or antenna panels, which may support MIMO operations or transmit or receive beamforming. For example, one or more base station antennas or antenna arrays may be co-located at an antenna assembly, such as an antenna tower. In some examples, antennas or antenna arrays associated with a network entity 105 may be located at diverse geographic locations. A network entity 105 may include an antenna array with a set of rows and columns of antenna ports that the network entity 105 may use to support beamforming of communications with a UE 115. Likewise, a UE 115 may include one or more antenna arrays that may support various MIMO or beamforming operations. Additionally, or alternatively, an antenna panel may support RF beamforming for a signal transmitted via an antenna port.

(47) Beamforming, which may also be referred to as spatial filtering, directional transmission, or directional reception, is a signal processing technique that may be used at a transmitting device or a receiving device (e.g., a network entity 105, a UE 115) to shape or steer an antenna beam (e.g., a transmit beam, a receive beam) along a spatial path between the transmitting device and the receiving device. Beamforming may be achieved by combining the signals communicated via antenna elements of an antenna array such that some signals propagating along particular orientations with respect to an antenna array experience constructive interference while others experience destructive interference. The adjustment of signals communicated via the antenna elements may include a transmitting device or a receiving device applying amplitude offsets, phase offsets, or both to signals carried via the antenna elements associated with the device. The adjustments associated with each of the antenna elements may be defined by a beamforming weight set associated with a particular orientation (e.g., with respect to the antenna array of the transmitting device or receiving device, or with respect to some other orientation).

(48) The wireless communications system 100 may be a packet-based network that operates according to a layered protocol stack. In the user plane, communications at the bearer or PDCP layer may be IP-based. An RLC layer may perform packet segmentation and reassembly to communicate via logical channels. A MAC layer may perform priority handling and multiplexing of logical channels into transport channels. The MAC layer also may implement error detection techniques, error correction techniques, or both to support retransmissions to improve link efficiency. In the control plane, an RRC layer may provide establishment, configuration, and maintenance of an RRC connection between a UE 115 and a network entity 105 or a core network 130 supporting radio bearers for user plane data. A PHY layer may map transport channels to physical channels.

(49) Some wireless communications systems may support artificial intelligence (AI) and machine learning techniques to enhance over-the-air communications or other system information communications via the air interface between a UE and an active network entity. For example, Al and machine learning may be used to support CSI feedback enhancements (e.g., overhead reduction for performing CSI measurements, improved CSI measurement prediction accuracy, increased CSI measurement efficiency). Additionally, or alternatively, Al and machine learning may be used to support enhancements to beam management such as enhancements in beam prediction, spatial domain beamforming for overhead and latency reduction, increased beam selection accuracy including accuracy enhancements for different scenarios including those associated with heavy non-line of sight (NLOS) beamforming conditions.

(50) In some examples, Al and machine learning techniques may be supported by or indicated by different capability indications (e.g., capability indication signaling), configuration procedures such as different training and inference processes, validation and testing procedures, and data management procedures associated with different Al and machine learning models. In some examples, existing radio access network interfaces and radio access network architecture (e.g., non-split and split architectures) may be enhanced with different data collection techniques and signaling support for Al and machine learning, which may increase network energy savings, load balancing, and device mobility optimizations. In addition, Al and machine learning may support network slicing and increased quality of experience (QoE) for wireless communications networks.

(51) In some implementations of Al and machine learning, network entities and interface procedures may support data management and model management for different Al and machine learning models that may be implemented. For example, a network entity may support multi-vendor interoperability between different Al and machine learning functions such as data collection, model training, and model inference. Additionally, or alternatively, a network entity may support integration and collaboration of additional communications techniques such as orbital angular momentum (OAM), core network functions, new generation networks, and air interface implementations with Al and machine learning.

(52) Some implementations of machine learning may include use of a neural network function (NNF), which may take the form of $Y=F(X)$ as supported by a corresponding neural network model, which includes a relatively large quantity of interconnected processing units or nodes. A NNF may use a standardized input (X) and output (Y), along with information element support for inter-vendor interworking and flexible vendor implementations. A NNF may be classified or identified by a standardized or non-standardized NNF identifier (e.g., based on public and private extensions), and one single NNF may support multiple models based on implementations. For example, a neural network model may include a model structure and a parameter set (e.g., defined by an operator, vendor, or other third party). The model structure may correspond to a model identifier (e.g., model identifier that is unique to the network) which includes a default parameter set, and is associated with a corresponding NNF. The parameter set of the neural network model may include weights of the neural network model along with other model configuration parameters, such as location or configuration-specific parameters.

(53) The wireless communications system **100** may implement Al, machine learning, or both, to enhance performance and increase device integration. For example, some machine learning models may be configured for interference prediction, and may help a device such as a UE **115** accurately predict interference based on previous channel measurements and network states. Such machine learning models may rely on inputs of CSI measurements along with network configuration information to predict the future interference level of beams used for communication.

(54) In some implementations, however, network configuration is relatively dynamic, and certain aspects of the network configuration (such as network node configuration and network load) may change over time. While these changes in network configuration may increase coverage and energy savings in the network, they also may pose challenges for accurately using machine learning to predict interference.

(55) To support accurate interference prediction using machine learning in dynamic systems, a UE **115** may receive assistance information signaling from the network that notifies the UE **115** of updated or new network configuration information. The UE **115** may then use the network configuration information to perform interference prediction via a machine learning model. For example, the assistance information may include configuration information for other cells including on/off status information of the cells, duty cycle information, cell load information, or scheduling information. In some examples, the network may notify the UE **115** of network configuration information that the UE **115** may use as inputs to the machine learning model.

(56) FIG. **2** illustrates an example of a wireless communications system **200** that supports

interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. For example, wireless communications system **200** may support communications between network entities (e.g., network entity **105**-*a* providing coverage for cell **110**-*a* and network entity **105**-*b* providing coverage for cell **110**-*b*) and a UE **115**-*a*, each of which may be examples of corresponding devices described with reference to FIG. **1**.

(57) Some wireless communications systems may implement AI, machine learning, or both, to support accurate interference prediction at one or more wireless or network devices. For example, a device such as UE **115**-*a* or a network entity (e.g., network entity **105**-*a*, network entity **105**-*b*, or both) may implement one or more machine learning models or prediction models to increase the accuracy of beam prediction and CSI measurements **210**. In some examples, the network entity **105**-*a* or the network entity **105**-*b* may implement a machine learning model at times where the UE **115**-*a* may be power-limited or computation-limited. The UE **115**-*a* may transmit various measurements such as CSI measurements **210**, sounding reference signaling (SRS), and other feedback information to the network entity **105**-*a*, which the network entity **105**-*a* may use as inputs to a machine learning model, which it may use to predict interference. The network entity **105**-*a* may then transmit a scheduling decision to the UE **115**-*a* based on the results of the machine learning prediction.

(58) In some other cases, the machine learning model may be implemented at the UE **115**-*a* (e.g., in cases that the UE **115**-*a* has relatively high computation capabilities). For example, the UE **115**-*a* may receive a machine learning model configuration from the network entity **105**-*a* along with an indication of reference signals to measure (e.g., the machine learning model may be configured by the network entity **105**-*a* or by some other central serving network node or third party service provider). The UE **115**-*a* may run the machine learning model based on local measurement at the UE **115**-*a* in addition to signaling and other information received from the network. After running the machine learning model, the UE **115**-*a* may report the prediction results to the network entity **105**-*a* based on various configuration and triggering conditions. In some examples, performing machine learning directly at the UE **115**-*a* may increase prediction accuracy since the UE **115**-*a* may have access to more UE-specific measurement results. Additionally, or alternatively, performing machine learning at the UE **115**-*a* may reduce overhead relative to performing machine learning at the network entity **105**-*a*, since the UE **115**-*a* may not need to report extensive beam information, and the network entity **105**-*a* may not need to report back prediction results.

(59) In such examples that the UE **115**-*a* performs machine learning techniques, the UE **115**-*a* may predict interference levels associated with one or more working beams, and may correspondingly notify the network (e.g., via signaling to the network entity **105**-*a* or the network entity **105**-*b*) of the interference prediction **225**. In some implementations, the UE **115**-*a* may use different information as inputs to a machine learning model **220** (e.g., prediction model), in order to predict interference. For example, a machine learning model **220** may use interference statistics (e.g., statistical trends related to interference, instantaneous interference, and other interference data collected over time) to predict future interference trends or instantaneous interference. In one example, a machine learning model **220** may identify temporal correlations or other identifiable trends between packet transmission in neighboring cells over a time span of multiple slots. In such examples, the machine learning model **220** may use the CSI-IM measurements in prior time intervals (e.g., past slots) to infer the interference distribution in one or more future slots. In some other examples, the machine learning model may perform interference prediction on a per-beam, per-beam group, per-transmission reception point (TRP), or per-transmission configuration indicator (TCI) basis. For example, an interference prediction **225** may be made for each individual beam or TCI used by the UE **115**-*a* over a time period.

(60) In some implementations, the distribution of interference may be determined by the configuration and network load of the nearby nodes, the location of the UE **115**-*a* in a serving cell, or any combination thereof. For example, a node configuration may include the activation (e.g.,

on/off) status of the node such as the on/off status of a configured duty cycle, scheduling resources and operating bandwidth of the node, a scheduling algorithm associated with the node (e.g., whether resources are preserved for periodic transmissions at the node). The machine learning model **220** may in some cases use network configuration information **215** including node configuration information and measured CSI-RS information from other cells to identify and predict interference for non-measured beams or for measured beams at a future time. Some machine learning models implemented by the UE **115**-*a* may also be specific to the network configuration of other cells, including neighbor node status and load distribution status in other cells. In some examples, however, node configuration and network load may change over time, which may affect the accuracy of the interference prediction such that the machine learning model may be modified or replaced with a different machine learning model or parameter set to accommodate network changes. For example, some high frequency systems (e.g., millimeter wave (mmW) networks) may support a relatively greater number of nodes such as repeaters, small cells, inter-access backhaul (IAB) relays to increase coverage. These different nodes, however, may not all be active at the same time (e.g., to reduce power expenditure), and some nodes may be turned on based on demand or based on changing network configuration.

(61) To support dynamic network configurations (e.g., network conditions and configurations that change over time), a UE **115**-*a* may use various different types of machine learning models. For example, some machine learning model designs may use CSI-RS measurements as inputs, and may be updated with different parameter sets or algorithms based on different network configuration changes. In such examples, the UE **115**-*a* may support a first prediction model (e.g., prediction module0) that corresponds to a first network configuration (e.g., network confg0), a second prediction model (e.g., prediction module1) that corresponds to a first network configuration (e.g., network confg1), and so on, and may switch between the different machine learning models based on different network configurations. Some other machine learning model designs may use both CSI-RS measurement information (e.g., CSI measurements **210**) and network configuration information (e.g., network configuration information **215**) as inputs. For example, the machine learning model **220** may input CSI measurements **210** along with network configuration information **215** such as load levels for neighboring cells (e.g., 0 for low load and 1 for high load), on/off status for each cell, and other static or semi-static network information. The UE **115**-*a* may then obtain the interference prediction **225** from other cells based on the various inputs to the machine learning model **220**.

(62) To further support machine learning at the UE **115**-*a* during changing network conditions, the network may provide assistance information to the UE **115**-*a* to aid in the machine learning interference prediction at the UE **115**-*a*. For example, the network entity **105**-*a* may transmit an assistance information message **205** to the UE **115**-*a* which includes cell information relating the network configuration of cells **110**-*a,* **110**-*b,* or both. In some examples, the assistance information message **205** may include information such as on/off status, duty cycle information, operating band information, cell load information, scheduling behavior type (e.g., preserved resource scheduling, dynamic scheduling).

(63) In some examples, the assistance information message **205** may include one or more input values for the machine learning model **220** that correspond to the network configuration, and the UE **115**-*a* may input these values into the machine learning model for interference prediction. For example, the network entity **105**-*a* may transmit the assistance information message **205** via MAC-CE, RRC, DCI, or a combination thereof, each of which may include the input values corresponding to the network configuration.

(64) In some other examples, the assistance information message **205** may include or indicate instructions for the UE **115**-*a* to switch from one machine learning model to another machine learning model that corresponds to a correct or updated network configuration. For example, the network entity **105**-*a* may transmit updated parameters, or one or more updated algorithm

configurations of the machine learning prediction model based on network configuration changes. Additionally, or alternatively, the network entity **105**-*a* may configure one or more additional machine learning model candidates for the UE **115**-*a*, where each machine learning model candidate corresponds to a different network configuration. Then, when changes are made to the network configuration, the network entity **105**-*a* may instruct the UE **115**-*a* to switch between the different configured machine learning models. In some other examples, the network entity **105**-*a* may notify the UE **115**-*a* of network configuration changes, and the UE **115**-*a* may request a model update from the network entity **105**-*a* (or from other network servers) based on the assistance information message **205**.

(65) The information provided in the assistance information message **205** may provide the UE **115**-*a* with additional information to support accurate interference prediction using machine learning techniques.

(66) FIG. **3** illustrates an example of a wireless communications system **300** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. For example, wireless communications system **300** may support communications between network entities (e.g., network entity **105**-*c* providing coverage for cell **110**-*c* and network entity **105**-*d* providing coverage for cell **110**-*d*) and a UE **115**-*b*, each of which may be examples of corresponding devices described with reference to FIGS. **1** and **2**.

(67) To further support machine learning at the UE **115**-*b* during changing network conditions, the network may provide assistance information to the UE **115**-*b* to aid in the machine learning interference prediction at the UE **115**-*b*. For example, the network entity **105**-*c* may transmit an assistance information message **305** to the UE **115**-*b* which includes cell information relating the network configuration of cells **110**-*c*, **110**-*d*, or both. In some examples, the assistance information message **305** may include information such as on/off status, duty cycle information, operating band information, cell load information, scheduling behavior type (e.g., preserved resource scheduling, dynamic scheduling).

(68) In some examples, a network configuration may include a repeater **330** that operates to extend cell coverage and increase communications reliability for the cell **110**-*c* and for the UE **115**-*a*. The repeater **330** may operate according to an on/off cycle, where it may be periodically turned on (e.g., when the load for the UE **115**-*a* is relatively high or above a threshold) or off (when the load for the UE **115**-*a* is relatively low or below a threshold) in its coverage area. In such cases, the activity status (e.g., whether the repeater **330** is on or off) affects the interference prediction of the UE **115**-*a* in the cell **110**-*d*.

(69) To support interference prediction for such a network and repeater configuration, the assistance information message **305** may include one or more input values for the machine learning model **320** that correspond to the network configuration, in addition to one or more CSI measurements **310**. For example, one input port of the machine learning model **320** may be for the on or off status **315** of the repeater **330** (e.g., the input may be "1" if the repeater **330** is on, and "0" if the repeater **330** is off during a time duration). In some other examples, the UE **115**-*b* may be configured with different machine learning models based on different repeater statuses, and the UE **115**-*b* may switch between the different machine learning models based on the status of the repeater **330** and based on the assistance information message **305**.

(70) In either example, the network may inform the UE **115**-*b* (via the assistance information message **305**) of the time pattern of the on or off status **315** of the repeater **330**, such that the UE **115**-*b* may adjust the input of machine learning model **320** or select between different machine learning models based on the time status of the repeater **330** and the assistance information message **305**. The UE **115**-*b* may then generate the interference prediction **325** based on the information received in the assistance information message **305**.

(71) FIG. **4** illustrates an example of a process flow **400** that supports interference prediction with network configuration information in accordance with one or more aspects of the present

disclosure. The process flow **400** may implement or may be implemented to realize or facilitate aspects of the wireless communications systems **100**, **200**, and **300**. For example, the process flow **400** illustrates communication between a UE **115**-*c* and a network entity **105**-*e*. The UE **115**-*c* and the network entity **105**-*e* as illustrated by and described with reference to FIG. **4** may be examples of corresponding devices illustrated and described herein, including with reference to FIGS. **1**, **2**, and **3**. In some examples, the UE **115**-*c* and the network entity **105**-*e* may support Al and machine learning applications.

(72) In the following description of the process flow **400**, the operations may be performed (such as reported or provided) in a different order than the order shown, or the operations performed by the example devices may be performed in different orders or at different times. Some operations also may be left out of the process flow **400**, or other operations may be added to the process flow **400**. Further, although some operations or signaling may be shown to occur at different times for discussion purposes, these operations may actually occur at the same time.

(73) At **405**, the network entity **105**-*e* may transmit, to the UE **115**-*c*, an assistance information message that includes network configuration information **410** corresponding to one or more inputs of an interference-prediction machine learning model. In some examples, the assistance information message may be sent via RRC, MAC-CE, DCI, or any combination thereof, and may indicate values of the one or more inputs of the interference-prediction machine learning model. The network configuration information **410** may also include a set of parameters associated with one or more neighboring cell configurations. In some examples, the network configuration information **410** may include or indicate one or more input values for the interference-prediction machine learning model including network configuration information and CSI measurement information. In some other examples, the network configuration information **410** the network configuration information may include a load level associated with one or more neighboring cells, a load distribution associated with the one or more neighboring cells, an active status or inactive status of the one or more neighboring cells, duty cycle information, scheduling behavior information, or any combination thereof.

(74) At **415**, the UE **115**-*c* may generate, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE **115**-*c* based on the network configuration information included in the assistance information message. In some examples, the UE **115**-*c* may receive, via the assistance information message, an indication of one or more modifications to the interference-prediction machine learning model based on the network configuration information **410**. For example, the one or more modifications to the interference-prediction machine learning model may include one or more parameters associated with the interference-prediction machine learning model that have been modified, an algorithm configuration of the interference-prediction machine learning model that has been modified, or both. In such examples, the UE **115**-*c* may generate the channel interference prediction in accordance with the one or more modifications to the interference-prediction machine learning model. In some examples, the UE **115**-*c* may perform one or more CSI measurements associated with the one or more communication links at the UE **115**-*c*, and may generate the channel interference prediction based on the network configuration information **410** and the one or more CSI measurements.

(75) In some other examples, the interference prediction machine learning models may be a first interference prediction machine learning model candidate of a plurality of interference-prediction machine learning model candidates, where the UE **115**-*c* receives an indication of the plurality of interference-prediction machine learning model candidates that each correspond to a respective network configuration. The UE **115**-*c* may then select the first interference-prediction machine learning model candidate based on the network configuration information **410**. In some examples, the UE **115**-*c* may further receive an indication of one or more changes to the network configuration information **410**, and may select a second interference prediction machine learning

model candidate based on the one or more changes to the network configuration information **410**.

(76) In some other examples, the UE **115**-*c* may receive, via the assistance information message, an indication of a transmission timing pattern associated with active and inactive states of one or more devices of neighboring cells, and the UE **115**-*c* may apply the transmission timing pattern to the one or more inputs of the interference-prediction machine learning model to generate the channel interference prediction.

(77) In some other examples, the UE **115**-*c* may receive, via the assistance information message, a transmission timing pattern associated with active and inactive states of one or more interfering devices. The UE **115**-*c* may then switch between the first interference-prediction machine learning model and a second interference-prediction machine learning model in accordance with the transmission timing pattern, where the channel interference prediction may be generated based on the active and inactive states of the one or more interfering devices.

(78) At **420**, the UE **115**-*c* may communicate with the network entity **105**-*e* based on the channel interference prediction. For example, the channel interference prediction may include a prediction of future channel interference associated with one or more beams, one or more beam groups, one or more transmission-reception points, or a combination thereof, which the network entity **105**-*e* may use for scheduling communications and the UE **115**-*c* may use to avoid potential interference.

(79) FIG. **5** illustrates a block diagram **500** of a device **505** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The device **505** may be an example of aspects of a UE **115** as described herein. The device **505** may include a receiver **510**, a transmitter **515**, and a communications manager **520**. The device **505** may also include a processor. Each of these components may be in communication with one another (e.g., via one or more buses).

(80) The receiver **510** may provide a means for receiving information such as packets, user data, control information, or any combination thereof associated with various information channels (e.g., control channels, data channels, information channels related to interference prediction with network configuration information). Information may be passed on to other components of the device **505**. The receiver **510** may utilize a single antenna or a set of multiple antennas.

(81) The transmitter **515** may provide a means for transmitting signals generated by other components of the device **505**. For example, the transmitter **515** may transmit information such as packets, user data, control information, or any combination thereof associated with various information channels (e.g., control channels, data channels, information channels related to interference prediction with network configuration information). In some examples, the transmitter **515** may be co-located with a receiver **510** in a transceiver module. The transmitter **515** may utilize a single antenna or a set of multiple antennas.

(82) The communications manager **520**, the receiver **510**, the transmitter **515**, or various combinations thereof or various components thereof may be examples of means for performing various aspects of interference prediction with network configuration information as described herein. For example, the communications manager **520**, the receiver **510**, the transmitter **515**, or various combinations or components thereof may support a method for performing one or more of the functions described herein.

(83) In some examples, the communications manager **520**, the receiver **510**, the transmitter **515**, or various combinations or components thereof may be implemented in hardware (e.g., in communications management circuitry). The hardware may include a processor, a digital signal processor (DSP), a central processing unit (CPU), an application-specific integrated circuit (ASIC), a field-programmable gate array (FPGA) or other programmable logic device, a microcontroller, discrete gate or transistor logic, discrete hardware components, or any combination thereof configured as or otherwise supporting a means for performing the functions described in the present disclosure. In some examples, a processor and memory coupled with the processor may be configured to perform one or more of the functions described herein (e.g., by executing, by the

processor, instructions stored in the memory).

(84) Additionally, or alternatively, in some examples, the communications manager **520**, the receiver **510**, the transmitter **515**, or various combinations or components thereof may be implemented in code (e.g., as communications management software or firmware) executed by a processor. If implemented in code executed by a processor, the functions of the communications manager **520**, the receiver **510**, the transmitter **515**, or various combinations or components thereof may be performed by a general-purpose processor, a DSP, a CPU, an ASIC, an FPGA, a microcontroller, or any combination of these or other programmable logic devices (e.g., configured as or otherwise supporting a means for performing the functions described in the present disclosure).

(85) In some examples, the communications manager **520** may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the receiver **510**, the transmitter **515**, or both. For example, the communications manager **520** may receive information from the receiver **510**, send information to the transmitter **515**, or be integrated in combination with the receiver **510**, the transmitter **515**, or both to obtain information, output information, or perform various other operations as described herein.

(86) The communications manager **520** may support wireless communication at a UE in accordance with examples as disclosed herein. For example, the communications manager **520** may be configured as or otherwise support a means for receiving an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations. The communications manager **520** may be configured as or otherwise support a means for generating, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The communications manager **520** may be configured as or otherwise support a means for communicating with a network entity based on the channel interference prediction.

(87) By including or configuring the communications manager **520** in accordance with examples as described herein, the device **505** (e.g., a processor controlling or otherwise coupled with the receiver **510**, the transmitter **515**, the communications manager **520**, or a combination thereof) may support techniques for reduced processing, more efficient utilization of communication resources, increased device integration and intelligence, enhanced machine learning implementations, and increased interference prediction accuracy.

(88) FIG. **6** illustrates a block diagram **600** of a device **605** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The device **605** may be an example of aspects of a device **505** or a UE **115** as described herein. The device **605** may include a receiver **610**, a transmitter **615**, and a communications manager **620**. The device **605** may also include a processor. Each of these components may be in communication with one another (e.g., via one or more buses).

(89) The receiver **610** may provide a means for receiving information such as packets, user data, control information, or any combination thereof associated with various information channels (e.g., control channels, data channels, information channels related to interference prediction with network configuration information). Information may be passed on to other components of the device **605**. The receiver **610** may utilize a single antenna or a set of multiple antennas.

(90) The transmitter **615** may provide a means for transmitting signals generated by other components of the device **605**. For example, the transmitter **615** may transmit information such as packets, user data, control information, or any combination thereof associated with various information channels (e.g., control channels, data channels, information channels related to interference prediction with network configuration information). In some examples, the transmitter

615 may be co-located with a receiver **610** in a transceiver module. The transmitter **615** may utilize a single antenna or a set of multiple antennas.

(91) The device **605**, or various components thereof, may be an example of means for performing various aspects of interference prediction with network configuration information as described herein. For example, the communications manager **620** may include an assistance information manager **625**, an interference prediction component **630**, a channel interference management component **635**, or any combination thereof. The communications manager **620** may be an example of aspects of a communications manager **520** as described herein. In some examples, the communications manager **620**, or various components thereof, may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the receiver **610**, the transmitter **615**, or both. For example, the communications manager **620** may receive information from the receiver **610**, send information to the transmitter **615**, or be integrated in combination with the receiver **610**, the transmitter **615**, or both to obtain information, output information, or perform various other operations as described herein.

(92) The communications manager **620** may support wireless communication at a UE in accordance with examples as disclosed herein. The assistance information manager **625** may be configured as or otherwise support a means for receiving an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations. The interference prediction component **630** may be configured as or otherwise support a means for generating, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The channel interference management component **635** may be configured as or otherwise support a means for communicating with a network entity based on the channel interference prediction.

(93) FIG. **7** illustrates a block diagram **700** of a communications manager **720** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The communications manager **720** may be an example of aspects of a communications manager **520**, a communications manager **620**, or both, as described herein. The communications manager **720**, or various components thereof, may be an example of means for performing various aspects of interference prediction with network configuration information as described herein. For example, the communications manager **720** may include an assistance information manager **725**, an interference prediction component **730**, a channel interference management component **735**, a model update component **740**, a network configuration analysis component **745**, or any combination thereof. Each of these components may communicate, directly or indirectly, with one another (e.g., via one or more buses).

(94) The communications manager **720** may support wireless communication at a UE in accordance with examples as disclosed herein. The assistance information manager **725** may be configured as or otherwise support a means for receiving an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations. The interference prediction component **730** may be configured as or otherwise support a means for generating, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The channel interference management component **735** may be configured as or otherwise support a means for communicating with a network entity based on the channel interference prediction.

(95) In some examples, the interference prediction component **730** may be configured as or otherwise support a means for identifying one or more input values indicated by the network configuration information, where the channel interference prediction is generated based on the one or more input values and one or more channel state information measurements.

(96) In some examples, the model update component **740** may be configured as or otherwise support a means for receiving, via the assistance information message, an indication of one or more modifications to the interference-prediction machine learning model based on the network configuration information, where the channel interference prediction is generated in accordance with the one or more modifications to the interference-prediction machine learning model.

(97) In some examples, the one or more modifications to the interference-prediction machine learning model include one or more parameters associated with the interference-prediction machine learning model that have been modified, an algorithm configuration of the interference-prediction machine learning model that has been modified, or both.

(98) In some examples, the interference-prediction machine learning model includes a first interference-prediction machine learning model candidate of a set of multiple interference-prediction machine learning model candidates, and the model update component **740** may be configured as or otherwise support a means for receiving an indication of the set of multiple interference-prediction machine learning model candidates including the first interference-prediction machine learning model candidate, each of the set of multiple interference-prediction machine learning model candidates corresponding to a respective network configuration. In some examples, the interference-prediction machine learning model includes a first interference-prediction machine learning model candidate of a set of multiple interference-prediction machine learning model candidates, and the model update component **740** may be configured as or otherwise support a means for selecting the first interference-prediction machine learning model candidate based on the network configuration information.

(99) In some examples, the model update component **740** may be configured as or otherwise support a means for receiving an indication of one or more changes to the network configuration information. In some examples, the model update component **740** may be configured as or otherwise support a means for selecting a second interference-prediction machine learning model candidate from the set of multiple interference-prediction machine learning model candidates based on the one or more changes to the network configuration information.

(100) In some examples, the model update component **740** may be configured as or otherwise support a means for receiving an indication of one or more changes to the network configuration information. In some examples, the channel interference management component **735** may be configured as or otherwise support a means for transmitting a message that requests an updated interference-prediction machine learning model based on the one or more changes to the network configuration information.

(101) In some examples, the network configuration analysis component **745** may be configured as or otherwise support a means for receiving, via the assistance information message, an indication of a transmission timing pattern associated with active and inactive states of one or more devices of neighboring cells. In some examples, the interference prediction component **730** may be configured as or otherwise support a means for applying the transmission timing pattern to the one or more inputs of the interference-prediction machine learning model to generate the channel interference prediction.

(102) In some examples, the interference-prediction machine learning model includes a first interference-prediction machine learning model, and the network configuration analysis component **745** may be configured as or otherwise support a means for receiving, via the assistance information message, a transmission timing pattern associated with active and inactive states of one or more interfering devices. In some examples, the interference-prediction machine learning model includes a first interference-prediction machine learning model, and the model update component

740 may be configured as or otherwise support a means for switching between the first interference-prediction machine learning model and a second interference-prediction machine learning model in accordance with the transmission timing pattern, where the channel interference prediction is generated based on the active and inactive states of the one or more interfering devices.

(103) In some examples, to support receiving the assistance information message, the assistance information manager **725** may be configured as or otherwise support a means for receiving the assistance information message via a MAC-CE, an RRC message, a DCI message, or any combination thereof, where the assistance information message indicates values of the one or more inputs of the interference-prediction machine learning model.

(104) In some examples, the network configuration information includes a load level associated with one or more neighboring cells, a load distribution associated with the one or more neighboring cells, an active status or inactive status of the one or more neighboring cells, duty cycle information, scheduling behavior information, or any combination thereof.

(105) In some examples, to support generating the channel interference prediction, the interference prediction component **730** may be configured as or otherwise support a means for generating a prediction of future channel interference associated with one or more beams, one or more beam groups, one or more transmission-reception points, or a combination thereof.

(106) In some examples, to support generating the channel interference prediction, the interference prediction component **730** may be configured as or otherwise support a means for performing one or more channel state information measurements associated with the one or more communication links at the UE. In some examples, to support generating the channel interference prediction, the interference prediction component **730** may be configured as or otherwise support a means for generating the channel interference prediction based on the network configuration information and the one or more channel state information measurements.

(107) FIG. **8** illustrates a diagram of a system **800** including a device **805** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The device **805** may be an example of or include the components of a device **505**, a device **605**, or a UE **115** as described herein. The device **805** may communicate (e.g., wirelessly) with one or more network entities **105**, one or more UEs **115**, or any combination thereof. The device **805** may include components for bi-directional voice and data communications including components for transmitting and receiving communications, such as a communications manager **820**, an input/output (I/O) controller **810**, a transceiver **815**, an antenna **825**, a memory **830**, code **835**, and a processor **840**. These components may be in electronic communication or otherwise coupled (e.g., operatively, communicatively, functionally, electronically, electrically) via one or more buses (e.g., a bus **845**).

(108) The I/O controller **810** may manage input and output signals for the device **805**. The I/O controller **810** may also manage peripherals not integrated into the device **805**. In some cases, the I/O controller **810** may represent a physical connection or port to an external peripheral. In some cases, the I/O controller **810** may utilize an operating system such as iOS®, ANDROID®, MS-DOS®, MS-WINDOWS®, OS/2®, UNIX®, LINUX®, or another known operating system. Additionally, or alternatively, the I/O controller **810** may represent or interact with a modem, a keyboard, a mouse, a touchscreen, or a similar device. In some cases, the I/O controller **810** may be implemented as part of a processor, such as the processor **840**. In some cases, a user may interact with the device **805** via the I/O controller **810** or via hardware components controlled by the I/O controller **810**.

(109) In some cases, the device **805** may include a single antenna **825**. However, in some other cases, the device **805** may have more than one antenna **825**, which may be capable of concurrently transmitting or receiving multiple wireless transmissions. The transceiver **815** may communicate bi-directionally, via the one or more antennas **825**, wired, or wireless links as described herein. For

example, the transceiver **815** may represent a wireless transceiver and may communicate bi-directionally with another wireless transceiver. The transceiver **815** may also include a modem to modulate the packets, to provide the modulated packets to one or more antennas **825** for transmission, and to demodulate packets received from the one or more antennas **825**. The transceiver **815**, or the transceiver **815** and one or more antennas **825**, may be an example of a transmitter **515**, a transmitter **615**, a receiver **510**, a receiver **610**, or any combination thereof or component thereof, as described herein.

(110) The memory **830** may include random access memory (RAM) and read-only memory (ROM). The memory **830** may store computer-readable, computer-executable code **835** including instructions that, when executed by the processor **840**, cause the device **805** to perform various functions described herein. The code **835** may be stored in a non-transitory computer-readable medium such as system memory or another type of memory. In some cases, the code **835** may not be directly executable by the processor **840** but may cause a computer (e.g., when compiled and executed) to perform functions described herein. In some cases, the memory **830** may contain, among other things, a basic I/O system (BIOS) which may control basic hardware or software operation such as the interaction with peripheral components or devices.

(111) The processor **840** may include an intelligent hardware device (e.g., a general-purpose processor, a DSP, a CPU, a microcontroller, an ASIC, an FPGA, a programmable logic device, a discrete gate or transistor logic component, a discrete hardware component, or any combination thereof). In some cases, the processor **840** may be configured to operate a memory array using a memory controller. In some other cases, a memory controller may be integrated into the processor **840**. The processor **840** may be configured to execute computer-readable instructions stored in a memory (e.g., the memory **830**) to cause the device **805** to perform various functions (e.g., functions or tasks supporting interference prediction with network configuration information). For example, the device **805** or a component of the device **805** may include a processor **840** and memory **830** coupled with or to the processor **840**, the processor **840** and memory **830** configured to perform various functions described herein.

(112) The communications manager **820** may support wireless communication at a UE in accordance with examples as disclosed herein. For example, the communications manager **820** may be configured as or otherwise support a means for receiving an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations. The communications manager **820** may be configured as or otherwise support a means for generating, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The communications manager **820** may be configured as or otherwise support a means for communicating with a network entity based on the channel interference prediction.

(113) By including or configuring the communications manager **820** in accordance with examples as described herein, the device **805** may support techniques for improved communication reliability, reduced latency, improved user experience related to reduced interference latency, more efficient utilization of communication resources, improved coordination and integration between devices, reduced signaling overhead, increased efficiency and effectiveness for machine learning, and reduced communications interference.

(114) In some examples, the communications manager **820** may be configured to perform various operations (e.g., receiving, monitoring, transmitting) using or otherwise in cooperation with the transceiver **815**, the one or more antennas **825**, or any combination thereof. Although the communications manager **820** is illustrated as a separate component, in some examples, one or more functions described with reference to the communications manager **820** may be supported by

or performed by the processor **840**, the memory **830**, the code **835**, or any combination thereof. For example, the code **835** may include instructions executable by the processor **840** to cause the device **805** to perform various aspects of interference prediction with network configuration information as described herein, or the processor **840** and the memory **830** may be otherwise configured to perform or support such operations.

(115) FIG. **9** illustrates a block diagram **900** of a device **905** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The device **905** may be an example of aspects of a network entity **105** as described herein. The device **905** may include a receiver **910**, a transmitter **915**, and a communications manager **920**. The device **905** may also include a processor. Each of these components may be in communication with one another (e.g., via one or more buses).

(116) The receiver **910** may provide a means for obtaining (e.g., receiving, determining, identifying) information such as user data, control information, or any combination thereof (e.g., I/Q samples, symbols, packets, protocol data units, service data units) associated with various channels (e.g., control channels, data channels, information channels, channels associated with a protocol stack). Information may be passed on to other components of the device **905**. In some examples, the receiver **910** may support obtaining information by receiving signals via one or more antennas. Additionally, or alternatively, the receiver **910** may support obtaining information by receiving signals via one or more wired (e.g., electrical, fiber optic) interfaces, wireless interfaces, or any combination thereof.

(117) The transmitter **915** may provide a means for outputting (e.g., transmitting, providing, conveying, sending) information generated by other components of the device **905**. For example, the transmitter **915** may output information such as user data, control information, or any combination thereof (e.g., I/Q samples, symbols, packets, protocol data units, service data units) associated with various channels (e.g., control channels, data channels, information channels, channels associated with a protocol stack). In some examples, the transmitter **915** may support outputting information by transmitting signals via one or more antennas. Additionally, or alternatively, the transmitter **915** may support outputting information by transmitting signals via one or more wired (e.g., electrical, fiber optic) interfaces, wireless interfaces, or any combination thereof. In some examples, the transmitter **915** and the receiver **910** may be co-located in a transceiver, which may include or be coupled with a modem.

(118) The communications manager **920**, the receiver **910**, the transmitter **915**, or various combinations thereof or various components thereof may be examples of means for performing various aspects of interference prediction with network configuration information as described herein. For example, the communications manager **920**, the receiver **910**, the transmitter **915**, or various combinations or components thereof may support a method for performing one or more of the functions described herein.

(119) In some examples, the communications manager **920**, the receiver **910**, the transmitter **915**, or various combinations or components thereof may be implemented in hardware (e.g., in communications management circuitry). The hardware may include a processor, a DSP, a CPU, an ASIC, an FPGA or other programmable logic device, a microcontroller, discrete gate or transistor logic, discrete hardware components, or any combination thereof configured as or otherwise supporting a means for performing the functions described in the present disclosure. In some examples, a processor and memory coupled with the processor may be configured to perform one or more of the functions described herein (e.g., by executing, by the processor, instructions stored in the memory).

(120) Additionally, or alternatively, in some examples, the communications manager **920**, the receiver **910**, the transmitter **915**, or various combinations or components thereof may be implemented in code (e.g., as communications management software or firmware) executed by a processor. If implemented in code executed by a processor, the functions of the communications

manager **920**, the receiver **910**, the transmitter **915**, or various combinations or components thereof may be performed by a general-purpose processor, a DSP, a CPU, an ASIC, an FPGA, a microcontroller, or any combination of these or other programmable logic devices (e.g., configured as or otherwise supporting a means for performing the functions described in the present disclosure).

(121) In some examples, the communications manager **920** may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the receiver **910**, the transmitter **915**, or both. For example, the communications manager **920** may receive information from the receiver **910**, send information to the transmitter **915**, or be integrated in combination with the receiver **910**, the transmitter **915**, or both to obtain information, output information, or perform various other operations as described herein.

(122) The communications manager **920** may support wireless communication at a network entity in accordance with examples as disclosed herein. For example, the communications manager **920** may be configured as or otherwise support a means for transmitting, to a UE, an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model at the UE, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations. The communications manager **920** may be configured as or otherwise support a means for receiving, with a channel state information report, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The communications manager **920** may be configured as or otherwise support a means for communicating with the UE based on the channel interference prediction.

(123) By including or configuring the communications manager **920** in accordance with examples as described herein, the device **905** (e.g., a processor controlling or otherwise coupled with the receiver **910**, the transmitter **915**, the communications manager **920**, or a combination thereof) may support techniques for reduced processing, more efficient utilization of communication resources, increased device integration and intelligence, enhanced machine learning implementations, and increased interference prediction accuracy.

(124) FIG. **10** illustrates a block diagram **1000** of a device **1005** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The device **1005** may be an example of aspects of a device **905** or a network entity **105** as described herein. The device **1005** may include a receiver **1010**, a transmitter **1015**, and a communications manager **1020**. The device **1005** may also include a processor. Each of these components may be in communication with one another (e.g., via one or more buses).

(125) The receiver **1010** may provide a means for obtaining (e.g., receiving, determining, identifying) information such as user data, control information, or any combination thereof (e.g., I/Q samples, symbols, packets, protocol data units, service data units) associated with various channels (e.g., control channels, data channels, information channels, channels associated with a protocol stack). Information may be passed on to other components of the device **1005**. In some examples, the receiver **1010** may support obtaining information by receiving signals via one or more antennas. Additionally, or alternatively, the receiver **1010** may support obtaining information by receiving signals via one or more wired (e.g., electrical, fiber optic) interfaces, wireless interfaces, or any combination thereof.

(126) The transmitter **1015** may provide a means for outputting (e.g., transmitting, providing, conveying, sending) information generated by other components of the device **1005**. For example, the transmitter **1015** may output information such as user data, control information, or any combination thereof (e.g., I/Q samples, symbols, packets, protocol data units, service data units) associated with various channels (e.g., control channels, data channels, information channels, channels associated with a protocol stack). In some examples, the transmitter **1015** may support

outputting information by transmitting signals via one or more antennas. Additionally, or alternatively, the transmitter **1015** may support outputting information by transmitting signals via one or more wired (e.g., electrical, fiber optic) interfaces, wireless interfaces, or any combination thereof. In some examples, the transmitter **1015** and the receiver **1010** may be co-located in a transceiver, which may include or be coupled with a modem.

(127) The device **1005**, or various components thereof, may be an example of means for performing various aspects of interference prediction with network configuration information as described herein. For example, the communications manager **1020** may include an assistance information manager **1025**, an interference prediction component **1030**, a channel interference management component **1035**, or any combination thereof. The communications manager **1020** may be an example of aspects of a communications manager **920** as described herein. In some examples, the communications manager **1020**, or various components thereof, may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the receiver **1010**, the transmitter **1015**, or both. For example, the communications manager **1020** may receive information from the receiver **1010**, send information to the transmitter **1015**, or be integrated in combination with the receiver **1010**, the transmitter **1015**, or both to obtain information, output information, or perform various other operations as described herein.

(128) The communications manager **1020** may support wireless communication at a network entity in accordance with examples as disclosed herein. The assistance information manager **1025** may be configured as or otherwise support a means for transmitting, to a UE, an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model at the UE, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations. The interference prediction component **1030** may be configured as or otherwise support a means for receiving, with a channel state information report, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The channel interference management component **1035** may be configured as or otherwise support a means for communicating with the UE based on the channel interference prediction.

(129) FIG. **11** illustrates a block diagram **1100** of a communications manager **1120** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The communications manager **1120** may be an example of aspects of a communications manager **920**, a communications manager **1020**, or both, as described herein. The communications manager **1120**, or various components thereof, may be an example of means for performing various aspects of interference prediction with network configuration information as described herein. For example, the communications manager **1120** may include an assistance information manager **1125**, an interference prediction component **1130**, a channel interference management component **1135**, a model update component **1140**, or any combination thereof. Each of these components may communicate, directly or indirectly, with one another (e.g., via one or more buses) which may include communications within a protocol layer of a protocol stack, communications associated with a logical channel of a protocol stack (e.g., between protocol layers of a protocol stack, within a device, component, or virtualized component associated with a network entity **105**, between devices, components, or virtualized components associated with a network entity **105**), or any combination thereof.

(130) The communications manager **1120** may support wireless communication at a network entity in accordance with examples as disclosed herein. The assistance information manager **1125** may be configured as or otherwise support a means for transmitting, to a UE, an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model at the UE, where the network configuration

information includes a set of parameters associated with one or more neighboring cell configurations. The interference prediction component **1130** may be configured as or otherwise support a means for receiving, with a channel state information report, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The channel interference management component **1135** may be configured as or otherwise support a means for communicating with the UE based on the channel interference prediction.

(131) In some examples, the model update component **1140** may be configured as or otherwise support a means for transmitting, via the assistance information message, an indication of one or more modifications to the interference-prediction machine learning model based on the network configuration information. In some examples, the interference prediction component **1130** may be configured as or otherwise support a means for receiving the channel interference prediction in accordance with the one or more modifications to the interference-prediction machine learning model.

(132) In some examples, the one or more modifications to the interference-prediction machine learning model include one or more parameters associated with the interference-prediction machine learning model that have been modified, an algorithm configuration of the interference-prediction machine learning model that has been modified, or both.

(133) In some examples, the interference-prediction machine learning model includes a first interference-prediction machine learning model candidate of a set of multiple interference-prediction machine learning model candidates, and the model update component **1140** may be configured as or otherwise support a means for transmitting an indication of the set of multiple interference-prediction machine learning model candidates including the first interference-prediction machine learning model candidate selected for the UE, each of the set of multiple interference-prediction machine learning model candidates corresponding to a respective network configuration.

(134) In some examples, to support transmitting the assistance information message, the model update component **1140** may be configured as or otherwise support a means for transmitting an indication of one or more changes to the network configuration information. In some examples, to support transmitting the assistance information message, the model update component **1140** may be configured as or otherwise support a means for receiving a message that requests an updated interference-prediction machine learning model based on the one or more changes to the network configuration information.

(135) In some examples, the channel interference management component **1135** may be configured as or otherwise support a means for transmitting, via the assistance information message, an indication of a transmission timing pattern associated with active and inactive states of one or more devices of neighboring cells to be applied to the one or more inputs of the interference-prediction machine learning model.

(136) FIG. **12** illustrates a diagram of a system **1200** including a device **1205** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The device **1205** may be an example of or include the components of a device **905**, a device **1005**, or a network entity **105** as described herein. The device **1205** may communicate with one or more network entities **105**, one or more UEs **115**, or any combination thereof, which may include communications over one or more wired interfaces, over one or more wireless interfaces, or any combination thereof. The device **1205** may include components that support outputting and obtaining communications, such as a communications manager **1220**, a transceiver **1210**, an antenna **1215**, a memory **1225**, code **1230**, and a processor **1235**. These components may be in electronic communication or otherwise coupled (e.g., operatively, communicatively, functionally, electronically, electrically) via one or more buses (e.g., a bus **1240**).

(137) The transceiver **1210** may support bi-directional communications via wired links, wireless links, or both as described herein. In some examples, the transceiver **1210** may include a wired transceiver and may communicate bi-directionally with another wired transceiver. Additionally, or alternatively, in some examples, the transceiver **1210** may include a wireless transceiver and may communicate bi-directionally with another wireless transceiver. In some examples, the device **1205** may include one or more antennas **1215**, which may be capable of transmitting or receiving wireless transmissions (e.g., concurrently). The transceiver **1210** may also include a modem to modulate signals, to provide the modulated signals for transmission (e.g., by one or more antennas **1215**, by a wired transmitter), to receive modulated signals (e.g., from one or more antennas **1215**, from a wired receiver), and to demodulate signals. In some implementations, the transceiver **1210** may include one or more interfaces, such as one or more interfaces coupled with the one or more antennas **1215** that are configured to support various receiving or obtaining operations, or one or more interfaces coupled with the one or more antennas **1215** that are configured to support various transmitting or outputting operations, or a combination thereof. In some implementations, the transceiver **1210** may include or be configured for coupling with one or more processors or memory components that are operable to perform or support operations based on received or obtained information or signals, or to generate information or other signals for transmission or other outputting, or any combination thereof. In some implementations, the transceiver **1210**, or the transceiver **1210** and the one or more antennas **1215**, or the transceiver **1210** and the one or more antennas **1215** and one or more processors or memory components (for example, the processor **1235**, or the memory **1225**, or both), may be included in a chip or chip assembly that is installed in the device **1205**. In some examples, the transceiver may be operable to support communications via one or more communications links (e.g., a communication link **125**, a backhaul communication link **120**, a midhaul communication link **162**, a fronthaul communication link **168**).

(138) The memory **1225** may include RAM and ROM. The memory **1225** may store computer-readable, computer-executable code **1230** including instructions that, when executed by the processor **1235**, cause the device **1205** to perform various functions described herein. The code **1230** may be stored in a non-transitory computer-readable medium such as system memory or another type of memory. In some cases, the code **1230** may not be directly executable by the processor **1235** but may cause a computer (e.g., when compiled and executed) to perform functions described herein. In some cases, the memory **1225** may contain, among other things, a BIOS which may control basic hardware or software operation such as the interaction with peripheral components or devices.

(139) The processor **1235** may include an intelligent hardware device (e.g., a general-purpose processor, a DSP, an ASIC, a CPU, an FPGA, a microcontroller, a programmable logic device, discrete gate or transistor logic, a discrete hardware component, or any combination thereof). In some cases, the processor **1235** may be configured to operate a memory array using a memory controller. In some other cases, a memory controller may be integrated into the processor **1235**. The processor **1235** may be configured to execute computer-readable instructions stored in a memory (e.g., the memory **1225**) to cause the device **1205** to perform various functions (e.g., functions or tasks supporting interference prediction with network configuration information). For example, the device **1205** or a component of the device **1205** may include a processor **1235** and memory **1225** coupled with the processor **1235**, the processor **1235** and memory **1225** configured to perform various functions described herein. The processor **1235** may be an example of a cloud-computing platform (e.g., one or more physical nodes and supporting software such as operating systems, virtual machines, or container instances) that may host the functions (e.g., by executing code **1230**) to perform the functions of the device **1205**. The processor **1235** may be any one or more suitable processors capable of executing scripts or instructions of one or more software programs stored in the device **1205** (such as within the memory **1225**). In some implementations, the processor **1235** may be a component of a processing system. A processing system may generally refer to a system

or series of machines or components that receives inputs and processes the inputs to produce a set of outputs (which may be passed to other systems or components of, for example, the device **1205**). For example, a processing system of the device **1205** may refer to a system including the various other components or subcomponents of the device **1205**, such as the processor **1235**, or the transceiver **1210**, or the communications manager **1220**, or other components or combinations of components of the device **1205**. The processing system of the device **1205** may interface with other components of the device **1205**, and may process information received from other components (such as inputs or signals) or output information to other components. For example, a chip or modem of the device **1205** may include a processing system and one or more interfaces to output information, or to obtain information, or both. The one or more interfaces may be implemented as or otherwise include a first interface configured to output information and a second interface configured to obtain information, or a same interface configured to output information and to obtain information, among other implementations. In some implementations, the one or more interfaces may refer to an interface between the processing system of the chip or modem and a transmitter, such that the device **1205** may transmit information output from the chip or modem. Additionally, or alternatively, in some implementations, the one or more interfaces may refer to an interface between the processing system of the chip or modem and a receiver, such that the device **1205** may obtain information or signal inputs, and the information may be passed to the processing system. A person having ordinary skill in the art will readily recognize that a first interface also may obtain information or signal inputs, and a second interface also may output information or signal outputs.

(140) In some examples, a bus **1240** may support communications of (e.g., within) a protocol layer of a protocol stack. In some examples, a bus **1240** may support communications associated with a logical channel of a protocol stack (e.g., between protocol layers of a protocol stack), which may include communications performed within a component of the device **1205**, or between different components of the device **1205** that may be co-located or located in different locations (e.g., where the device **1205** may refer to a system in which one or more of the communications manager **1220**, the transceiver **1210**, the memory **1225**, the code **1230**, and the processor **1235** may be located in one of the different components or divided between different components).

(141) In some examples, the communications manager **1220** may manage aspects of communications with a core network **130** (e.g., via one or more wired or wireless backhaul links). For example, the communications manager **1220** may manage the transfer of data communications for client devices, such as one or more UEs **115**. In some examples, the communications manager **1220** may manage communications with other network entities **105**, and may include a controller or scheduler for controlling communications with UEs **115** in cooperation with other network entities **105**. In some examples, the communications manager **1220** may support an X2 interface within an LTE/LTE-A wireless communications network technology to provide communication between network entities **105**.

(142) The communications manager **1220** may support wireless communication at a network entity in accordance with examples as disclosed herein. For example, the communications manager **1220** may be configured as or otherwise support a means for transmitting, to a UE, an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model at the UE, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations. The communications manager **1220** may be configured as or otherwise support a means for receiving, with a channel state information report, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The communications manager **1220** may be configured as or otherwise support a means for communicating with the UE based on the channel interference prediction.

(143) By including or configuring the communications manager **1220** in accordance with examples as described herein, the device **1205** may support techniques for improved communication reliability, reduced latency, improved user experience related to reduced interference latency, more efficient utilization of communication resources, improved coordination and integration between devices, reduced signaling overhead, increased efficiency and effectiveness for machine learning, and reduced communications interference.

(144) In some examples, the communications manager **1220** may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the transceiver **1210**, the one or more antennas **1215** (e.g., where applicable), or any combination thereof. Although the communications manager **1220** is illustrated as a separate component, in some examples, one or more functions described with reference to the communications manager **1220** may be supported by or performed by the transceiver **1210**, the processor **1235**, the memory **1225**, the code **1230**, or any combination thereof. For example, the code **1230** may include instructions executable by the processor **1235** to cause the device **1205** to perform various aspects of interference prediction with network configuration information as described herein, or the processor **1235** and the memory **1225** may be otherwise configured to perform or support such operations.

(145) FIG. **13** illustrates a flowchart showing a method **1300** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The operations of the method **1300** may be implemented by a UE or its components as described herein. For example, the operations of the method **1300** may be performed by a UE **115** as described with reference to FIGS. **1** through **8**. In some examples, a UE may execute a set of instructions to control the functional elements of the UE to perform the described functions. Additionally, or alternatively, the UE may perform aspects of the described functions using special-purpose hardware.

(146) At **1305**, the method may include receiving an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations. The operations of **1305** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1305** may be performed by an assistance information manager **725** as described with reference to FIG. **7**.

(147) At **1310**, the method may include generating, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The operations of **1310** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1310** may be performed by an interference prediction component **730** as described with reference to FIG. **7**.

(148) At **1315**, the method may include communicating with a network entity based on the channel interference prediction. The operations of **1315** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1315** may be performed by a channel interference management component **735** as described with reference to FIG. **7**.

(149) FIG. **14** illustrates a flowchart showing a method **1400** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The operations of the method **1400** may be implemented by a UE or its components as described herein. For example, the operations of the method **1400** may be performed by a UE **115** as described with reference to FIGS. **1** through **8**. In some examples, a UE may execute a set of instructions to control the functional elements of the UE to perform the described functions. Additionally, or alternatively, the UE may perform aspects of the described functions using special-purpose hardware.

(150) At **1405**, the method may include receiving an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations. The operations of **1405** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1405** may be performed by an assistance information manager **725** as described with reference to FIG. **7**.

(151) At **1410**, the method may include identifying one or more input values indicated by the network configuration information, where the channel interference prediction is generated based on the one or more input values and one or more channel state information measurements. The operations of **1410** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1410** may be performed by an interference prediction component **730** as described with reference to FIG. **7**.

(152) At **1415**, the method may include generating, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The operations of **1415** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1415** may be performed by an interference prediction component **730** as described with reference to FIG. **7**.

(153) At **1420**, the method may include communicating with a network entity based on the channel interference prediction. The operations of **1420** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1420** may be performed by a channel interference management component **735** as described with reference to FIG. **7**.

(154) FIG. **15** illustrates a flowchart showing a method **1500** that supports interference prediction with network configuration information in accordance with one or more aspects of the present disclosure. The operations of the method **1500** may be implemented by a network entity or its components as described herein. For example, the operations of the method **1500** may be performed by a network entity as described with reference to FIGS. **1** through **4** and **9** through **12**. In some examples, a network entity may execute a set of instructions to control the functional elements of the network entity to perform the described functions. Additionally, or alternatively, the network entity may perform aspects of the described functions using special-purpose hardware.

(155) At **1505**, the method may include transmitting, to a UE, an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model at the UE, where the network configuration information includes a set of parameters associated with one or more neighboring cell configurations. The operations of **1505** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1505** may be performed by an assistance information manager **1125** as described with reference to FIG. **11**.

(156) At **1510**, the method may include receiving, with a channel state information report, a channel interference prediction corresponding to one or more communication links at the UE based on the network configuration information included in the assistance information message. The operations of **1510** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1510** may be performed by an interference prediction component **1130** as described with reference to FIG. **11**.

(157) At **1515**, the method may include communicating with the UE based on the channel interference prediction. The operations of **1515** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1515** may be performed by a channel interference management component **1135** as described with reference to FIG. **11**.

(158) The following provides an overview of aspects of the present disclosure: Aspect 1: A method for wireless communication at a UE, comprising: receiving an assistance information message

including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, wherein the network configuration information comprises a set of parameters associated with one or more neighboring cell configurations; generating, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based at least in part on the network configuration information included in the assistance information message; and communicating with a network entity based at least in part on the channel interference prediction. Aspect 2: The method of aspect 1, further comprising: identifying one or more input values indicated by the network configuration information, wherein the channel interference prediction is generated based at least in part on the one or more input values and one or more CSI measurements. Aspect 3: The method of any of aspects 1 through 2, further comprising: receiving, via the assistance information message, an indication of one or more modifications to the interference-prediction machine learning model based at least in part on the network configuration information, wherein the channel interference prediction is generated in accordance with the one or more modifications to the interference-prediction machine learning model. Aspect 4: The method of aspect 3, wherein the one or more modifications to the interference-prediction machine learning model comprise one or more parameters associated with the interference-prediction machine learning model that have been modified, an algorithm configuration of the interference-prediction machine learning model that has been modified, or both. Aspect 5: The method of any of aspects 1 through 4, wherein the interference-prediction machine learning model comprises a first interference-prediction machine learning model candidate of a plurality of interference-prediction machine learning model candidates, the method further comprising: receiving an indication of the plurality of interference-prediction machine learning model candidates including the first interference-prediction machine learning model candidate, each of the plurality of interference-prediction machine learning model candidates corresponding to a respective network configuration; and selecting the first interference-prediction machine learning model candidate based at least in part on the network configuration information. Aspect 6: The method of aspect 5, further comprising: receiving an indication of one or more changes to the network configuration information; and selecting a second interference-prediction machine learning model candidate from the plurality of interference-prediction machine learning model candidates based at least in part on the one or more changes to the network configuration information. Aspect 7: The method of any of aspects 1 through 6, further comprising: receiving an indication of one or more changes to the network configuration information; and transmitting a message that requests an updated interference-prediction machine learning model based at least in part on the one or more changes to the network configuration information. Aspect 8: The method of any of aspects 1 through 7, further comprising: receiving, via the assistance information message, an indication of a transmission timing pattern associated with active and inactive states of one or more devices of neighboring cells; and applying the transmission timing pattern to the one or more inputs of the interference-prediction machine learning model to generate the channel interference prediction. Aspect 9: The method of any of aspects 1 through 8, wherein the interference-prediction machine learning model comprises a first interference-prediction machine learning model, the method further comprising: receiving, via the assistance information message, a transmission timing pattern associated with active and inactive states of one or more interfering devices; and switching between the first interference-prediction machine learning model and a second interference-prediction machine learning model in accordance with the transmission timing pattern, wherein the channel interference prediction is generated based at least in part on the active and inactive states of the one or more interfering devices. Aspect 10: The method of any of aspects 1 through 9, wherein receiving the assistance information message further comprises: receiving the assistance information message via a MAC-CE, an RRC message, a DCI message, or any combination thereof, wherein the assistance information message indicates values of the one or more inputs of

the interference-prediction machine learning model. Aspect 11: The method of any of aspects 1 through 10, wherein the network configuration information comprises a load level associated with one or more neighboring cells, a load distribution associated with the one or more neighboring cells, an active status or inactive status of the one or more neighboring cells, duty cycle information, scheduling behavior information, or any combination thereof. Aspect 12: The method of any of aspects 1 through 11, wherein generating the channel interference prediction further comprises: generating a prediction of future channel interference associated with one or more beams, one or more beam groups, one or more transmission-reception points, or a combination thereof. Aspect 13: The method of any of aspects 1 through 12, wherein generating the channel interference prediction further comprises: performing one or more CSI measurements associated with the one or more communication links at the UE; and generating the channel interference prediction based at least in part on the network configuration information and the one or more CSI measurements. Aspect 14: A method for wireless communication at a network entity, comprising: transmitting, to a UE, an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model at the UE, wherein the network configuration information comprises a set of parameters associated with one or more neighboring cell configurations; receiving, with a CSI report, a channel interference prediction corresponding to one or more communication links at the UE based at least in part on the network configuration information included in the assistance information message; and communicating with the UE based at least in part on the channel interference prediction. Aspect 15: The method of aspect 14, further comprising: transmitting, via the assistance information message, an indication of one or more modifications to the interference-prediction machine learning model based at least in part on the network configuration information; and receiving the channel interference prediction in accordance with the one or more modifications to the interference-prediction machine learning model. Aspect 16: The method of aspect 15, wherein the one or more modifications to the interference-prediction machine learning model comprise one or more parameters associated with the interference-prediction machine learning model that have been modified, an algorithm configuration of the interference-prediction machine learning model that has been modified, or both. Aspect 17: The method of any of aspects 14 through 16, wherein the interference-prediction machine learning model comprises a first interference-prediction machine learning model candidate of a plurality of interference-prediction machine learning model candidates, the method further comprising: transmitting an indication of the plurality of interference-prediction machine learning model candidates including the first interference-prediction machine learning model candidate selected for the UE, each of the plurality of interference-prediction machine learning model candidates corresponding to a respective network configuration. Aspect 18: The method of any of aspects 14 through 17, wherein transmitting the assistance information message further comprises: transmitting an indication of one or more changes to the network configuration information; and receiving a message that requests an updated interference-prediction machine learning model based at least in part on the one or more changes to the network configuration information. Aspect 19: The method of any of aspects 14 through 18, further comprising: transmitting, via the assistance information message, an indication of a transmission timing pattern associated with active and inactive states of one or more devices of neighboring cells to be applied to the one or more inputs of the interference-prediction machine learning model. Aspect 20: An apparatus for wireless communication at a UE, comprising a processor; memory coupled with the processor; and instructions stored in the memory and executable by the processor to cause the apparatus to perform a method of any of aspects 1 through 13. Aspect 21: An apparatus for wireless communication at a UE, comprising at least one means for performing a method of any of aspects 1 through 13. Aspect 22: A non-transitory computer-readable medium storing code for wireless communication at a UE, the code comprising instructions executable by a processor to perform a method of any of aspects 1 through 13. Aspect

23: An apparatus for wireless communication at a network entity, comprising a processor; memory coupled with the processor; and instructions stored in the memory and executable by the processor to cause the apparatus to perform a method of any of aspects 14 through 19. Aspect 24: An apparatus for wireless communication at a network entity, comprising at least one means for performing a method of any of aspects 14 through 19. Aspect 25: A non-transitory computer-readable medium storing code for wireless communication at a network entity, the code comprising instructions executable by a processor to perform a method of any of aspects 14 through 19.

(159) It should be noted that the methods described herein describe possible implementations, and that the operations and the steps may be rearranged or otherwise modified and that other implementations are possible. Further, aspects from two or more of the methods may be combined.

(160) Although aspects of an LTE, LTE-A, LTE-A Pro, or NR system may be described for purposes of example, and LTE, LTE-A, LTE-A Pro, or NR terminology may be used in much of the description, the techniques described herein are applicable beyond LTE, LTE-A, LTE-A Pro, or NR networks. For example, the described techniques may be applicable to various other wireless communications systems such as Ultra Mobile Broadband (UMB), Institute of Electrical and Electronics Engineers (IEEE) 802.11 (Wi-Fi), IEEE 802.16 (WiMAX), IEEE 802.20, Flash-OFDM, as well as other systems and radio technologies not explicitly mentioned herein.

(161) Information and signals described herein may be represented using any of a variety of different technologies and techniques. For example, data, instructions, commands, information, signals, bits, symbols, and chips that may be referenced throughout the description may be represented by voltages, currents, electromagnetic waves, magnetic fields or particles, optical fields or particles, or any combination thereof.

(162) The various illustrative blocks and components described in connection with the disclosure herein may be implemented or performed using a general-purpose processor, a DSP, an ASIC, a CPU, an FPGA or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general-purpose processor may be a microprocessor but, in the alternative, the processor may be any processor, controller, microcontroller, or state machine. A processor may also be implemented as a combination of computing devices (e.g., a combination of a DSP and a microprocessor, multiple microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration).

(163) The functions described herein may be implemented using hardware, software executed by a processor, firmware, or any combination thereof. If implemented using software executed by a processor, the functions may be stored as or transmitted using one or more instructions or code of a computer-readable medium. Other examples and implementations are within the scope of the disclosure and appended claims. For example, due to the nature of software, functions described herein may be implemented using software executed by a processor, hardware, firmware, hardwiring, or combinations of any of these. Features implementing functions may also be physically located at various positions, including being distributed such that portions of functions are implemented at different physical locations.

(164) Computer-readable media includes both non-transitory computer storage media and communication media including any medium that facilitates transfer of a computer program from one location to another. A non-transitory storage medium may be any available medium that may be accessed by a general-purpose or special-purpose computer. By way of example, and not limitation, non-transitory computer-readable media may include RAM, ROM, electrically erasable programmable ROM (EEPROM), flash memory, compact disk (CD) ROM or other optical disk storage, magnetic disk storage or other magnetic storage devices, or any other non-transitory medium that may be used to carry or store desired program code means in the form of instructions or data structures and that may be accessed by a general-purpose or special-purpose computer, or a general-purpose or special-purpose processor. Also, any connection is properly termed a computer-

readable medium. For example, if the software is transmitted from a website, server, or other remote source using a coaxial cable, fiber optic cable, twisted pair, digital subscriber line (DSL), or wireless technologies such as infrared, radio, and microwave, then the coaxial cable, fiber optic cable, twisted pair, DSL, or wireless technologies such as infrared, radio, and microwave are included in the definition of computer-readable medium. Disk and disc, as used herein, include CD, laser disc, optical disc, digital versatile disc (DVD), floppy disk and Blu-ray disc. Disks may reproduce data magnetically, and discs may reproduce data optically using lasers. Combinations of the above are also included within the scope of computer-readable media.

(165) As used herein, including in the claims, "or" as used in a list of items (e.g., a list of items prefaced by a phrase such as "at least one of" or "one or more of") indicates an inclusive list such that, for example, a list of at least one of A, B, or C means A or B or C or AB or AC or BC or ABC (i.e., A and B and C). Also, as used herein, the phrase "based on" shall not be construed as a reference to a closed set of conditions. For example, an example step that is described as "based on condition A" may be based on both a condition A and a condition B without departing from the scope of the present disclosure. In other words, as used herein, the phrase "based on" shall be construed in the same manner as the phrase "based at least in part on."

(166) The term "determine" or "determining" encompasses a variety of actions and, therefore, "determining" can include calculating, computing, processing, deriving, investigating, looking up (such as via looking up in a table, a database or another data structure), ascertaining and the like. Also, "determining" can include receiving (e.g., receiving information), accessing (e.g., accessing data stored in memory) and the like. Also, "determining" can include resolving, obtaining, selecting, choosing, establishing, and other such similar actions.

(167) In the appended figures, similar components or features may have the same reference label. Further, various components of the same type may be distinguished by following the reference label by a dash and a second label that distinguishes among the similar components. If just the first reference label is used in the specification, the description is applicable to any one of the similar components having the same first reference label irrespective of the second reference label, or other subsequent reference label.

(168) The description set forth herein, in connection with the appended drawings, describes example configurations and does not represent all the examples that may be implemented or that are within the scope of the claims. The term "example" used herein means "serving as an example, instance, or illustration," and not "preferred" or "advantageous over other examples." The detailed description includes specific details for the purpose of providing an understanding of the described techniques. These techniques, however, may be practiced without these specific details. In some instances, known structures and devices are shown in block diagram form in order to avoid obscuring the concepts of the described examples.

(169) The description herein is provided to enable a person having ordinary skill in the art to make or use the disclosure. Various modifications to the disclosure will be apparent to a person having ordinary skill in the art, and the generic principles defined herein may be applied to other variations without departing from the scope of the disclosure. Thus, the disclosure is not limited to the examples and designs described herein but is to be accorded the broadest scope consistent with the principles and novel features disclosed herein.

Claims

1. An apparatus for wireless communication at a user equipment (UE), comprising: a processor; memory coupled with the processor; and instructions stored in the memory and executable by the processor to cause the apparatus to: receive an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, wherein the network configuration information comprises a set of

parameters associated with one or more neighboring cell configurations; generate, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based at least in part on the network configuration information included in the assistance information message; and communicate with a network entity based at least in part on the channel interference prediction.

2. The apparatus of claim 1, wherein the instructions are further executable by the processor to cause the apparatus to: identify one or more input values indicated by the network configuration information, wherein the channel interference prediction is generated based at least in part on the one or more input values and one or more channel state information measurements.

3. The apparatus of claim 1, wherein the instructions are further executable by the processor to cause the apparatus to: receive, via the assistance information message, an indication of one or more modifications to the interference-prediction machine learning model based at least in part on the network configuration information, wherein the channel interference prediction is generated in accordance with the one or more modifications to the interference-prediction machine learning model.

4. The apparatus of claim 3, wherein the one or more modifications to the interference-prediction machine learning model comprise one or more parameters associated with the interference-prediction machine learning model that have been modified, an algorithm configuration of the interference-prediction machine learning model that has been modified, or both.

5. The apparatus of claim 1, wherein the interference-prediction machine learning model comprises a first interference-prediction machine learning model candidate of a plurality of interference-prediction machine learning model candidates, and the instructions are further executable by the processor to cause the apparatus to: receive an indication of the plurality of interference-prediction machine learning model candidates including the first interference-prediction machine learning model candidate, each of the plurality of interference-prediction machine learning model candidates corresponding to a respective network configuration; and select the first interference-prediction machine learning model candidate based at least in part on the network configuration information.

6. The apparatus of claim 5, wherein the instructions are further executable by the processor to cause the apparatus to: receive an indication of one or more changes to the network configuration information; and select a second interference-prediction machine learning model candidate from the plurality of interference-prediction machine learning model candidates based at least in part on the one or more changes to the network configuration information.

7. The apparatus of claim 1, wherein the instructions are further executable by the processor to cause the apparatus to: receive an indication of one or more changes to the network configuration information; and transmit a message that requests an updated interference-prediction machine learning model based at least in part on the one or more changes to the network configuration information.

8. The apparatus of claim 1, wherein the instructions are further executable by the processor to cause the apparatus to: receive, via the assistance information message, an indication of a transmission timing pattern associated with active and inactive states of one or more devices of neighboring cells; and apply the transmission timing pattern to the one or more inputs of the interference-prediction machine learning model to generate the channel interference prediction.

9. The apparatus of claim 1, wherein the interference-prediction machine learning model comprises a first interference-prediction machine learning model, and the instructions are further executable by the processor to cause the apparatus to: receive, via the assistance information message, a transmission timing pattern associated with active and inactive states of one or more interfering devices; and switch between the first interference-prediction machine learning model and a second interference-prediction machine learning model in accordance with the transmission timing pattern, wherein the channel interference prediction is generated based at least in part on the active and

inactive states of the one or more interfering devices.

10. The apparatus of claim 1, wherein the instructions to receive the assistance information message are further executable by the processor to cause the apparatus to: receive the assistance information message via a medium access control-control element, a radio resource control message, a downlink control information message, or any combination thereof, wherein the assistance information message indicates values of the one or more inputs of the interference-prediction machine learning model.

11. The apparatus of claim 1, wherein the network configuration information comprises a load level associated with one or more neighboring cells, a load distribution associated with the one or more neighboring cells, an active status or inactive status of the one or more neighboring cells, duty cycle information, scheduling behavior information, or any combination thereof.

12. The apparatus of claim 1, wherein the instructions to generate the channel interference prediction are further executable by the processor to cause the apparatus to: generate a prediction of future channel interference associated with one or more beams, one or more beam groups, one or more transmission-reception points, or a combination thereof.

13. The apparatus of claim 1, wherein the instructions to generate the channel interference prediction are further executable by the processor to cause the apparatus to: perform one or more channel state information measurements associated with the one or more communication links at the UE; and generate the channel interference prediction based at least in part on the network configuration information and the one or more channel state information measurements.

14. An apparatus for wireless communication at a network entity, comprising: a processor; memory coupled with the processor; and instructions stored in the memory and executable by the processor to cause the apparatus to: transmit, to a user equipment (UE), an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model at the UE, wherein the network configuration information comprises a set of parameters associated with one or more neighboring cell configurations; receive, with a channel state information report, a channel interference prediction corresponding to one or more communication links at the UE based at least in part on the network configuration information included in the assistance information message; and communicate with the UE based at least in part on the channel interference prediction.

15. The apparatus of claim 14, wherein the instructions are further executable by the processor to cause the apparatus to: transmit, via the assistance information message, an indication of one or more modifications to the interference-prediction machine learning model based at least in part on the network configuration information; and receive the channel interference prediction in accordance with the one or more modifications to the interference-prediction machine learning model.

16. The apparatus of claim 15, wherein the one or more modifications to the interference-prediction machine learning model comprise one or more parameters associated with the interference-prediction machine learning model that have been modified, an algorithm configuration of the interference-prediction machine learning model that has been modified, or both.

17. The apparatus of claim 14, wherein the interference-prediction machine learning model comprises a first interference-prediction machine learning model candidate of a plurality of interference-prediction machine learning model candidates, and the instructions are further executable by the processor to cause the apparatus to: transmit an indication of the plurality of interference-prediction machine learning model candidates including the first interference-prediction machine learning model candidate selected for the UE, each of the plurality of interference-prediction machine learning model candidates corresponding to a respective network configuration.

18. The apparatus of claim 14, wherein the instructions to transmit the assistance information message are further executable by the processor to cause the apparatus to: transmit an indication of

one or more changes to the network configuration information; and receive a message that requests an updated interference-prediction machine learning model based at least in part on the one or more changes to the network configuration information.

19. The apparatus of claim 14, wherein the instructions are further executable by the processor to cause the apparatus to: transmit, via the assistance information message, an indication of a transmission timing pattern associated with active and inactive states of one or more devices of neighboring cells to be applied to the one or more inputs of the interference-prediction machine learning model.

20. A method for wireless communication at a user equipment (UE), comprising: receiving an assistance information message including network configuration information corresponding to one or more inputs of an interference-prediction machine learning model, wherein the network configuration information comprises a set of parameters associated with one or more neighboring cell configurations; generating, using the interference-prediction machine learning model, a channel interference prediction corresponding to one or more communication links at the UE based at least in part on the network configuration information included in the assistance information message; and communicating with a network entity based at least in part on the channel interference prediction.