CLAIMS

1. A computer-implemented method for providing an artificial intelligence (AI) -based digital assistant, the method being executed by one or more processors and comprising:

receiving, by the one or more processors, communication data from a device, the communication data comprising data input by a user of the device;

receiving, by the one or more processors, text data based on the communication data;

providing, by the one or more processors, an intent set, an entity set and a confidence index based on processing the text data through an artificial intelligence service, the intent set comprising one or more intents indicated in the text data, the entity set comprising one or more entities indicated in the text data, the confidence index indicating accuracy of the one or more intents and entities respectively included in the intent and entity sets, the artificial intelligence service implementing one or more convolution neural networks (CNNs);

identifying, by the one or more processors, a set of actions based on one or more of the text data, the intent set, the entity set and the confidence index, the set of actions comprising one or more actions to be executed by one or more computer-implemented services;

receiving, by the one or more processors, a set of results comprising at least one result from a computer-implemented service executing an action of the set of actions;

providing, by the one or more processors, result data comprising data describing the at least one result; and

transmitting, by the one or more processors, the result data to the device.

2. The method of claim 1, wherein the artificial intelligence service comprises an intent classification model using natural language processing (NLP) to provide the intent set.

3. The method of claim 1 or claim 2, wherein the NLP comprises word embedding.

4. The method of any one of the preceding claims, wherein the artificial intelligence service comprises an entity extraction model using named entity recognition (NER) to provide the entity set.

5. The method of any one of the preceding claims, further comprising determining that one or both of the intent set and the entity set is empty, and in response, transmitting at least one disambiguation question to the device.

6. The method of any one of the preceding claims, further comprising determining that an expected entity is absent from the entity set based on an intent of the intent set, and in response, transmitting at least one disambiguation question to the device.

7. The method of any one of the preceding claims, further comprising determining that the set of results includes a deficiency, and in response, transmitting at least one disambiguation question to the device.

8. The method of any one of the preceding claims, wherein the communication data comprises audio data, and the result data comprises audio result data.

9. The method of any one of the preceding claims, wherein the communication data comprises text data, and the result data comprises text result data.

10. The method of any one of the preceding claims, wherein the result data comprises audio data that is provided by a voice response composition module based on text result data.

11. One or more non-transitory computer-readable storage media coupled to one or more processors and having instructions stored thereon which, when executed by the one or more processors, cause the one or more processors to perform operations for providing an artificial intelligence (AI) -based digital assistant, the operations comprising:

receiving communication data from a device, the communication data comprising data input by a user of the device;

receiving text data based on the communication data;

providing an intent set, an entity set and a confidence index based on processing the text data through an artificial intelligence service, the intent set comprising one or more intents indicated in the text data, the entity set comprising one or more entities indicated in the text data,

the confidence index indicating accuracy of the one or more intents and entities respectively included in the intent and entity sets, the artificial intelligence service implementing one or more convolution neural networks (CNNs);

identifying a set of actions based on one or more of the text data, the intent set, the entity set and the confidence index, the set of actions comprising one or more actions to be executed by one or more computer-implemented services;

receiving a set of results comprising at least one result from a computer-implemented service executing an action of the set of actions;

providing result data comprising data describing the at least one result; and

transmitting the result data to the device.

12. The computer-readable storage media of claim 11, wherein the artificial intelligence service comprises an intent classification model using natural language processing (NLP) to provide the intent set.

13. The computer-readable storage media of claim 11 or claim 12, wherein the NLP comprises word embedding.

14. The computer-readable storage media of any one of claims 11 to 13, wherein the artificial intelligence service comprises an entity extraction model using named entity recognition (NER) to provide the entity set.

15. The computer-readable storage media of any one of claims 11 to 14, wherein operations further comprise determining that one or both of the intent set and the entity set is empty, and in response, transmitting at least one disambiguation question to the device.

16. The computer-readable storage media of any one of claims 11 to 15, wherein operations further comprise determining that an expected entity is absent from the entity set based on an intent of the intent set, and in response, transmitting at least one disambiguation question to the device.

17. The computer-readable storage media of any one of claims 11 to 16, wherein operations further comprise determining that the set of results includes a deficiency, and in response, transmitting at least one disambiguation question to the device.

18. The computer-readable storage media of any one of claims 11 to 17, wherein the communication data comprises audio data, and the result data comprises audio result data.

19. The computer-readable storage media of any one claims 11 to 18, wherein the communication data comprises text data, and the result data comprises text result data.

20. The computer-readable storage media of any one of claims 11 to 19, wherein the result data comprises audio data that is provided by a voice response composition module based on text result data.

21. A system, comprising:

one or more processors; and

a computer-readable storage device coupled to the one or more processors and having instructions stored thereon which, when executed by the one or more processors, cause the one or more processors to perform operations for providing an artificial intelligence (AI) -based digital assistant, the operations comprising:

receiving communication data from a device, the communication data comprising data input by a user of the device;

receiving text data based on the communication data;

providing an intent set, an entity set and a confidence index based on processing the text data through an artificial intelligence service, the intent set comprising one or more intents indicated in the text data, the entity set comprising one or more entities indicated in the text data, the confidence index indicating accuracy of the one or more intents and entities respectively included in the intent and entity sets, the artificial intelligence service implementing one or more convolution neural networks (CNNs);

identifying a set of actions based on one or more of the text data, the intent set, the entity set and the confidence index, the set of actions comprising one or more actions to be executed by one or more computer-implemented services;

receiving a set of results comprising at least one result from a computer-implemented service executing an action of the set of actions;

providing result data comprising data describing the at least one result; and

transmitting the result data to the device.

22. The system of claim 21, wherein the artificial intelligence service comprises an intent classification model using natural language processing (NLP) to provide the intent set.

23. The system of claim 21 or claim 22, wherein the NLP comprises word embedding.

24. The system of any one of claims 21 to 23, wherein the artificial intelligence service comprises an entity extraction model using named entity recognition (NER) to provide the entity set.

25. The system of any one of claims 21 to 24, wherein operations further comprise determining that one or both of the intent set and the entity set is empty, and in response, transmitting at least one disambiguation question to the device.

26. The system of any one of claims 21 to 25, wherein operations further comprise determining that an expected entity is absent from the entity set based on an intent of the intent set, and in response, transmitting at least one disambiguation question to the device.

27. The system of any one of claims 21 to 26, wherein operations further comprise determining that the set of results includes a deficiency, and in response, transmitting at least one disambiguation question to the device.

28. The system of any one of claims 21 to 27, wherein the communication data comprises audio data, and the result data comprises audio result data.

29. The system of any one of claims 21 to 28, wherein the communication data comprises text data, and the result data comprises text result data.

30. The system of any one of claims 21 to 29, wherein the result data comprises audio data that is provided by a voice response composition module based on text result data.