

**FORM 2**

**THE PATENT ACT, 1970**

**(39 of 1970)**

**&**

**The Patent Rules, 2003**

**COMPLETE SPECIFICATION**

**(See section 10 and rule 13)**

**1. TITLE OF THE INVENTION:**

**Real-time Smart Multilingual Interactive System for Passengers**

**2. APPLICANT:**

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**3. PREAMBLE TO THE DESCRIPTION:**

The following specification particularly describes the invention and the manner in which it is to be performed:

#### **4. DESCRIPTION:**

##### **Field of the invention:**

[0001] The present disclosure generally relates to the technical field of voice assistance interactive systems, and in specific relates to an artificial intelligence based multilingual virtual voice assistive kiosk and system that interacts with passengers in any vernacular language and provides information in real-time.

##### **Background of the invention:**

[0002] Transport or transportation includes movement of humans, animals and goods from one place to another. There are different modes of transport such as air, land, water, and thereof. Transport enables trade between people, which is essential for the development of civilizations.

[0003] Transport infrastructure consists of fixed installations, including roads, railways, airways, waterways, canals and pipelines and terminals such as airports, railway stations, bus stations, warehouses, trucking terminals, refuelling depots (including fuelling docks and fuel stations) and seaports. Terminals may be used both for interchange of passengers and cargo and for maintenance.

[0004] In highly populated countries, transportation plays a key role in the economy and development. On an average, 30 million people travel across a country. Considering the number of people travelling, offline ticket booking counters and help desks are often filled with a queue of passengers and sometimes people may miss travelling vehicle due to lack of information about concerned vehicle such as delay in trains thereof. Further, handling the Railway passengers from different places talking in different languages is a challenge for inquiry counters round the clock and operating the conventional inquiry counter by people with multilingual ability is highly expensive.

[0005] Some interactive devices such as kiosks are usually equipped at railway stations or airports to assist travellers or passengers by providing required information. The kiosks are usually employed with interactive touch screens that enable the user to choose required

information or to ask queries. However, for an uneducated person it is quite complicated to interact with such devices.

[0006] An interactive voice response system is a computer interface that accepts input by voice rather than mouse, keyboard or touch. The technology has been around at least since 1970s but has become increasingly widespread as large organizations deploy such systems to handle customer service. When combined with artificial intelligence, it's becoming increasingly difficult to distinguish voice response systems from communication with a live person.

[0007] In existing technology, a touch based kiosk is provided at railway stations. The kiosk aids the user to select a required question and provides different facilities available at a station using a 3 dimensional map. The kiosk provides information after the user touches relevant position on the screen. The kiosk aids daily passengers as well as travellers to find required facilities in a station. However, the kiosk does not provide any information about trains or planes or the like and the user need to wait in queues to know any related information.

[0008] In updated technology, an artificial intelligence (AI) device for recognizing speech of user exists. The AI apparatus includes a microphone and a processor configured to receive a sound signal corresponding to speech of the user via the microphone. The device recognizes the speech from the sound signal using a language model, determines an intention of the user based on the recognition result and determines whether the determination of the intention is successful. The device aids to obtain a user's application usage log if the determination of the intention is not successful, and updates the language model using the obtained user's application usage log.

[0009] However, there is no single virtual voice assisting system that provides train related information to passengers from different regions and languages. There is no universal system that reduces the need for personnel with multiple language knowledge at inquiry centers in railway stations. A system that interacts with uneducated people and provides them with required railway information does not exist.

[0010] Therefore, there is a need for an artificial intelligence based multilingual voice assistive kiosk that interacts with passengers in any vernacular language and aids to provide real-time information in the same language. There is a need to reduce congestion and delays at information query desks at railway stations by employing a number of voice assistive kiosks in a station without any language barriers. There is a need to provide real-time information about various railway queries posed by a user in the same language spoken by the user. There is a need to retrieve and provide real-time data about trains such as the current status of the train, the platform it is assigned to arrive, and thereof to passengers. There is a need to interact with uneducated users to enable them to be independent of inquiry personnel for railway data.

#### **Objectives of the invention:**

[0011] The primary objective of the invention is to provide an artificial intelligence based multilingual voice assistive kiosk that interacts with passengers in any vernacular language using machine learning and aids to provide real time information in the same language.

[0012] Another objective of the invention is to reduce congestion and delays at information inquiry desks at railway stations by employing number of voice assistive kiosks in a station without any language barriers.

[0013] The other objective of the invention is to provide real time information about various railway queries posed by a user in the same language by utilizing natural language processing techniques.

[0014] Yet another objective of the invention is to retrieve details of the user such as native language from central database and thereof by utilizing personal details of the user such as fingerprint, unique identification number and thereof.

[0015] Further objective of the invention is to retrieve real time data about trains such as current status of the train, platform it is assigned to arrive, and thereof from railway database.

[0016] Another objective of the invention is to interact with uneducated users to enable them to be independent of inquiry personnel for railway data.

### **Summary of the invention:**

[0017] The present disclosure proposes a real-time smart multilingual interactive system for passengers. The following presents a simplified summary in order to provide a basic understanding of some aspects of the claimed subject matter. This summary is not an extensive overview. It is not intended to identify key/critical elements or to delineate the scope of the claimed subject matter. Its sole purpose is to present some concepts in a simplified form as a prelude to the more detailed description that is presented later.

[0018] In order to overcome the above deficiencies of the prior art, the present disclosure is to solve the technical problem to provide an artificial intelligence based real-time multilingual virtual voice assistive kiosk and system that interacts with passengers in any vernacular language and provides information in real-time.

[0019] According to an aspect, the invention provides a real-time smart multilingual interactive system for passengers incorporated in a kiosk. The interactive system comprises a user input module, a nativity identification module, a voice assistance module, a speech input module, a processing module, a speech to text conversion module, a query parsing module, and a database. The kiosk incorporates a microphone to receive the user's voice and a speaker to assist the user with relevant information. The smart multilingual interactive system acts as a virtual assistant that aids passengers to know about various details related to railways in real-time and thereby removes the dependence of uneducated passengers on other persons or inquiry personnel.

[0020] The user input module is configured to enable the user to input personal details into the system. The nativity identification module is configured to retrieve the nativity and vernacular language of the user from a central database based on the personal details. A voice assistance module is configured to interact with the user by asking queries in real-time based on the identified vernacular language and nativity of the user and provide relevant

information. In specific, the voice assistance module utilizes natural language processing to ask queries in the user's vernacular language.

[0021] The speech input module is configured to receive the user response to the queries from the voice assistance module. The processing module is configured to utilize artificial intelligence to process the user response, find relevant results, and provide a reply in the user's vernacular language. The speech to text conversion module is configured to convert user response into text if any relevant result is not found. The query parsing module is configured to search for relevant information from the text in a database. The database is configured to store details related to queries such as train timings, available trains in real-time between different stations, ticket fares between different stations, and the like.

[0022] According to another aspect, the invention provides a method of interacting with passengers using a real-time smart multilingual interactive system. The method of interacting with a passenger includes the steps comprising of inputting personal details into the system. Then, the system retrieves the nativity and vernacular language of the user from a central database based on the personal details. Next, the system interacts with the user by asking queries in real-time based on the identified vernacular language and nativity of the user. Later, the user response to the queries from the voice assistance module is received. Then, the user response is processed to find relevant results using artificial intelligence and provide a reply in the user's vernacular language. Next, the user response is converted into text if any relevant result is not found. Later, the text is utilized to search for relevant information in a database and it is retrieved. Finally, the relevant information from the database is provided to the user in user's vernacular language.

[0023] Further, objects and advantages of the present invention will be apparent from a study of the following portion of the specification, the claims, and the attached drawings.

#### **Detailed description of drawings:**

[0024] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate an embodiment of the invention, and, together with the description, explain the principles of the invention.

[0025] FIG. 1 illustrates a real-time smart multilingual interactive system for passengers in accordance to an exemplary embodiment of the invention.

[0026] FIG. 2 illustrates an exemplary method of interacting with a passenger using real-time smart multilingual interactive system in accordance to an exemplary embodiment of the invention.

#### **Detailed invention disclosure:**

[0027] Various embodiments of the present invention will be described in reference to the accompanying drawings. Wherever possible, same or similar reference numerals are used in the drawings and the description to refer to the same or like parts or steps.

[0028] The present disclosure has been made with a view towards solving the problem with the prior art described above, and it is an object of the present invention to provide an artificial intelligence based real-time multilingual virtual voice assistive kiosk and system that interacts with passengers in any vernacular language and provides information in real-time.

[0029] According to an exemplary embodiment of the invention, FIG. 1 refers to a real-time smart multilingual interactive system 100 for passengers incorporated in a kiosk. The interactive system 100 comprises a user input module 101, a nativity identification module 102, a voice assistance module 103, a speech input module 104, a processing module 105, a speech to text conversion module 106, a query parsing module 107, and a database 108. The kiosk incorporates a microphone to receive the user's voice and a speaker to assist the user with relevant information. The smart multilingual interactive system acts as a virtual assistant that aids passengers to know about various details related to railways in real-time and thereby removes the dependence of uneducated passengers on other persons or inquiry personnel.

[0030] The user input module 101 is configured to enable the user to input personal details into the system. The personal details include thumb impression or a unique identification

number and thereof of a user that are registered in a central database. The nativity identification module 102 is configured to retrieve the nativity and vernacular language of the user from a central database based on the personal details. The nativity identification module matches the thumb impression or unique identification number and retrieves the corresponding language and native place of the user. A voice assistance module 103 is configured to interact with the user by asking queries in real-time based on the identified vernacular language and nativity of the user and provide relevant information. In specific, the voice assistance module 103 utilizes natural language processing to ask queries in the user's vernacular language.

[0031] The speech input module 104 is configured to receive the user response to the queries from the voice assistance module. In specific, the user response includes queries regarding the running status of a train by its name or number or transition stations and thereof, availability of trains in real-time between any two stations, a corresponding platform to which a train is assigned, ticket fares between various stations for different trains in different classes of travel. The processing module 105 is configured to utilize artificial intelligence to process the user response, find relevant results, and provide a reply in the user's vernacular language. The speech to text conversion module 106 is configured to convert user response into text if any relevant result is not found. The query parsing module 107 is configured to search for relevant information from the text in a database. In specific, the query parsing module 107 relates the words in the text to relevant information in the database 108. The database 108 is configured to store details related to queries such as train timings, available trains in real-time between different stations, ticket fares between different stations and the like.

[0032] According to another exemplary embodiment of the invention, FIG. 2 refers to a method 200 of interacting with passengers using a real-time smart multilingual interactive system. The method 200 of interacting with a passenger includes the steps comprising of inputting personal details into the system at step 201. Then at step 202, the system retrieves the nativity and vernacular language of the user from a central database based on the personal details. Next, the system interacts with the user by asking queries in real-time based on the identified vernacular language and nativity of the user at step 203.



[0033] Later at step 204, the user response to the queries from the voice assistance module is received. Then, the user response is processed to find relevant results using artificial intelligence at step 205. Then, a reply is provided to the user in the user's vernacular language at step 207 if relevant results are found at step 206. Next at step 208, the user response is converted into text if any relevant result is not found. Later at step 209, the text is utilized to search for relevant information in a database, and the relevant information is retrieved. Finally, the relevant information from the database is provided to the user in the user's vernacular language at step 207.

[0034] Numerous advantages of the present disclosure may be apparent from the discussion above. In accordance with the present disclosure, a real-time smart multilingual interactive system that interacts with people from any vernacular language using machine learning and aids to provide information in the same language spoken by the user. The proposed system incorporated in a kiosk and deployed across a railway station reduces the congestion and delays at information query desks without any language barriers. The smart multilingual interactive system provides information about various railway queries posed by a user in the same language as the user by utilizing natural language processing.

[0035] Further, the device retrieves the details of the user such as the native language from a central database and thereof by utilizing biometric details of the user such as fingerprint and unique identification number thereof. The interactive system retrieves real-time data about trains such as the current status of the train, the platform it is assigned to arrive, and thereof from railway database. The system interacts with uneducated users to enable them to be independent of inquiry personnel for railway data. The system provides information to the passengers from various languages thereby removing the language barrier.

[0036] The real-time smart multilingual interactive system may utilize face recognition to retrieve the nativity and vernacular language of the user by matching facial features with the central database. The real-time smart multilingual interactive system may also connect to a remote device near inquiry personnel to provide the required information in speakers to address other passengers concerned with a similar query. The kiosks incorporated with

the real-time smart multilingual interactive system may also be utilized at airports by integrating a database that stores the data of airplanes. The voice assistance may utilize either a male voice or a female voice to interact with the user. The kiosk may incorporate a slot for scanning the thumbprint of the user or a camera to recognize face of the user.

[0037] It will readily be apparent that numerous modifications and alterations can be made to the processes described in the foregoing examples without departing from the principles underlying the invention, and all such modifications and alterations are intended to be embraced by this application.

## **5. CLAIMS:**

### **I Claim:**

1. A real-time smart multilingual interactive system for passengers, comprising:

a user input module configured to enable a user to input personal details into the system;

a nativity identification module configured to retrieve the nativity and vernacular language of the user from a central database based on the said personal details;

a voice assistance module configured to interact with the user by asking queries in real-time based on the identified vernacular language and nativity of the user and provide relevant travel information;

a speech input module configured to enable the user to interact with the system and receive the user response to the queries from the voice assistance module;

a database configured to store travel information such as train timings, available trains in real-time between different stations, ticket fares between different stations;

a processing module configured to utilize artificial intelligence to process the user response from said speech input module, find relevant results from said database, and transmit the results to said voice assistance module to provide results to the user;

a speech to text conversion module configured to convert user response into text if any relevant result is not found; and

a query parsing module configured to search for relevant information from the text in the database,

whereby said smart multilingual interactive system interacts with passengers in any vernacular language and provides required information in real-time and thereby removes the dependence of uneducated passengers on other persons or inquiry personnel.

2. The real-time smart multilingual interactive system for passengers as recited in claim 1, wherein said personal details of the user include either thumb impression or a unique identification number that are registered in a central database.

3. The real-time smart multilingual interactive system for passengers as recited in claim 1, wherein said nativity identification module matches the thumb impression or unique identification number and retrieves the corresponding language and native place of the user from the central database.

4. The real-time smart multilingual interactive system for passengers as recited in claim 1, wherein said the voice assistance module utilizes natural language processing to ask queries in the user's vernacular language.

5. The real-time smart multilingual interactive system for passengers as recited in claim 1, wherein said user response include queries regarding including travel information such as running of a train by its name or number or transition stations and thereof, availability of trains in real-time between any two stations, a corresponding platform to which a train is assigned, ticket fares between various stations for different trains in different classes of travel.

6. The real-time smart multilingual interactive system for passengers as recited in claim 1, wherein said system is incorporated in a kiosk configured with a microphone to receive the user's voice and a speaker to assist the user with relevant information.

7. The real-time smart multilingual interactive system for passengers as recited in claim 1, wherein said voice assistance module utilizes natural language processing to ask queries in the user's vernacular language.

8. The real-time smart multilingual interactive system for passengers as recited in claim 1, wherein said query parsing module relates the words in the text to relevant information in the database.

9. A method of interacting with passengers using a real-time smart multilingual interactive system, comprising:

inputting personal details into the system;

retrieving the nativity and vernacular language of the user from a central database based on the personal details;

interacting with the user by asking queries in real-time based on the identified vernacular language and nativity of the user;

receiving the user response to the queries from the voice assistance module;

processing the user response to find relevant results using artificial intelligence and providing a reply in the user's vernacular language;

converting the user response into text if any relevant result is not found;

utilizing the converted text to search for relevant information in a database and retrieving it, and

providing relevant information from the database to the user in user's vernacular language.

**6. DATE AND SIGNATURE:**

Dated this 3<sup>rd</sup> day of July, 2021

A handwritten signature in black ink, appearing to read 'Hima Bindu Atti'.

Patent Agent Name: Hima Bindu Atti

INPA-3925

## **7. ABSTRACT:**

### **Title: Real-time Smart Multilingual Interactive System for Passengers**

The present disclosure proposes an artificial intelligence based multilingual voice assistive kiosk that interacts with people in any vernacular language using machine learning and aids to provide information in the same language. The interactive system 100 comprises a user input module 101, a nativity identification module 102, a voice assistance module 103, a speech input module 104, a processing module 105, a speech to text conversion module 106, a query parsing module 107, and a database 108. The proposed device reduces the congestion and delays at information query desks at railway stations by employing number of voice assistive kiosks in a station without any language barriers. The voice assistant device provides information about various railway queries posed by a user in the same language spoken by the user by utilizing machine learning and natural language processing techniques. Further, the device retrieves the details of the user such as native language from central database and thereof by utilizing biometric details of the user such as fingerprint and thereof. The voice assistant device retrieves real time data about trains such as current status of the train, platform it is assigned to arrive, and thereof from a railway database. The device therefore interacts and assists uneducated users to enable them to be independent of inquiry personnel for railway data.

