All India Institute of Medical science, Bathinda
Dr Tarun Kumar Singh

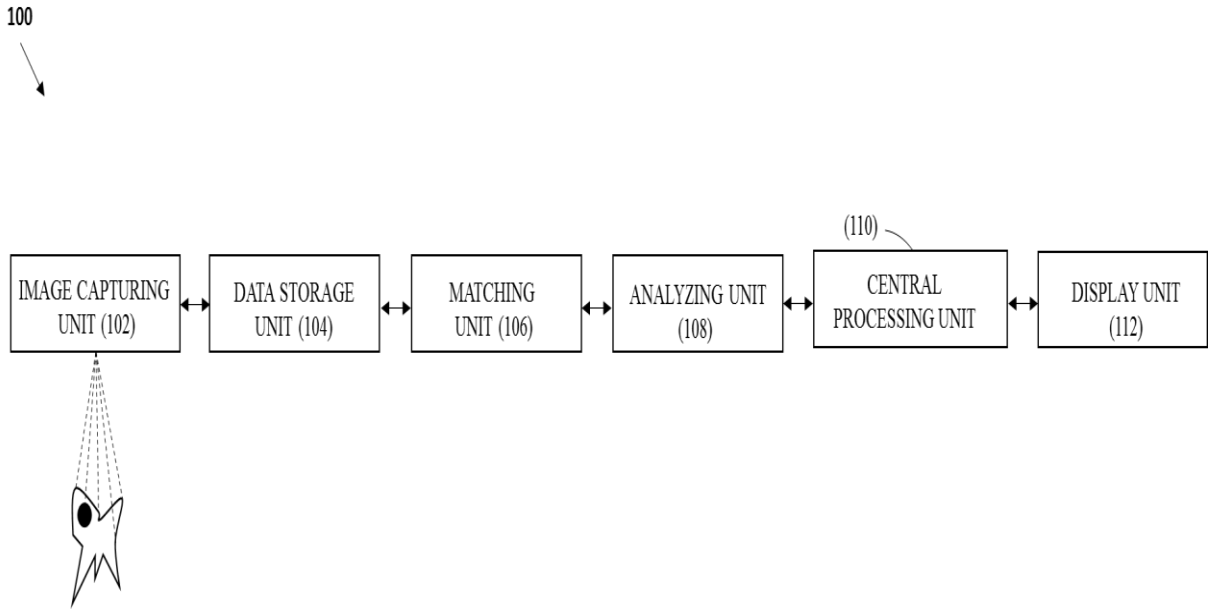

Figure 1

Amrish Chandra
Agent of the Applicant
IN/PA-2959

FORM 2

THE PATENTS ACT 1970 (39 of 1970)

AND

The Patents Rules, 2003

COMPLETE SPECIFICATION

(See section 10 and rule13)

TITLE OF THE INVENTION

AN ARTIFICIAL INTELLIGENCE BASED SYSTEM FOR DETECTION OF CAVITY ON INTRAORAL IMAGES

APPLICANT:

Name in Full	All India Institute of Medical science, Bathinda
Nationality	Indian
Country of Residence	India
Address of the Applicant	Dabwali Rd, Lal Singh Nagar, Bathinda, Punjab, Pin Code: 151001
Name in Full	Dr.Tarun Kumar Singh
Nationality	Indian
Country of Residence	India
Address of the Applicant	Department of Dentistry, AIIMS, Dabwali Rd, Lal Singh Nagar, Bathinda, Punjab, Pin Code: 151001

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

FIELD OF INVENTION

The present invention relates to the field of intraoral scanning, and more particularly to an artificial intelligence based system for detection of cavity on intraoral images.

BACKGROUND OF THE INVENTION

At present, the incidence rate of oral diseases is high, explosion type spreading of novel coronavirus is achieved, the number of hospital patients is sharply increased, meanwhile, the risk that doctors are infected is also caused, and huge challenges are brought to clinical diagnosis and treatment. It is an urgent need to reduce doctor-patient cross infection and eliminate human differences.

The following prior arts have been reported:

JP2021058672: A processing device receives an intraoral image of a first intraoral site, and determines a unique feature of the first intraoral site. The processing device then locks the intraoral image, and selects a portion of the intraoral image that depicts a portion of the first intraoral site on the basis, at least partly, of the unique feature of the first intraoral site. The processing device may then generate a model comprising the first intraoral site on the basis, at least partly, of the locked intraoral image. The portion of the locked intraoral image is used for a first region of the model, and data from one or more additional intraoral images that also depict the portion of the first intraoral site is not used for the first region of the model.

JP2009056298: A system for capturing multiple intraoral images includes an intraoral sensor. The sensor 1 includes a sensor array, a transmitter and a power source that provides power to the sensor array and the transmitter. The sensor is configured to be inserted inside a patient's oral cavity, capture an image upon the presence of incident radiation and transmit 4 from within the oral cavity via a wireless link electrical signals representing the image. A base station 2 positioned outside the oral cavity is configured to receive the electrical signals transmitted

from the sensor. The sensor is capable of capturing the electrical signals representing multiple intraoral images and transmitting to the base station the electrical signals representing the multiple intraoral images without removing the sensor from the patient's oral cavity.

Therefore, there remains a need in the art for an IoT based smart mask that does not suffer from the above-mentioned deficiencies or at least provides a viable and effective solution.

OBJECTS OF THE INVENTION

Some of the objects of the present disclosure, which at least one embodiment herein satisfies, are as follows.

It is an object of the present disclosure to ameliorate one or more problems of the prior art or to at least provide a useful alternative.

An object of the present disclosure is to provide an artificial intelligence based system for detection of cavity on intraoral images.

An object of the present disclosure is to provide an artificial intelligence based system for detection of cavity on intraoral images in real time.

An object of the present disclosure is to provide an artificial intelligence based system for detection of cavity on intraoral images to realize real-time tracking and image operation of oral lesion teeth, so as to block virus disease propagation and reduce the contact between a doctor and a patient.

SUMMARY OF THE INVENTION

The following presents a simplified summary of the invention in order to provide a

basic understanding of some aspects of the invention. This summary is not an extensive overview of the present invention. It is not intended to identify the key/critical elements of the invention or to delineate the scope of the invention. Its sole purpose is to present some concept of the invention in a simplified form as a prelude to a more detailed description of the invention presented later.

An embodiment of the present invention provides an artificial intelligence-based system for the detection of the cavity on intraoral images. The system comprises an image-capturing unit, a data storage unit, a matching unit, an analyzing unit, a central processing unit, and a display unit. The system is configured to realize real-time tracking and image operation of oral lesion teeth, to block virus disease propagation, and reduce the contact between a doctor and a patient.

In accordance with an embodiment of the present invention, the image-capturing unit is configured to improve the quality of images obtained from the captured reflected and auto-fluorescence light.

In accordance with the embodiment of the present invention, the predefined information comprises primary data and secondary data.

In accordance with an embodiment of the present invention, the primary data is data regarding teeth and dental disease collected from various dentists.

In accordance with an embodiment of the present invention, the secondary data is data about artificial intelligence will be collected from research journals and e-resources

In accordance with an embodiment of the present invention, the display unit is selected from a group comprising laptops, desktops, smartphones, and tablets.

BRIEF DESCRIPTION OF THE DRAWINGS

So that the manner in which the above recited features of the present invention can be understood in detail, a more particular description of the invention, briefly summarized above, may have been referred to by embodiments, some of which are illustrated in the appended drawings. It is to be noted, however, that the appended drawings illustrate only typical embodiments of this invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective embodiments.

These and other features, benefits, and advantages of the present invention will become apparent by reference to the following text figure, with like reference numbers referring to like structures across the views, wherein

Fig.1: Illustrates provides an artificial intelligence based system for detection of cavity on intraoral images, in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The following description is of exemplary embodiments only and is not intended to limit the scope, applicability or configuration of the invention in any way. Rather, the following description provides a convenient illustration for implementing exemplary embodiments of the invention. Various changes to the described embodiments may be made in the function and arrangement of the elements described without departing from the scope of the invention.

While the present invention is described herein by way of example using embodiments and illustrative drawings, those skilled in the art will recognize that the invention is not limited to the embodiments of drawing or drawings described, and are not intended to represent the scale of the various components. Further, some components that may form a part of the invention may not be illustrated in certain figures, for ease of illustration, and such omissions do not limit the embodiments outlined in any way. It should be understood that the drawings and detailed

description thereto are not intended to limit the invention to the particular form disclosed, but on the contrary, the invention is to cover all modifications, equivalents, and alternatives falling within the scope of the present invention as defined by the appended claim. As used throughout this description, the word "may" is used in a permissive sense (i.e. meaning having the potential to), rather than the mandatory sense, (i.e. meaning must). Further, the words "a" or "an" mean "at least one" and the word "plurality" means "one or more" unless otherwise mentioned. Furthermore, the terminology and phraseology used herein is solely used for descriptive purposes and should not be construed as limiting in scope. Language such as "including," "comprising," "having," "containing," or "involving," and variations thereof, is intended to be broad and encompass the subject matter listed thereafter, equivalents, and additional subject matter not recited, and is not intended to exclude other additives, components, integers or steps. Likewise, the term "comprising" is considered synonymous with the terms "including" or "containing" for applicable legal purposes.

Figure.1: Illustrates provides an artificial intelligence-based system (100) for the detection of the cavity on intraoral images, in accordance with an embodiment of the present invention. The system (100) comprises an image-capturing unit (102), a data storage unit (104), a matching unit, an analyzing unit (108), a central processing unit (110), and a display unit (112). The image capturing unit (102) is configured to capture the image to detect the cavity present in the tooth. The data storage unit (104) is operationally connected to the image capturing unit (102). The data storage unit (104) is configured to store predefined image information data about the presence of cavities in the teeth and captured images. The matching unit (106) is operationally connected to the data storage unit (104). The matching unit (106) is configured to match the captured image with the predefined image information data. The analyzing unit (108) is operationally connected with the data storage unit (104). The analyzing unit (108) is configured to analyze the matched image. The central processing unit (110) is operationally

connected with the image capturing unit (102), data storage unit (104), matching unit (106) and analyzing unit (108). The central processing unit (110) is configured to function performed by the image capturing unit (102), data storage unit (104), matching unit (106) and analyzing unit (108). The display unit (112) is operationally connected with the central processing unit (110). The display unit (112) is configured to provide user interface and display the analyzed information about the presence of cavity in the teeth and level of defectiveness of the teeth. The predefined information comprises primary data and secondary data. The primary data is data regarding teeth and dental disease are collected from various dentists. The secondary data is data about artificial intelligence will be collected from research journals and e-resources. The display unit (112) may be, but is not limited laptops, desktops, smartphones, and tablets.

In accordance with an embodiment of the present invention, the image capturing unit (102), data storage unit (104), matching unit, analyzing unit (108), central processing unit (110) and display unit (112) are communicatively connected through a wired or wireless communication network. While considerable emphasis has been placed herein on the specific features of the preferred embodiment, it will be appreciated that many additional features can be added and that many changes can be made in the preferred embodiment without departing from the principles of the disclosure. These and other changes in the preferred embodiment of the disclosure will be apparent to those skilled in the art from the disclosure herein, whereby it is to be distinctly understood that the foregoing descriptive matter is to be interpreted merely as illustrative of the disclosure and not as a limitation.

We Claim,

1. An artificial intelligence-based system (100) for the detection of a cavity on intraoral images, comprising:

   an image capturing unit (102) configured to capture the image to detect cavity presence in the tooth;

   a data storage unit (104) operationally connected with the image capturing unit (102) configured to store predefined image information data about the presence of cavities in the teeth and captured image;

   a matching unit (106)operationally connected with the data storage unit (104), configured to match the captured image with the predefined image information data;

   an analyzing unit (108) operationally connected with the data storage unit (104), configured to analyze the matched image;

   a central processing unit (110) operationally connected with the image capturing unit (102), data storage unit (104), matching unit (106), and analyzing unit (108), configured to function performed by the image capturing unit (102), data storage unit (104), matching unit (106)and analyzing unit (108);

   a display unit (112) operationally connected with the central processing unit (110), configured to provide a user interface and display the analyzed information about the presence of cavities in the teeth and the level of defectiveness of the teeth.
2. The system (100) as claimed in claim 1, wherein the image capturing unit (102) is configured to improve the quality of images obtained from the captured reflected and auto fluorescence light.
3. The system (100) as claimed in claim 1, wherein the predefined information comprises primary data and secondary data.
4. The system (100) as claimed in claim 1, wherein the primary data is data regarding teeth and dental disease collected from various dentists

5. The system (100) as claimed in claim 1, wherein the secondary data is data about artificial intelligence will be collected from research journals and e-resources
6. The system (100) as claimed in claim 1, wherein the display unit (112) is selected from a group comprising laptops, desktops, smartphones, and tablets.

Dated this 31 October 2022



Dr. Amrish Chandra
Agent of the Application
IN/PA-2959.

TITLE: AN ARTIFICIAL INTELLIGENCE BASED SYSTEM FOR DETECTION OF CAVITY ON INTRAORAL IMAGES

ABSTRACT

The present invention relates to an artificial intelligence-based system (100) for the detection of the cavity on intraoral images. The system (100) comprises an image-capturing unit (102), a data storage unit (104), a matching unit, an analyzing unit (108), a central processing unit (110), and a display unit (112). The system (100) is configured to realize real-time tracking and image operation of oral lesion teeth, so as to block virus disease propagation and reduce the contact between a doctor and a patient. The image capturing unit (102) is configured to capture the image to detect the cavity present in the tooth. The data storage unit (104) is configured to store predefined image information data about the presence of cavities in the teeth and captured images. The display unit (112) is configured to provide a user interface and display the analyzed information about the presence of cavities in the teeth and the level of defectiveness of the teeth in real time.