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# USPTO Object Detection



## **End Goal**

Create an intuitive user-interface to allow the layman to be able to more readily work with patent data.

## **Goal for this capstone**

Create the first one or two phases on the overall project.

- Create and object detector to recognize patent images.



## Some tools

tensorflow==1.13.1

six==1.12.0

Pillow==6.0.0

numpy==1.16.4

matplotlib==3.1.1

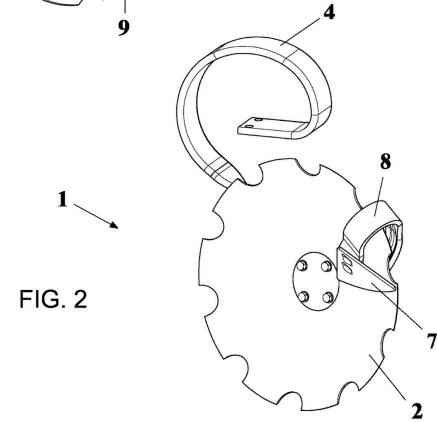
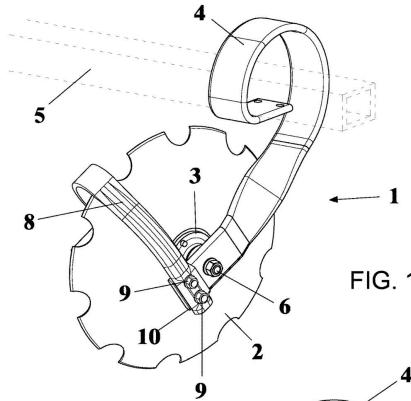
And much more...

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# Some steps

- 1- Collect images from USPTO website
- 2- Annotate the images - human trains machine
- 3- Split images/annotations into train/test
- 4- Generate TF Records - 1s & 0s
- 5- Setup config file
- 6- Train
- 7- Export graph from trained model
- 8- Detect patent images.





Image

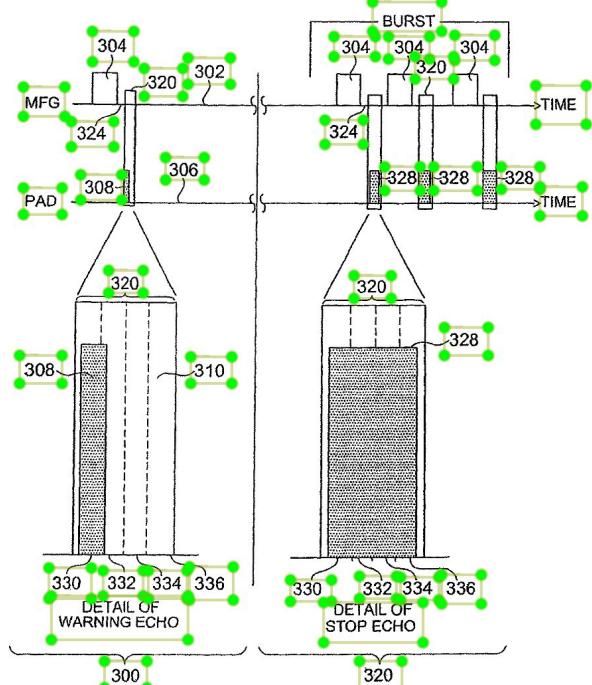


FIG. 7

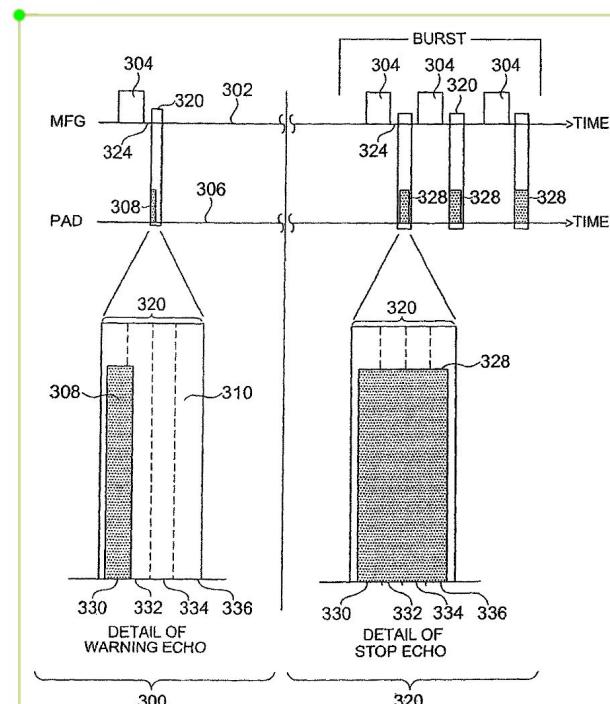


FIG. 7



# **test/train split**

10/90 - 36/323



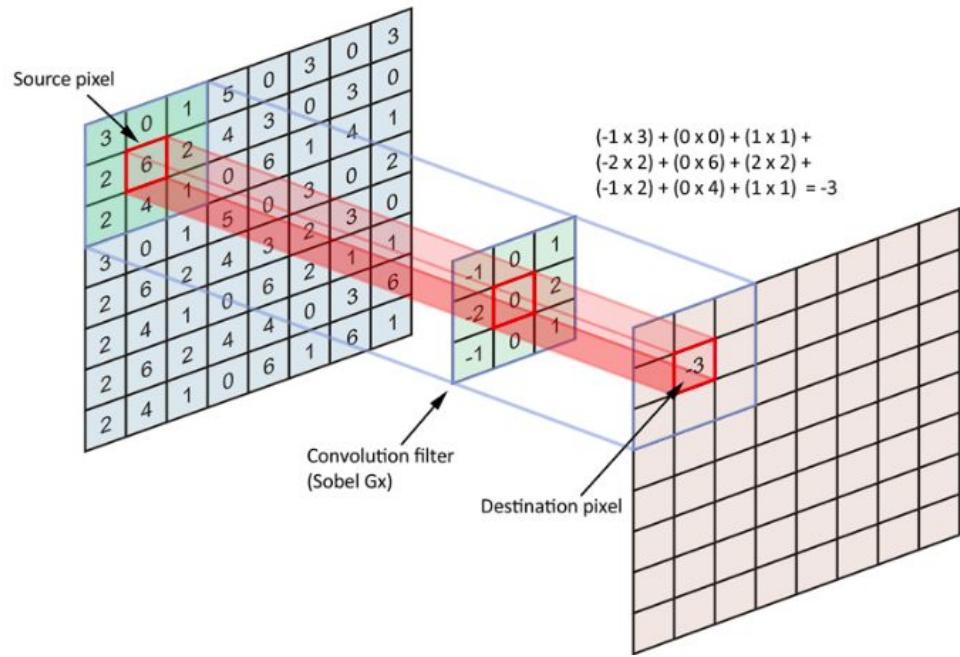
# Config file

Connects/Dictates:

TF Record | .pbtxt | steps | rate

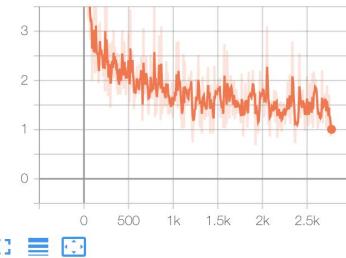
# Train

Convolutional Neural Network -

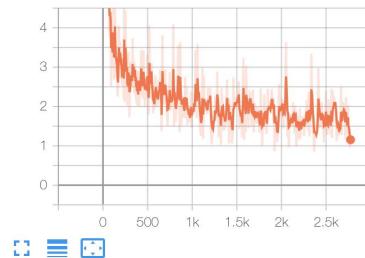


# Minimizing error

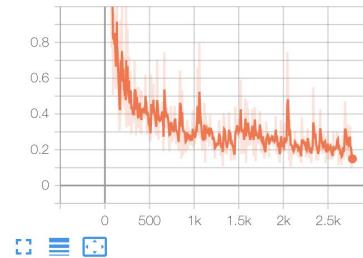
Loss/classification\_loss  
tag: Losses/Loss/classification\_loss



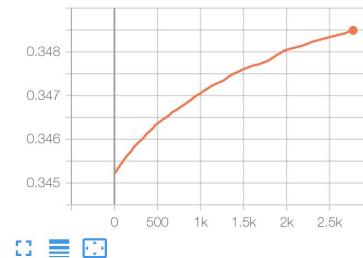
clone\_loss  
tag: Losses/clone\_loss



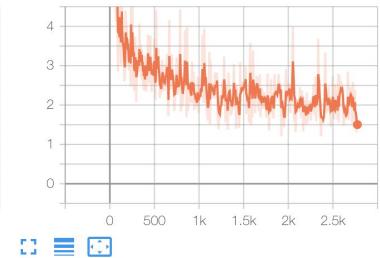
Loss/localization\_loss  
tag: Losses/Loss/localization\_loss



regularization\_loss  
tag: Losses/regularization\_loss

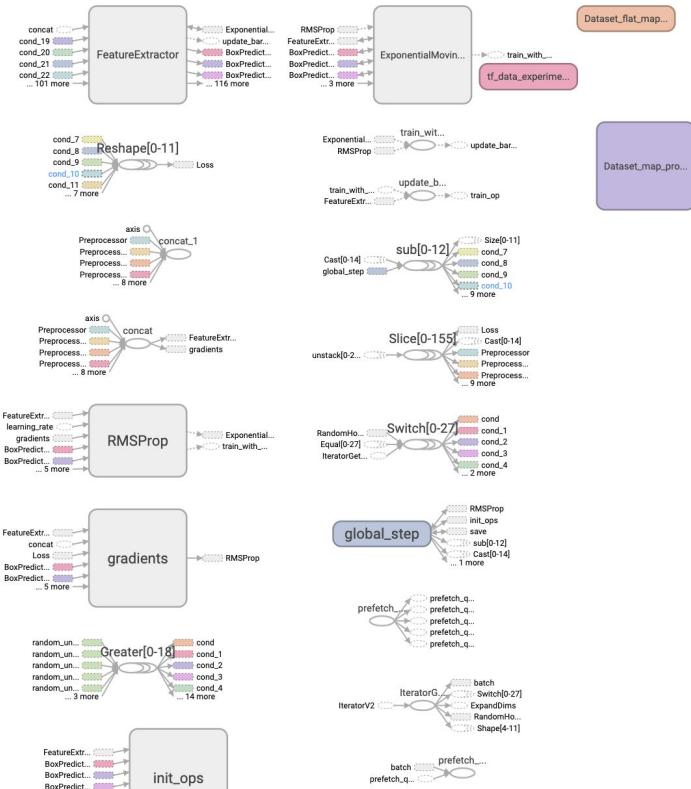
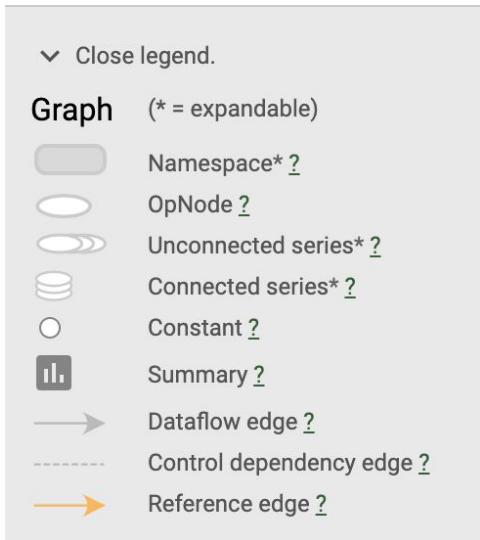


TotalLoss  
tag: Losses/TotalLoss





# Visualizing network



(12) United States Patent  
Wijayarata et al.

(16) Patent No.: US 10,165,982 B2  
(45) Date of Patent: Jan. 1, 2019

(54) PHONE FOR USE IN HEALTH MONITORING

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Sanath Wijayarata, Bingham (GB); Michael Pearson, Bingham (GB)

(73) Assignee: SANANDCO LIMITED, Bingham, Nottinghamshire (GB)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. (154(b)) by 141 days.

(21) Appl. No.: 15/191,362

(22) PCT Filed: Feb. 17, 2015

(86) PCT No.: PCT/GB2015/050453

3,771 (GB).

(2) Date: Aug. 16, 2016

(87) PCT Pub. No.: WO2015/121689

PCT Pub. Date: Aug. 20, 2015

(65) Prior Publication Data  
US 2017/0055911 A1 Mar. 2, 2017

(30) Foreign Application Priority Data

Feb. 17, 2014 (GB) 1402728.8

(51) Int. Cl.  
A61B 5/00 (2006.01)

A61B 5/01 (2006.01)

(Continued)

(52) U.S. CL.  
CPC ..... A61B 5/6899 (2013.01); A61B 5/0022 (2013.01); A61B 5/01 (2013.01);  
(Continued)

(55) Field of Classification Search  
CPC ... A61B 25/20(06); A61B 5/0022; A61B 5/01;  
A61B 5/00(06); A61B 5/02(06); A61B 5/025(05);  
(Continued)

(56) References Cited  
U.S. PATENT DOCUMENTS

5,357,427 A 1994 Lang et al.  
5,934,791 A 1999 Saito et al.  
(Continued)

FOREIGN PATENT DOCUMENTS

CA 2426259 A1 11/20/12  
CN 102331632 A 07/2012  
(Continued)

011181 PUBLICATIONS

Extended European Search Report, for European Patent Application No. 1719531.9, dated Dec. 8, 2017, 9 pages.  
(Continued)

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(74) Attorney, Agent or Firm: Kinney & Lange, P.A.

(57) ABSTRACT

A phone comprising: a phone body, at least one sensor on a phone body for measuring a vital sign of a user when the user places the phone body against their head; and means for transmitting the voice-frequency band signal for use monitoring the health of the user.

(Continued)

15 Claims, 6 Drawing Sheets

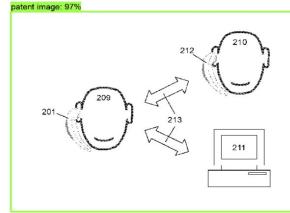


Figure 1

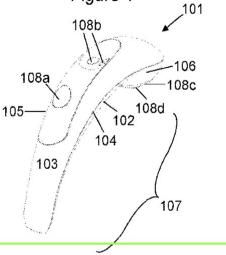


Figure 2

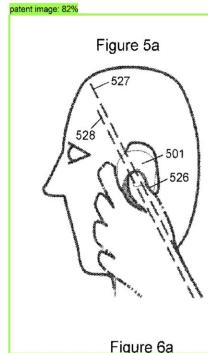
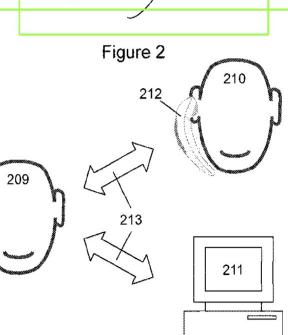
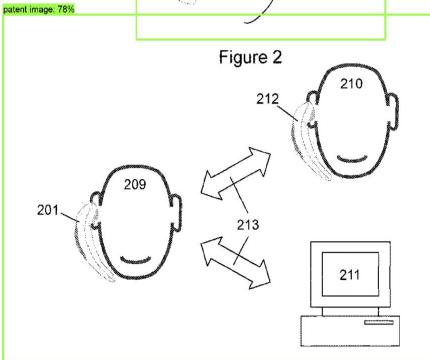


Figure 5a

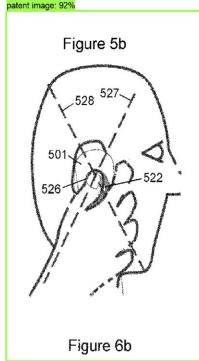


Figure 5b

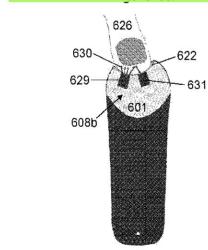


Figure 6a

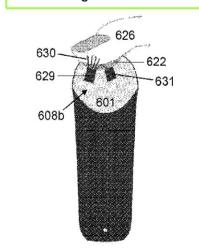


Figure 6b

US 10,165,982 B2

1 2

PHONE FOR USE IN HEALTH MONITORING  
TECHNICAL FIELD

The present disclosure relates to the field of health monitoring. More particularly, the present disclosure relates to a phone body for monitoring a vital sign of a user when the user places the phone body against their head, convert the vital sign measurement into a voice-frequency band signal, and means for transmitting the voice-frequency band signal for use monitoring the health of the user.

BACKGROUND

An ever-increasing ageing population and growing health problems has led to an increase in the demand for healthcare services. In particular, there is a need for emergency (A&E) and non-emergency healthcare services to treat patients attending in the UK was three times more than in 1970. This not only puts pressure on the medical staff and resources of the National Health Service (NHS) as a whole. It is estimated that at least a fifth of patients admitted as emergencies could be managed at home.

To try and address this issue, the NHS has introduced a free number for patients with urgent, but not life-threatening conditions, to call for help. This can be done by calling 111 or by calling 999. However, reports have emerged of patients facing long wait for advice, and unnecessary treatment. This is because the advice given has been either incorrectly referred to the medical handlers or who are simply unable to get any help at all.

One of both the shape and arrangement of the phone may be configured to encourage a left-handed hold over a right-handed hold.

The ease of the centre of gravity of the phone body in the centre of the phone body, or in a location therefore. The centre of gravity may be formed on the rear side of the left side of the phone body, or in a location therefore.

The centre of gravity may be formed on the rear side of the phone body and may be tilted towards the left side of the phone body.

The centre of gravity may be tilted at an angle of up to 30° relative to the vertical axis of the phone body.

The phone body may comprise an emitter coupled to illuminate a thumb or finger of the user with light when the user places the phone body against their head. The detector may be configured to detect light from the centre which has been reflected by the user's thumb/finger.

The centre of gravity may have a substantially elliptical, rectangular or square shape.

The phone body may have a generally elongated shape.

The phone body may have a substantially circular, elliptical or rectangular cross-section.

The phone body may have a generally curved or C-shaped longitudinal axis.

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# Going forward

Furthur train existing dataset.

Annotate/train/test on patent image figure labels.

Parse patent full text data.

NLP

Pair NLP results with image labels.

Create interface.