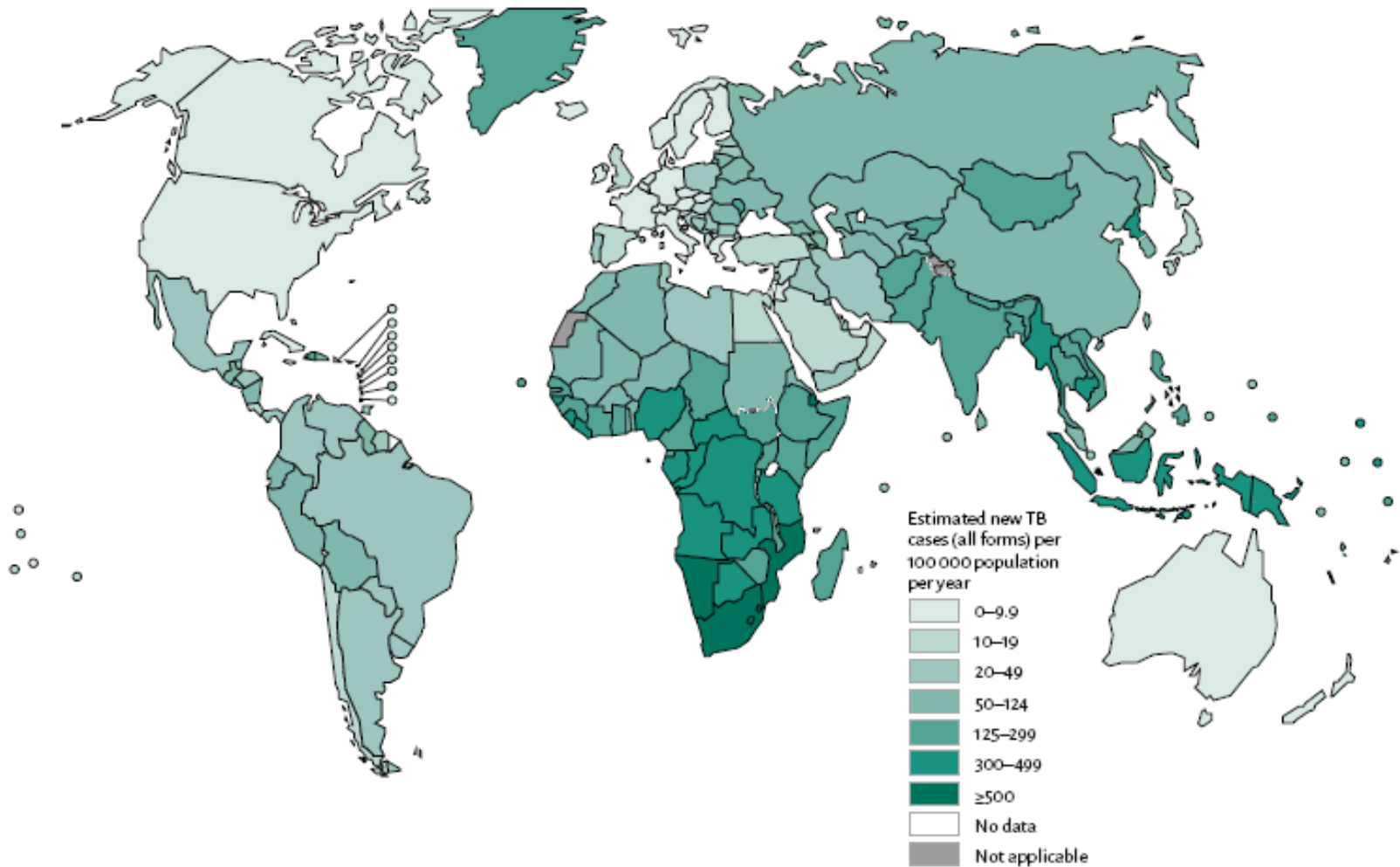# IOT-BASED PULMONARY TUBERCULOSIS DIAGNOSTICS SYSTEM

ASEAN IVO Forum 2016
Hanoi, Vietnam

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**Universiti Teknologi Malaysia**

2015 Global Tuberculosis Report 20th Ed (WHO, 2015)

Estimated TB incidence rates, 2014

Estimated new TB cases (all forms) per 100 000 population per year

- 0–9.9
- 10–19
- 20–49
- 50–124
- 125–299
- 300–499
- ≥500
- No data
- Not applicable

Global distribution of estimated TB incidence by rate and absolute number in 2014

Global distribution of estimated TB incidence by rate and absolute number, 2014. The size of each bubble is proportional to the size of the country's population. High-burden countries are shown in red.
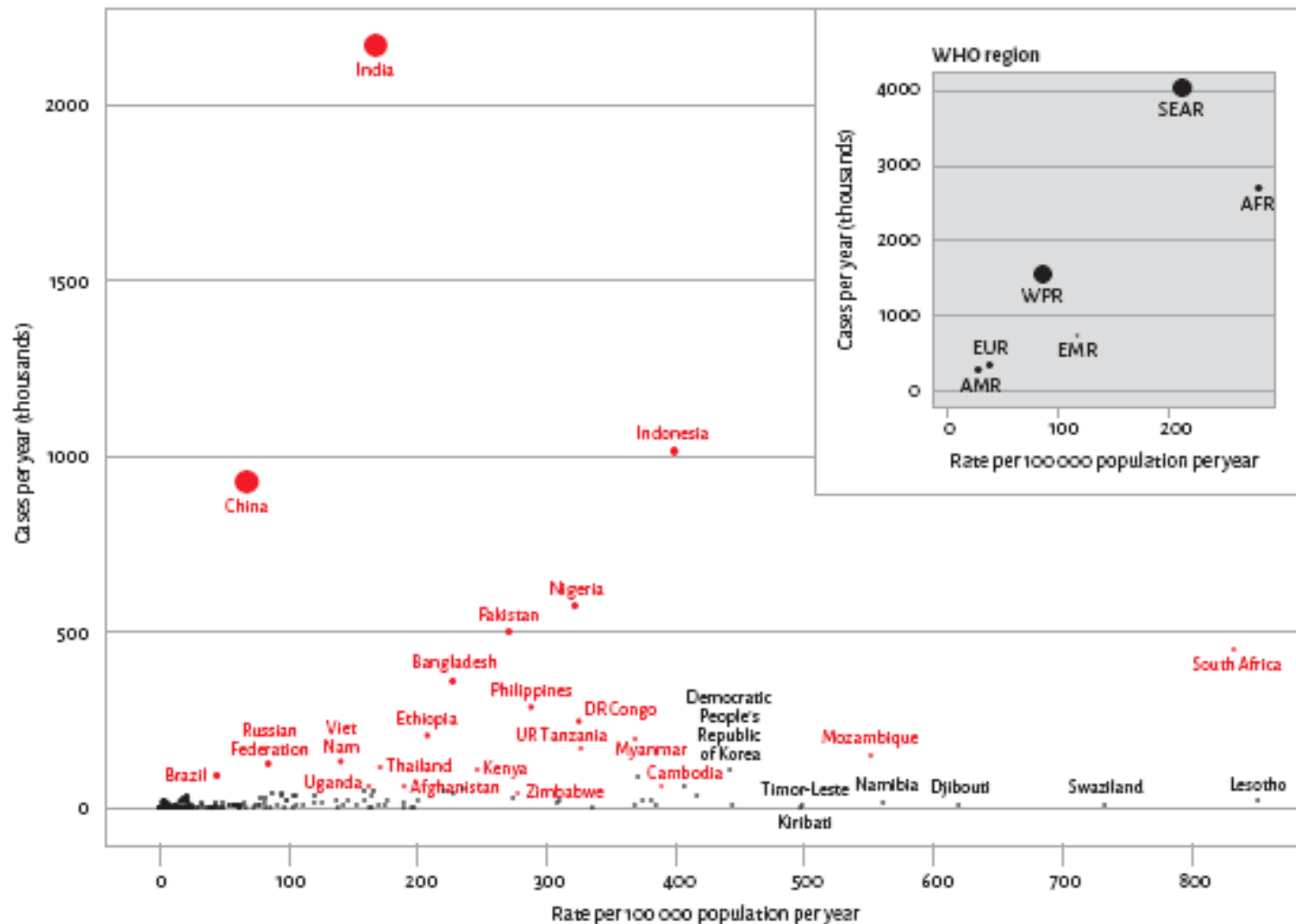
Screening of Lung diseases

- Variety of lung diseases that have the similar symptoms and sign – pneumonia, lung cancer and pulmonary tuberculosis
  - Coughing for more than 2 weeks
  - Loss of appetite
  - Loss of weight

- Different manifestation of Pulmonary Tuberculosis
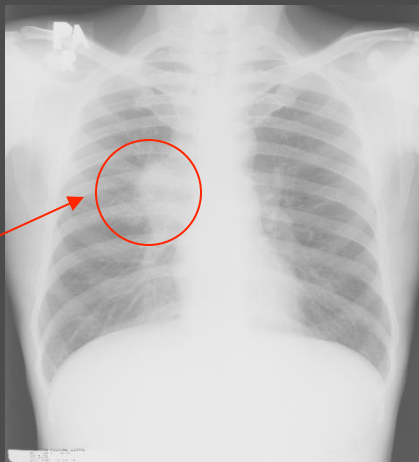 - COPD
  - Emphysema
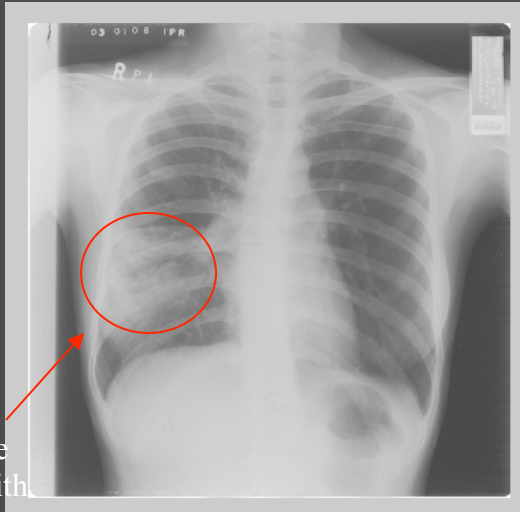
Lung tissue
infected with
pneumonia

Figure 1.1 Visual of chest radiograph of pneumonia
infected lung [2]
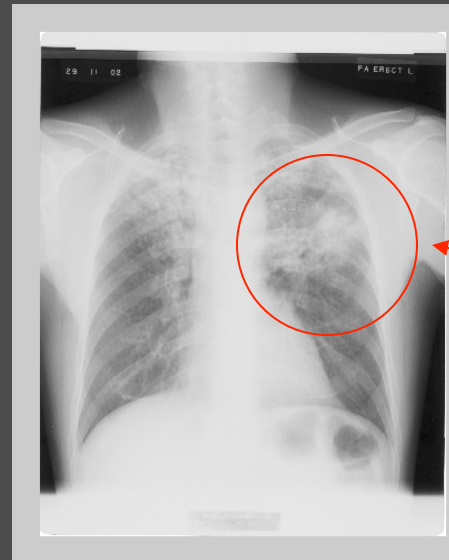
Lung tissue
infected with
PTB

Figure 1.2 Example of chest radiograph
showing PTB infected lung (snowflakes) [2]

Lung tissue
infected with
cancer

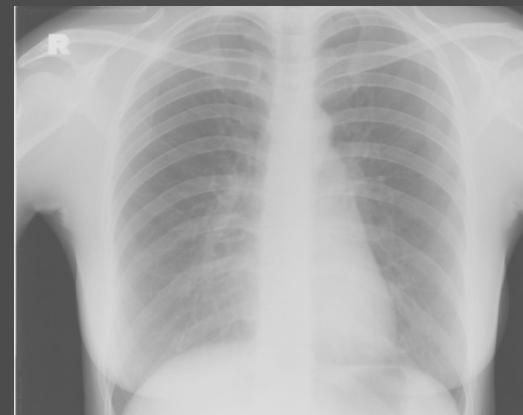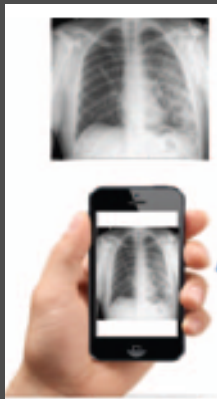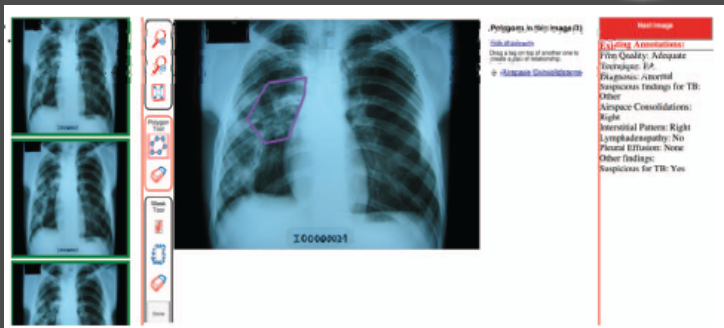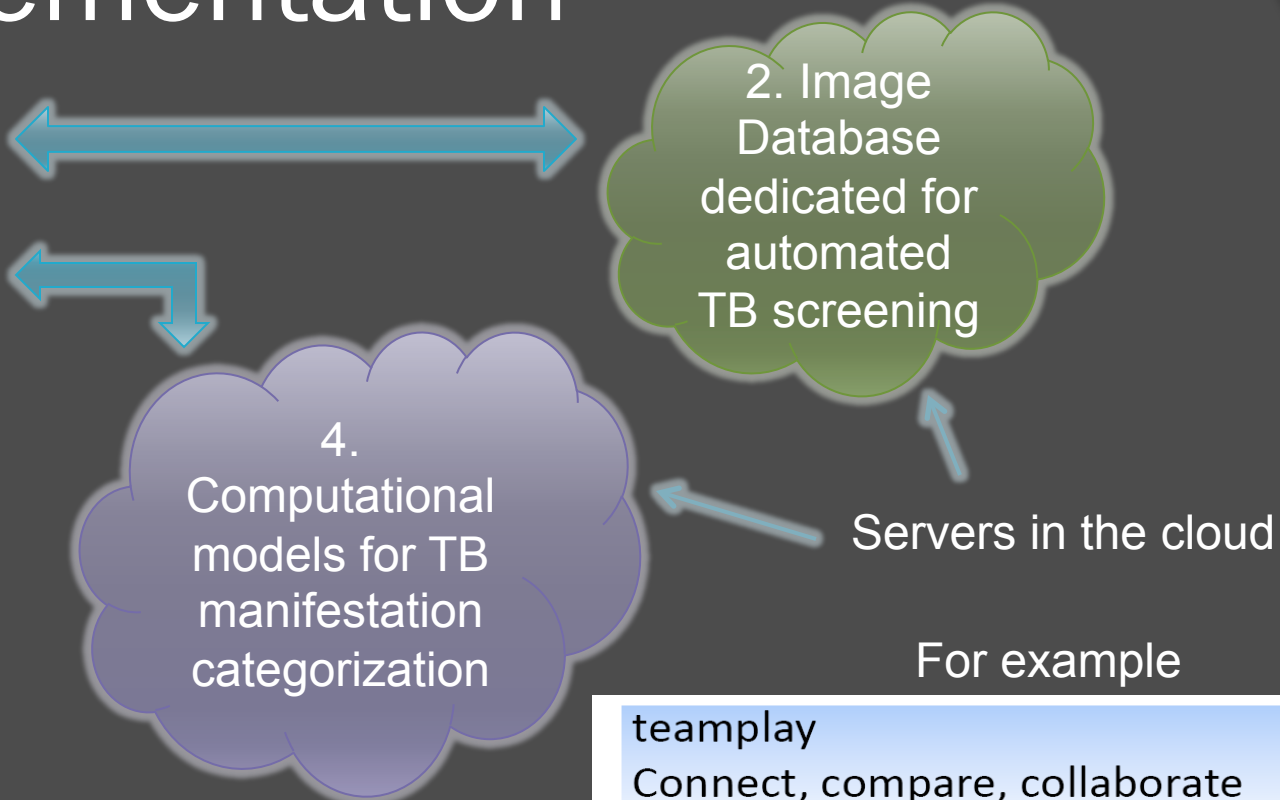**Figure 1.3** Example of chest radiograph showing
lung cancer [2]

Figure 1.4 Example of normal lung of an
healthy individual [2]

Implementation

1. Mobile Device for Data Capturing

2. Image Database dedicated for automated TB screening

4. Computational models for TB manifestation categorization
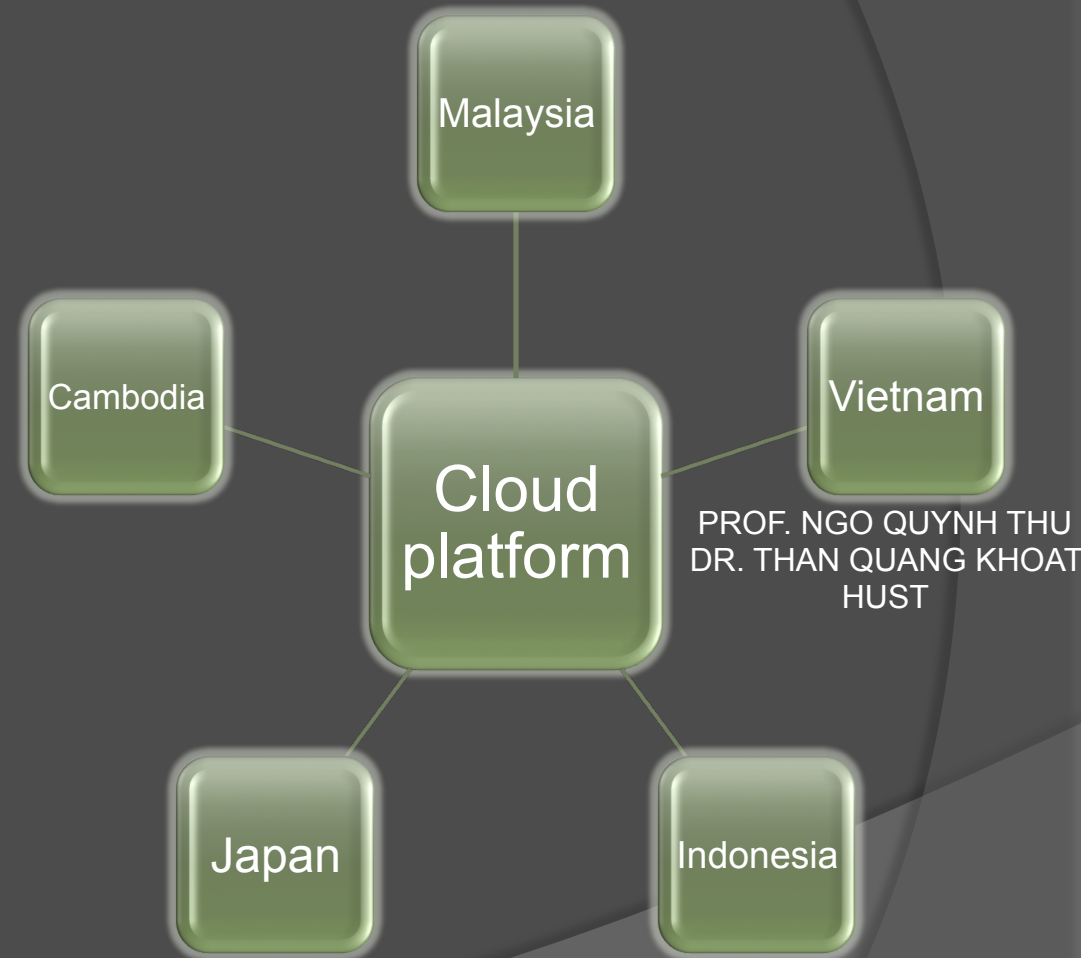
Servers in the cloud

For example

3. Manifestation Annotation System

teamplay
Connect, compare, collaborate

teamplay is a network that brings together healthcare professionals and patients in order to advance medicine and human health

Call for Collaborations

- Ethical Committee approval for each country

- Database sharing for lung X-ray

- IoT platform for DICOM images

- Radiologist/ Pulmonary Expert

Malaysia

Cambodia

Cloud platform

Vietnam

PROF. NGO QUYNH THU
DR. THAN QUANG KHOAT
HUST

Japan

Indonesia

Our Related Research in Lung Disease Discrimination

1. Patent MY-153250-A, Jan 2015 Patent File No: **PI 2007 2342** Patent Title: 'Computer Aided Diagnostics System for Detecting Pulmonary Tuberculosis and Lung Cancer' – **NM Noor**, OM Rijal

2. O. M. Rijal, Ebrahimian H, **N. M. Noor**, Hussin A, A. Yunus, Mahayiddin AA (2015). Application of Phase Congruency for Discriminating Some Lung Diseases using Chest Radiograph, Computational and Mathematical Methods in Medicine (open-access). DOI:10.1155/2015/424970

3. **N. M. Noor**, A. Yunus, S.A.R. Abu Bakar, A. Hussin, O. M. Rijal. Applying a Statistical PTB Detection Procedure to Complement the Gold Standard, Computerized Medical Imaging and Graphics, (2011)35 (3), pp. 186-194, (ISI-Index Publication) DOI:**10.1016/j.compmedimag.2010.10.002**

4. **N. M. Noor**, O. M. Rijal, A. Yunus, S.A.R. Abu-Bakar, (2010) A Discrimination Method for the Detection of Pneumonia Using Chest Radiograph, Computerized Medical Imaging and Graphics. 34(2010): 160-166 (ISI-Index Publication) DOI:**10.1016/j.compmedimag.2009.08.005**

THANK YOU

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