IoT-Based Automatic Rain Gauge Radar for Climate Change Adaptation
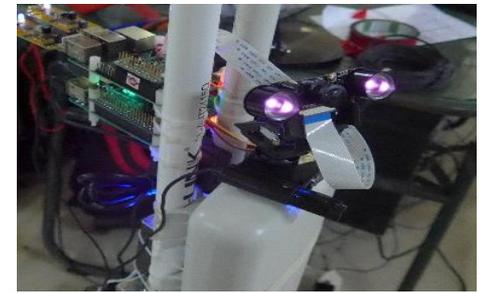
AHMAD BUDI SETIAWAN
The Agency of Research and Human Resources Development
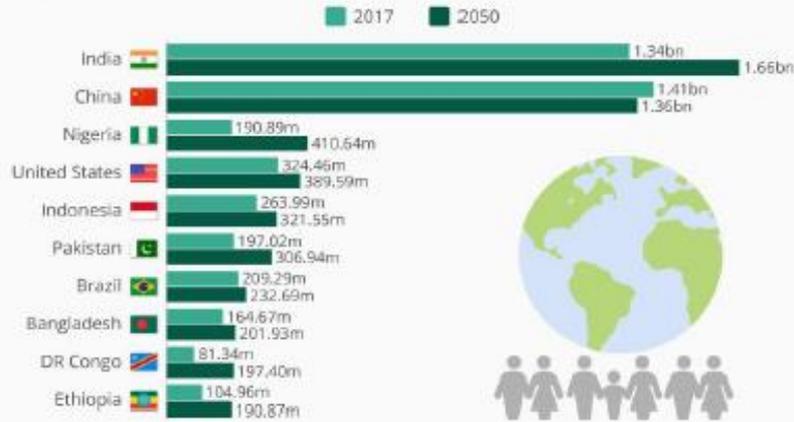**Ministry of ICT, Indonesia**

KEMKOMINFO

Internet of Things (IoT)

The World's Most Populous Nations In 2050
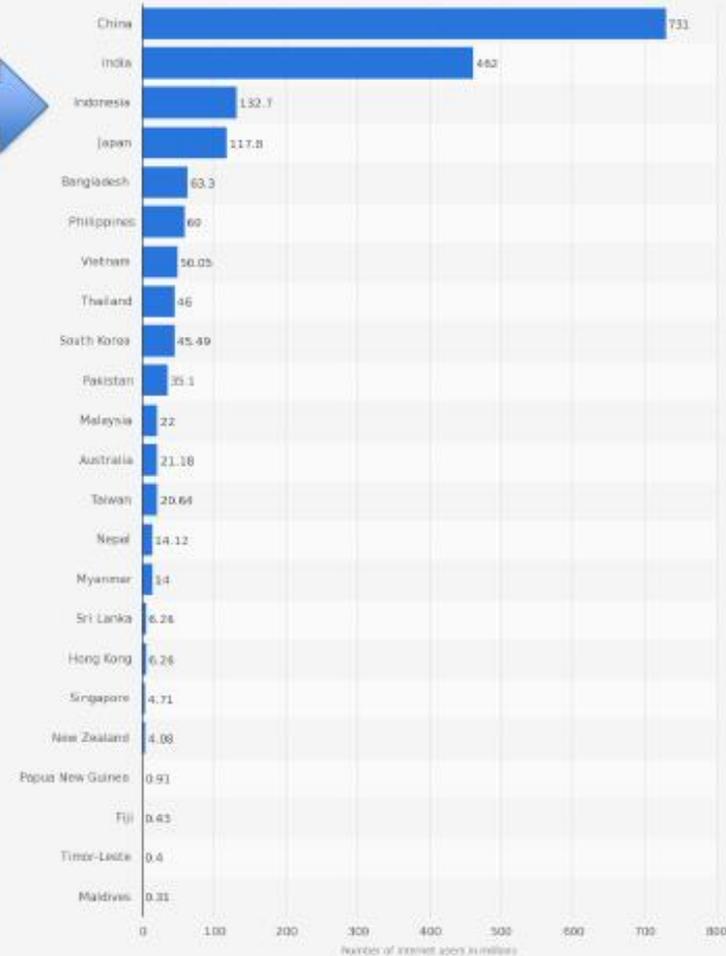Population in 2017 and forecast for 2050

	2017	2050
India	1.34bn	1.66bn
China	1.41bn	1.36bn
Nigeria	190.89m	410.64m
United States	324.46m	389.59m
Indonesia	263.99m	321.55m
Pakistan	197.02m	306.94m
Brazil	209.29m	232.69m
Bangladesh	164.67m	201.93m
DR Congo	81.34m	197.40m
Ethiopia	104.96m	190.87m

@StatistaCharts   Source: UN Population Division

statista

> 50%

Number of internet users in the Asia Pacific region as of January 2017, by country (in millions)

Country	Users (millions)
China	731
India	462
Indonesia	132.7
Japan	117.8
Bangladesh	63.3
Philippines	60
Vietnam	50.05
Thailand	46
South Korea	45.49
Pakistan	35.1
Malaysia	22
Australia	21.18
Taiwan	20.64
Nepal	14.12
Myanmar	14
Sri Lanka	6.26
Hong Kong	6.26
Singapore	4.71
New Zealand	4.08
Papua New Guinea	0.91
Fiji	0.43
Timor-Leste	0.4
Maldives	0.31

Number of internet users in millions

Source: We Are Social, Internet World Stats, US Census Bureau, GSMA
Additional information: Asia Pacific; We Are Social, January 2017
© Statista 2017

statista

Indonesia

TECHNOLOGY MIX

2016
- 4G 45%
- 2G 12%
- 3G 34%
- (23%)

2020
- 55%
- 32%

SUBSCRIBER PENETRATION
2016 → 2020
79% → 84%
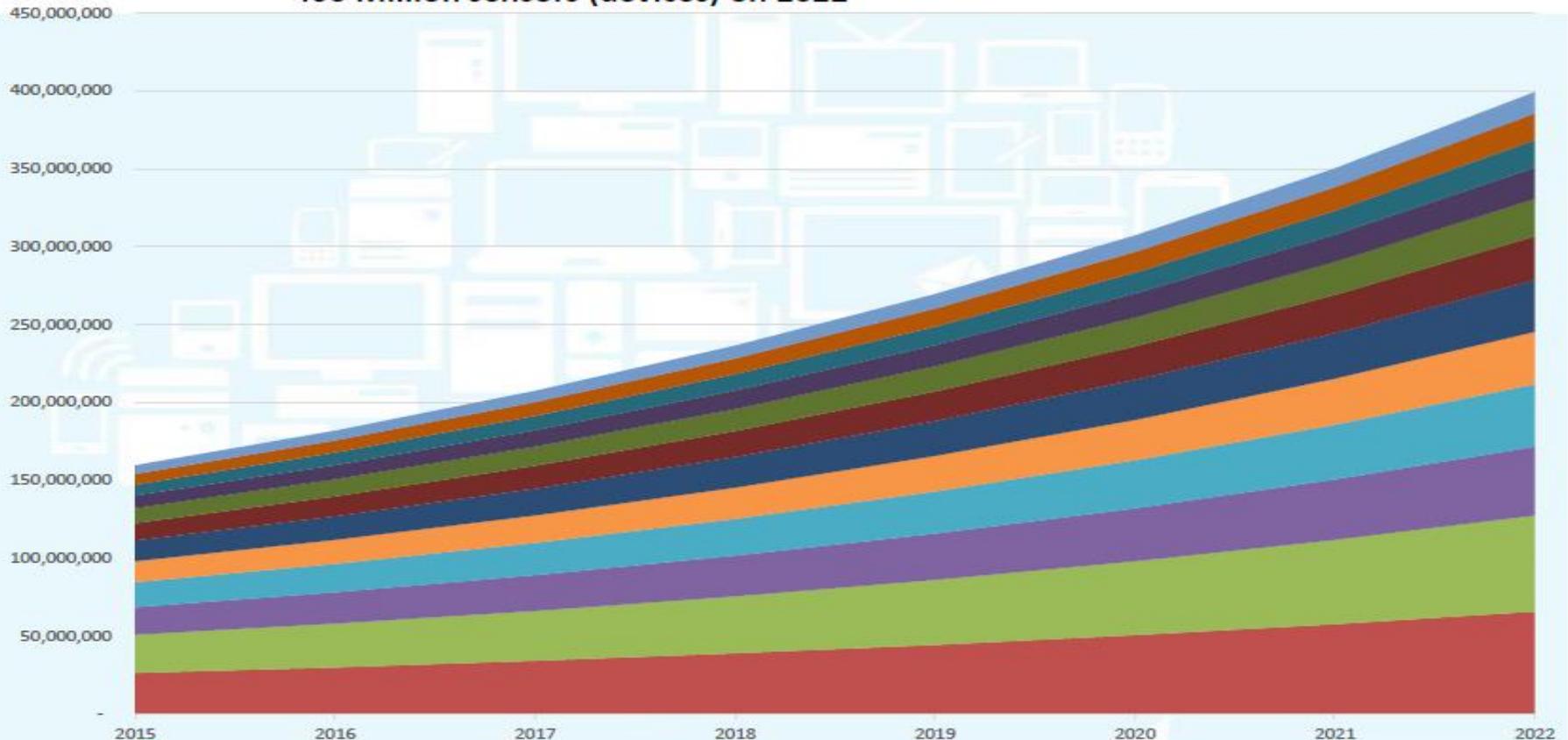
SMARTPHONE ADOPTION
2016 → 2020
52% → 67%

Internet of Things (IoT)
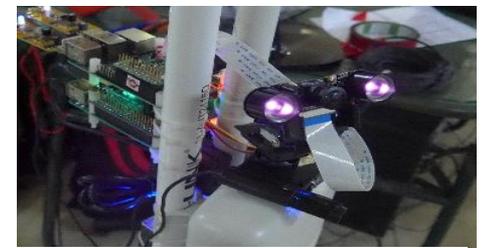
IOT Devices 2015-2022
### 400 Million sensors (devices) on 2022

Legend:
- Manufacture 16%
- Healthcare 15%
- Insurance 11%
- Banking & Securities 10%
- Retail & Wholesale 8%
- Computing Services 8%
- Government 7%
- Transportation 6%
- Utilities 5%
- Real Estate & Business Services 4%
- Agriculture 4%
- Home & Others 3%

→ 81%

Cyber-Physical Systems (CPS)/IoT : Intelligent System that Covers both Interaction Network Physical Component Engineering and Computing
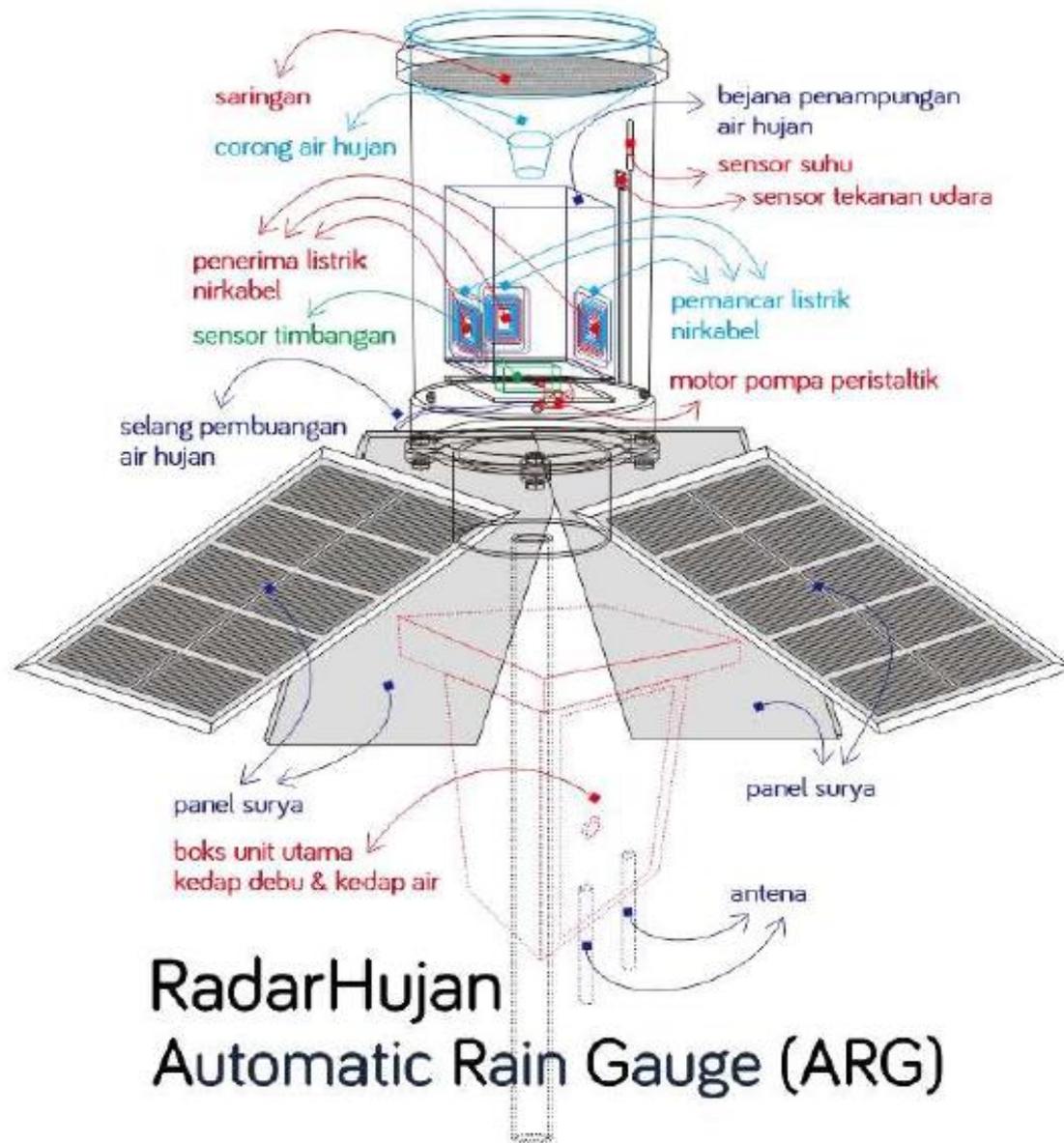
The Use of IoT
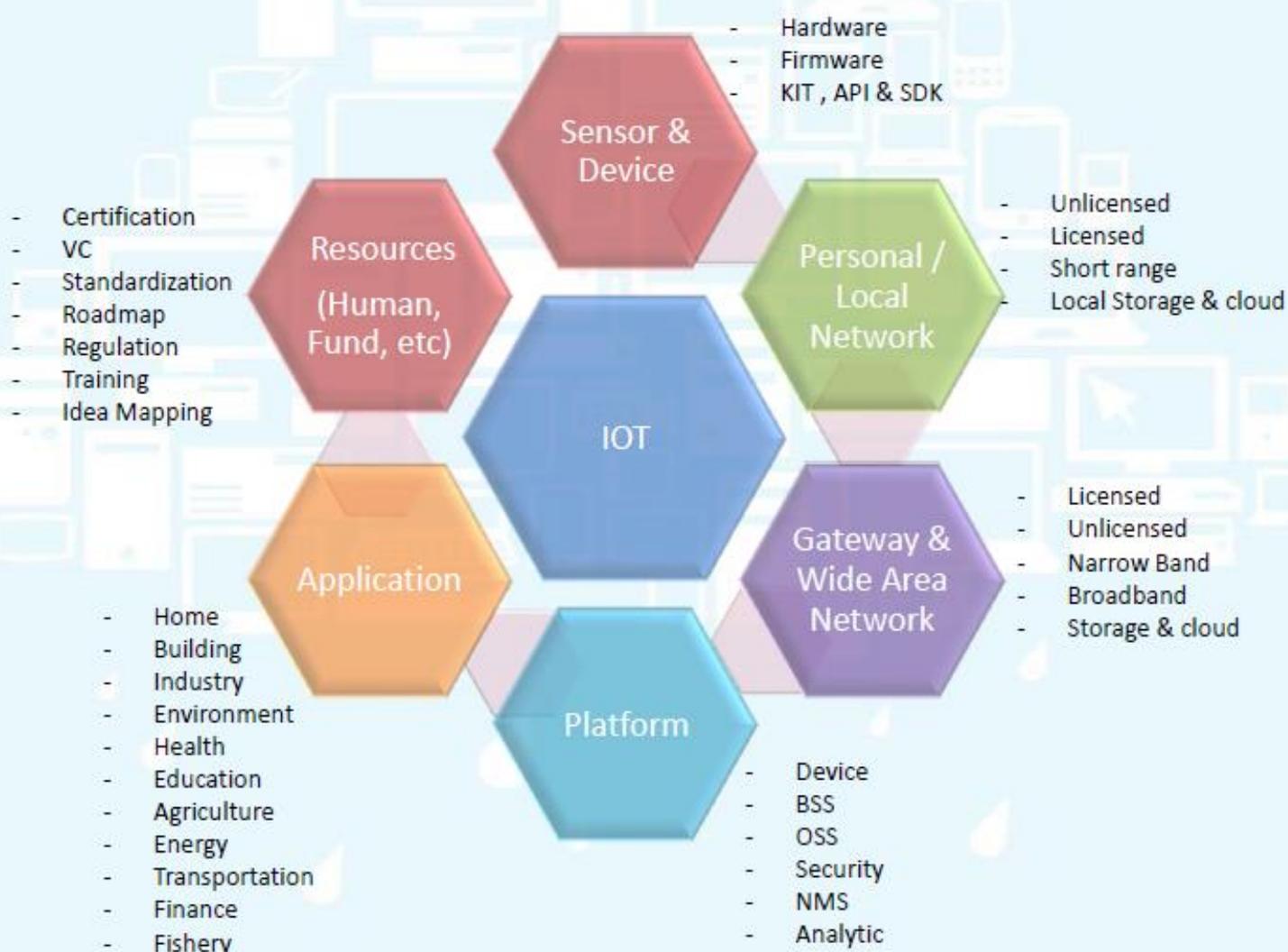
IoT for Climate Change

- It's hoped that the substitution of the common rain stations can generate more advantages included network, cost, and the simplicity of operation and accuracy data.
- This instruments will help observer who have not specific education in meteorology or climatology
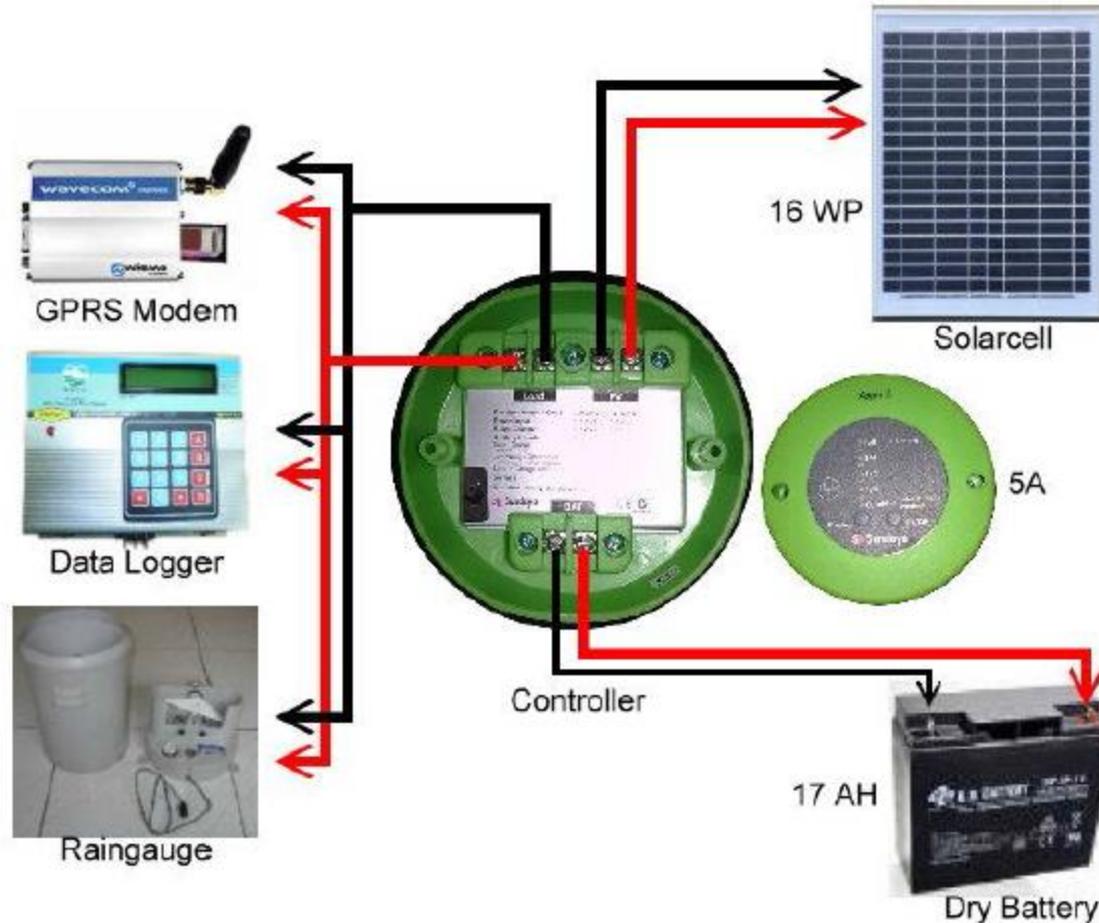
The aim of research project

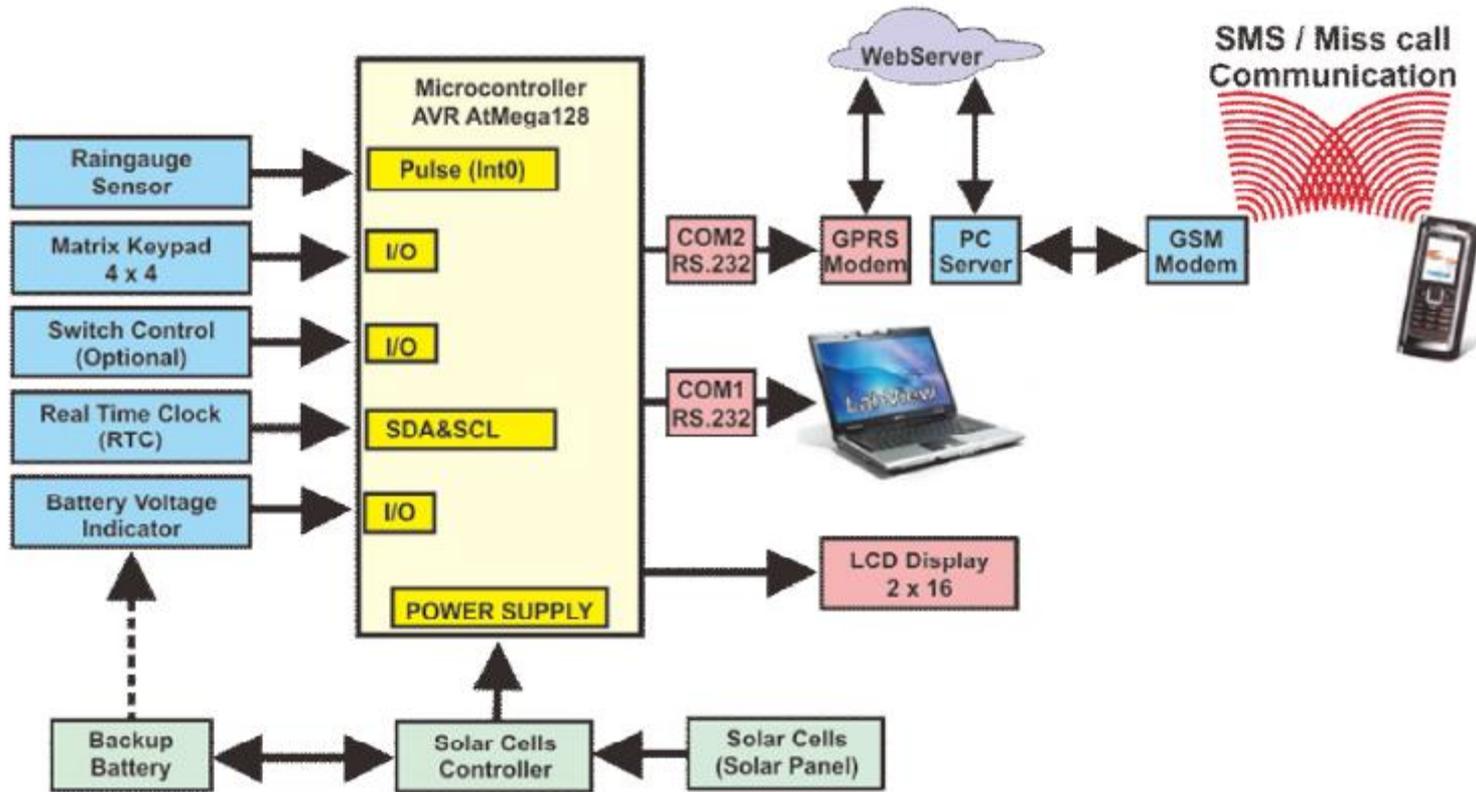To develop a rain gauge device that can provide information on rainfall and rainfall prediction

saringan

corong air hujan
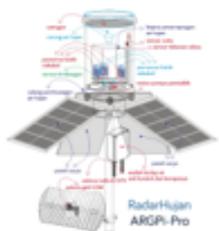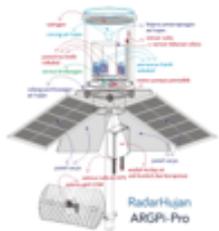
bejana penampungan air hujan

sensor suhu

sensor tekanan udara

penerima listrik nirkabel

pemancar listrik nirkabel

sensor timbangan

motor pompa peristaltik

selang pembuangan air hujan

panel surya

panel surya

boks unit utama kedap debu & kedap air

antena

RadarHujan
Automatic Rain Gauge (ARG)

Automatic Rain Gauge Process

Scheme of ARG

ARG

Server

Data Processing with large data, assisted learning machines and data mining
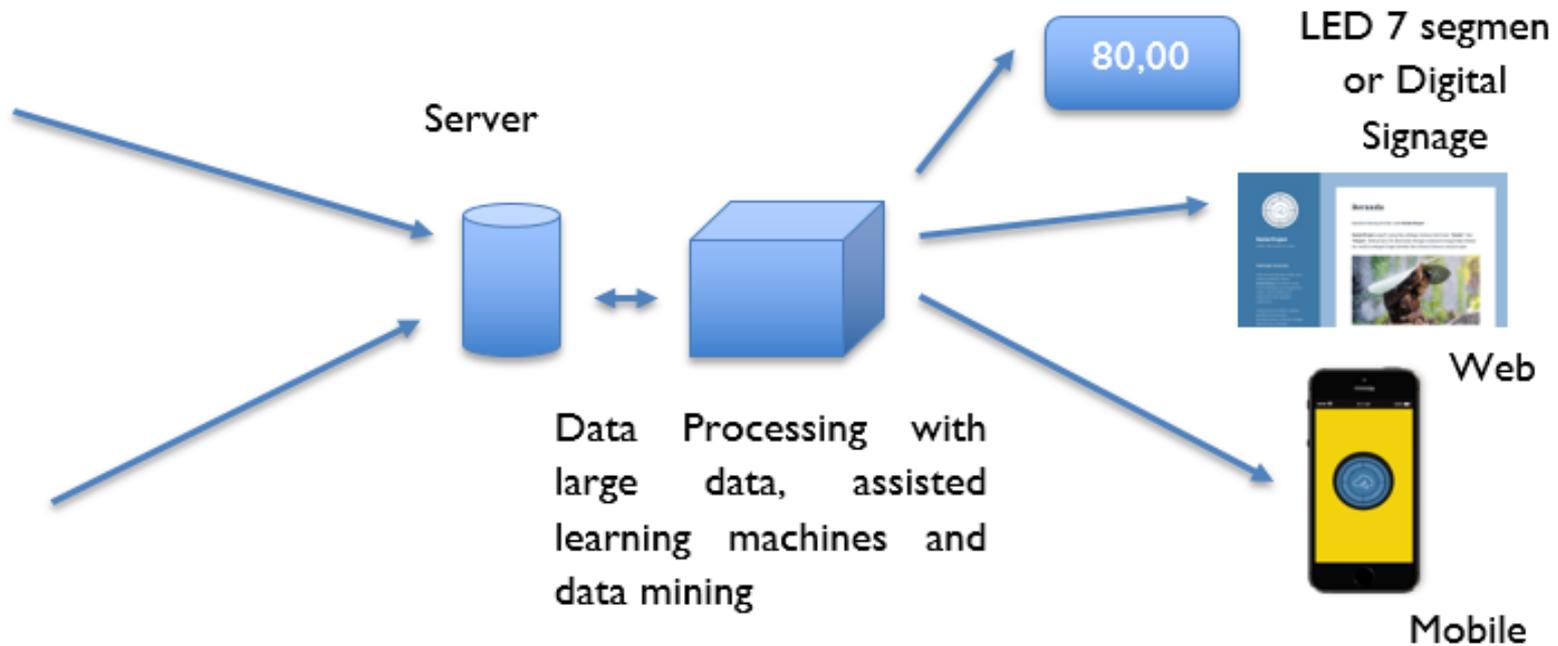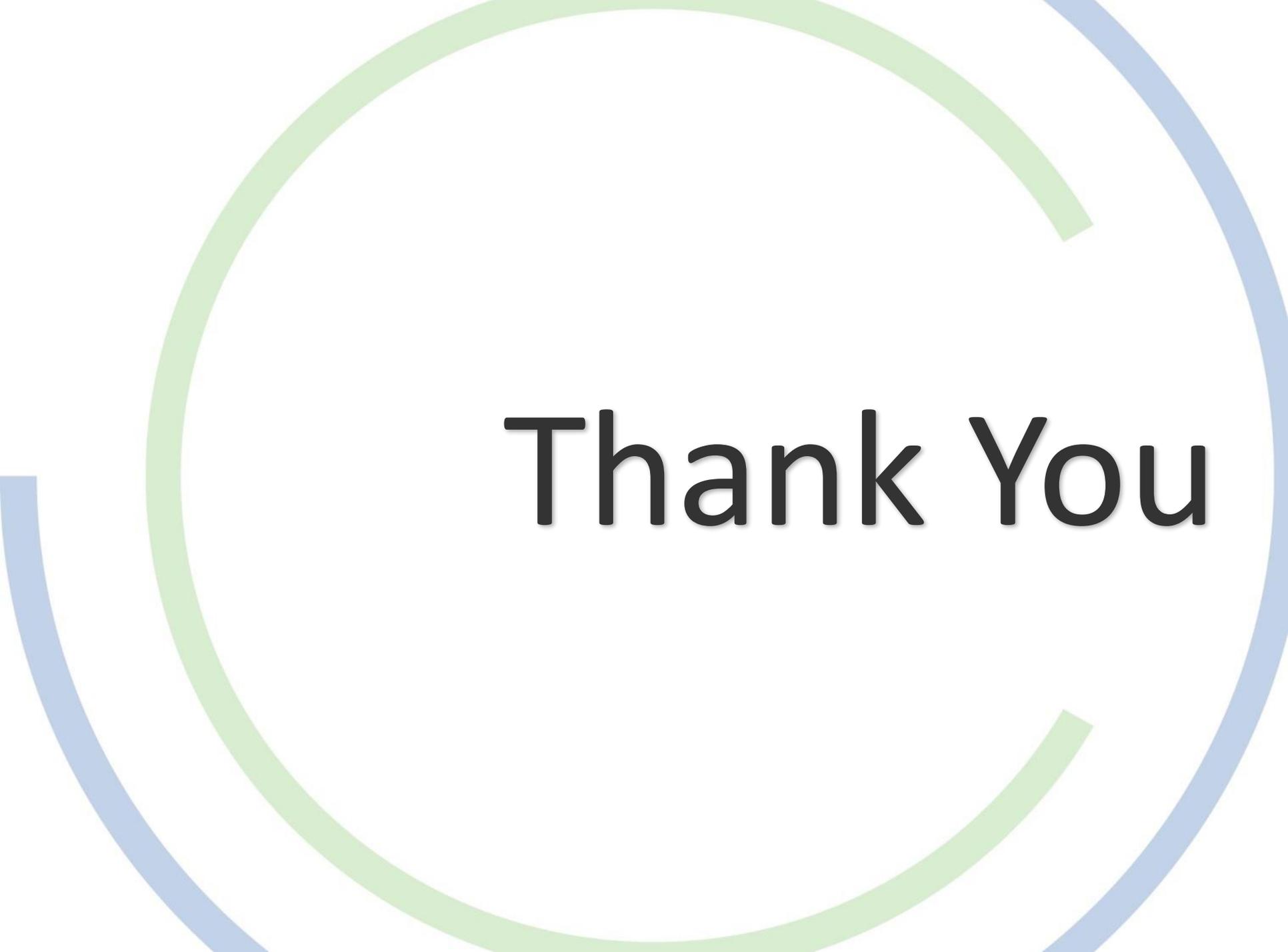
80,00

LED 7 segmen or Digital Signage

Web

Mobile

The Main Functions Performed by the Data Logger of ARG Tools

- As the system of acquisition of rainfall measurements.

- As a data storage of rainfall that is stored in system storage and analyzed in Big Data system.

- Set the delivery of data through RS232 to PC or via GPRS to the Web-Server and PCServer

Thank You