Panel on New Trends in Citizen-oriented Services
Theme: Citizen-access to the Services

Moderator
Hassan Khachfe, Lebanese International University, Lebanon

Panelists
Hiroshi Tanaka, Kanagawa Institute of Technology, Japan
Carlos Henrique Tolentino, IFTO - Palmas Brazil
Konstantinos Chatzikokolakis, MarineTraffic, United Kingdom
Javid Taheri, Karlstad University, Sweden

Wednesday, 21 November 2018

NexTech / ICGHC 2018, 18-23/11/2018, Athens, Greece

Citizen-access to the Services

- Demand for healthcare services is on the rize
  - In USA, went up from 4.5% of GDP in 1960 to 16% in 2010
- Effect on demographics, quality, customer-driven services and access
- Services have been influences by
  - Telemedicine
  - Mobility and cloud access
  - Wearables and IoT
  - AI and Big Data
  - Empowered consumers

Citizen-access to the Services

- USA in 2015: HC expenditure amounted to $3.2 trillions, which is 18% of GDP
- Upon use of technology-driven access, the government was able to save $300 billions
- Global recommendations:
  - Increase in digital user experience begins from the top to the bottom
  - Need for knowledge-bases
  - Improved operating systems
  - Data at work

Dr. Konstantinos Chatzikokolakis
konstantinos.chatzikokolakis@marinetraffic.com

Problem definition

Identify vessels travelling around the globe, understand and reason on their movements

MarineTraffic

Automatic Identification System (AIS)

- The AIS is a collaborative, self-reporting system that allows marine vessels to broadcast their information to nearby vessels and on-ground base stations.
- It uses digital radio signals to exchange real time information between vessels and shore based stations on dedicated VHF frequencies.
  - Collision detection
  - Although mandatory for large commercial vessels to carry device, it is not mandatory to use it.
  - Not a replacement of radar as it cannot detect land masses, navigation beacons and vessels not equipped with AIS

Challenges

- Big Data management
- Non-uniform data distribution
  - Area’s geometry
  - Coverage issues
  - Transmission/Reception time inconsistencies
- Data uncertainty
  - Handlers’ errors
  - Transmission/reception errors

Data as Information

POWERED BY

Positional data

Events data

Vessel data

Port data

SOLUTIONS

Online services

Data services

Mobile apps

DELIVERING

Information

Thank you!

Questions?

MarineTraffic

New Trends in Citizens-oriented Services

Prof. Claudio de Castro Monteiro, Ph.D.
Carlos Henrique Tolentino, M.D.
ccm@ifto.edu.br //
ccm.monteiro@gmail.com
gredes.ifto.edu.br

Whatsapp: (063) 98138-6300

Nov/2018

A Brief History

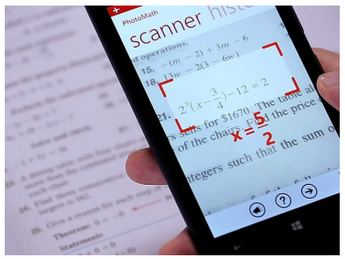
1999 **2003**

2007 **2010**

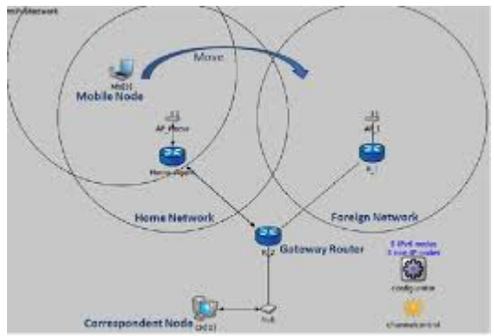
GPARC **GERES**

SOL-TO **G-REDES**

What we can do there?



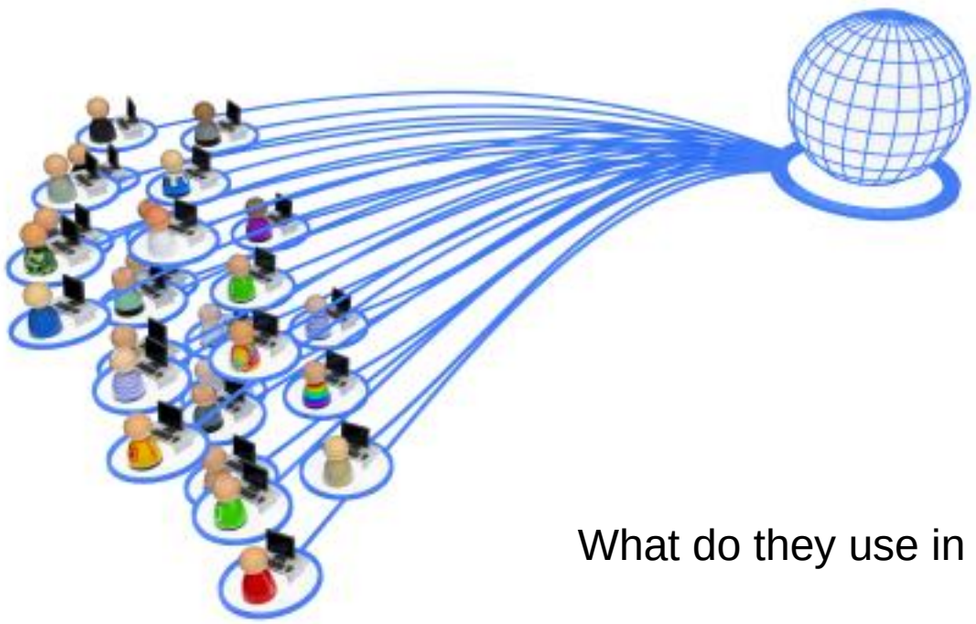
Applications for aiming teaching/learning process



Mobility managment protocols

Computing vision and autonomous drones

InteGNet Project



* GSM
* 3G
* 4G
* WiFi
* WiMax
* PLC
* LiFi

What do they use in upper layer

IP

INSTITUTO FEDERAL DE EDUCAÇÃO, CIÊNCIA E TECNOLOGIA
TOCANTINS
Campus Palmas

IARIA

TELEMÁTICS

TELECOMMUNICATIONS
+
INFORMATICS

TECHNOLOGICAL VISION

SMIP – Specialized MIP

ASMIP – Application Seamless MIP

BNS – Best Network Selector

FAMA Framework for Aiming Mobility Administration

ALL OF THEM ARE IN TEST FASE

INSTITUTO FEDERAL DE EDUCAÇÃO, CIÊNCIA E TECNOLOGIA
TOCANTINS
Campus Palmas

IARIA

How can you know more?

Portal: gredes.ifto.edu.br

Email: ccm@ifto.edu.br

Hangout/g+: ccm.monteiro@gmail.com

Youtube: www.youtube.com/user/ccmmonteiro

Whatsapp: (063) 98138-6300

INSTITUTO FEDERAL DE
EDUCAÇÃO, CIÊNCIA E TECNOLOGIA
TOCANTINS
Campus Palmas

IARIA

Thank you very much for attention

Panel on New Trends in Citizen-oriented Services
Theme: Citizen-access to the Services

Service systems for welfare based on IoT and AI

Kanagawa Institute of Technology
Dept. of Information & Computer Sciences
November 21 2018
Hiroshi Tanaka

Contents

- **Introduction : Where we locate and Who we are.**
- **Introduction : Our current efforts**
  - **Background & motivations**
  - **Sign language recognition system with optical camera**
  - **Electrical wheelchair control by wearable device**
- **Summary**

Introduction of KAIT (1)
(Kanagawa Institute of Technology)

Where we locate

- Tokyo Metropolitan Area has 30,000,000 population (30 million)
- **Kanagawa** is the largest prefecture in Japan (9 million)
- KAIT is located in the center of Kanagawa Pref.

Introduction of KAIT (2)
(Kanagawa Institute of Technology)

Established in **1963** by Kenkichi NAKABE who was the president of Taiyo Fishery, world largest fishery company at that time.

5 Faculties, 13 Departments

5,000 Students

7 Graduate Courses

Our current efforts

Evolution of Devices & Sensors

Smartphone, Tablet PC

Sensors: Acceleration, Gyro, Magnet, ・・・
Actuators: Display, Vibrator, Speaker, ・・・
Communication: Wi-Fi, Bluetooth, ・・・

https://www.epson.jp/products/moverio/bt300special/

Wearable devices

Efforts:
Aggressive use of functions and features of devices

Evolution of IoT & AI

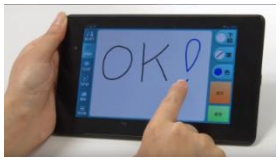
Targets:
Safe, secure, comfortable, convenient environment
Systems for disabled and eldery people

Example 1

Sign language recognition system by optical camera

Motivation : Bridge over valley

- There is communication barrier between healthy people and hearing impaired people.
- Sign language interpreters or supporting equipment are necessary for communication.



Supporting equipment

- Related methods of sign language recognition

  Research using Kinect or sensor gloves

  - Need power supply
  - Not portable, not handy

Why optical camera and colored glove?

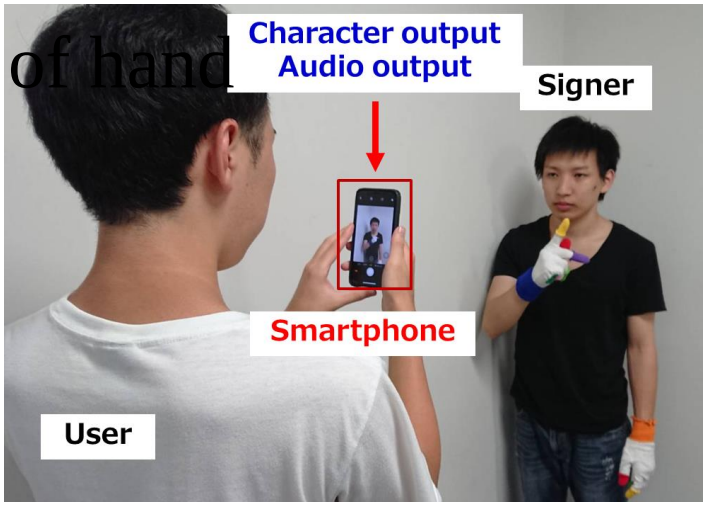
Optical camera

- Portable (implemented in smartphone)
  - ✓ Can be used in anytime, anyplaces
- Inexpensive

Smartphone/Tablet

Colored glove

- Discrimination of each finger
- Discrimination of palm or back of hand
- Carry in pocket



Final usage scenery

Feature elements for recognition

Six feature elements

From wrist colored region

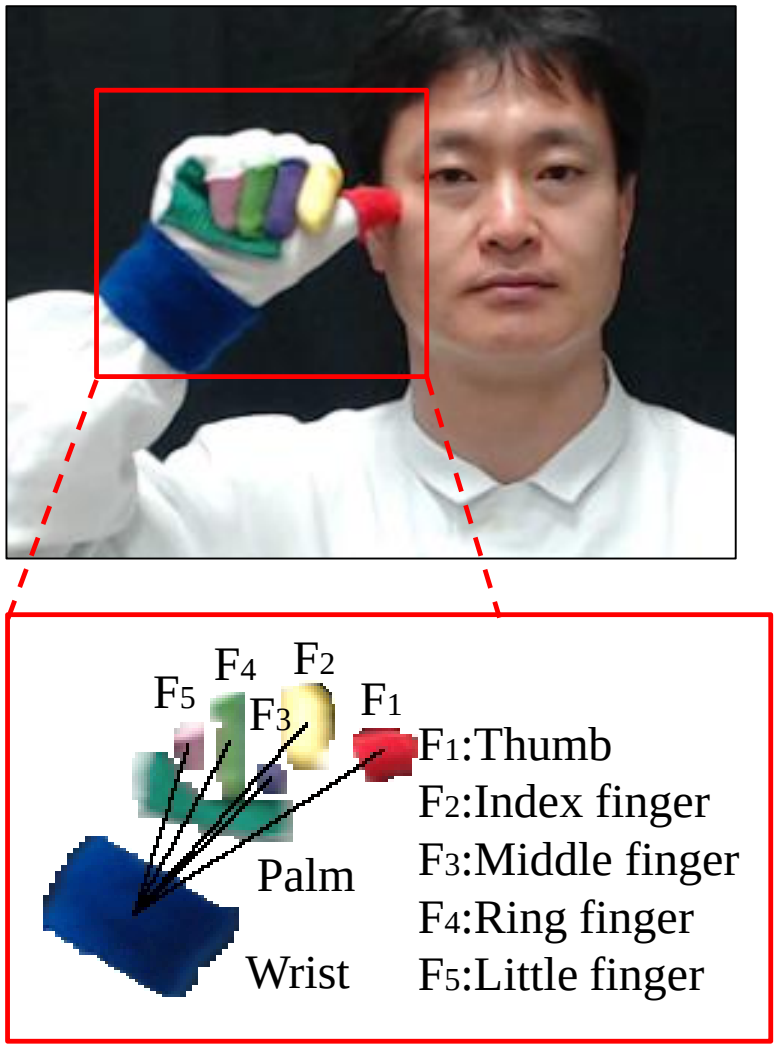
- Trajectory of hand movement
- Position of hand movement
- Velocity of hand movement

From wrist and finger colored region

- Hand direction
- Hand shape

From wrist and palm colored region

- Hand rotation



Input to classifiers

Utilization of machine learning technologies

Demonstration Video

Example 2

Electrical wheelchair control by wearable device

Motivation : Providing various operation methods

https://www.yamaha-motor.co.jp/wheelchair/

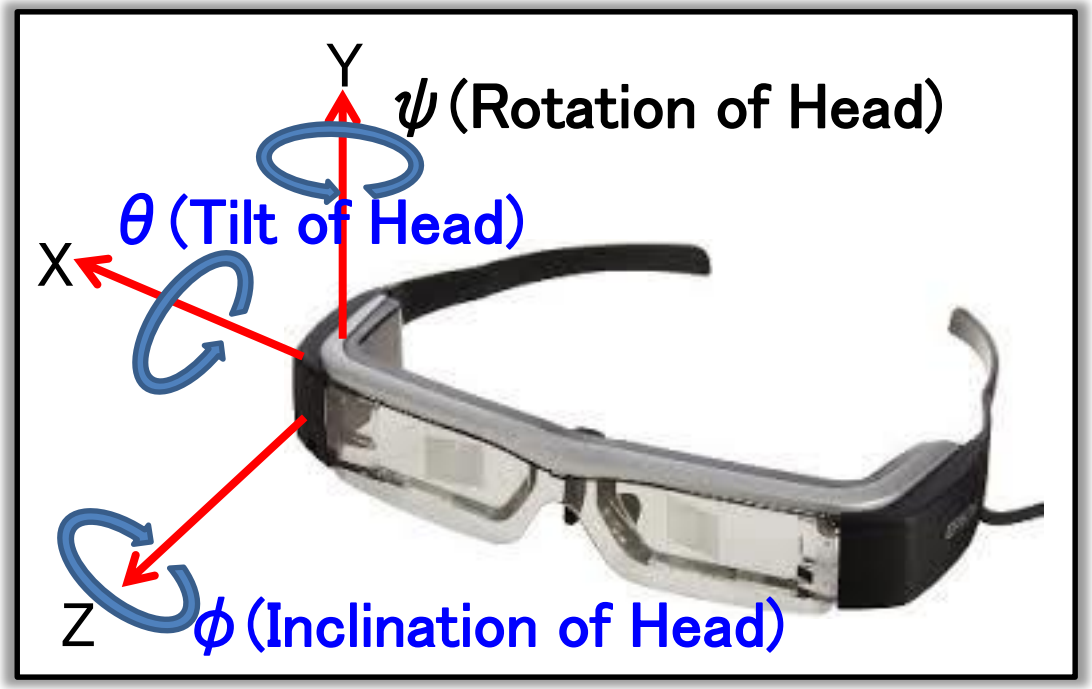
Operation method

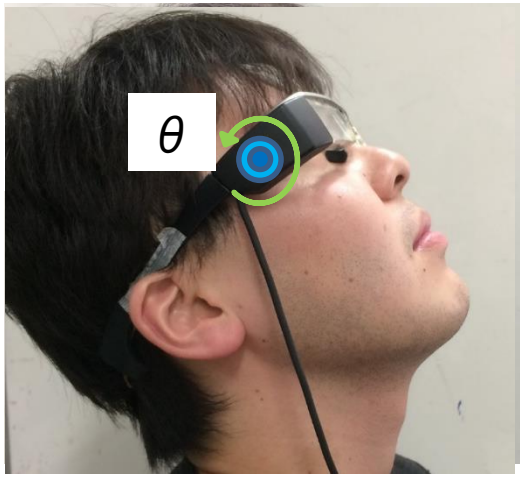
- **Joysticks operation by hand**

Operation methods according to user's situation

- **Voice**
- **Line of sight**
- **Winks**
- **Gesture**
- **Head inclination**

Operation by Head inclination





Utilization of acceleration sensor in HMD

$$\theta = \mathrm{atan}(A_X / \sqrt{A_Y{}^2 + A_Z{}^2})$$

$$\phi = \mathrm{atan}(A_Z / \sqrt{A_X{}^2 + A_Y{}^2})$$

Where,

A_X : Acceleration along X axis

A_Y : Acceleration along Y axis

A_Z : Acceleration along Z axis

⇒ **Commands to Wheelchair travelling**

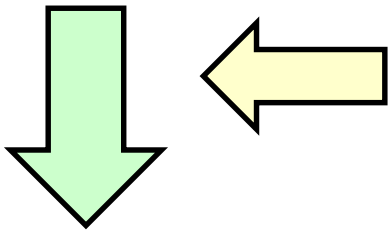
Demonstration Video

Summary

Contribution to realization of

Safe, secure, comfortable, convenient environment

Systems for disabled and eldery people



Evolution of devices

Utilization of IoT & AI

Examples of our efforts

- ☐ Sign language recognition system
- ☐ Electrical wheelchair control

Enhancing each element technologies

Finding field trial opportunity for evaluation

Thank you for your kind attention.