医療DX教育研究センター
Center for Digital Transformation of Healthcare

Hospital Journey to Innovation - Sandbox Implementation & Deployment

medical informatics

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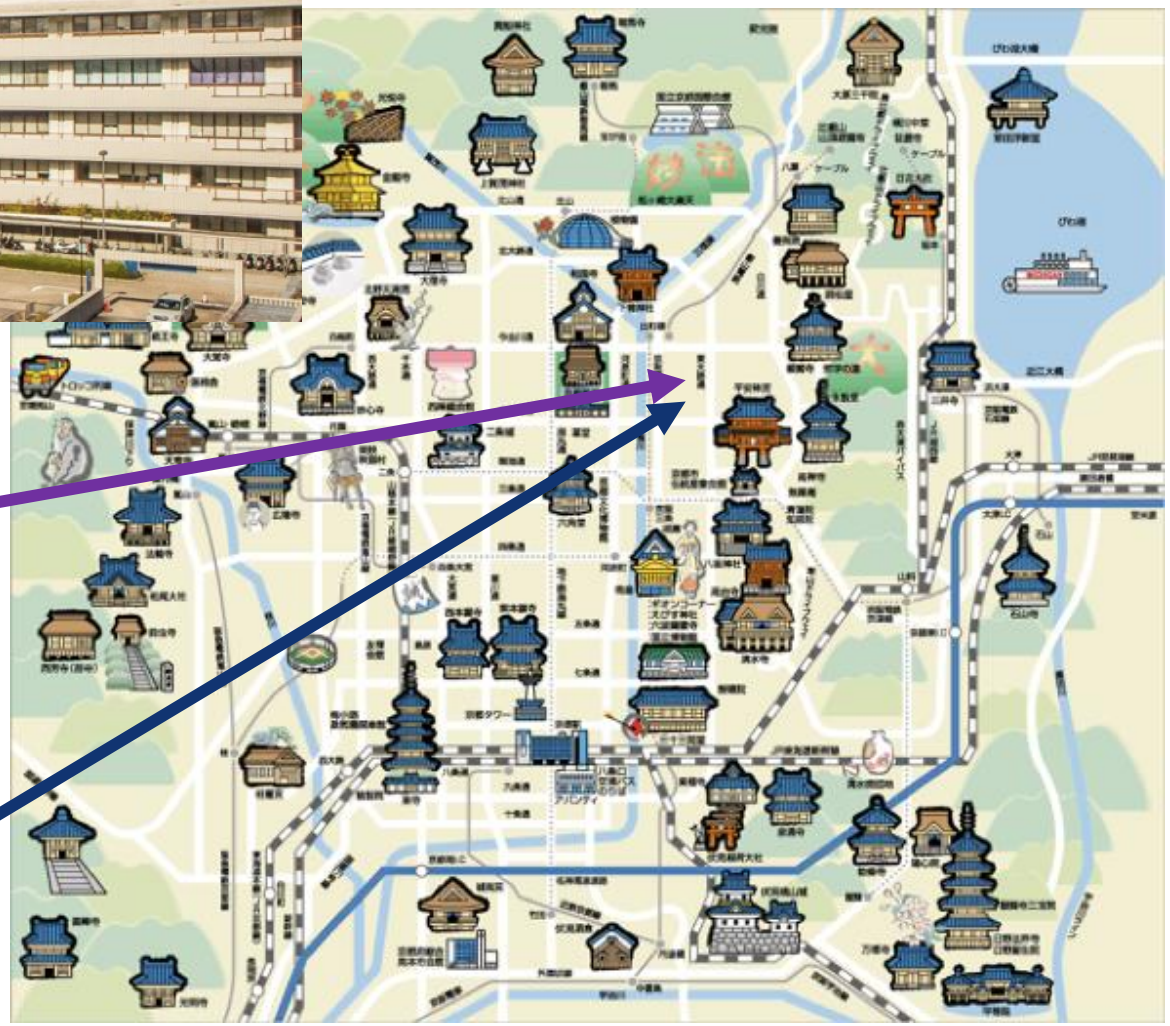
KYOTO UNIVERSITY

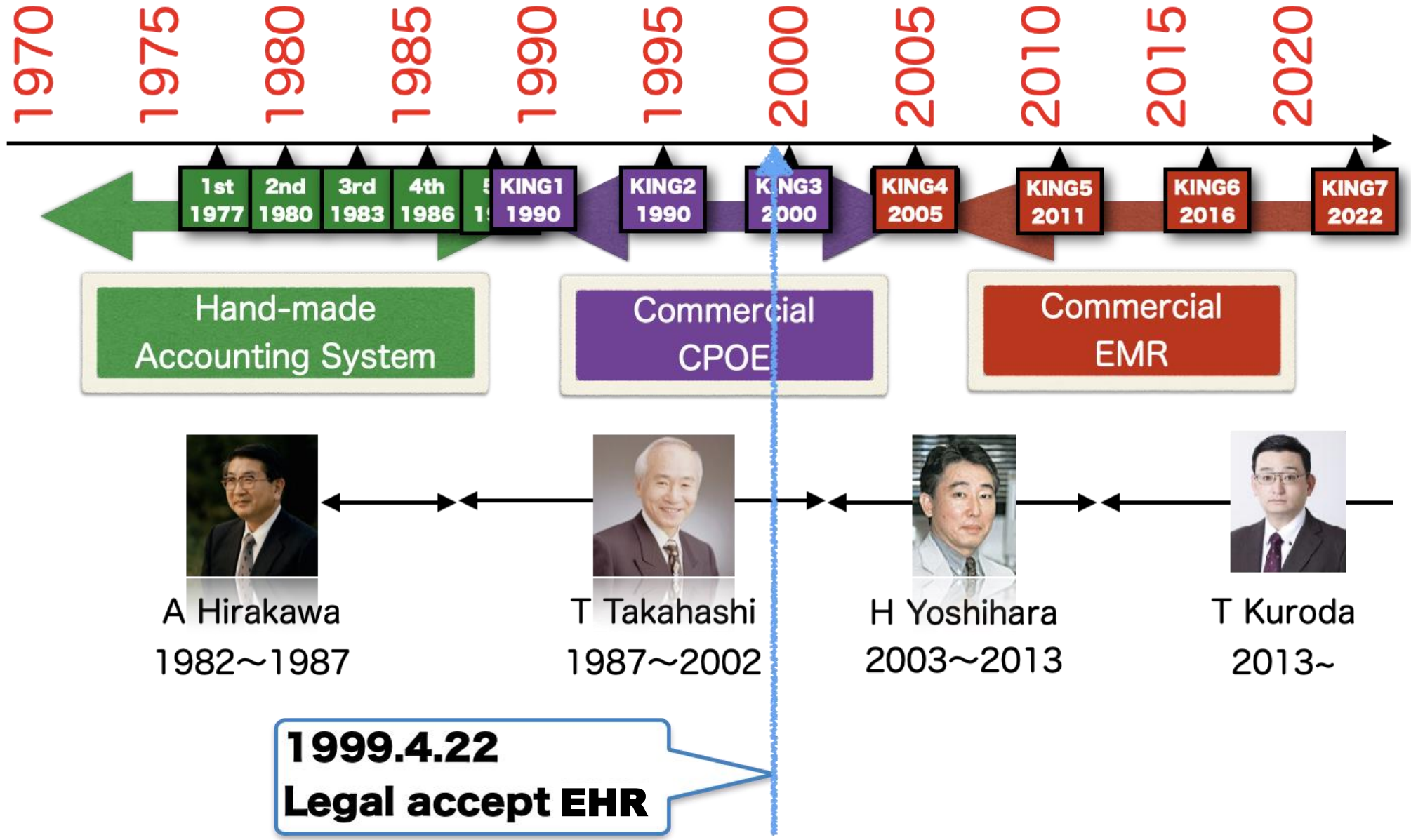
Kyoto University Hospital (KUHP)



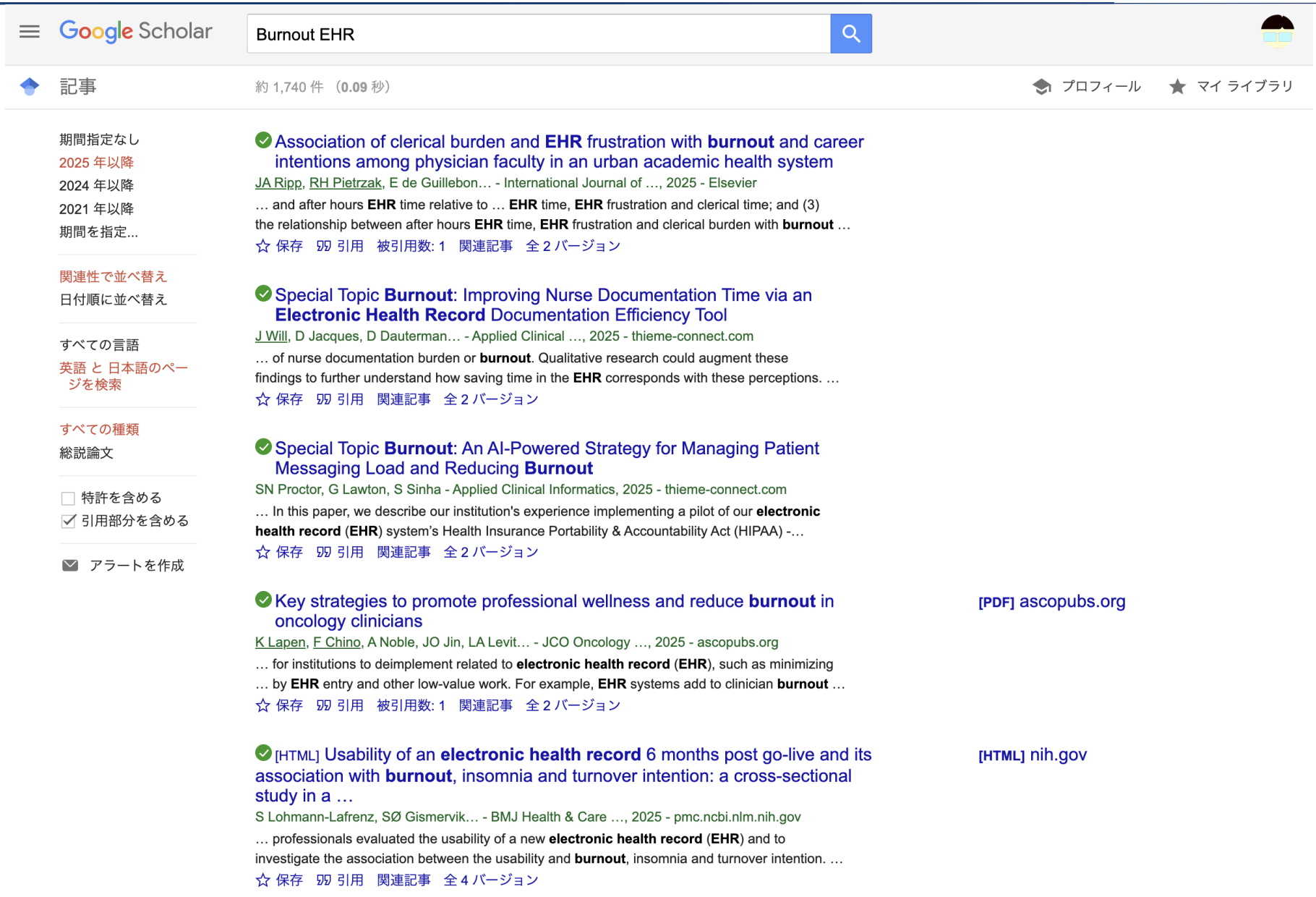
Landscape of KUHP

Nightmare of KUHP

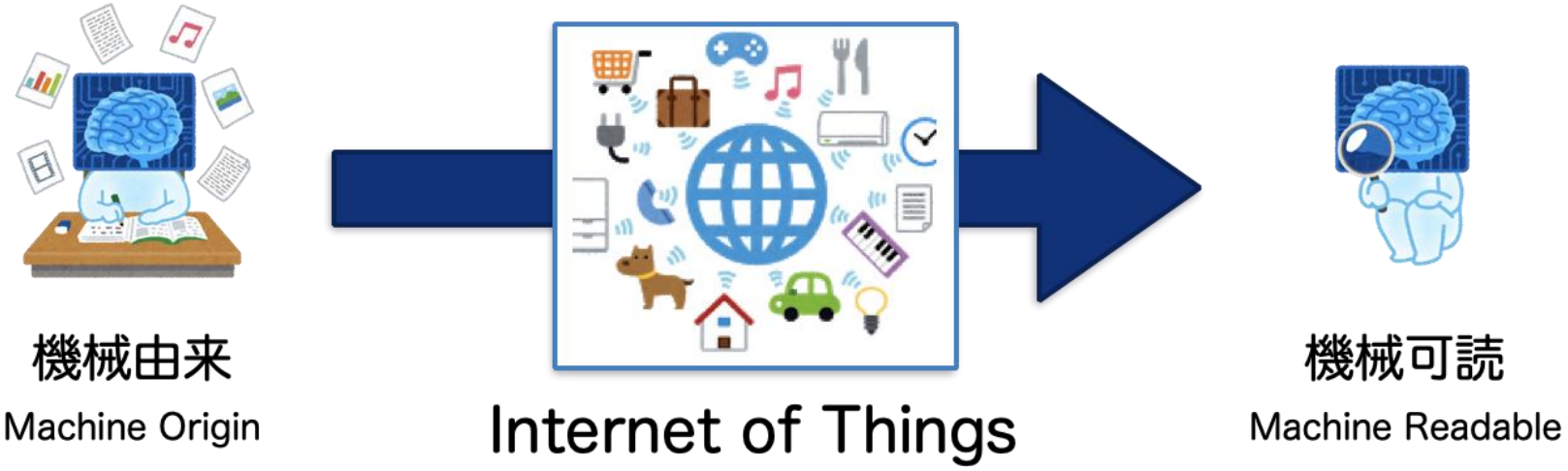
History of HIS of KUHP



Common Problem of EHR



IoT : The Silver Bullet



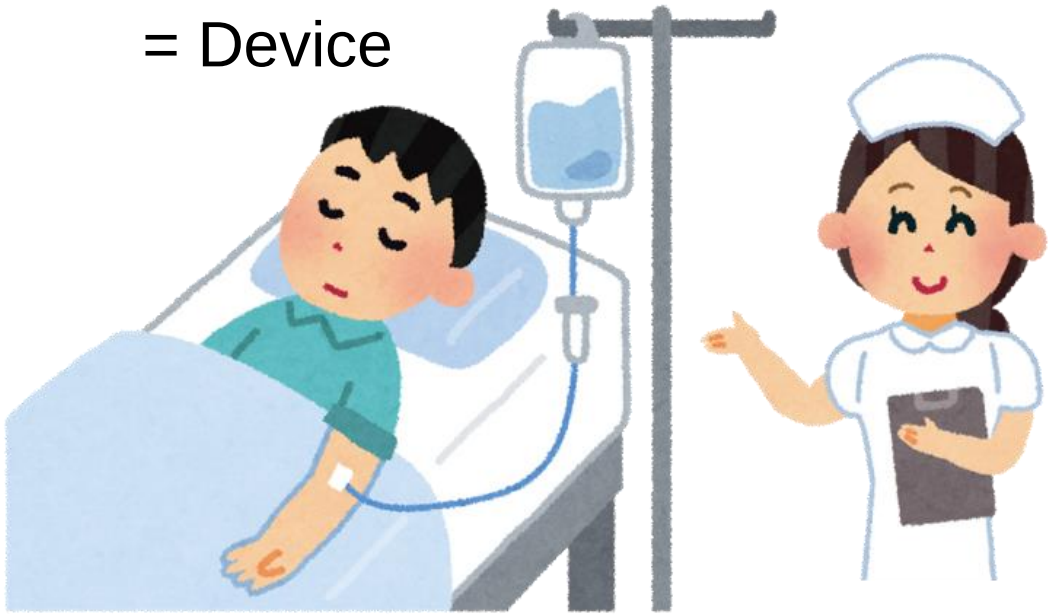
The problem is, people have limited time, attention and accuracy
— all of which means they are not very good at capturing data about things in the real world.
(Kevin Ashton. That 'Internet of Things' Thing)

Direct Data Capture from Machine to Machine

Bedside IoT

- When = NTP
- Who = Nurse + Patient
- Where = Bed
- What = Device
- How = Device

How to Collect Automatically ?



Measure Person at the Bedside

VDT : Bedside IoT (2016)

Body Temp / 体温

SpO2

BP / 血圧

Glucose / 血糖

SHIMADZU TERUMO OMRON arkray

Vital Data Terminal / バイタルデーターミナル

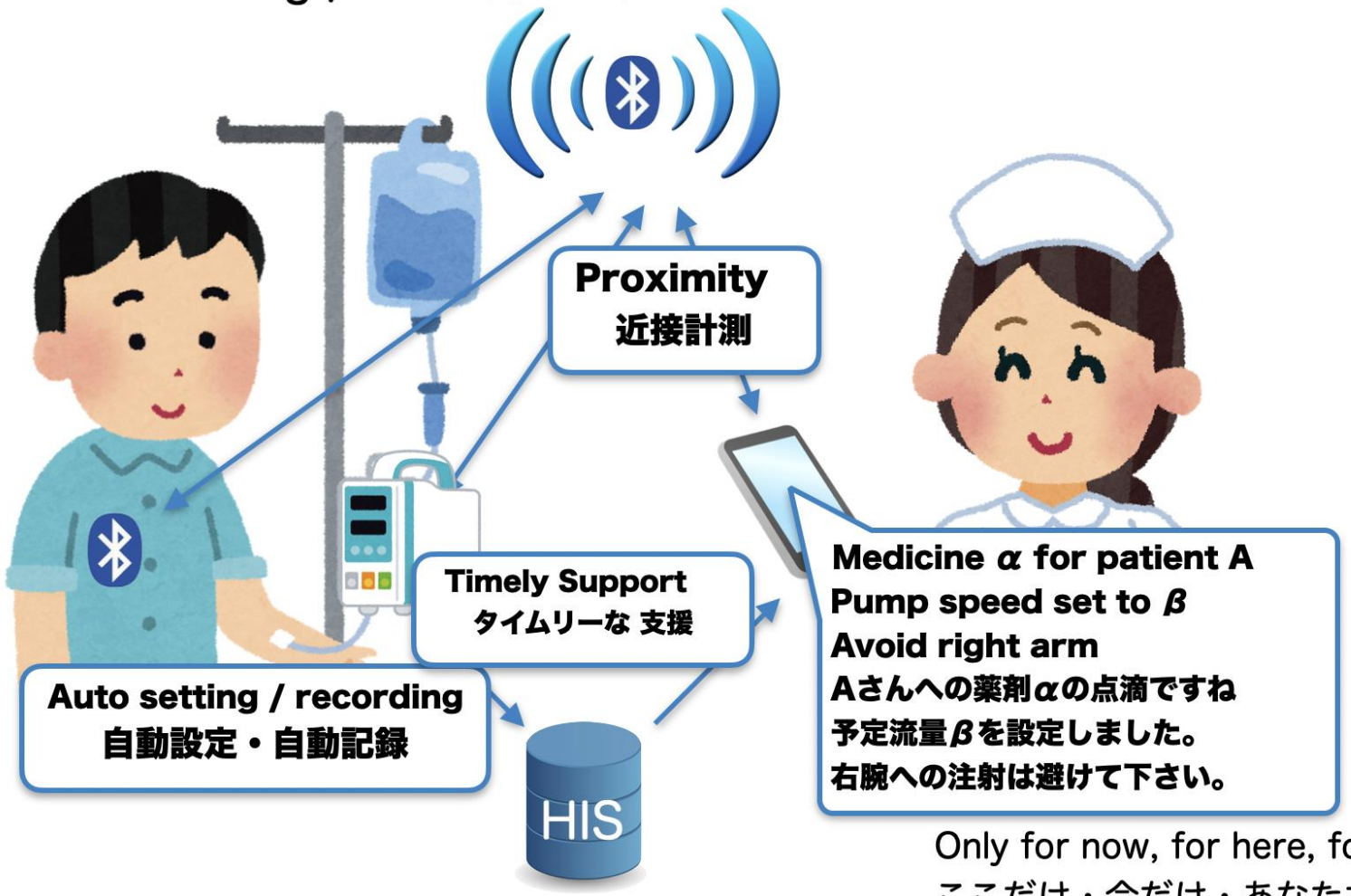
Position = Context
場所 = 文脈

お名前		職員名
島津　太郎		京大　花子
SpO2	98 %	9:54:29
脈拍(SpO2)	85 bpm	9:54:29
PI	44	9:54:29

機器選択 ▼　クリア　確認

Beyond IoT : Context-Aware IT Service

- Zero-point Check up / ゼロ点認証
- Automatic Recording / 自動詳細記録

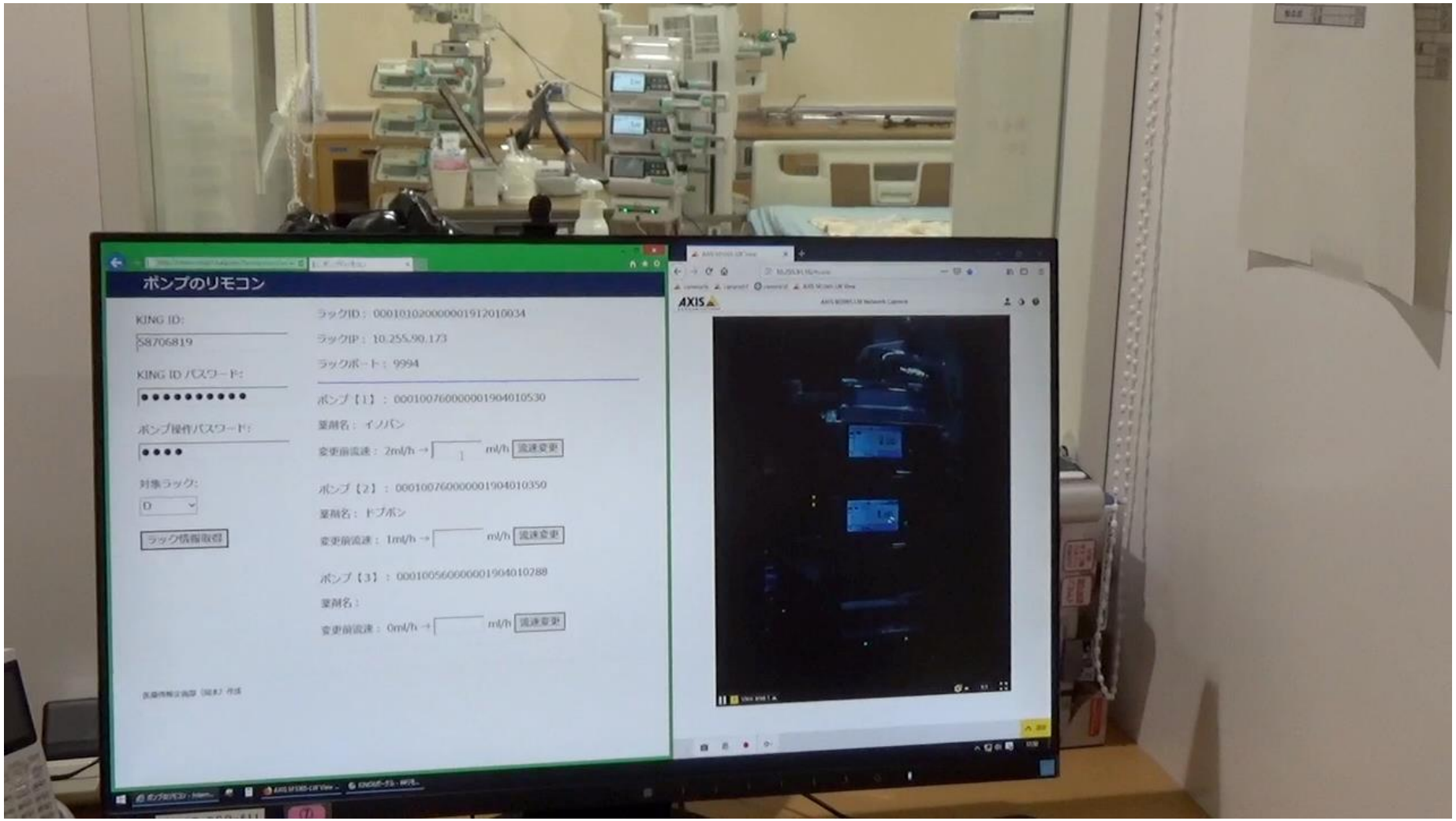


Only for now, for here, for you
ここだけ・今だけ・あなただけ

2016 NICT委託研究 ソーシャル・ビッグデータ利活用・基盤技術の研究開発

IoT at ICU : Six-Feet Telemedicine (2020)

Under Covid to Reduce PPE Consumption



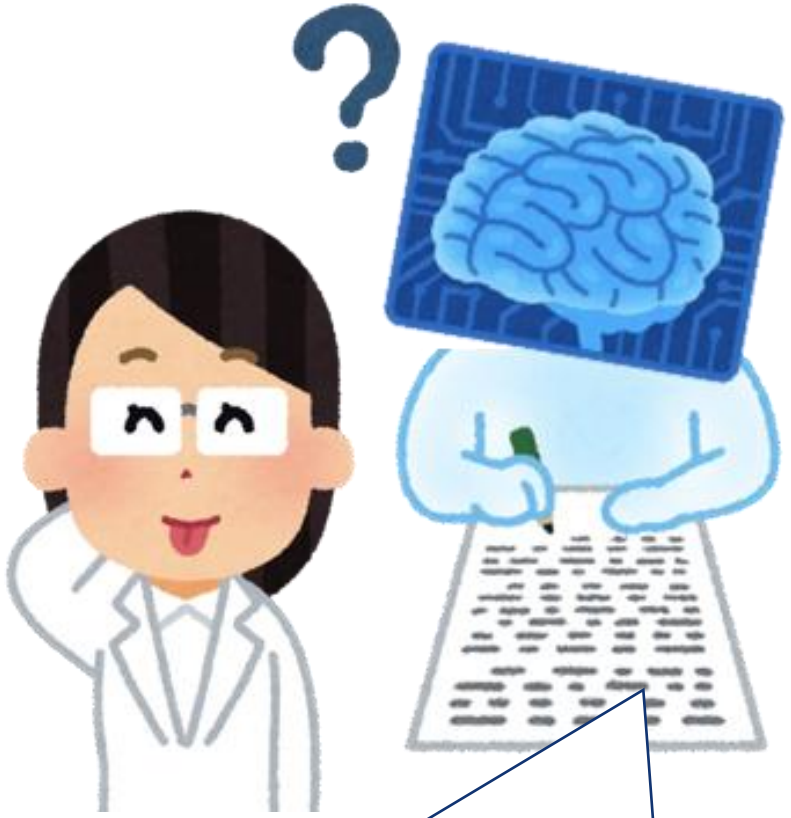
Beyond IoT : Salient HIS

- Clinic = Routine + Response
  - Routine : Defined by Clinical Path
  - Response : React Patient Condition

HIS can estimate coming event

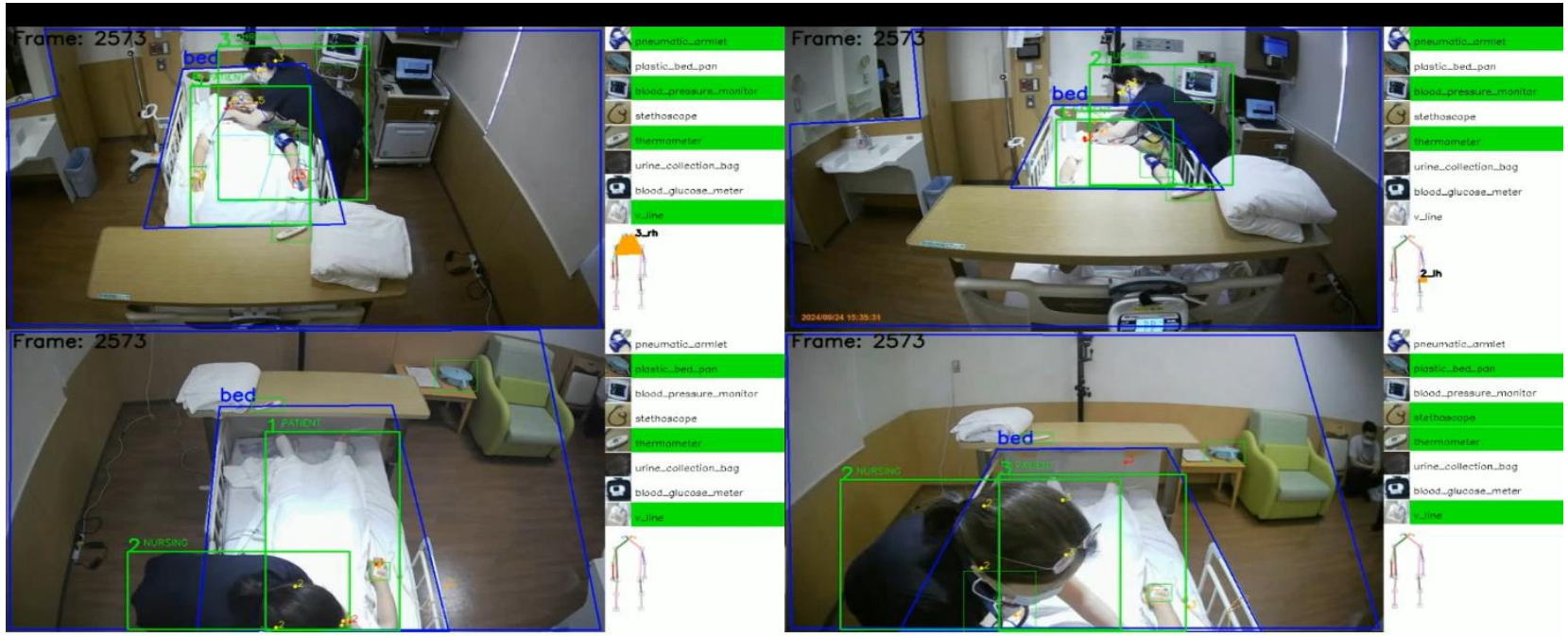
- Unexpected Happening for HIS
  - Incident
  - Reacting Un-measured Event

HIS needs to ask WHY



Future HIS may record EHR automatically
and
ask WHY when unexpected action taken

Future HIS may record EHR automatically



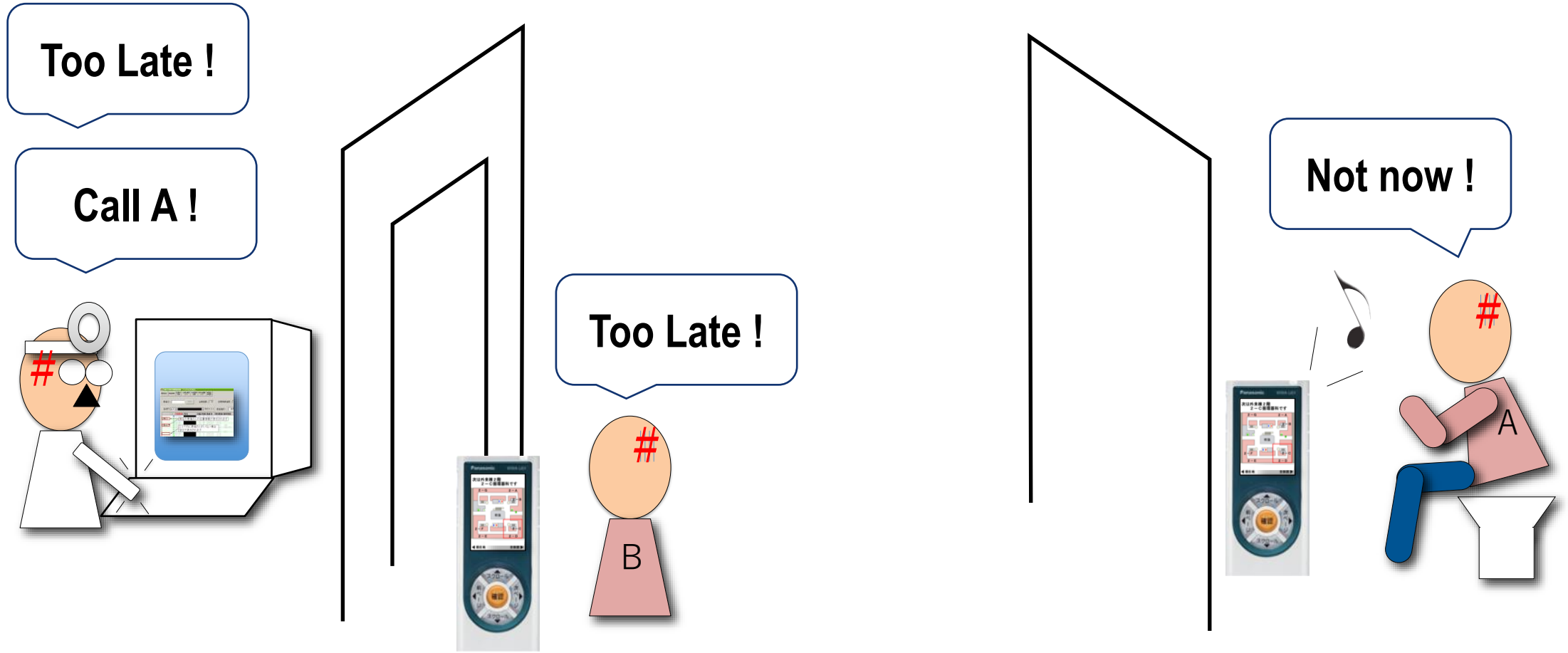
body_temperature_measurement	64
blood_pressure_and_pulse_rate	87
lung_sound_and_breath_sound	0
bowel_sound	0
indwelling_bladder_catheter	0
excretion	0
blood_glucose_measurement	0
turning_over	0
sensory_dullness	0
abnormality_V_line	0
peripheral_artery_palpation	0
dorsiflexion	0
mobility	0

SIP Project (2024)

Common Problem for Patients

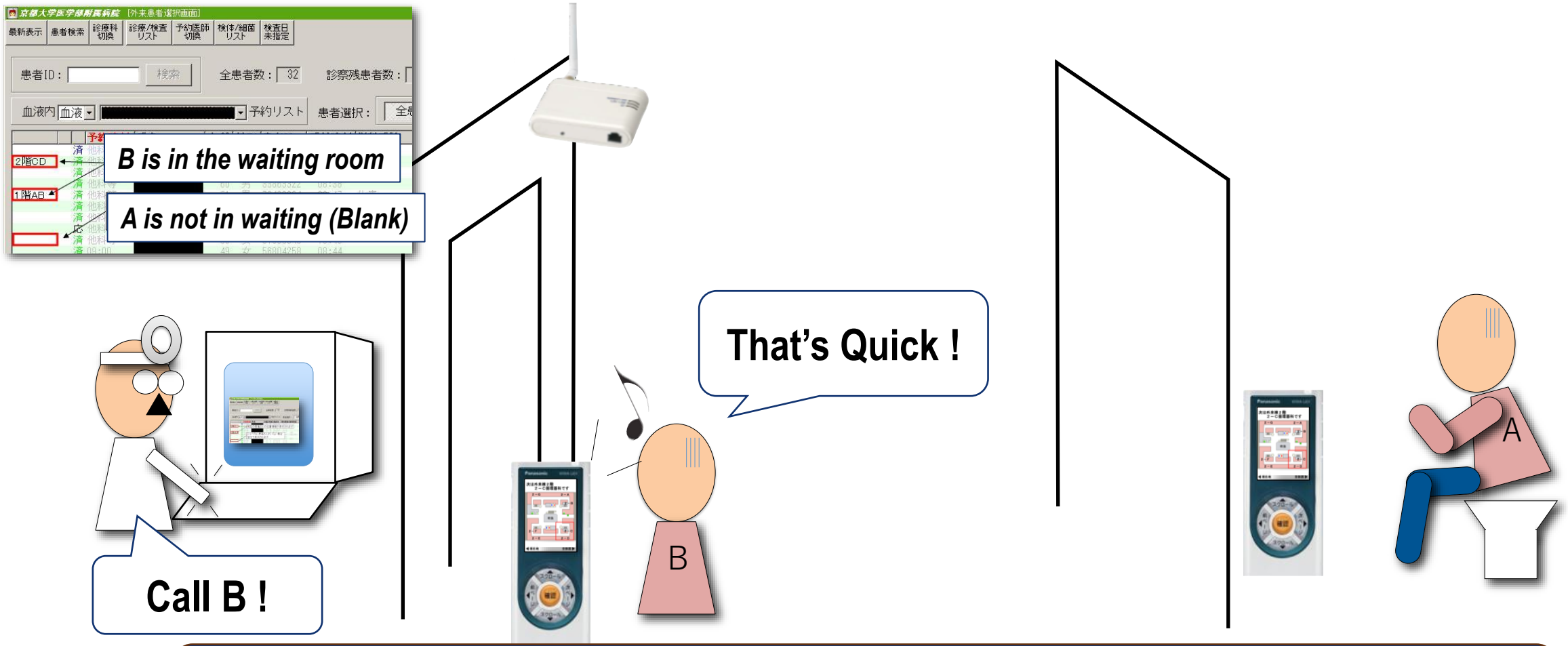
Wait ... Wait ... Wait

Beeper : to Keep Patient Wait (2000)



Nobody becomes happy

Beeper + IoT = Reduce Wait (2011)



Reduce 100 hours/day waiting & reporting time

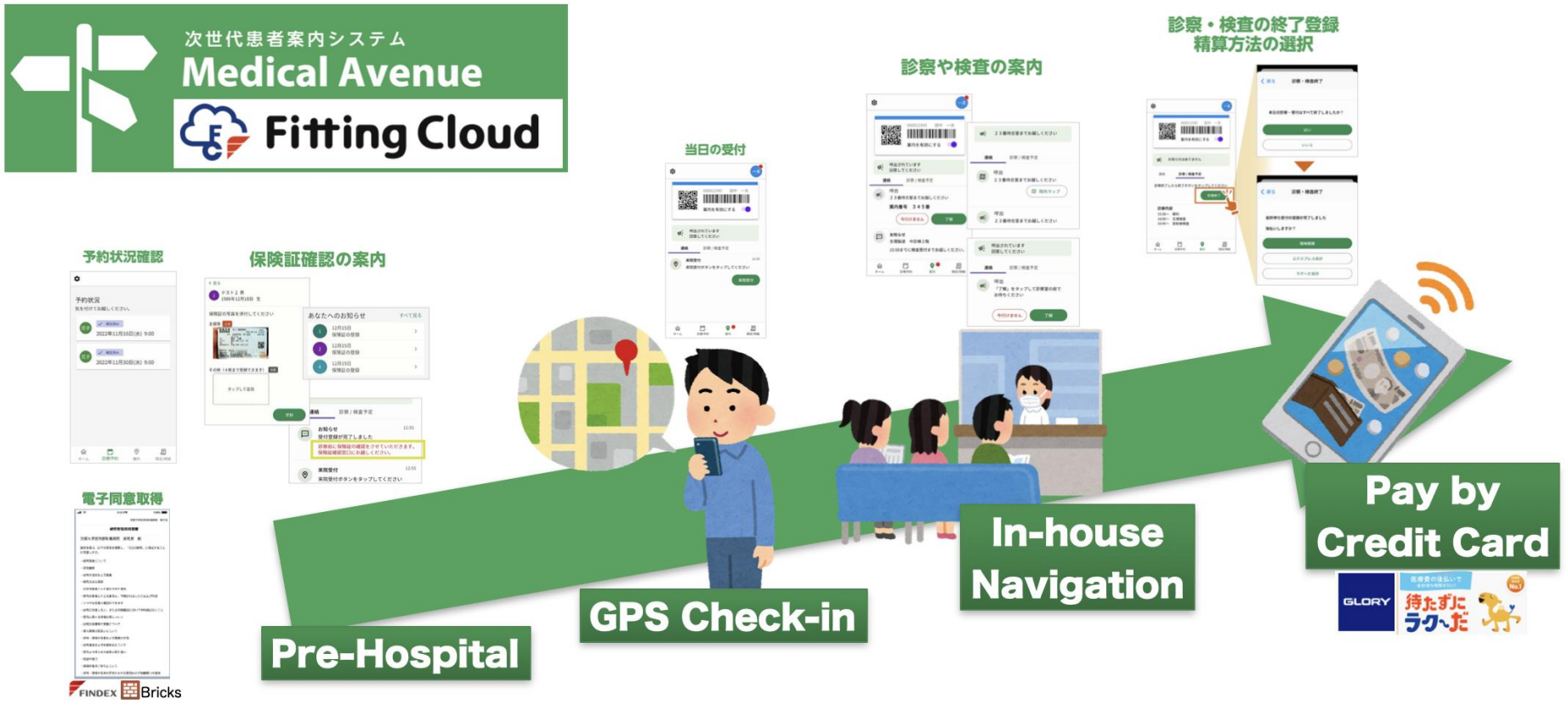
Proc IEEE EMBC 6104-6 (2012)

Patients are still Waiting for …

Check in

Pay copayment

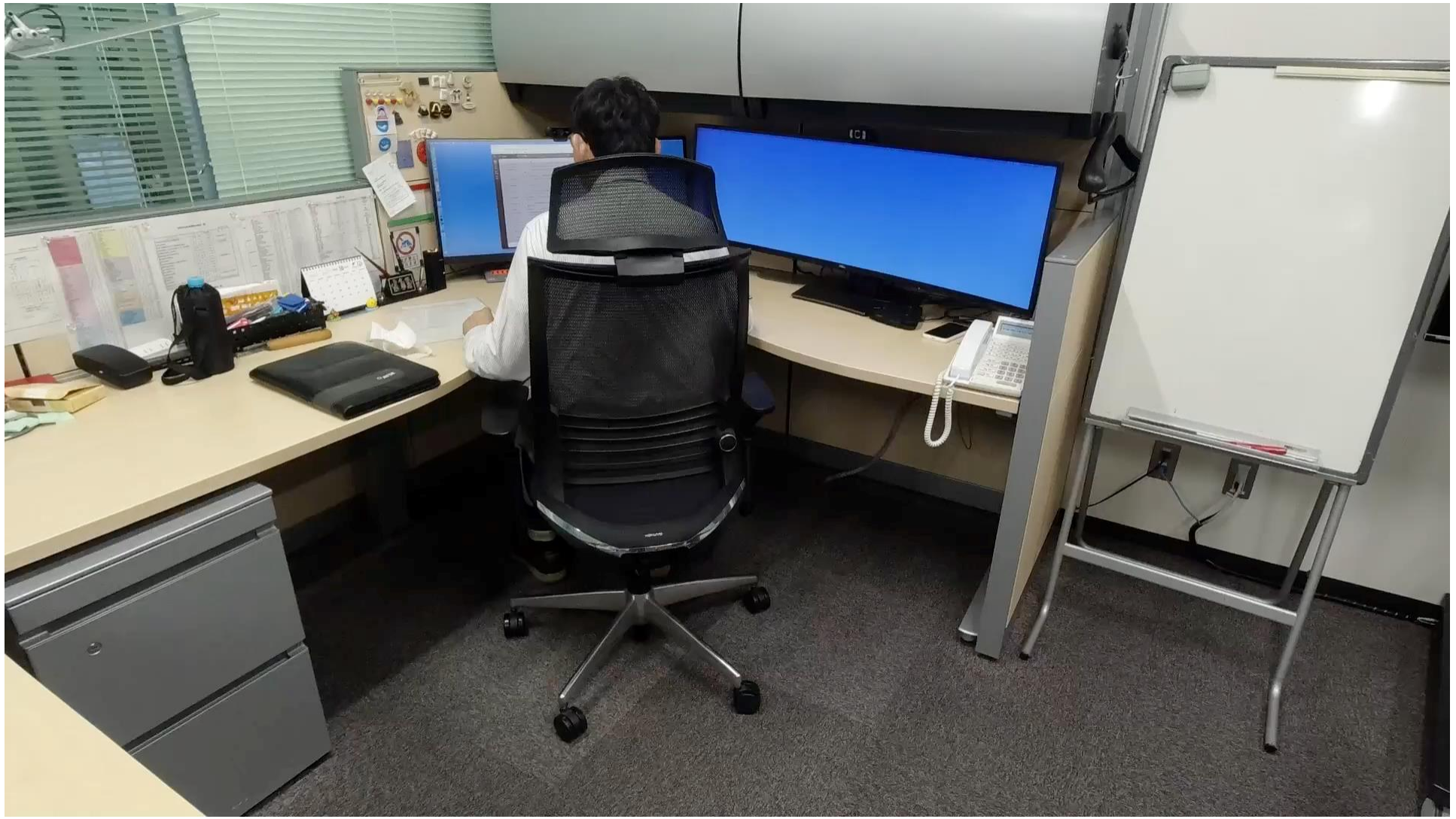
Medical Avenue : Do it Outside (2023)



Connecting Patient over Mobile

- Data Collection : ePRO / eConsent
- Data Provision ：Lab Results / CT Recruitment / SaMD
- Data Carrier ：e-Prescription / Referral / Insurance Application

Medical Avenue : Do it Outside (2023)

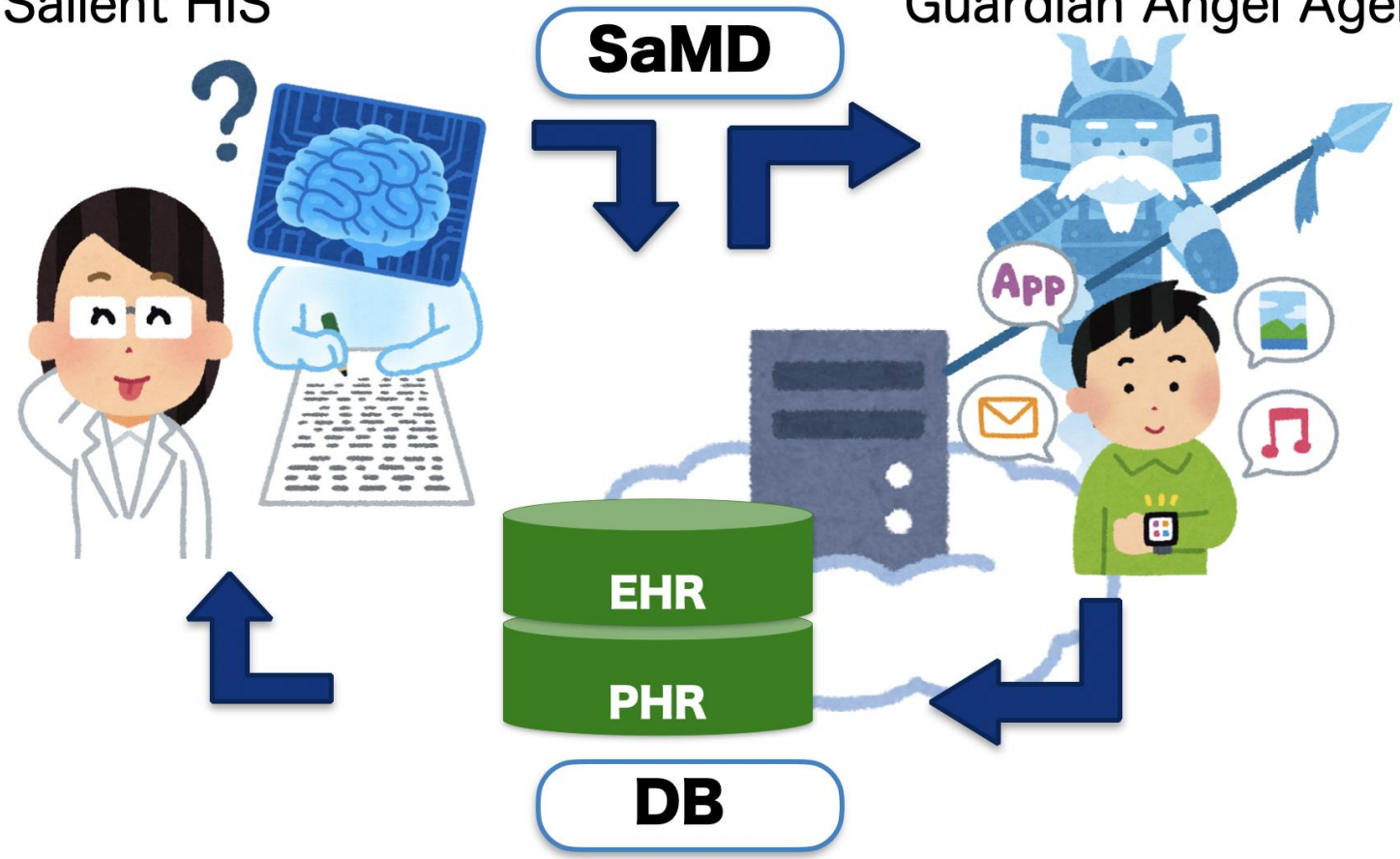


Healthcare of IT Age

Man-Machine System / 人間機械系

さりげない電子カルテ
Salient HIS

守護霊エージェント
Guardian Angel Agent



Data Driven World / データ駆動型社会

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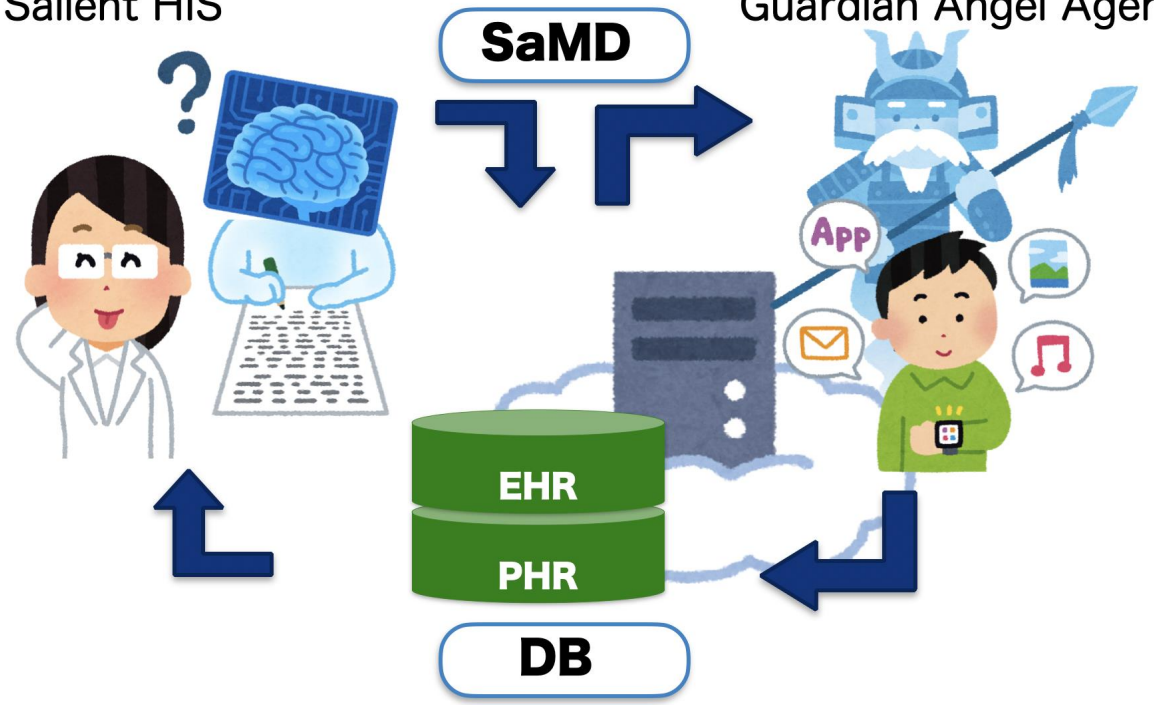

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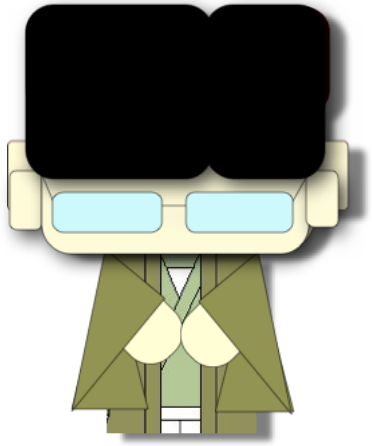

Thank you for your kind attention !

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