HKU SPACE & PLYMOUTH UNIVERSITY

BSc (Hon) Computer and Information Security

PRCO204HK Integrated Project

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An Integrated Health Care System

Background

Medical technology improved

Life span of people increase

Aging population increase

Increase the burden of medical system

- Shortage of health care worker
- Quality of care deteriorated
- Increase the medical risks
- Lack of security and safety guard for high risk aging people

Vision

In order to make elderly people live in a more convenient environment with high quality of care and optimized of the health care workers, a smart elderly home with AI support may be the result to solve the problems.

User Story (1) – Residents of elderly home

monitor the activities and vital signs of the residents living in an elderly home

- Monitor the heart rate of the resident
- Alert health care worker if any abnormal reading
- Data save in the database for health record

User Story (2) – Health care assistant

email notification when giving medicine time issued or changed

email remind to giving the medicine to the residents

interface to input and record the hearth rate or hearth Pressure of the resident

Aim: minimized the medical risk by human error

Automatic reminder of giving medicine to residents

User Story (3) – Manager of Elderly Home

Master control of the system

Create or delete the health care assistant and resident

Input and change the diet alert and the health record of the resident

send a email to alert the assistance for the input and change Automatically

the storage of the personal data and clinical records of residents by a secured database.

- Privacy issue and consent may need to count into consideration

Division of labour of the project

Product Owner: Winters YAU

Scrum Master: Mark WONG

Technical Lead: Fung WONG

Independent Tester: Winters, Mark andFung

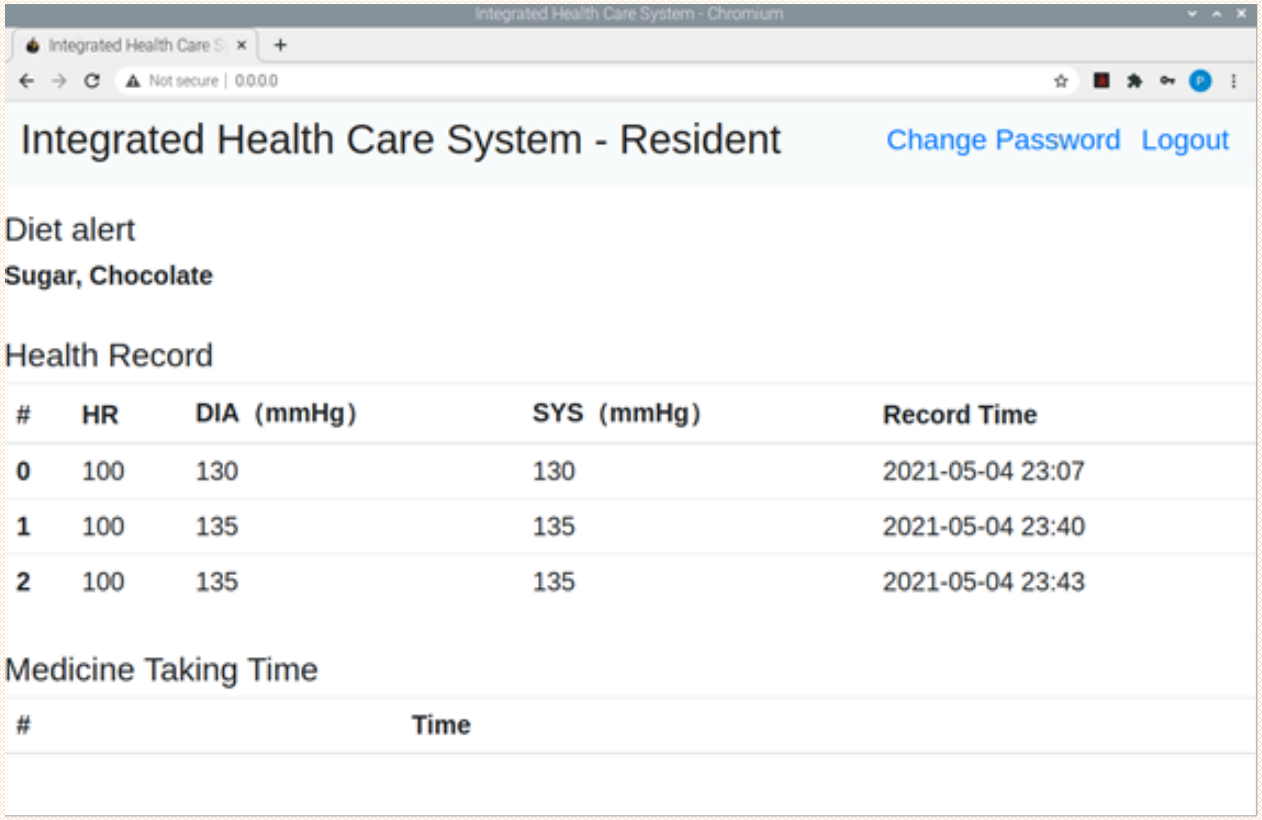
Product Solution – Hardware and software

Hardware
- Raspberry Pi 4B
- Ipad air

Software
- Python program

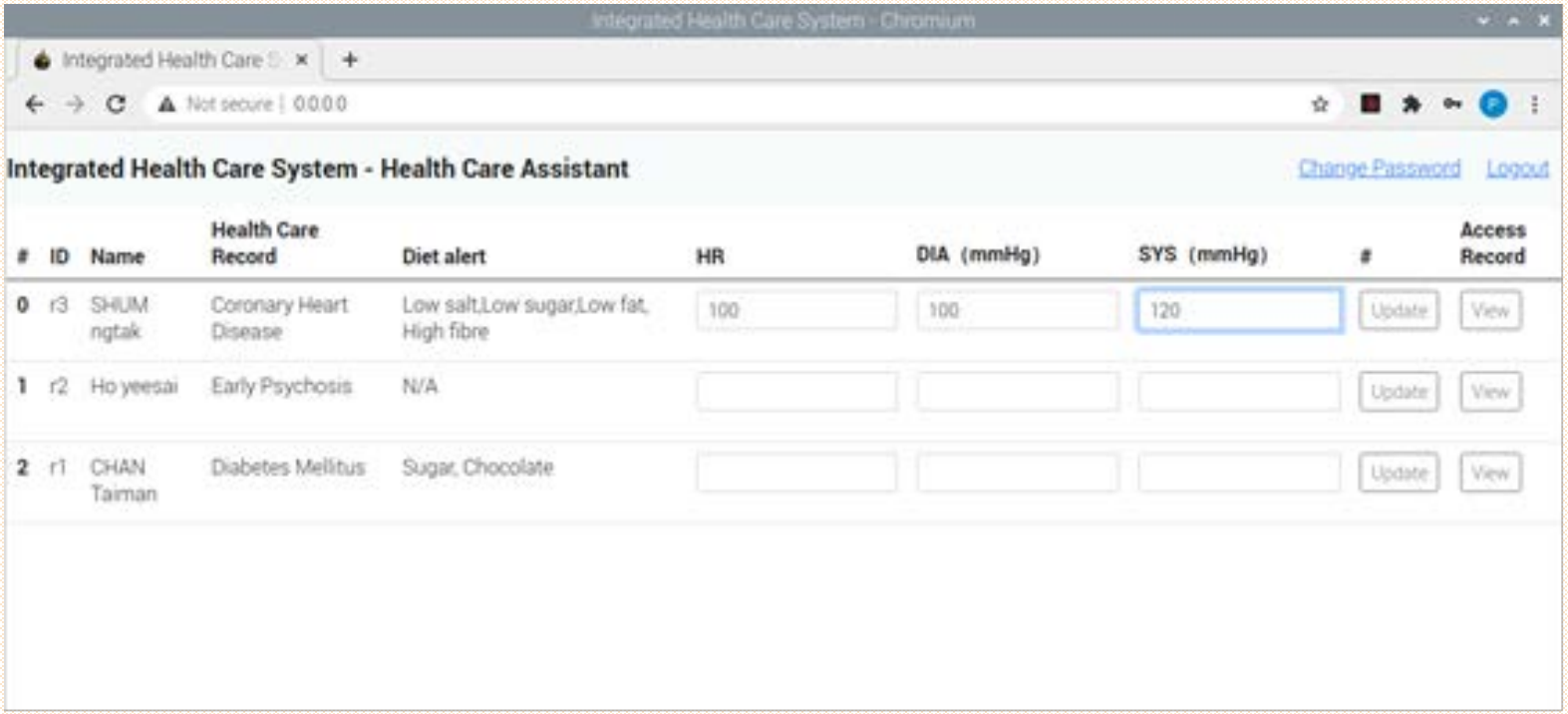
GUI for Elderly Residents

- View own health record, e.g. heart rate, blood pressure



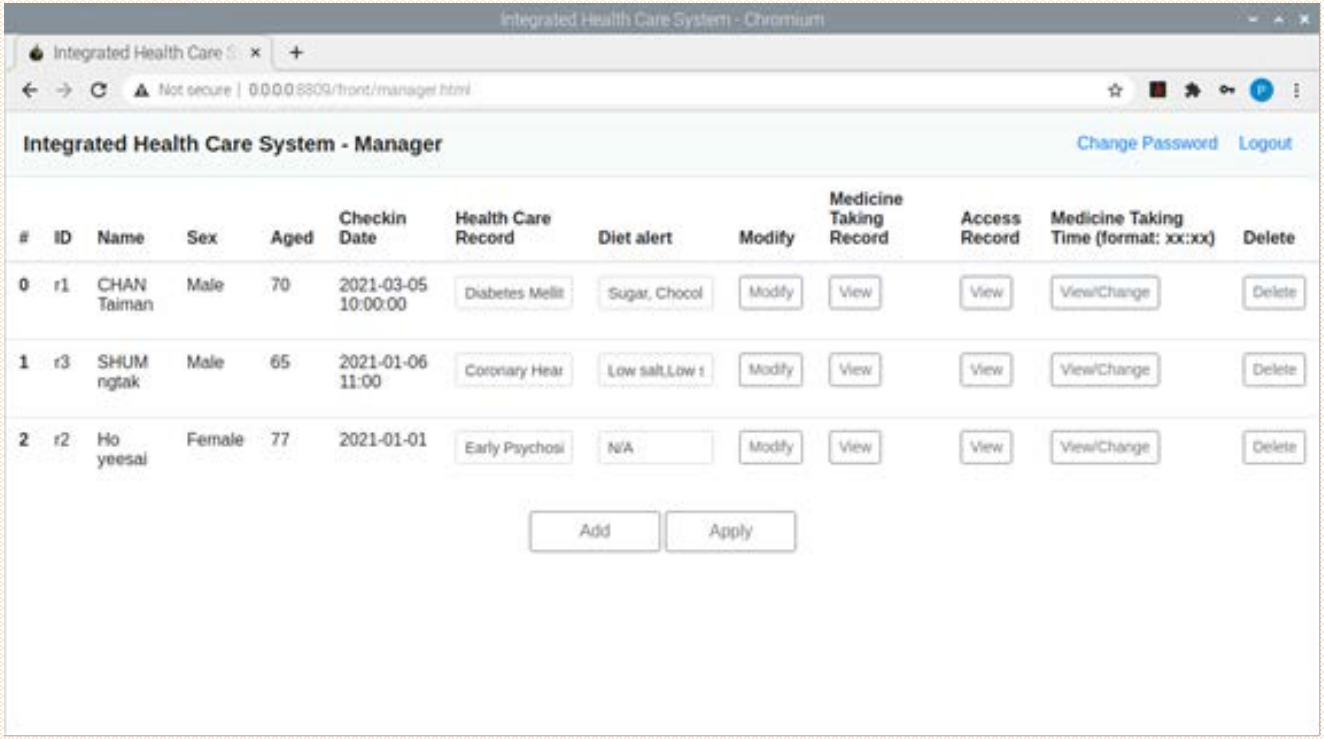
GUI for Health Care Assistant

- Create and modify the particulars of residents
- Receive email alert



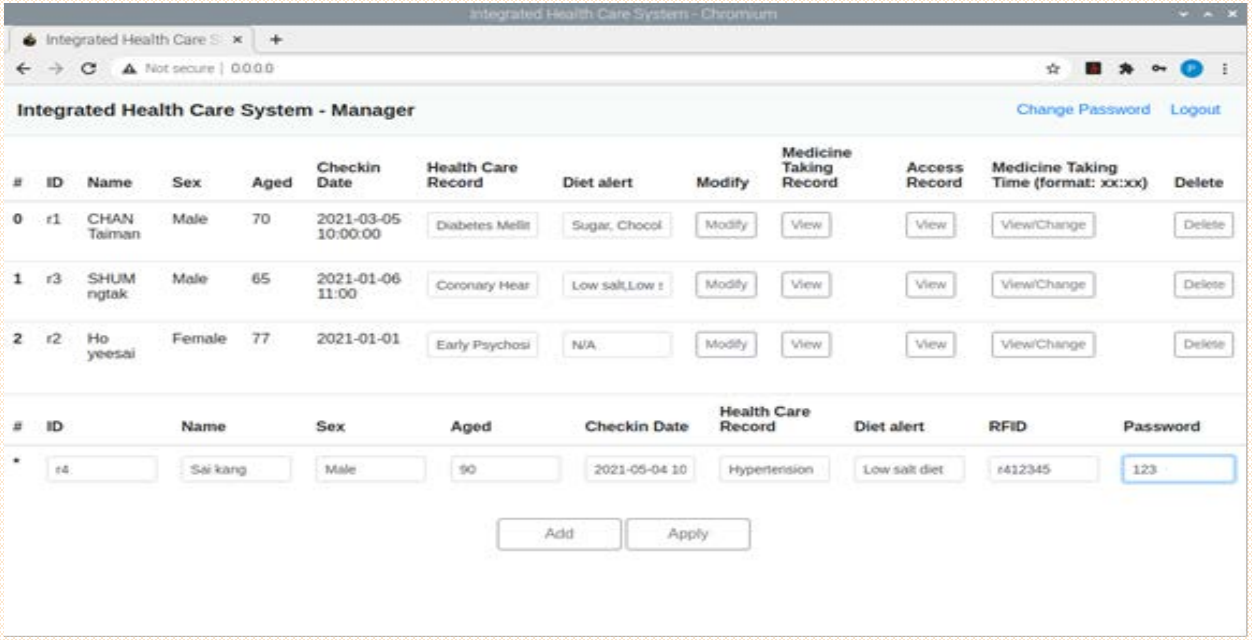
GUI for Manager

- Create and modify the particular of residents
- Input the medicine record and diet alert of residents



GUI for Manager

- Add User Account
- Modify data
- Change Medication taking time→ Email alert automatically



https://www.youtube.com/watch?v=5kChZ1AYT6U

Security issues

Host security

- raspberry pi stored at a cabinet with lock
- Temperature and humidity in a good condition

Cyber security

- behind a router with a firewall

Application Security

- The password set in program: for easy testing ONLY!
- Permission control methods based on different users – M0, N0, P0
- The storage space used by platform-related files, directories, and database records protected with the storage space used by other systems.
- All password were using SHA256 for encryption

Project management approach

Traditional approach

- A set of period of time
- Initiation, planning, execution, control and monitor, project closing

Agile approach

- Flexible
- Constantly changing

Product Development process (1)

1. Go through the project scenarios
2. Decide a product which meet the requirement
   - User input changes behavior of software
   - Important data storage
   - Communications between software components
3. Product designed is “an integrated health care system”
4. Confirm the product goals and vision

Product Development process (2)

5. Division of labour
   - Product owner – winters
   - Scrum master – mark
   - Technical lead – fung
- All team members share the role of independent tester

Product Development process (3)

6. Procurement of materials
7. Decisions of the program use – python
8. Different functions developed by group work
9. Obstacles found
    - RFID Recognition
    - Alert system for daily activities
    - Face detection

Product Development process (4)

10. Final Product
    - Different user gui created – residents, health care assistance, manager
    - Residents can check her own Heart Rate/blood pressure
    - Health care assistance can input the heart rate/blood pressure of residents
    - Manger can input and change the particular of the resident and the system will send a email alert to the health care assistance when any change of the giving medicine time automatically

Evaluation of the solutions

1. The idea was good and able to help people
2. Too many desired functions with limited time
3. Time consuming project
4. Insufficient team member
5. Knowledge deficit of the hardware and the program
6. Insufficient teamwork

References

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