Lancaster University College
at Beijing Jiaotong University

[Mentcare System]

CNSCC204: Software Design Coursework 2

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Contents:

Mentcare: A patient information system for mental health care (V2.0)

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1. Introduction

This section will give the reader an overview of the project, including why it was conceived, what it will do when complete, and the types of people we expect will use it. We also list constraints that were faced during development and assumptions we made about how we would proceed.

1.1 Scenario Assumptions

- A patient information system to support mental health care is a medical information system that maintains information about patients suffering from mental health problems and the treatments that they have received.
- Most mental health patients do not require dedicated hospital treatment but need to attend specialist clinics regularly where they can meet a doctor who has detailed knowledge of their problems.
- To make it easier for patients to attend, these clinics are not just run in hospitals. They may also be held in local medical practices or community centres.

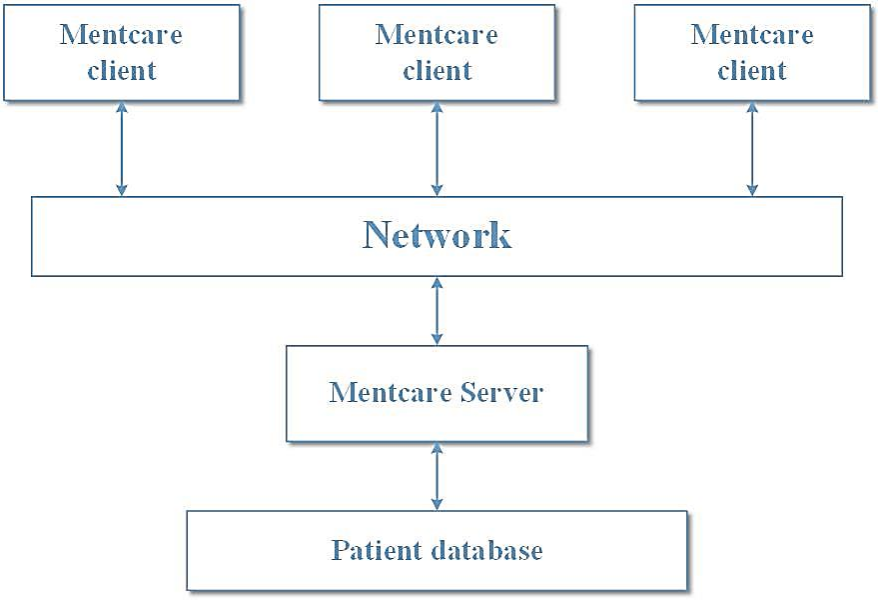
1.2 Product Perspective

According to the assumption, there are several objects in this patient information systems:

- Patients whose information is recorded in the system.
- Doctors who are responsible for assessing and treating patients.
- Nurses who coordinate the consultations with doctors and administer some treatments.

- Medical Receptionists who manage patients' appointments.
- IT Staffs who are responsible for installing and maintaining the system.

1.3 Product Organization



1.4 Product Function

- Mentcare is an information system that is intended for use in clinics.
- It makes use of a centralized database of patient information but has also been designed to run on a PC, so that it may be accessed and used from sites that do not have secure network connectivity.
- When the local systems have secure network access, they use patient information in the database but they can download and use local copies of patient records when they are disconnected.

2. Specific Requirements

This section of the document lists specific requirements for Mentcare. Requirements are divided into the following sections from the perspective of stakeholders:

This section of the document lists specific requirements for Healthcare Smart Home. Requirements are divided into the sections from the perspective of stakeholders mentioned in the Product Perspective:

- Patients
- Doctors

- Nurse
- Medical Receptionists
- IT Staffs

Detailed and specific requirements are following:

2.1 Patients

1 The Mentcare System **SHALL** have abundant functions for patients to choose time and doctor. (FR)

1.1 The Mentcare System **SHALL** provide patients with information and evaluation of doctors. (FR)

1.2 The Mentcare System **SHALL** show patients a recommendation list of doctors. (FR)

1.3 The Mentcare System **SHALL** provide patients with an approach to evaluate, reflect and complain doctors and nurses. (FR)

2 The Mentcare System **SHALL** have emergency entrance which can connect doctor immediately. (FR)

3 The Mentcare System **SHALL** consider religion, special people and taboos, which means it can provide humanistic care. (FR)

4 The Mentcare System **SHALL** provide the way to cancel the appointment. (FR)

5 The Mentcare System **SHALL** protect privacy and security data. (NFR, Security)

6 The Mentcare System **SHALL** have low learning cost and easy to use. (NFR, usability and accessibility,)

7 The Mentcare System **SHALL** be able to use on PC as well as mobile. (NFR, portability)

2.2 Doctors

1. The Mentcare System **SHALL** allow doctors to amend the treatment plans. (FR)
2. The Mentcare System **SHALL** provide simple and clear User Interface (UI). (FR)

2.1 The Mentcare System **SHALL** have low learning cost and be easy to use. (NFR, usability & accessibility)

3. The Mentcare System **SHALL** provide related information. (FR)

3.1 The Mentcare System **SHALL** provide required patients information. (FR)

3.2 The Mentcare System **SHALL** provide similar cases and history information for reference. (Performance, NFR)

4. The system **SHALL** collect and arrange the schedule of patients for doctors. (NFR, availability)
5. The Mentcare System **SHALL** have the platform of consultation for different doctors of departments. (FR)
6. The Mentcare System **SHALL** provide the standard templates and optional input ways for doctors to simplify the input process. (NFR, reusability)
7. The respond time of the Mentcare System **SHALL** be less than 0.1ms. (NFR, Performance)

2.3 Nurses

1. The system **SHALL** synchronize to obtain some necessary patient information. (FR)
2. The system **SHALL** synchronize to obtain doctor's guidance. (FR)
3. The system **SHALL** provide a way for connection when doctors is offline. (FR)
4. The system **SHALL** give an automatic treatment feedback to doctors regularly. (FR)
5. The system **SHALL** provide standard document form for diff departments interchange. (FR)
6. The system **SHALL** remind the nurses appointment/visit time. (FR)
7. The system **SHALL** have low learning cost and easy to use. (NFR, usability and accessibility)
8. The time to synchronize of system **SHALL** be less than 0.5s. (NFR, performance)
9. The system **SHALL** have a connection interface with pharmacy and relational departments. (NFR, usability)

2.4 Medical Receptionists

1. The Mentcare System **SHALL** be smart enough to automatically match physician according to the history records and personal preference. (FR)
2. The Mentcare System **SHALL** contain the message system which can retain the message leaved to the doctor during the day-offs. (FR)
3. The Mentcare System **SHALL** contain smart Artificial Intelligence to response some easy question from the patient. (FR)
4. The training time of the Mentcare System **SHALL** be kept as short as possible. (NFR, usability)
5. The Mentcare System **SHALL** analyze the using time and utilization ratio of the treatment rooms smartly. (NFR, performance)
6. The Mentcare System **SHALL** be able to check the history information offline. (NFR, reliability)

2.5 IT Staffs

1. The Mentcare System **SHALL** apply as much standardized Application Programming Interface (API). (FR)
2. The Mentcare System **SHALL** include back-end database that can implement data operations. (FR)
   - 2.1 The database of the Mentcare System **SHALL** implement the technique of standard database to achieve specific functions (ADD, DELETE, SET, SEARCH…). (FR)
   - 2.2 The database of the Mentcare System **SHALL** have functions of statistics to generate reports showing the degree of the satisfaction, the number of patients treated at each clinic, the number of patients who have entered an left the Mentcare System, the number of patients sectioned, the drugs prescribed and their cots, etc. (FR)
   - 2.3 The database of the Mentcare System **SHALL** have access to handle unexpected data. (FR)
   - 2.4 The capacity of the database **SHALL** be large enough to ensure the data security. (NFR, security)
3. Each staff member who is using the Mentcare System **SHALL** be uniquely identified by his or her 8-digit employee number to distinguish different objects and provide different permission. (FR)
4. The authority management Mentcare System of the Mentcare System **SHALL** be equipped with authority grading function. (NFR, Security)
5. The Mentcare System **SHALL** consider the compatibility of installed system. (NFR, reliability)
6. The Mentcare System **SHALL** be able to run under multiple conditions.
   - 6.1 The Mentcare System **SHALL** be able to run while the internet is bad-connected (NFR, reliability).
   - 6.2 The Mentcare System **SHALL** be able to operate properly during offline situation in day-offs or caused by emergence. (NFR, robustness)
7. The Mentcare System **SHALL** be reliable as much as possible. (NFR, reliability)
   - 7.1 The mean time to failure (MTTF) of the Mentcare System **SHALL** be shorter than 1,000 hours.
   - 7.2 The mean time to repair (MTTR) of the Mentcare System **SHALL** be shorter than 24 hours.
   - 7.3 The mean time between failure (MTBF) of the Mentcare System **SHALL** be longer than 20,000 hours. (NFR, Reliability)
8. The Mentcare System **SHALL** encrypt the local documents. (NFR, security)
9. The maintenance fees of system **SHALL** as low as possible. (NFR, cost)

3. Requirement Conflicts

Different stakeholders may have conflicting requirements. Here are some conflicts are raised to be compared and analyzed. Some possible solutions are also proposed.

3.1 Patients & Clinics

Involved Stakeholders	Patients	Clinics (doctors and nurses)
Conflicting Requirements	The system **SHALL** protect privacy and **SHALL** not leak the personal information.	The system **SHALL** download copies of patients' records.
Resolution	1. Apply safe protocol and API. 2. Only authorized accounts can access records.	

Involved Stakeholders	Patients	Clinics (doctors and nurses)
Conflicting Requirements	The system **SHALL** provide 24/7 service.	Clinics **SHALL** be only available during working hours (e.g. Mon-Fri, 08:30-17:30)
Resolution	The system SHALL provide a message function and an intelligent QA system.	

3.2 IT Staff & Clinics

Involved Stakeholders	IT Staff	Clinics (doctors and nurses)
Conflicting Requirements	The system **SHALL** prevent leak of database.	The system **SHALL** allow users to download copies of patients.
Resolution	Use AES512 encryption algorithm to secure the database.	

4. Glossary

Include a glossary of definitions, acronyms, and abbreviations that might be unfamiliar to some readers, especially technical terms that may not be understood by end-users or domain-specific terms that might not be familiar to developers.

[Glossary]	**Definition**
[API]	Application Programming Interface, a catalog of predefined functions.
[ADD]	An order to add data into database.
[DELETE]	An order to delete data from database
[MTBF]	Mean Time Between Failure
[MTTR]	Mean Time to Repair
[MTTF]	Mean Time to Failure
[SEARCH]	An order to search data from database
[SET]	An order to change a data from database
[UI]	User Interface, a platform that provide interaction between human and computer.