SYSTEM DESIGN PROJECT: PROJECT PLAN

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DispensED - Group 17

Last Update: January 23, 2018

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0.1 Purpose of this Document

This document is prepared as part of the project for the System Design Project course at the University of Edinburgh. This project plan will highlight the goals we have set as a team as well as how we will achieve them - Including a breakdown of our resources and overview of our organisational structure.

1 Goals

There is a large shortage of nursing staff across the UK. The NHS alone reported that nurses account for 38% of overall vacancies[1]. Care home staff, specifically, spend about 40-50% of their time with drug related activities. Administration errors occur 8.4% of the time [BAR+09], meaning if a patient receives medication three times a day, there is a 1 in 4 chance that an error occurs.
DispensED is aiming to develop a solution to the problems created by manual drug administration by creating a robot to do the bulk of the work. Our product will move around care homes to different residents' homes. The residents can then scan their identification and the appropriate drugs and vitamins will be dispensed. The system will also have a wide range of administrative functions available to staff, such as setting alerts on low stock levels or non-admittance of drugs.

1.1 Technical Subgoals

1.1.1 Communication The robot needs to communicate with a DICE machine that will support vision and connection to the back-end.

[1] http://digital.nhs.uk/catalogue/PUB30033

1.1.2 Movement

The robot needs to be able to move along the facility it is being deployed in. The navigation will happen along predefined routes using marks on the floor. Additional care must be taken in regards to possible collisions as the robot will operate in a generally dynamic environment.

1.1.3 Vision

Several vision systems are needed in order for the robot to accomplish its objective:

1.1.3.1 Orientation

The robot must be able to recognise and process the markings on the floor that are used for navigation. Additionally, the system must know where the rooms are it is trying to service - separate floor markings or an alternative kind of internal representation of the environment may be used for this.

1.1.3.2 Barcode Scanning

Medication is dispensed to the patient after they have authorised themselves. The main form of authorisation will be bar codes (these could be affixed to the patients' wristbands). The system must be able to read the barcodes

1.1.4 Dispensing of Medication

The robot will support giving out medication in two different ways:

1.1.4.1 Pre Packed Sets of Medication

Most care homes get pharmaceutical drugs come pre-packed from the pharmacy, sorted by patient. In this case, the robot must give out the container with the pre-packaged drugs to the correct patient. There needs to be support to store drugs for several different people that may not collect their drugs in order.

1.1.4.2 Single Pills (Vitamins)

For pills that do not come pre-packed (such as vitamins), a different kind of dispenser is needed. This dispenser must be able to give out single pills, one at a time.

1.1.5 Back-end

The back-end will offer a range of configuration as well as storing the patient database. Configured alerts will be sent out from the back-end, too.

1.1.5.1 Database

The Database will store patient information, including which room they reside in and their daily medication preferences. These preferences include:

- Patient information
- Type of medication needed (pre-packaged and/or loose?)
- Deadline for drug admission (to send out alerts)

1.1.5.2 User Interface

There will be a user interface to serve as the front-end to the aforementioned configuration.

TODO : ADD MILESTONES HERE

2 Resource Allocation

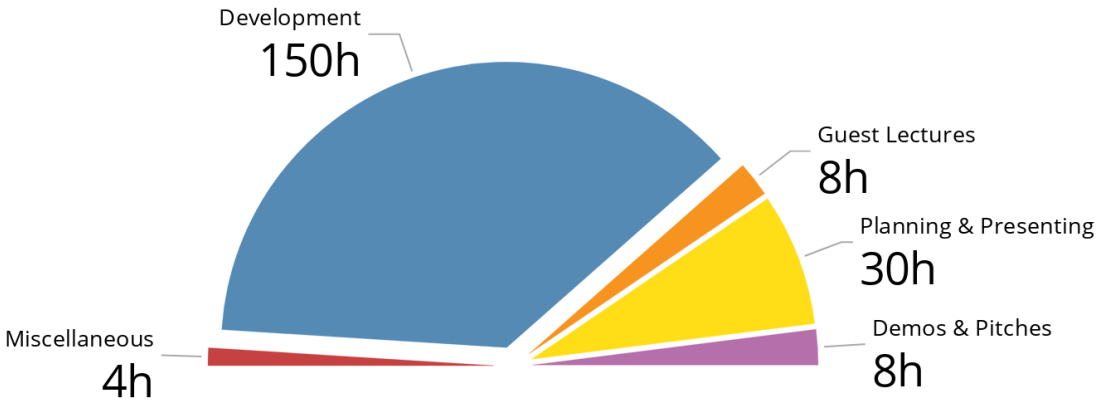

Figure 2.1: Planned Time Deployment

2.1 Risks and Contingency Planning

The most apparent risk that would hinder project progress is absence of team members. As mentioned above, we split our team into different sub-teams. Every sub team has multiple members and the project management ensures that no one team member has knowledge that no other team member possesses. This way, the impact of any one team member being ill or otherwise unable to work is minimised. Other risks arise from

3 Organisational Structure

3.1 Team Structure

The team structure follows loosely a Functional Matrix structure. Alexander was assigned as key contact and team manager. As previously mentioned, we split our team up into multiple sub-teams working towards the sub-goals of their area. The bold person is the "owner" of the groups work, meaning they are the first point of contact.

Medication Dispensing	Software Back & Front End	Movement (physical)	Vision
Glen	**Alex**	**Philip**	**Jasper**
Tizzy	Bobby	Jasper	Stefani
Philip	Glen	Bobby	
Stefani	Tizzy	Alex	

Table 3.1: Sub Teams

3.2 Meetings

Every morning an informal catch-up is held so that everyone is able to be up to date with the current state of the system. These catch-ups usually just include any progress from the previous day as well as potential new issues / roadblocks that may have emerged.
The whole team meets with our mentor during a one hour fixed meeting slot on Thursdays at noon - everyone is expected to attend these meetings. Additional meetings follow a drop-in approach and are conducted as needed.

3.3 Communication and Tools

The main vector of communication is the team slack - we use Notion as platform for notes, drafts and project management. Specific tasks are allocated via trello-like boards in the To-Do section on notion. We decided to use Notion instead of Trello as it offers additional functionality. The way we manage both task allocation and progress tracking follows SCRUMBAN management system, a mix between SCRUM and KANBAN. This system picks out the most useful agile parts from KANBAN while maintaining clearly defined roles - We hope this will aid our team with more steady progress whilst not locking ourselves into an engineering process that requires planning very far ahead.
A private GitHub repository for code version control has been set up for the project. We have used GitHub as it was the most accessible since everyone already had an account.

Table 3.2: Tool Overview

Tool	Purpose	Link
Slack	Main Communications HUB, Chat	`https://sdpgroup17.slack.com/`
Notion	Meeting Notes, Drafts, Project Management	`https://www.notion.so/dispensed/`
GitHub	Code Version Control	`https://github.com/xMythycle/DispensED/`

Bibliography

[BAR+09] Barber, N D. ; Alldred, D P. ; Raynor, D K. ; Dickinson, R ; Garfield, S ; Jesson, B ; Lim, R ; Savage, I ; Standage, C ; Buckle, P ; al. et:
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