Minutes of the First Client Meeting

Coding Pharaohs (Group 2)

August 12, 2013

Chair	Yifei Pei
Secretary	Matthew Nestor
Members	Abdulaziz Alhulayfi
	Bowen Tao
	Jianqui Li
	Yu Hong
Apologies	None

1 Time and Place

The first client meeting for Software Engineering and Project was held in **Ingkarni Wardli, Room 462** at **2:20pm** on **Monday 12 August 2013**.

2 Quorum Announcement

Having determined that quorum was satisfied, the Chairman Mr. Pei declared the meeting open.

3 Summary of Previous Meeting

Not applicable.

4 Group Milestone: Poster

4.1 Overview

Mr. Pei presented the group poster the team created to advertise itself. He explained the reasoning behind various design decisions, as well as the reasoning behind individual members' group roles.

4.2 Detailed Presentation

- Mr. Pei explained the rationale behind the group's name, *Coding Pharaohs*. First, it is a strong name, implying that the group consists of highly proficient coders. Second, there is a link between Ancient Egypt and the Robot Project the group is undertaking. The project is to design and programme a robot to safely navigate a débris-stricken city and mark out hazardous zones therein. Robots have a similar role in ancient Egyptian pyramids: they explore and mark out potentially hazardous areas and boobytraps.

- As the team finished the poster well before the deadline, a second poster was made. There was some debate as to which of the posters was preferable. The team asked the client which poster he prefered, but as there is a competition for the best poster, he politely declined to influence our decision. In the end, the group chose the first poster.

- The poster contained information about each team member, including the group roles for which they were elected. Thus, Mr. Pei used the poster presentation to introduce the group members' roles. They were as follows:

Abdulaziz Alhulayfi	Documentation Manager
Bowen Tao	Quality Control Manager
Jianqui Li	Hardware Manager
Matthew Nestor	Software Manager
Yifei Pei	Project Manager
Yu Hong	Testing Manager

5 Individual Milestone Reports

No individual milestones were reported.

6 Project Administration

The lecturer made some points about project administration:

- The group SVN repository is now available.
- The robot and lab are now available.
- The DTD document and examples will be available early next week.
- Like this meeting, the next meeting, to be held next week, will focus on requirements collection. However, the client will be a different person from this week.

Mr. Pei noted a few points of administration:

- Mr. Pei shall shortly create and set out the folder structure of the group SVN repository.
- All members shall familiarise themselves with LaTeXand the SVN repository.
- Mr. Nestor shall write up the minutes for this meeting in LaTeX.
- Mr. Alhulayfi shall write up the agenda for the following meeting in LaTeX.

The lecturer agreed to be contactable via email for follow-up questions after client meetings. Mr. Li, Mr. Nestor, and Mr. Hong agreed to convene after the meeting to construct a prototype of the robot body.

7 Requirements Elicitation

The majority of the meeting consisted of interviewing the client for project requirements. This was driven by a list of questions compiled by Mr. Pei, as well as spontaneous questions from other members. A paraphrased summary of the questions, and client answers, follows:

7.1 Functional Requirements

1. **Mr. Pei:** Is the robot intended for use in one specific site, or for use in multiple sites?
   Client: It is for use in just one site, the XML file for which will be issued soon.

2. **Mr. Pei:** Is the software intended for use in one or many robots?
   Client: Just one robot.

3. **Mr. Pei:** To what extent should the robot's operation be automated? Does the robot need to move with or without an operator? Does the robot need the operator's command to mark road closures?
   Client: The system should support both manual and automatic modes. Take the following scenario. In the beginning, a truck will deliver the robot to the edge of the city, for consider that the robot in reality may be quite large. The robot should begin in automatic mode and follow the road to the dangerous areas in order to mark the road closures. Manual mode is crucial from a safety standpoint. For example, if the robot detects an obstacle along its path, it should be stopped, and it should wait for operator to issue commands.

4. **Mr. Nestor:** So should that stopping occur automatically upon detection of an obstacle?
   Client: That's correct. Basically, the robot will have a bump sensor to detect obstacles. In natural disasters this will always happen; buildings and other objects will block the road and you will have to choose another path to get where you want to go.

5. **Mr. Nestor:** And at that point, the new path is determined by the user, rather than the robot? Or should the robot be able to navigate a new path automatically?
   Client: That is one possible solution. Here's an example. In the description we mention that, for safety reasons, the robot should always stay on the road; it should never run off the road. Otherwise it would be very dangerous: the robot could hit buildings or people. In reality, there is always a possibility that the robot will go off the road. In this case, firstly, the robot should automatically stop, and wait for manual control from the operator. The operator can then move the robot back to the road. There are many other situations in which manual control is necessary. For example, what happens when communication is lost between the robot and the host system?

6. **Mr. Pei:** What should happen once the robot has searched the entire area?
   Client: The robot should return to the starting point.

7. **Mr. Pei:** So the robot should automatically find a path, search the whole city, and when it has finished, it should return to the starting

point?
Client: You will already know that something has happened in a particular area of the city. You will know a point in the city where the disaster is thought to have occured, and there will be a radius around that point. At any point that a road intersects that radius, a road closure should be marked. This is the main task of the robot, so it may not be necessary for it to explore the whole city.

8. **Mr. Nestor:** So you're saying that the robot isn't required to make a complete map of the city, only the areas of the city that have been damaged?
   Client: Yes.

9. **Mr. Li:** So, when the robot meets an obstacle, it needs to record the place of the obstacle?
   Client: Yes. When the robot detects an object, it should mark it, not the physical map, but on the host screen.

10. **Mr. Nestor:** In the damaged area, should we assume that there are some circumstances under which the robot must go off-road?
    Client: The robot should never leave the road. The robot is not allowed to go into the damaged areas; it simply finds the edge of the affected areas.

11. **Mr. Pei:** How does the robot identify the damaged area?
    Client: The robot has prior knowledge of the affected areas.

12. **Mr. Nestor:** How detailed is our knowledge of the city and the affected areas?
    Client: You will be given a point and a distance around it, for example one hundred metres around that that point, which represents the dangerous zone. The main task is then to determine which streets intersect that zone, and mark them.

13. **Mr. Li:** Will the obstacles be the same size?
    Mr. Pei: Yes, what sorts of shapes and sizes will the obstacles be?
    Client: You can represent the obstacles as you like. Here are some other requirements I can tell you. The city will be a scaled down model made out of A1 or A0 paper. The width of the streets will be 5mm. Intersections will be a solid circle. So, when the robot arives at an intersection, it detects a circle, and thereby knows it is at an intersection. Then, you need to think about how to represent obstacles. If you represent obstacles with circles, then you'll run into trouble.

14. **Mr. Nestor:** Perhaps I misunderstood, but I thought the question was, How will the objects be represented in the physical domain that the robot is trying to navigate? On the paper. For I assume the robot doesn't know beforehand where the obstacles will be?
    Client: It's half-half: you will know where some of the obstacles are, and not others, just like in reality. It's a dynamic situation: yesterday there was no obstacle here, but today there might be.
    Mr. Nestor: So what sort of form will these obstacles take?
    Client: You mean, on the paper?
    Mr. Nestor: Yes.
    Client: Any solid object. Imagine this object is here [client points to mobile phone]. The robot has a bump sensor which will detect it. After it detects it, it has to mark it on the host side, using a different shape.

15. **Mr. Alhulayfi:** How will the sensors recognise shape, whether something is an the obstacle or an intersection?
    Client: You will have the light sensor for this. So you will need to figure out how to use the light sensor to detect whether something is a solid line, a circle, or a rectangle.

16. **Mr. Pei:** Will the user be on site with the robot, or will it be remotely controlled?
    Client: It will be operated remotely; the user will be in an office far away, potentially in another city. This has implications for the whole project. So, the communication between the robot and the host should happen in real-time.

17. **Mr. Pei:** Given communication must occur in real time, what sort of delay is acceptable?
    Client: Good question. This is a safety-critical project. Acceptable delay will be less than 0.5 seconds.

18. **Mr. Pei:** What kind of graphic user interface will the operator prefer?
    Client: This question is too vague.
    Mr. Pei: Okay. Do you prefer a GUI or command-line control?
    Client: Definitely a GUI, because a command-line has too much text to know what's happening quickly. The GUI will have a map so the operator can see what's happening very quickly.

19. **Mr. Pei:** How simple do you want the GUI? Will it be operated by an expert, or will many people need to operate it?
    Client: This is a technical question that will be covered in a later

meeting. You will design a GUI and show it to the client for feedback. This will happen in week 5 or 6, I think.

20. **Mr. Pei:** We've discussed the representations of the dangerous areas, the roads, the obstacles. Is there anything else, except for the roads and obstacles, such as buildings or walls?
Client: You don't have to worry about buildings because we assume the robot always stays on the roads.

21. **Mr. Nestor:** Are we going to be given the map of the road as a data-structure first? Or do we have to determine the map of the road on the basis of the lines on the paper?
Client: We give you a DTD, which specifies how to represent the city, the obstacles, the dangerous areas. We also give you an example. With that example you can draw an initial map.

7.2 Safety Requirements

1. **Mr. Pei:** What action should the robot take when power is low or lost?
Client: As safety is critical, in such situations the robot should automatically stop and await further instruction. **Mr. Pei:** Should it give a warning to the operator?
Client: Yes. If the robot's power falls below a certain level, you should give a warning.

2. **Mr. Pei:** What action should the robot take if communication between the operator and the robot is lost?
Client: It should stop.

3. **Mr. Tao:** Should the robot be expected to change automatically between automatic and manual modes?
Client: You mean, when the robot loses communication with the host?
Mr. Tao: Yes.
Client: No, the robot should just stop. Otherwise you'll have trouble; the robot may kill people. Keep in mind that the robot has survelance equipment, such as a camera. So whenever the robot travels somewhere, the operator should see a video feed of the surrounding area. But if this feed is lost, you don't know what the robot is doing, so it's very dangerous.

4. **Mr. Nestor:** So we'll have three different types of sensors: the bumper sensor, light sensor, and a camera?
   Client: You don't have a camera; it is just assumed.

5. **Mr. Pei:** What is a safe force with which the robot may make contact with external objects, such as obstacles?
   Client: This is an important safety issue, for if the robot make contact with objects with too much force, it could be damaged. For this reason, the robot should not move very fast; use a slow speed.
   Mr. Pei: How do you define the speed limit? What is a slow speed.
   Client: You should be able to figure this out for yourselves by experimentation.

6. **Mr. Pei:** How do you define a safe starting position?
   Client: As the requirements document specifies, you can assume that a truck will deliver the robot to the starting position.
   Mr. Pei: What if the robot starts in a dangerous zone?
   Client: In the case, the truck couldn't have delivered it. So you can assume that the robot will start in a safe area.

7. **Mr. Pei:** Is the starting area randomly picked?
   Client: Yes, but definitely inside the city, not outside.

8 Meeting Feedback

The lecturer gave the group some feedback for its performance in its first client meeting. The following is a summary of the key points.

- The chairperson role is a managing role. This includes the allocation of tasks, making sure the meeting finishes on time, and ensuring all items are covered. In this way, the chair doesn't have to do everything.

- Recording minutes is good, but you should also write notes for the minutes as the meeting unfolds. Otherwise, you have to relisten to everything recorded in order to start writing. If you already have handwritten notes, you merely need the recording as a reference.

- The group still hasn't asked all the requirements questions necessary, and should carefully about what to ask for the next meeting.

9 Adjournment

The next meeting is a group meeting to be held in the same place, namely Ingkarni Wardli, Room 462 at 2pm on Thursday 15 August 2013.
The meeting closed at 3:12pm.