IPRO 330

Home Monitoring of the Spinal Cord Injured Patient to Prevent Re-hospitalization Using Web-Based Technology

Group Members

- Dr. Peter Lykos, Faculty Advisor
- Dr. James Walter, Hines VA Hospital
- Raslan Othman, Hines VA Hospital
- Jai Hira, Group Leader
- Timothy Victor
- Stoyan Vassilev
- Despina Stasi
- Angie File
- Rohit Kumar
- Meryl Lobo
- Pat O'Leary
- Eric Oberle
- Mitul Patel

Hines VA Hospital

- The IPRO team is working on this project in conjunction with staff at Hines VA Hospital
- Dr. James Walter has been working on designing a system that meets the needs of patients and physicians alike

Introduction to the Problem

- Prevention of secondary medical problems is an important part of lifelong patient rehabilitation.
  - Risks can include, but are not limited to, pressure ulcers, urinary tract infections, respiratory infection, chronic pain, and obesity
- The prevention of these complications is the major goal of physicians and patients.
- The use of Web-Based Technology will allow for home monitoring of patients.

Case Management Issues

- Home visiting has shown to improve patient participation in their own rehabilitation and disease management, is however limited and costly.
- Interactive voice response systems and home teleconferencing systems are limited to monitored areas and have high drop out rates.
- One internet system has much to offer, but is very costly and requires considerable staff time for development, training, and use.

Our Proposal

- We want to improve patient home monitoring to motivate patients to take an active interest in their care.
- Also provide a longitudinal summary for patients and doctors so that they may work together to create better programs for the patient.

Goals for the Semester

- Design and create a website that allows patients to answer questionnaires about their health from their home.
- Create a database that will store the answers from each patient and allow physicians easy access to medical history
- Find appropriate hardware that will meet the needs of the program.

Sub-Groups

- Internet Technology group, which is responsible for design and creation of the database and website
- Access Technology group, which is responsible for researching hardware that provide useful solutions for the users
- Focus Group, which is responsible for gathering feedback on the website.

Primary Issues

- The website design has to be easy to use and secure
- The database design has to allow for easy access to patient history and overall patient statistics
- Hardware chosen for use by patients must be easy to use and affordable

Additional Design Issues

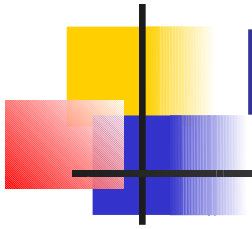
- SCI Service population reports
  - Proportion of patients having problems and severity
  - Effectiveness of service home programs
- Planning for future areas
  - Changes in problem areas and questions
  - Education programs with testing
  - Intervention programs with monitoring
  - Home interactions with clinic staff
    - Chat, voice, photo, teleconference

Previous Work

- A focus group with patients and staff had been conducted on the layout design for the website
- Eight areas of secondary complications were identified such as pain etc.
  - 6 to 12 questions for each area where there is a problem
    - General symptom questions and general concerns
    - Is medication or therapy working?
    - Would you like to talk to staff about problem?

Access Technology Team

- Pat O'Leary (team leader)
- Eric Oberle



Early Issues

- Find a piece of hardware that allows for easy and affordable access to the internet
- Not all patients are familiar with the internet or how to use a computer
- User interface provided by hardware

Hardware Under Consideration

- Conventional PC's – commonly used in many households, these have the most wide range of use
- WebTV – Less expensive than the other options, this is also the most limited in terms of its interface and use
- V-Link – a terminal designed solely for the purpose of accessing the internet using a standard keyboard, mouse, and monitor

Cost/Benefit Analysis for Hardware

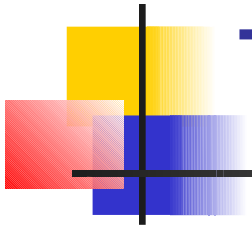
	Unit Cost	Monthly Fees	Advantages	Disadvantages
Conventional PC	$500+	$20-$40	Versatile	Complicated
Web TV	$100	$21.95	Simple Inexpensive	Lacks User Interface
V-Link	$0	$75	Simple	Expensive

Teleconferencing

- Allows doctors to visually see some physical problem patients are having
- May be a more appropriate way to communicate in some circumstances
- Needs:
  - Web cameras for teleconferencing
  - Choice of teleconferencing software

Teleconferencing – Hardware

- Any web-based system requires:
  - A web-cam
  - A microphone
  - Sufficient internet transfer rates



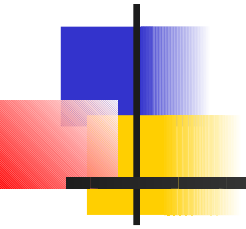
Teleconferencing - Software

- Two systems were examined:
  - MS Windows Messenger in Win XP supports a teleconferencing feature
  - MS NetMeeting ships standard with most Windows-based operating systems
- NetMeeting was considered to be the more attractive package
  - NM is more easily available, not just on XP
  - NM is more easily integrated into the web page
  - Windows Messenger requires a screen name

Future Thoughts on Access

- Find viable, affordable mobile access solutions
- Looking for hardware to facilitate use by quadriplegic patients

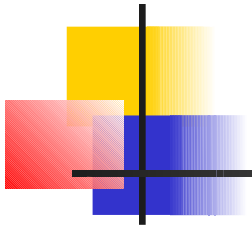
Website Development and Deployment



- The Website
- Roadmap to completion of the website

IT Design Team

- Stoyan A. Vassilev (Team Leader)
- Mitul Patel
- Timothy Victor
- Meryl Lobo
- Rohit Kumar



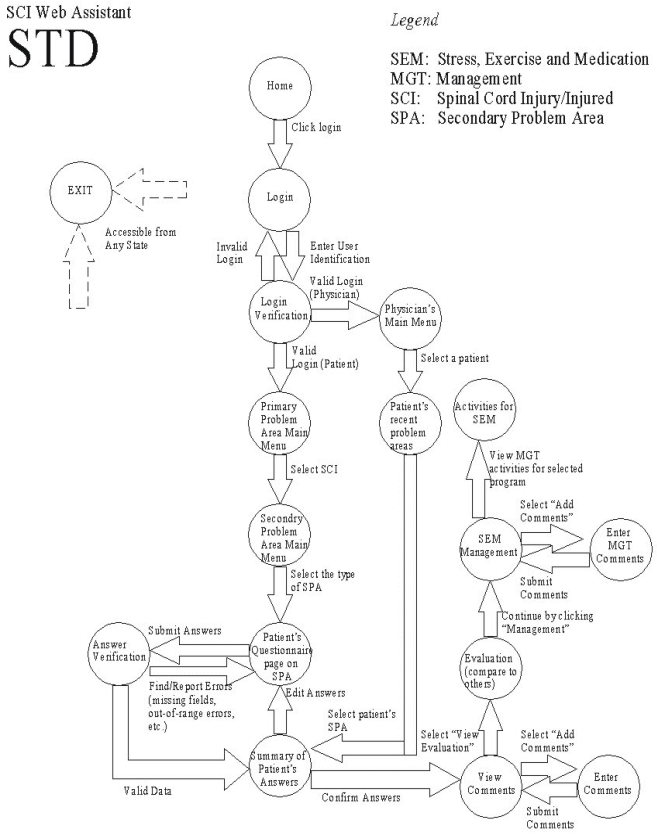
The Website

- Overall Software Design:
  - Stoyan Vassilev
- Database Design:
  - Mitul Patel
- Software Development:
  - Timothy Victor
  - Meryl Lobo
  - Rohit Kumar

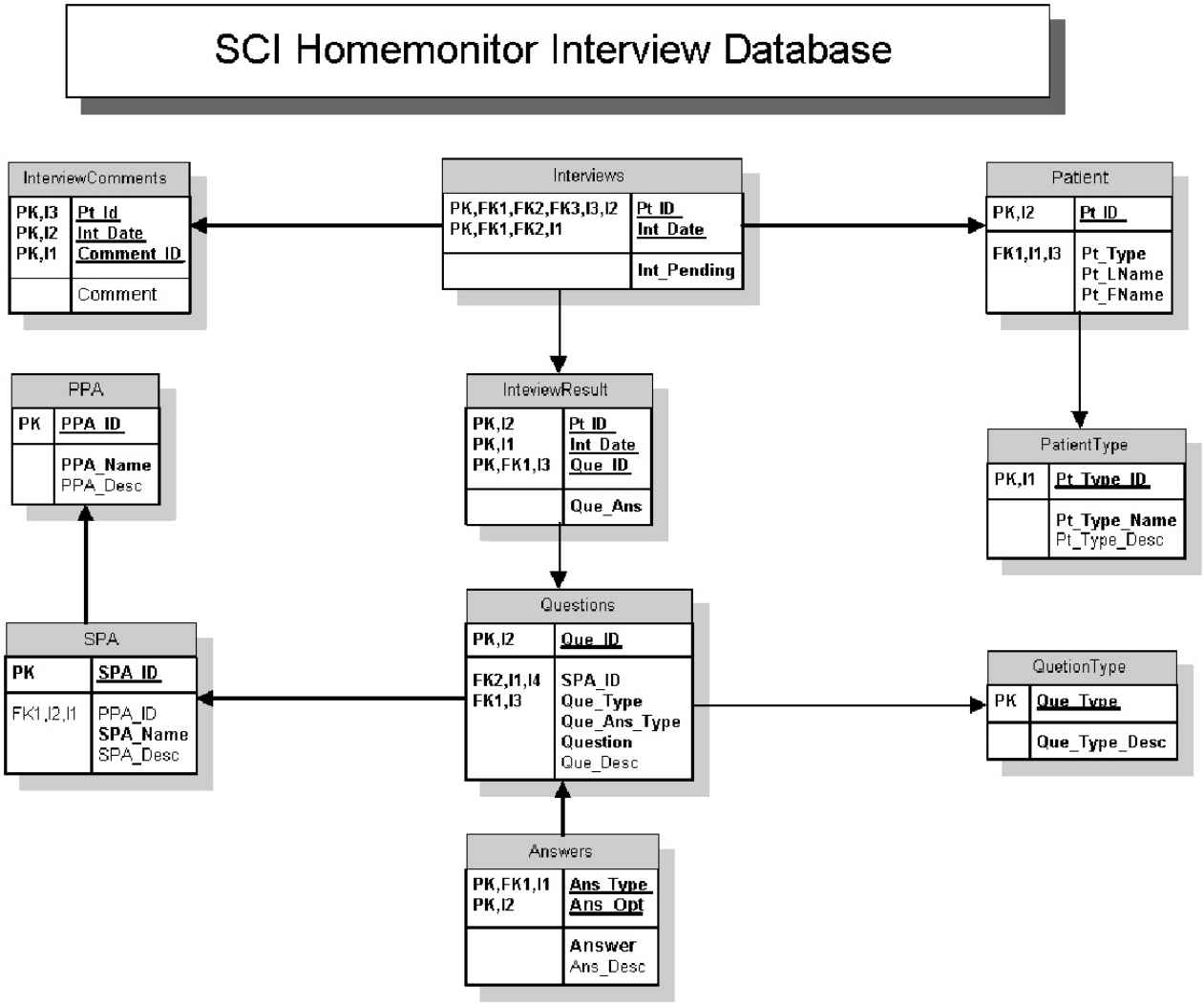
Software Design

State Transition Diagram

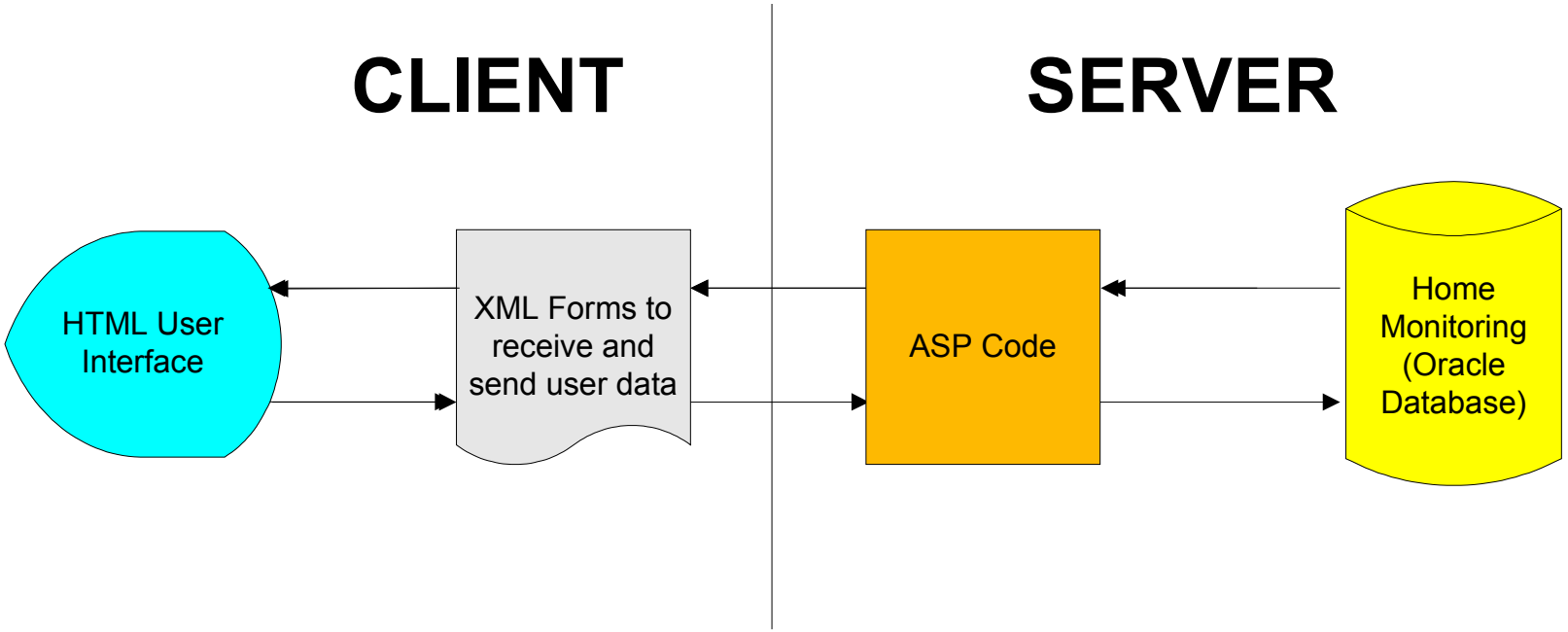
This figure shows the different states the patients/physicians may go through while using the website.

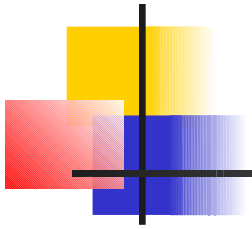


Database Design



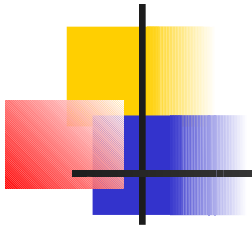
SCI Website Design





Key Features

- Privacy protection
- User-friendliness
- Inputs checked for validity and coherence
- Dynamic content
- Easily upgradeable to include other problem areas



Levels of Software Testing

- Internal Testing – testing done by the IT team to make sure the software is stable and bug free.
- External Testing – testing done by simulated patients to confirm the usability of the software.

IPRO 330 – Roadmap Spring '03

		W 1	W 2	W 3	W 4	W 5	W 6	W 7	W 8	W 9	W 10	W 11	W 12	W 13	W 14	W 15	W 16
IT Task	Assigned To	1/24	1/31	2/7	2/14	2/21	2/28	3/7	3/14	3/21	3/28	4/4	4/11	4/18	4/25	5/2	5/9
Requirements Overview	ALL																
Software Platform Agreement	ALL																
Client Interview (Hines VA Personnel)	ALL																
Overall Software Design	Stoyan																
Database Design	Mitul																
Function Descriptions & Linkage	Meryl, Rohit, Tim																
Code Implementation	Meryl, Rohit, Tim																
Internal Testing	ALL																
External Testing	Hines VA																
Testing Resolution	Meryl, Rohit, Tim																
Release	ALL																
Software Documentation	ALL																
IPRO Presentation Review	ALL																
IPRO Presentation - Showtime!!	ALL																
Completed																	
Work In Progress																	
Future Tasks																	

Focus Group Team

- Despina Stasi (team leader)
- Angie File
- Jai Hira

Original Objectives

- Obtain information from patients and staff at Hines VA Hospital about the website
- Create a pilot program to test the website on patients at Hines

Problems Encountered

- The grants that had been applied for did not get approved
- This made it unfeasible to conduct a pilot program
  - Can’t use patients to gather insight about the web-site

What We have Done

- Surveyed students to test the website and give feedback
- Contacted the Institute of Psychology and obtain their feedback on creating a survey to ask for the student input
- Put together a summary to pass along to future IPRO

Another Proposal

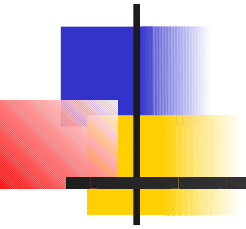
- Dr. Nemchausky suggested to start:
  - 1. Start Web site for patients only
  - 2. Care givers ask patients to use site
    - Patients could get reports
      - Mail, Fax, E-mail
      - Bring to clinic visits
  - 3. Not a study
    - No identifiers at web site
    - No human studies required
    - Need hospital approval

Other Group Activities

- A website for IPRO 330 has been constructed and posted on the IIT server at https://www.iit.edu/~ipro330s03
- The IPRO notebook has been updated and worked upon

Future Goals

- Complete the website
  - Finish health programs
  - Work on aesthetics of the site
  - Incorporate teleconferencing option
- Test the website with SCI patients
- Consider the commercial aspects of this project



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Questions/ Comments