IPRO Project Plan

A Video Annotation and Indexing System

IPRO 327

September 11, 2009

Team Charter

TEAM INFORMATION

Roster

Name	Year	Major
Dhagam, Karthik	4	Electrical Engineering
Donchev, Alexander	3	Computer Engineering
Homawoo, Sergio T.		
Litas, Alexander	4	Computer Science
Orlichenko, Anton	4	Electrical Engineering
Osswald, Christian	4	Biomedical Engineering
Petsod, Jason	4	Physics
Rawlings, Ori	4	Computer Science
Shaffer, Joshua	4	Electrical Engineering
Smith, Antoinette	4	Professional and Technical Communication
Yates, Andrew	3	Computer Science
Yu, Hee Jeoung	5	Computer Engineering

Strengths, needs and expectations

Name	Strengths	Needs/ Skills to develop	Expectations
Dhagam	• C • Java • VHDL • Robot C • Dynamic C • Hard working • Works well in team • Enthusiastic	• Communication • Additional programming skills • Web design and interface	• A working prototype which can be demonstrated to the judges on IPRO day • Good project reports (midterm and final) • Set expectations for future team that works on this project
Donchev	• Open-minded • Eager to learn • Realistic • Troubleshooting hardware and software • Knowledge of C, Java, HTML, Ruby on Rails	• Communication • Teamwork • Technical skills in designing and deploying web applications	• A working version of the system by end of the semester • Gain skills in communication and presentation • Work in an good team environment • Take away as much knowledge as possible
Homawoo			
Litas	• General programming knowledge • Curious • Open-minded	• Communication • Learn C++ • Improve Java skills	• A finished designed that is ready to be deployed or already deployed • Product will be well thought out and field-tested

Orlichenko	• C • C++ • Java • Linux systems • Subversion • Git • Some HTML	• Communication • Cooperation • Goal setting • Leadership • Web development (Flash, Ruby, etc.)	• A working prototype of a video annotation system based on input gathered from prior studies as well as new research by us • We will communicate effectively, leading to good teamwork with minimal duplicated effort • Time to evaluate finished product
Osswald	• Photoshop • Cooperation • Accountability • Writing	• Teamwork • Leadership	• A successful project in both product and team development • To become more aware of the ethical concerns that arise when working as a team and how to manage these concerns
Petsod	• Python • Java • C • Unix • LaTeX • HTML/CSS JavaScript • Mercurial • Subversion • Grammar • Attention to detail	• Interface design • Ruby/Ruby on Rails • Teamwork/ collaborative skills • Leadership skills	• A working system by the end of this semester that will be beta tested next semester and put into full production for all IIT courses in Fall 2010 • A team where everyone puts full effort into their part, helps others if necessary, and shows enthusiasm and motivation for the task at hand

Rawlings	• Java • Some Python • Some Ruby • Strong technical skills • Solid work ethic • Strong technical knowledge • Interest in user interface design	• Interface design philosophies • Ruby/Ruby on Rails • Identifying ethical challenges • Team leadership	• A team that will both accomplish technical goals and overcome interprofessional challenges • A team that is able to effectively communicate this process to the IPRO office through a combination of deliverables and IPRO day presentation/fair • Second or higher in our track on IPRO day • A completed system that is stable, scalable, usable and deployable next semester in a subset of all IIT courses • Full production of the system by the Fall 2010 semester
Shaffer	• C# • Java • C • Haskell • SQL • .NET • Some Python • Some Ruby • Some C++ • Some ASP.NET	• Web development • Good design practices	• A working prototype sometime during the semester • A working version of the software to be deployed in a preliminary phase used by a few classes before being considered to replace the old video system, possibly to be evaluated by a future IPRO semester
Smith	• Document design • Public speaking • Basic programming knowledge	• Teamwork • Leadership • Communication • Project management	• A well-documented working prototype of this system for beta testing in the spring

Yates	• Java • Ruby • Linux • HTML • Some Python	• Communication • Leadership • Teamwork	• Good teamwork and communication resulting in successful production of a working and tested video annotation system by the end of the semester
Yu	• C • Java	• Teamwork • Communication • Coding	• A better tool for the user • A good experience to the participants making it

Team identity

Our design is motivated by our goal to serve IIT by enhancing their course video capabilities. Using IIT colors and fonts in our logo reflects our connection with IIT. The positioning of a "plus sign" and a "u" as super and subscripts reflects IIT's science and engineering orientation. The motto signifies our goal of making the online educational experience more interactive.

Name
iitOnline+u
(Read as "IIT Online plus you.")

Logo

Motto
Putting *u* in the classroom.

TEAM PURPOSE AND OBJECTIVES

Purpose

Vision
Much information available on the Web is in video format. The problem with this medium is users cannot comment on particular scenes within the videos and there is no method of searching for specific content within the videos. The team proposes to develop a system that will allow users to make fine-grained comments on scenes within the video and then to use these comments to aid in search within videos.

In the first semester of this project, the team will design and implement a Web-based video-viewing system that allows viewers to type in comments that are linked (i.e., timestamped) to a particular point in the video. These comments will allow for a deeper discussion on the video content as well as other social-networking and crowd-sourcing benefits.

Once the system has been implemented, it will be deployed in a real-world setting, such as a classroom with recorded lectures. Students will be allowed to view lecture recordings and make fine-grained comments on the instructor's lesson. In this environment, the experimental system could be tested for usability and for educational impact. A metric for this system is whether it improves the educational experience.

Mission
To create a combined video and message annotation system that increases interaction and participation among online course students and provides greater opportunity for meaningful Internet-based interactions with course professors.

Objectives

1. To gather requirements for the deployment of iitOnline+u into the classroom.
2. To improve upon, and potentially redesign, the user interface (UI) of the existing system prototype.
3. To devise metrics which define a successful UI design.
4. To devise a user testing strategy, formulate hypotheses, execute experiments, and review results.
5. To design and implement a system that allows us to sample UI modifications in the live web application with a small subset of users, and allows us to log and examine user interaction with the experimental modifications.
6. To implement the required features as determined by the process in initial phase of project.
7. To conduct software tests and fix any problems.
8. To ensure that the software meets scalability and stability requirements.
9. To devise a plan for integration of our system into IIT's infrastructure.

BACKGROUND

Customer/Sponsor

There is no external sponsor for this project; it is faculty-initiated. The target customer is IIT.

User problems

Currently, IIT Online courses are streamed to users using RealPlayer and collaboration with other students in courses is facilitated via IIT's Blackboard infrastructure. This current design has two problems of interest to our team: RealPlayer is known to have incompatibilities with specific computer configurations (http://www.iit-online.iit.edu/current_students/technical_support.php) and more importantly, the Blackboard collaborative forums (discussion board, chat room, etc.) are anecdotally considered to be underutilized. Further, in the current implementation of IIT Online courses, video streaming and Blackboard discussions are not integrated into a seamless, intuitive interface; instead, users need to have a RealPlayer window open streaming the class video as well as a window open to Blackboard. This lack of the integration of video and associated discussion potentially makes it unwieldy, if not complicated, to start and maintain collaboration with other members of the class and the professor.

Technology/science

The system we are creating is adapted from software called EduKen, developed by TOCA, LLC, a Chicago design firm. A screen capture of this software can be seen in Figure 1. This software is missing required features, has an interface unsuitable for the target audience, and has not been adequately tested. The interface is intended for experts: It's not easy to use and, visually, is not aesthetically-pleasing, but it can be efficient once the user learns it. For example, to finish typing a comment a user must press the Ctrl key. There is no indication

that this is the right thing to do. Also, the display of comments will be different: The method for viewing comments (i.e., chronologically by posting order, by subject, by time referred to in the video, etc.) will differ.

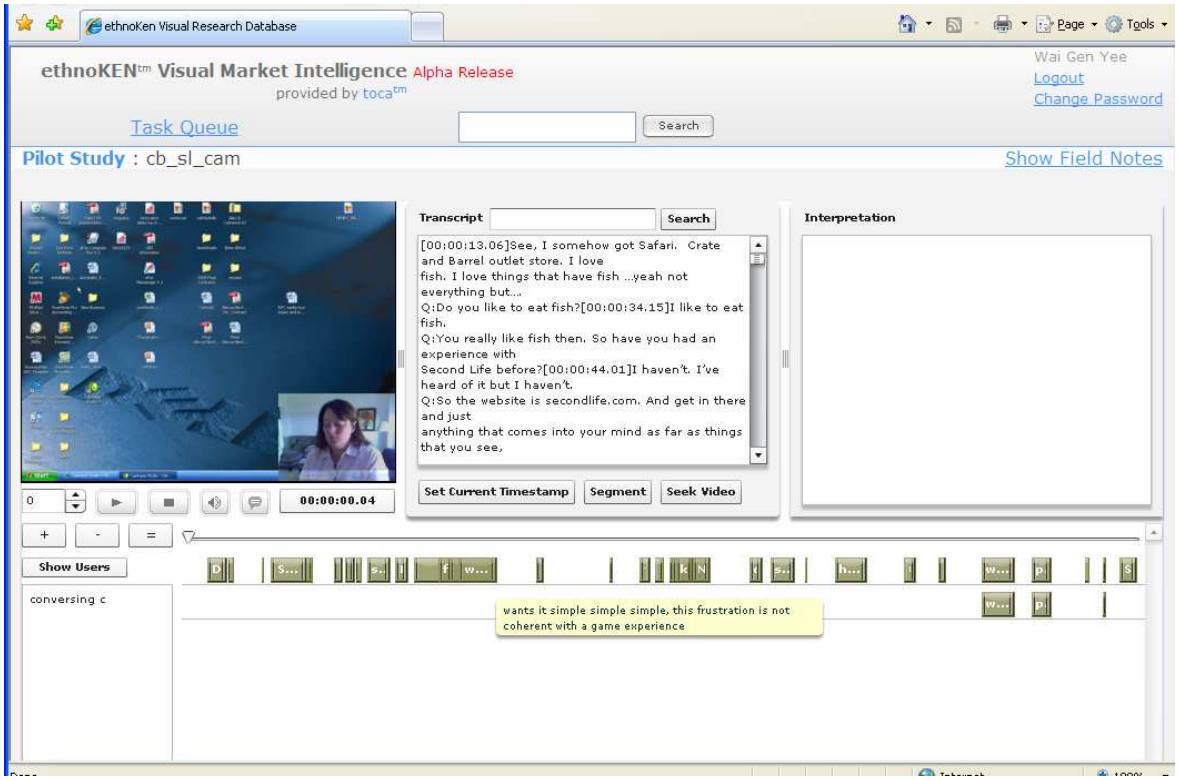

Figure 1. A screen capture of the EduKen software; a prototype for iitOnline+u.

History of previous attempts

Many attempts have been made to help schools, students and teachers to use the Internet to their advantage. According to insidehighered.com (http://www.insidehighered.com/news/2009/09/09/lms), Blackboard is one of the leading software services that attempt to help the class learning environment with Internet technology. However, as many IIT students have experienced, Blackboard's discussion and communications facilities are underused. Despite Blackboard's goal to inspire communication among peers and promote active exchange of ideas most students ignore them. We hypothesize that this problem is due to ill-managed user interface design. Through the

current project we will try to identify the room for improvement of our existing software to make a better tool for learning.

Ethical issues

Ethical issues which must be avoided while creating the web application: not complying with the interests of the client—the school, the students—implementing code that has not been thoroughly tested or using illegally-obtained software.

Additionally, with an improved and more intuitive IIT Online interface, there is an increased potential for academic dishonesty (e.g., an unscrupulous student posting answers to a homework assignment on the proposed discussion forum). Such an ethical implication will need to be investigated further as the semester progresses.

Business/societal costs

Annotated video comes with increased cost to store all of the user comments. Also, as with most discussion boards, there is the possibility of information overload to both the student and the professor. Questions may go unanswered due the fact that there could be too many questions for a professor or teacher's assistant to answer in a reasonable time. It is our hope that through the use of an annotation system, other users will read comments and questions and answer them through discussion with the effect of overload reduction.

Proposed implementation outline

The team will design, implement and test a prototype system this semester. The work this semester is in anticipation of a deployment in a real classroom next semester. Larger-scale classroom integration is expected for the Fall 2010 semester.

Research/Attached documents

Alex Donchev researched a previous annotation system method. His paper on the MRAS interface can be found in Appendix A.

TEAM VALUES STATEMENT

Desired behaviors

Each team member should:

- Arrive promptly to all meetings
- Actively and constructively contribute to the team
- Be cognizant of and adhere to appropriate timelines and deadlines (if not possible, he should inform his subteam, his subteam leader, and all other affected parties as soon as he can)
- Openly communicate with other members
- Seek expert help when necessary
- Be enthusiastic about and have pride in the team

Team leadership (overall team and subteam leaders) should:

- Achieve equitable distribution of work amongst the team
- Foster an environment of open communication within the team
- Make sure timelines and objectives are being met
- Make sure the team's focus is well-defined

Addressing problems

Should problems arise between team members that cannot be resolved by the involved parties, the respective subteam leader(s), and, if necessary, the overall team leader, should mediate the dispute. If the issue cannot be resolved in this fashion, the problem should be presented to the entire team and be decided by democratic consensus.

Project Methodology

WORK BREAKDOWN STRUCTURE

Our IPRO is divided into three phases:

I. Planning

II. Implementation

III. Wrap-up

Each phase has different expectations, which require different task identification and manpower allocation. To be flexible and effective, the team structure will adapt according to the special needs of each phase. Organizationally, each phase has one overall phase leader, two or more subteam leaders with two or more members per subteam.

Phase I: Planning

Phase I of our IPRO begins on 08/24 and ends on 09/11. The overall goal for this phase is to determine the functionality desired in our system by the end of the semester and the methods in which we will accomplish construction of such a system. This research culminated in the project plan for the IPRO office.

In deciding how to approach this semester, we wanted a clear and defined path. The process of finding this path took a greater amount time than anticipated; however, the decisions made in these first few weeks will pay off in long run. With this in mind, we will perform the requirements-gathering as the first step in Phase II.

The teams during this phase are responsible for planning the objectives, team values, milestones/timeline, methodology, expected results, manpower organization and budget for Phase II; researching any background material that could be relevant for Phase II; and compiling this information for inclusion in the project plan.

Three teams were created: User Liaison Planning, School Liaison Planning and Development Planning. Teams were created based on major task functions: user interface design, system development (e.g., programming) and implementation (into IIT systems). The team structure for Phase I is shown in Figure 2.

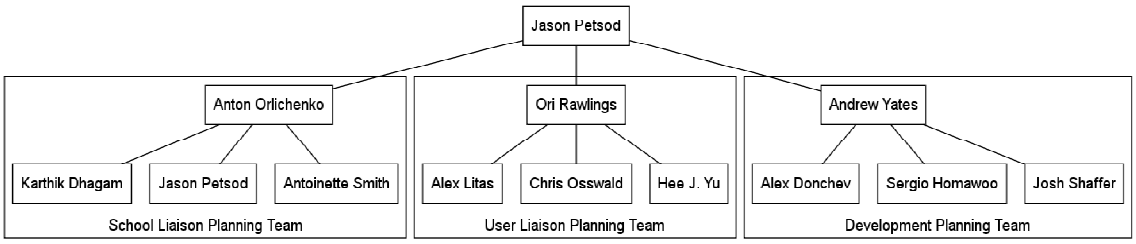

Figure 2. Phase I Team Organization Chart.

Phase II: Implementation

Phase II of our IPRO starts on 09/12 and ends on 11/14. In this phase, the majority of the work towards a deliverable product occurs. The overall goal for this phase is to develop and test an improved IIT Online video interface where such improvement is determined through discussion with its potential users: students, professors, and administrators. The team structure is shown in Figure 3; the three teams created for this phase are charged with following through on the tasks created by the planning teams from Phase I.

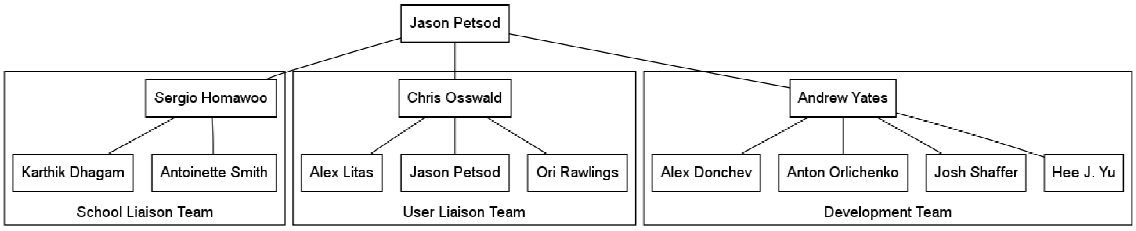

Figure 3. Phase II Team Organization Chart.

Methodology

User Liaison Team

To meet the objectives illustrated in our Purpose, the User Liason team shall do the following:

- Research
    - The domain of user interface design
    - The domains relevant to designing and implementing experiments
- Experiment
    - Define the metrics in terms of operational definitions needed for the experiment plan
    - Create, test and develop mock-up designs
    - Assist School Liaison team with administering the experiments
    - Analyze the data from the administered experiments
- Communicate

    - Cooperate with School Liaison team with administering the experiments
    - Request the Development team to add or modify certain functions or features to the software product
- Record (using the wiki, the alternative collaborative space on the Web for our team)
    - Compile documents of our activities
    - Preserve the materials from the mock-up development
    - Preserve the data obtained from the experiments

Development Team

To accomplish its objectives, the Development team will:

- Regularly meet with the School and User Liason teams to communicate school and user requirements
    - In class (up to 0.5 hours a week)
    - Using the wiki
- Write code to implement the required features and improved interface
    - Implement features as determined by the User and School Liason teams (TBD)
    - Implement the interface (20 hours)
- Write documentation
    - Deployment documentation (2 hours)
    - System use & maintenance documentation (2 hours)

School Liaison Team

To accomplish its objectives, the School Liaison team will:

- Meet with the school to determine desired functionality
    - Identify and arrange meetings with school (3 hours)
    - Meet with school (3 hours)

    - Distill meeting deliberations into report on desired functionality (3 hours)
- Meet with technical services to determine integration plan
    - Meet with Development Team and discuss our system's infrastructure (2 hours)
    - Identify key technical services personnel and arrange meetings (2 hours)
    - Meet with technical services (3 hours)
    - Write integration plan (5 hours)
- Meet with the school and technical services midway through the semester and demonstrate system implemented thus far
    - Advertise and plan logistics of demo (2 hours)
    - Perform demo and gather feedback (3 hours)
    - Make changes according to feedback (2-6 hours)
- Regularly meet with Development and User Liaison Teams to communicate findings, especially proceeding meetings with the school or technical services
    - During class time (up to 0.5 hours each week)
    - Wiki (varying)

Work Breakdown Structure

User Liaison Team

Task	Week Ending
Research user interface design techniques and present them to the class and acquire skills necessary to implement these techniques.	9/13
Define objective metrics which specify a successful user interface design and create a user interface-flow diagram to determine how the user interface will work and transition.	9/20

Task	Week Ending
Create a mock-up of the user interface that the rest of the team can review; present interface prototype to the entire IPRO team and collect constructive criticism.	9/27
Devise a user testing strategy and prepare to administer experiments.	10/4
Perform user tests and modify user interface as appropriate; meet with the School Liaison team to determine logistics of school demonstration the following week.	10/11
Additional testing.	10/18
Conclude testing; compile results and present to the rest of the IPRO group.	10/25
Revise and improve user interface design based on results of testing.	11/1
Finalize user interface design.	11/9

Development Team

Task	Week Ending
Set up a development environment, version control and backup system. Begin familiarization of code.	9/13
Continue environment set up and familiarization of code.	9/20
Begin development of new features as described by School Liaison team.	9/27
Continue development.	10/4
Basic version with new features finished. Integrate new user interface per User Liaison team.	10/11
Continue development, making changes/fixes as school demonstration warrants; begin debugging and documentation writing.	10/18
Continue fixing problems found during school demonstration; continue debugging, documentation writing, and testing.	10/25
Focus on finishing documentation, debugging and testing the software.	11/1

Task	Week Ending
Continue documentation, debugging and testing. Finish implementation of high-priority feature requests. (As of 11/15 the software should be feature complete, but will be in need of further testing and debugging.)	11/9

NOTE: The potential solutions for the web application will be tested in a development environment by the programmers and by groups of students who are not familiar with the software. After verifying the integrity of the software, it will be moved to a production environment.

School Liaison Team

Task	Week Ending
Meet with school to determine desired functionality.	9/13
09/23 class meeting: Present and discuss school-requested functionality to entire team.	9/20
Midterm presentation work: Meet with Development and User Liaison teams to gauge present progress.	9/27
Continue midterm presentation work including further synchronization with other subteams if necessary. Four days prior to midterm presentation: Draft midterm presentation finished and submitted to entire class for comments and revisions; practice presentations commence. Midterm presentation. (Date TBD)	10/4
Meet with Development team to discuss working functionality that can be demoed to school the following week and technical infrastructure needed; determine logistics of demonstration with User Liaison team.	10/11
Meet with school and technical services to demonstrate system	10/18

Task	Week Ending
implemented thus far.	
Demonstration recap; begin work on integration plan.	10/25
Continue work on integration plan: distribute preliminary copy to entire team for revisions and comments; begin importing and annotating videos from IIT Online.	11/1
Integration plan finalized.	11/9

Phase III: Wrap-up

This phase begins on 11/15 and ends on the last day of the semester. The goal of the wrap-up phase will be to produce the end-of-semester IPRO office deliverables and make the transition to next semester's IPRO as seamless as possible. The two teams during this phase will be the Development/Integration team and the Deliverables team. The organizational structure of this team is shown in Figure 4.

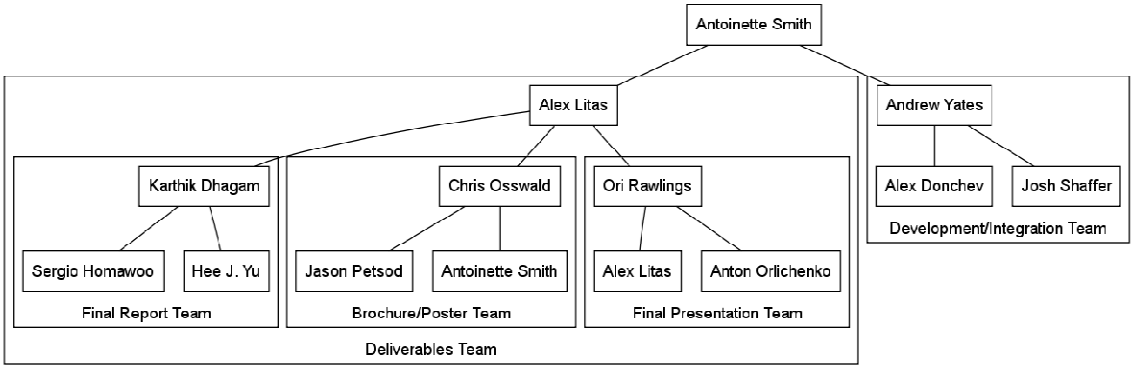

Figure 4. Phase III Team Organization Chart.

Methodology

Development/Integration Team

- Write codebase and integration documentation for future IPROs. (40 hours)
- Finalize code and fix show-stopper bugs. (20 hours)

Deliverables Team

- Produce end-of-semester IPRO office deliverables
    - Brochure/poster (20 hours)
    - Final Report (20 hours)
    - Final Presentation (20 hours)

Milestones

Development/Integration Team

Event	Date/Time
Feature freeze.	11/15, 00:00
Documentation finished, distributed to deliverables team and rest of class.	11/19, 17:00
Code freeze.	11/29, 12:00
Documentation finalized, submitted to deliverables team.	11/30, 00:00
Code bundled for next semester's IPRO.	12/06, 17:00

Deliverables Team

Brochure/Poster

Event	Date/Time
Brochure finished, distributed to team.	11/22, 19:00
Poster finished, distributed to team.	11/22, 19:00
Brochure finalized (aggressive scheduling is accounting for Thanksgiving holiday).	11/24, 17:00
Brochure submitted to iKnow.	11/30, 10:00
Poster submitted to iKnow.	11/30, 10:00

Final Report

Event	Date/Time
Final report draft finished, distributed to team for comments and revisions.	11/18, 17:00
Final report draft finalized	11/19, 17:00
Final report draft submitted to iKnow.	11/20, 12:00
Final report finished, distributed to team.	11/29, 19:00
Final report finalized.	12/02, 12:00
Final report submitted to iKnow.	12/04, 10:00

Final Presentation

Event	Date/Time
Final presentation finished, distributed to team; practice presentations start.	11/29, 19:00

Event	Date/Time
Final presentation finalized.	12/01, 12:00
Final presentation submitted to iKnow.	12/02, 12:00

Expected Results

User Liaison
The team expects to

- Define metrics of a successful UI by researching user testing strategies and good interface design techniques.
- Implement a UI design that rates highly against our defined metrics by creating an initial prototype, administering user tests, analyzing results, and incorporating feedback into a second and final UI design.
- Coordinate with the Development team in order to implement a front end to the system software by defining a firm application programming interface (API) early in the semester to which both sub-teams adhere.
- Coordinate with the School liaison team in order to identify school and IPRO policies for executing user testing as well as to identify the school's expectations for such a system by planning meeting and discussion time in advance.

Development
The team expects to

- Coordinate with the User Liaison team to design an improved user interface.
- Coordinate with the User Liaison team to solicit feedback from users.
- Coordinate with the School Liaison team to ensure all targeted end-user school's software requirements are met.
- Implement an improved user interface.
- Implement the features determined in Phase I.
- React to user testing and feedback by making software changes as necessary.
- Write documentation detailing the deployment, operation, and maintenance of the software system.
- Create a working system and to prepare it for use in next semester's IPRO.

- Conduct extensive testing to ensure that the system meets scalability and stability requirements, and to ensure that the system is free of bugs.

School Liaison
The School Liaison team will create the following products:

- A report to be presented to the entire team describing the desired functionality the school wants from our system.
- A report to be presented to the entire team describing the results of the demonstration to the school and technical staff.
- A plan of integration based on discussions with technical staff.
- The midterm presentation.

The School Liaison team anticipates the following challenges:

- Different school officials may want to see different functionality.
- Adding functionality may make the system harder to integrate with IIT's current system.
- A working product might not exist in time for the demonstration.

The School Liaison team will incorporate its work and findings into the final product by relaying any suggestions, comments, complaints, or otherwise to the User Liaison team or Development team as appropriate. It will then be up to these teams to act upon and execute any changes stemming from this input.

Project Budget

Because this project relies heavily on user feedback, our group wanted to create incentives for those persons. We have also included line items for printing of materials and any other miscellaneous administrative items.

- Incentives for user testing - $75
- Catered lunch for demonstration - $100
- Printing/miscellaneous - $100

Total budget: $275

Designation of roles

Minute Taker
This position will rotate each week, so that each team member shares the responsibility.

Agenda Maker
The agenda items are initially posted to the wiki by the IPRO team leader. Additional items

can be added by any and all team members.

Time Keeper
Assigned to phase leaders: Jason Petsod (Phase I, II) and Antoinette Smith (Phase III).

iGroups Moderator
Chris Osswald.

Appendix A

Alexander Donchev

IPRO 497 – 327
09-01-2009 rev. 0.2

An Introduction to MRAS and Its Relationship to IPRO 327

The Microsoft Research Annotation System (MRAS) is a Web-based server/client application. The objective of this paper is to introduce the MRAS system and its practical implementation in an educational environment. The goal is to make sure that the IPRO327 problem is well understood and certain ideas for the needed system in this project are introduced. The information presented here is gathered from the paper "Annotations for Streaming Video on the Web: Design and Usage Studies" [1]. The presentation will go in the following order: introduction, importance, structure and functionality, experiments and results, and conclusion.

The MRAS prototype is created for an asynchronous collaboration though the annotation of video media. The system has many characteristics that are needed in order to complete the IPRO project. The basic goals are to create a system for online learning that is Web-based and allows the annotation of the media that is presented in the online learning process. This environment must be well structured for each of the different groups of clients such as: students, teacher assistants and instructors. MRAS provides the end client with a Web-based framework. Simply, everything is accessed though a Web page that communicates with the media, annotation and email servers. Figure 1 in the slides shows a diagram of the structure and the different protocols for communication in between.

Due to the fact that this project is in its starting phase a simpler diagram (Figure 2 in the slides) is created as a proposal for the basic structure of an annotation system. The idea behind it is similar to the MRAS system but simplified. The end user connects to the web server. The web server uses Rails framework to provide email communication, access to media and annotation database. The Rails application which is the actual web page has its

own database which can be used for storing user credentials and tabulated information for linking the annotations to the media.

Back to the MRAS system, MRAS provides the basic functionalities for an annotation system. The prototype is made to annotate videos. There are two ways of annotating provided, annotation through text and annotation through audio. The Annotation Meta Data Server stores the user authentication credentials and the user groups. Adding, positioning, organizing and sending annotations through email are the first functions that are introduced. Adding an annotation to the video file is simple to a certain extent. While watching a video the user will click on the "Add" button present in the toolbar (Figure 3 in the slides). A window divided into three parts appears on the screen (Figure 4 in the slides). The first part is named as "Target", starting with the URL of the video file (not necessary for the user) and the progress bar of the video file indicating the time when the "Add" function was accessed. This progress bar allows the user to select not just a position for his/her annotation but a time period. The next group is labeled "Annotation" and holds the Annotation set value, an option to email the annotation, a text field for the summary and the actual annotation. The annotation type is specified at the bottom with a radio button.

The next function provided is to search for annotations. The user needs to specify the file, then the target period in which the annotations exist and so on as Figure 5 in the presentation shows. All the possible ways for searching are included in the Query Annotations window. The found annotations are shown in the View Annotations window (Figure 6 in the slides). Another way to get to this window would be to click on the MRAS toolbar on the "Show annotations" button while the user is watching a video file. The items that are in red in the view window show the nearest annotations to the time of the video at which the user submitted the query. Intuitively, the balls represent the text annotations and the loud speakers the audio annotations. The user has the possibility to play the video from the annotation time stamp, can reply to the annotation by either audio, text or both or can

open the annotation. According to the credentials possessed the user can delete and edit an existing annotation.

The research team at Microsoft conducted two studies where they put a few users to work with the MRAS system. The first study was composed on six participants that were divided into two equal groups. Their objective was to watch a video and take notes. For the first half of the video three users were using pen and paper and the others used the MRAS annotation system. In the second half they switched roles. The results were quite interesting: the MRAS system made the participants change the way they take their notes. The hand written notes did not make much of a sense except for one user who recorded the time for each of his note (a user that firstly used the MRAS and then took notes on paper). Learning of the material was not measured by the Microsoft Research Team.

The second study involved 18 participants and the objective was to create a learning environment in which users share their annotations and reply to others, creating a threaded discussion. The text annotations were slightly preferred over the audio ones. Knowing that this research was conducted more than 10 years ago, it could be assumed that today everyone would prefer the text annotation type due to the ways of communication (instant messaging, cell phone text messages). A study conducted among college students shows that: "When asked which method they preferred, 59% of respondents said SMS texting, 17% said phone calls, 9% said IMs, and an abysmal 7% said e-mail. Curiously, social networking websites weren't named. You'd better bet those'd rank highly too."[2] Another interesting result that can be seen in the study is that the addition of annotations increased over time and so the annotation replying. This trend can be seen on Figure "Subject Sequence" [1].

The MRAS prototype and research shows that an online learning can become as beneficial as participating in a class room, and in certain instances create a better learning environment. This prototype is a great source of ideas for the IPRO327 project. It is certainly a quite complicated system, the future goal would be to extract the best ideas and combine them

with the research conducted for the IPRO in order to create a final working product in a timely fashion.

References

[1] Bargeron, D., Gupta, A., Grudin, J., Sanocki, E. Annotations for Streaming Video on the Web: Design and Usage Studies (Sept. 1998), available at http://research.microsoft.com/en-us/um/redmond/groups/coet/mras/www8/paper.htm

[2] Axon, S., College students overwhelmingly prefer text messages to phone calls, e-mail, and IMs (Mar 2009), available at http://www.obsessable.com/news/2009/03/30/college-students-overwhelmingly-prefer-text-messages-to-phone-calls-e-mail-and-ims/