

RAFT- a Role-Based Appliance for Collaborative Learning

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It has become more and more difficult in many countries to organize field trips due to various reasons, including finance, staffing levels, health and safety.

It is one of the main issues of the RAFT¹- Remote Accessible Field Trips- project to promote new forms of contextualized learner collaboration, embedding learning and teaching activities in real world context, with the help of real time video conferencing and audio communication.

Several fields related to experiential learning, education and training, rely on the idea that people can learn very effectively through direct, hands-on experience, as long as these experiences are well designed and facilitated [1]. RAFT envisions facilitating field trips for schools and enabling international collaboration of schools. Instead of managing a trip for 30 students, small groups from the RAFT partner schools go out to the field, while the other students and classes from remote schools participate in real time interactively from their classrooms. Web based video conferencing and wireless networking is used to enable an integrated, interactive system to link field trips and classrooms in real time, so as to establish extensions on current learning material standards and to exchange formats for contextualization of learning material.

A general RAFT scenario sees a teacher preparing a field trip as part of a course, structuring several modules including various tasks to be distributed among

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students in the field and in the classroom. The learners in the field and in the classroom work in teams in order to accomplish the assigned tasks. The groups going to the field are equipped with data-gathering devices (photographic, video, audio, measuring), wireless communication devices and a video conferencing system for direct interaction between the field and the classroom. Learners at school can ask questions, influence the behaviour of their peers in the field, and help them by providing information they request, analyze the collected data and eventually archive it (Fig.1).



Figure 1: Students on a field trip getting familiar with devices

By identifying patterns of collaborative learning we adopted a flexible role-based architecture in order to support the learning activity and simplify the complexity of accomplishing the learning goals. Roles allow specifying a context model enabling to foresee the diverse ways in which different users access and process the available information to accomplish a shared goal, depending on their due contribution.

To clarify this approach and illustrate how some patterns identified can be realized on the basis of a flexible role-based architecture, we present the role of a Scout as example. We illustrate here the case of a Scout getting involved in a task to detect a certain tree in the field. According to the related use cases, the Scout searches for interesting points in the field and needs to be informed about tasks; to be able to send information about interesting locations (hotspots); to communicate with other users in the class and in the field. A device suiting these requirements is a GPS, GPRS enabled handheld device, providing features of portability and trackability: the user interface for a Scout on a Gotive handheld device is shown in Figure 2.



Figure 2. The Scout's User Interface

The Scout mainly cooperates with the Task Manager in the classroom and the Data Gathering teams in the field. Therefore, the entities a Scout manipulates go into a consistent field trip object repository and can be seen and manipulated by other team members in the field and in the classroom.

The Scout starts to search for points of interest and scans the environment; as soon as he/she finds something interesting, he/she locks the position and a notification with the Point Of Interest (POI) record is stored in the shared field trip repository (see interaction flow in Fig.3).

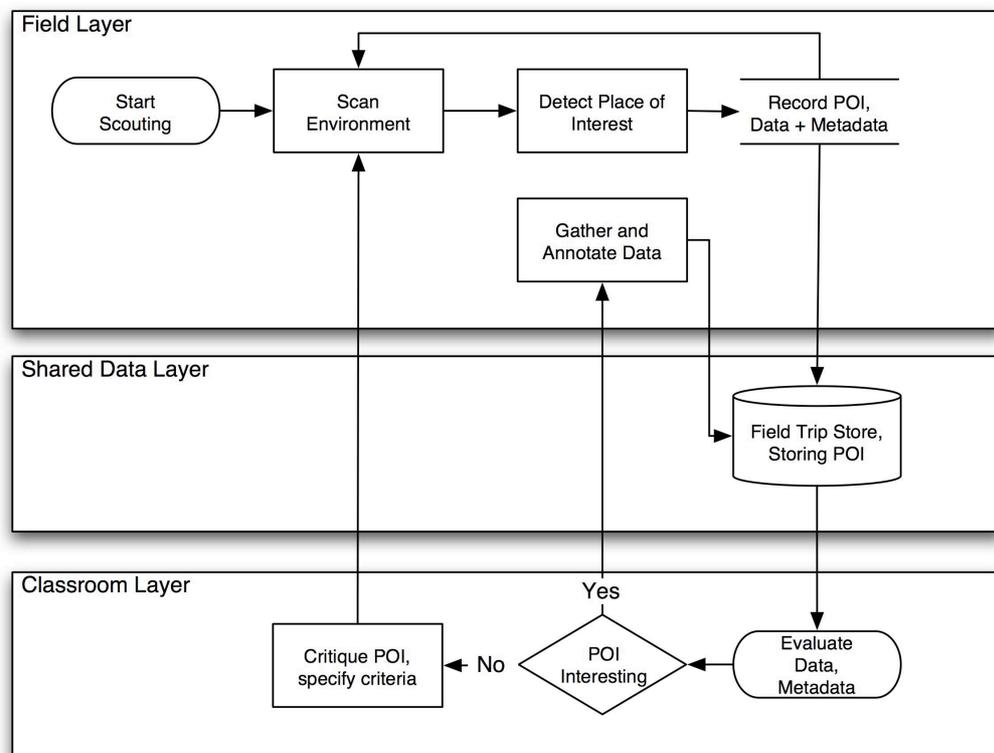


Figure3. Schema of the interaction flow.

The repository automatically sends a notification to the team members and also to the Task Manager. Awareness about changes in the state of tasks and data collections for tasks plays an important role for the collaborative work and the design of the interface. The Task Manager evaluates the data and the metadata of the Scout and decides whether more scouting is needed or the data gathering and annotation can start (Fig. 4 shows the Task Manager's view on POIs based on the status of the different tasks he/she is managing).

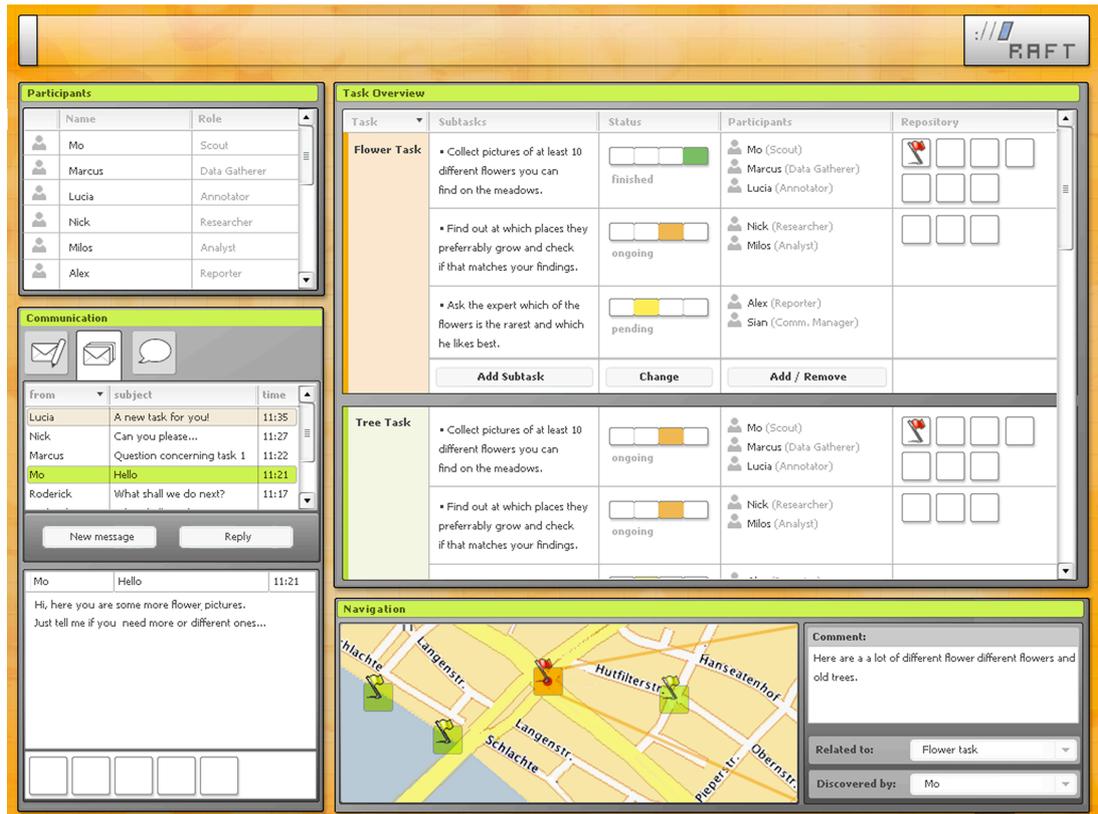


Figure 4. The Task Manager's view.

The Data Gatherer then works together with the Annotator in the field to collect samples and material that can be forwarded to the Task Manager and further elaborated by the students in the classroom (see the Annotator's interface in Figure 5). In this case the team players are distributed over different places and can use different devices due to the necessary mobility. Nevertheless different GUIs for the manipulation of POIs goes back to a shared field trip repository.

Communication

from	subject	time
Lucia	A new task for you!	11:35
Nick	Can you please...	11:27
Marcus	Question concerning task 1	11:22
Mo	Hello	11:21
Roderick	What shall we do next?	11:17

New message
Reply

Mo	Hello	11:21
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Hi, could you send me more hotspots which are interesting for the flower task?

< no attachments >

Tasks

Annotation







Title:

Comment:

A great example of something related to the flower task: a flower. I guess some more text would be nice here, but right now there's not much more to say.

Related to:

Found at:

Save
Submit

Figure5. Annotation widget used by the Annotator for in-field meta-tagging.

References

1. Dewey, J.: Experience and education. Pocket Books (1938).