Adaptive Mobile Computing for Infrastructure Field Tasks

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Objectives

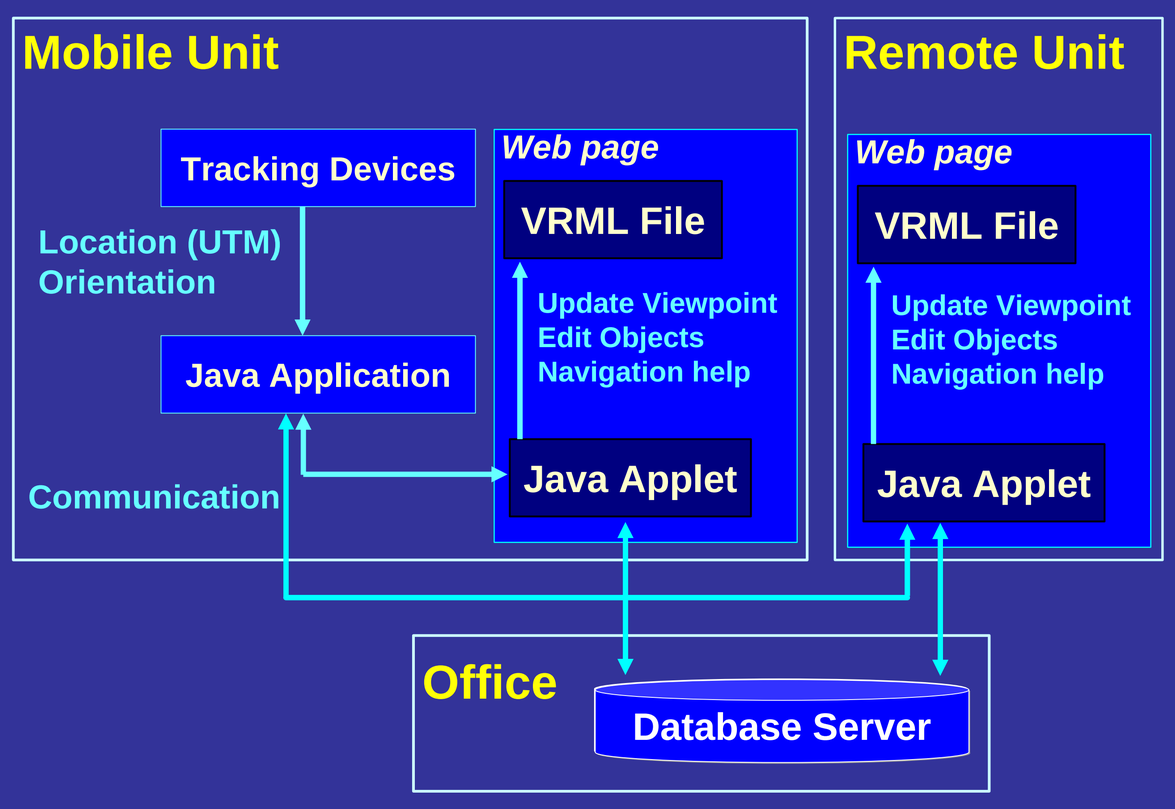
- To facilitate Infrastructure field data collection, e.g. data for element-level bridge inspection.
- To develop methods that allow field workers to automatically retrieve technical documents necessary for inspection/monitoring tasks based on their location and orientation, and the specific task context.
- To investigate the requirements of tracking accuracy, 3D GIS/CAD integration, and the HCI model.

Strategy

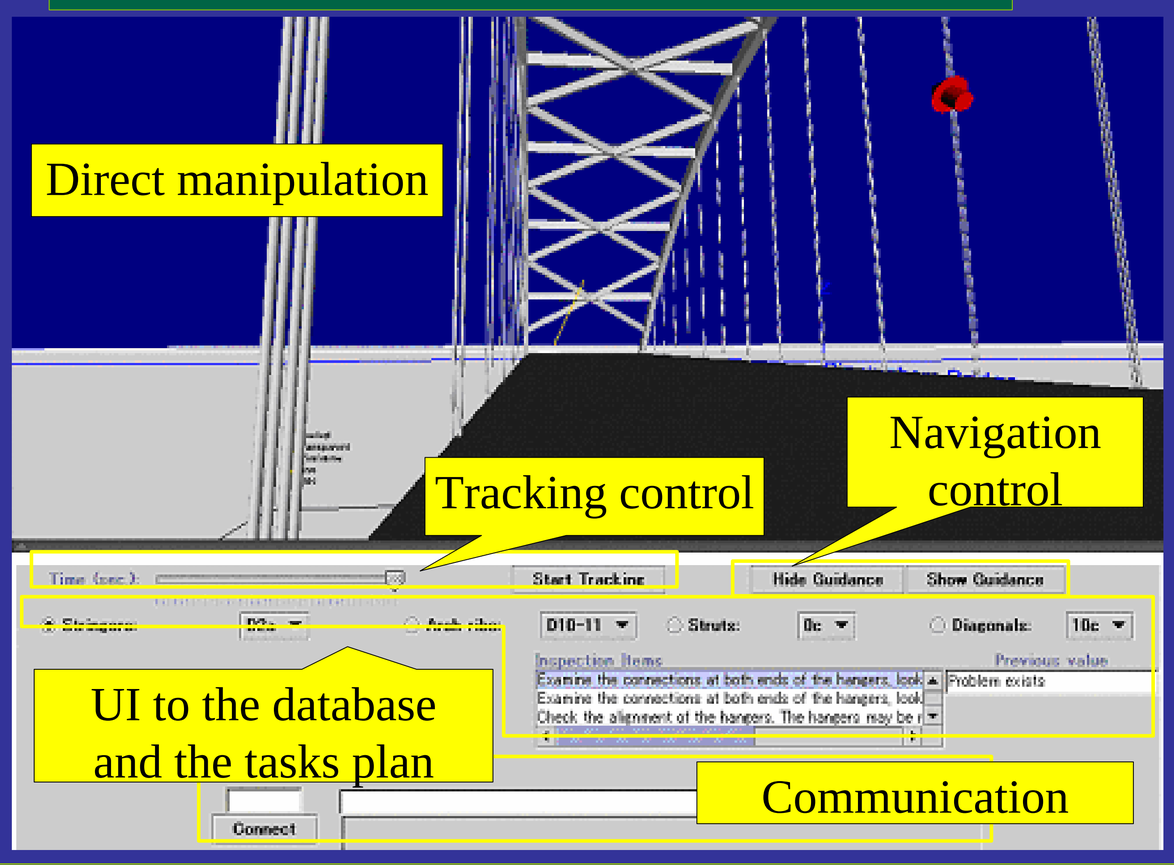
Location and task-aware (adaptive) mobile computing:

- Retrieving graphical and textual Information related to the domain and task models
- Navigation assistance
- Communication through a wireless network with a remote expert
- HCI based on menus and 3D direct manipulation

Prototype System Structure



Snapshot of the User Interface



Initial Findings

- The tracking accuracies of a GPS (5 m) and a digital compass (5 degrees) are acceptable in most situations. However, adding inertial tracking is recommended to support the GPS.
- Virtual Reality Modeling Language (VRML) is used efficiently for the 3D GIS/CAD integration.
- Wireless communication band width is critical for a client-server architecture.
- Direct manipulation and menu selection are used efficiently for the HCI model. A speech recognition user-interface can allow for hands-free interaction.

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