



# Dynamic User Interface Generation for Workflow-Aware Medical Applications

Project Management and Software Development  
for Medical Applications

## General Info

Project Title: [Dynamic User Interface Generation for Workflow-Aware Medical Applications](#)

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## Project Abstract

In order to enable intra-operative use of touch-based user interfaces on mobile devices, the interaction elements have to be highly focused, clearly identifiable and easy to reach. Additionally the whole interface has to react to the medical workflow and adjust the available commands to the current phase of surgery.

## Background and Motivation

Modern surgical interventions rely more strongly on different intra-operative imaging systems like ultrasound, or are based on pre-operatively acquired imaging data like CT or MRI volumes. While those datasets are already available during a surgery, the devices displaying them have to be arranged around the sterile area and can not be used directly by the surgical staff. They have to rely on the indirect manipulation through a non-sterile nurse, which is a source of delay, frustration and possibly errors.

To give control over image sources and parameters back to the surgeon, a user interface is required, that not only matches the usability constraints of touch interfaces, but also automatically reacts to the change of surgical workflow phases and utilizes very limited screen estate efficiently, in order not to distract the surgeon from the actual patient data.

## Student's Tasks Description

Based on existing XML schemas and UI descriptions, interface elements should be created and positioned automatically. The UI should react to external commands of workflow change and switch the layout. It is also of importance to use screen space cautiously, so that medical data can still be displayed without obstruction.

## Technical Prerequisites

Programming in C++ and Qt

Knowledge of video streaming (e.g. VLC or Qt Phonon) is a plus

## Timeline and Milestones

There will be 3 milestones including presentations, which will be defined according to the course schedule.

## References

Stauder, R., Belagiannis, V., Schwarz, L., Bigdelou, A., Söhngen, E., Ilic, S., & Navab, N. (2012). A User-Centered and Workflow-Aware Unified Display for the Operating Room. MICCAI Workshop on Modeling and Monitoring of Computer Assisted Interventions (M2CAI). Nice, FR.

Söhngen, E., Rahmah, N. N., Kakizawa, Y., Horiuchi, T., Fujii, Y., Kiuchi, T., & Hongo, K. (2011). Operation-Microscope-Mounted Touch Display Tablet Computer for Intraoperative Imaging Visualization: Technical Note and Comparison with Other Modalities. World Neurosurgery. Elsevier.