

Lighting level control of the office room by using computer modeling and real time measurements

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Background

- Natural and artificial lighting integration is insufficient
- Energy efficiency of buildings needs enhancement – better lighting control one possibility
- ICT opens new technical solutions for building automation and lighting control

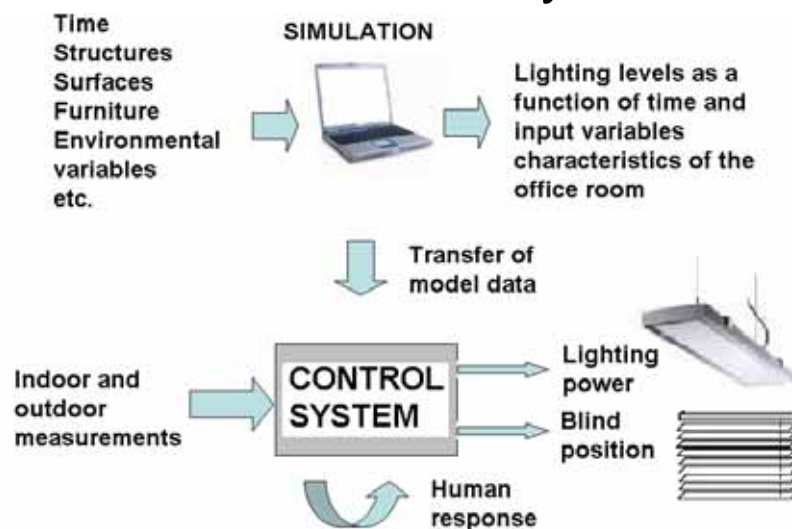
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Objective

- To create a new approach for lighting level control of office rooms, which:
 - Guides the user to apply energy efficient but still satisfactory artificial lighting level
 - Creates uniform spatial lighting level distribution in the office room by benefitting natural outdoor lighting
 - Extends lamp lives of the controlled system
 - Avoids excessive instrumentation and measurements in its final implementation
 - Benefits new IC-technology in control

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Overview of the system



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The approach

- Spatial lighting requirements of the office room are simulated by a computer program
- All the information concerning structures, surfaces, furniture, working places, environmental variables etc. are included
- The simulation will be done many times by varying indoor and outdoor environmental conditions and including seasonal variations
- The output data is applied in lighting level and blind position control together with indoor and outdoor environmental measurements
- Possibility for human feedback included

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Technical implementation

- A demonstration system will be installed in the office rooms of TKK Lighting laboratory
- The system will be interfaced to the daylight measurement and photo voltaic system of the building
- The lamps and venetian blinds are controlled through Dali-bus using Digidim-Toolbox user interface
- The ultimate goal is to save the model in a serial flash memory-IC and create control system for each room with minimum measurements and instrumentation.

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