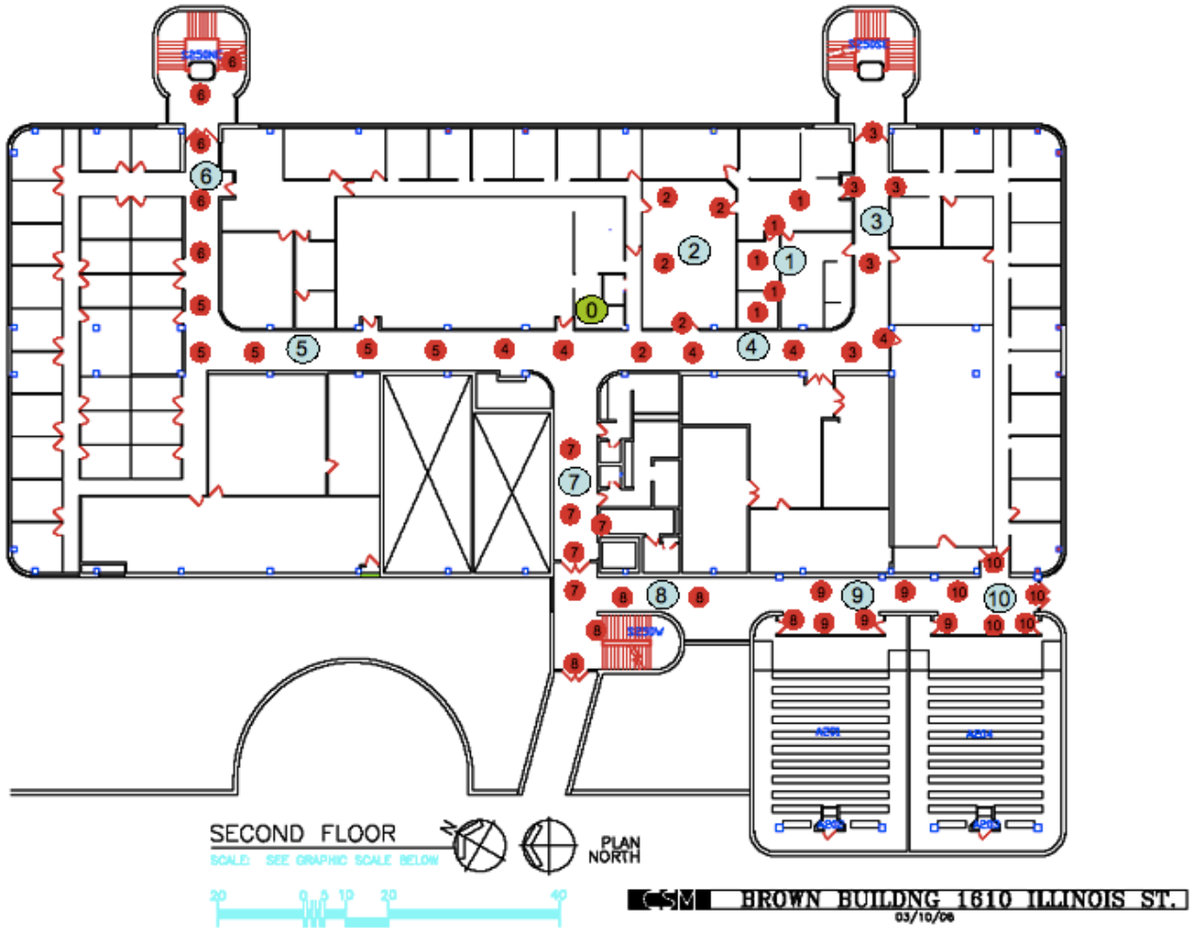
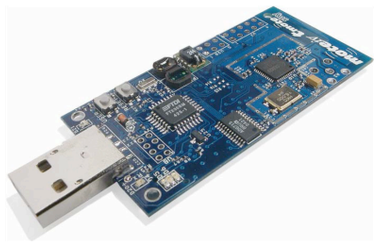
Forecasting Building Occupancy Using Sensor Network Data

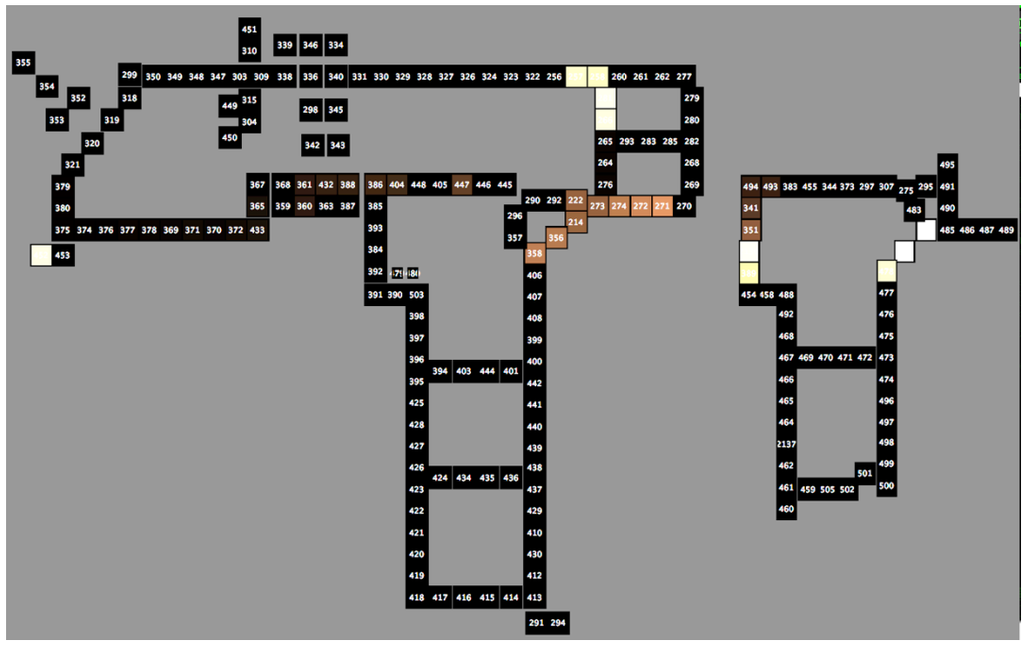
James Howard and William Hoff
Colorado School of Mines

- Heating and cooling accounts for 35 - 45% of a building's energy expenditure
- Accurate occupancy forecasts can reduce this expenditure

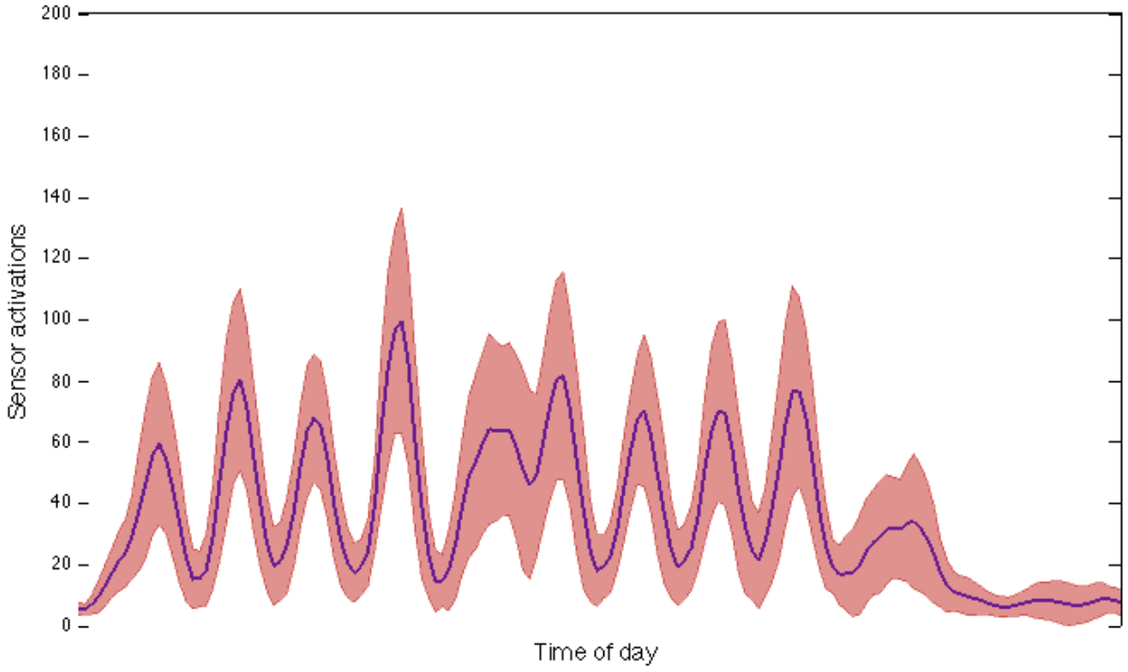


Colorado School of Mines classroom building





Mitsubishi Electronic Research Lab office building

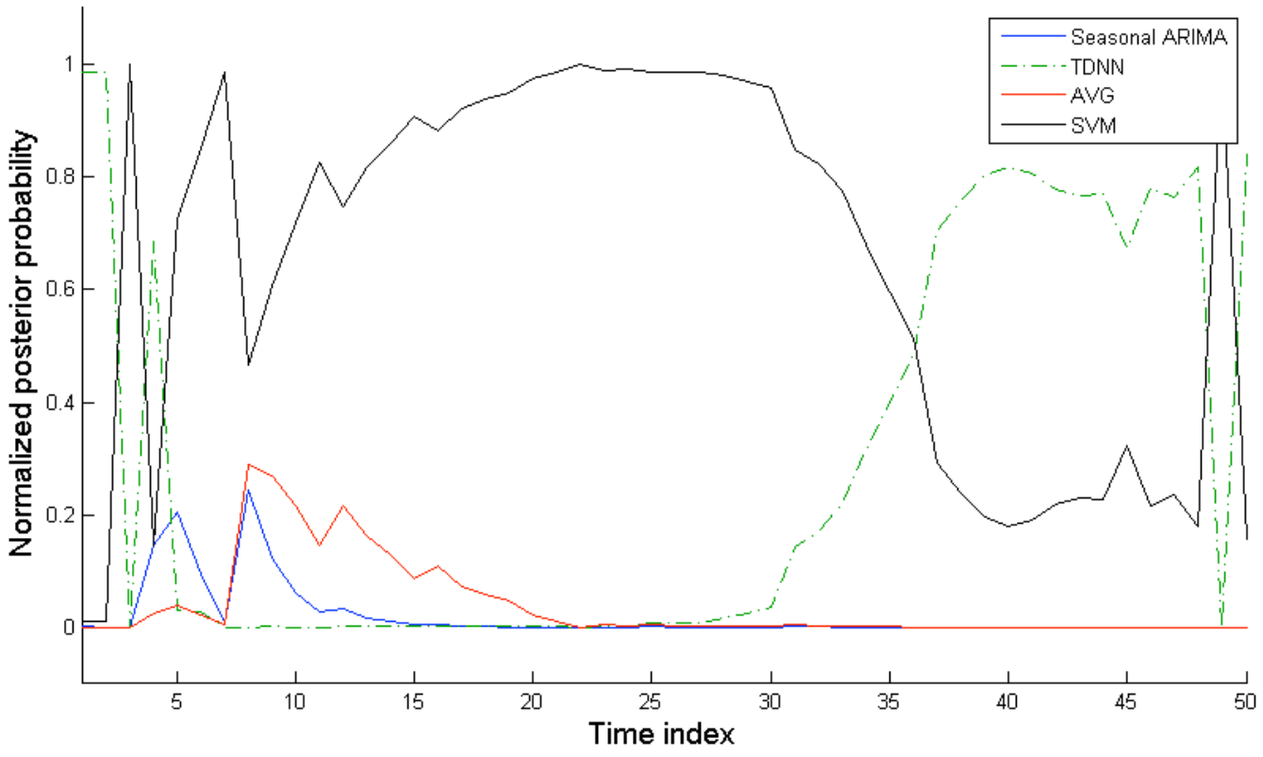


Typical day with one standard deviation

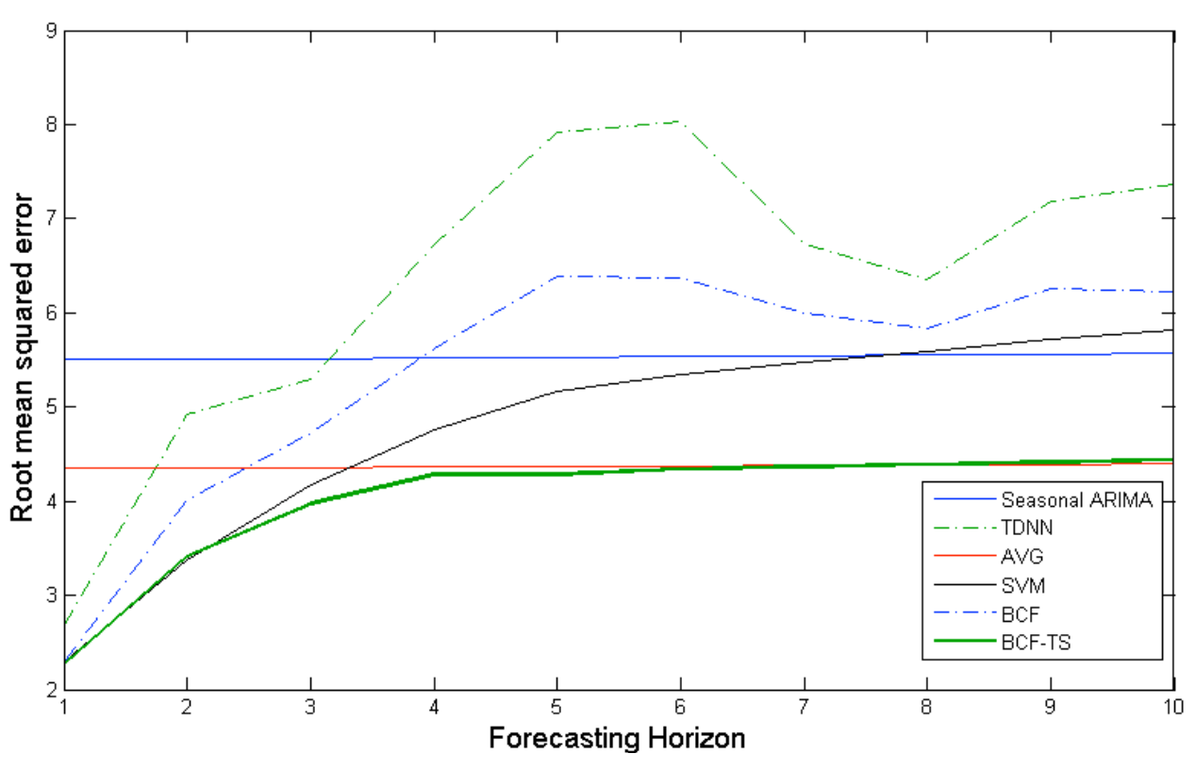
- Standard forecasting models include: SVM, SARIMA, Historic Avg, TDNN

- We combine these using Bayesian combined forecasting with adaptations specific to this problem domain

- This results in improved accuracy for forecasts up to 60 minutes into the future



Prediction accuracy vs forecasting horizon



Prediction accuracy vs forecasting horizon