Bridging Facilities Operations with Maintenance to Improve Understanding of Building System Behaviors

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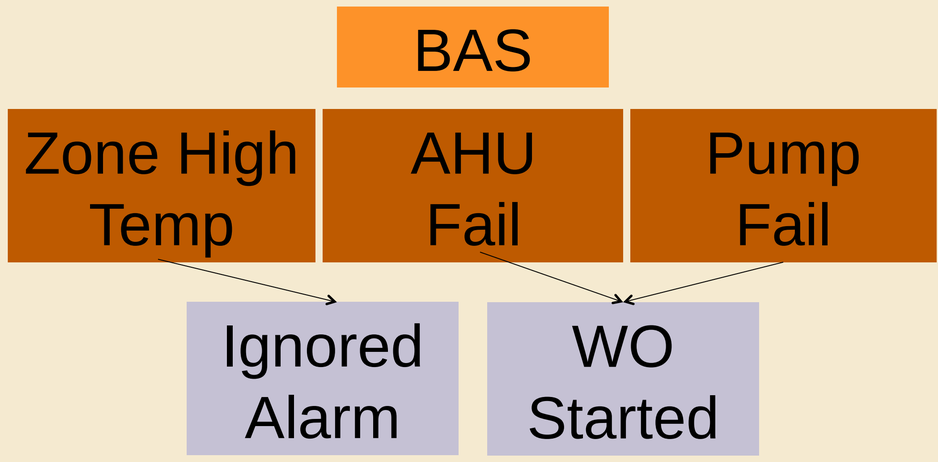
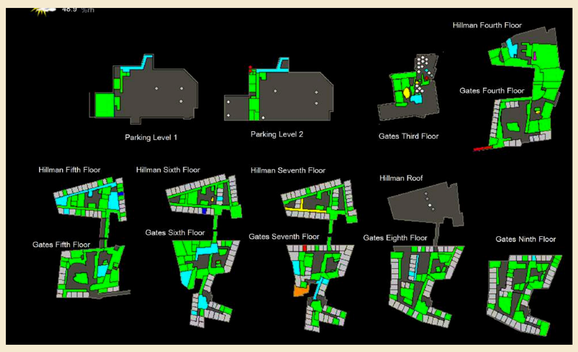
Problem Statement

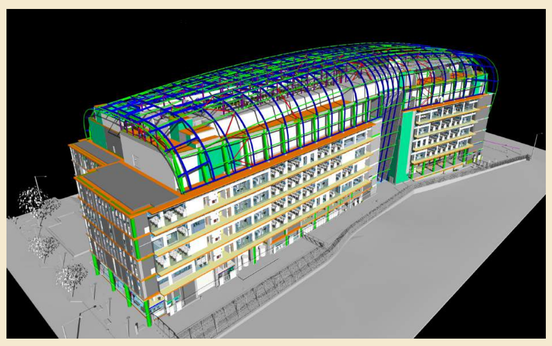
- Poorly maintained and improperly controlled equipment result in 15-30% of energy waste in buildings
- Interdependences between operation and maintenance is not clearly known in current practice
- Historical knowledge of work orders and building automation system alarm information not used for possible improvements in operations and maintenance



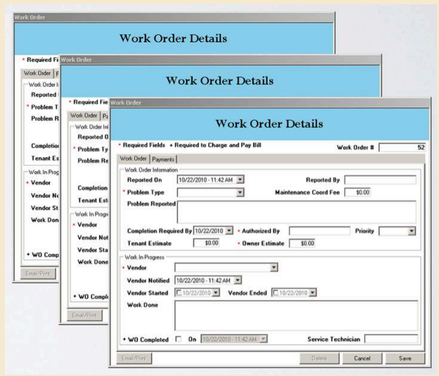
Research Vision



BAS Data

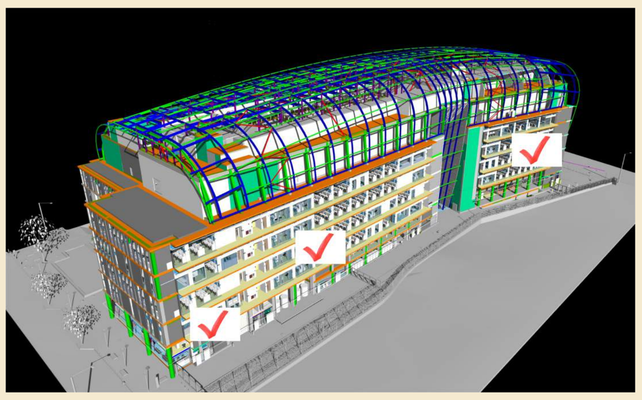


BIM



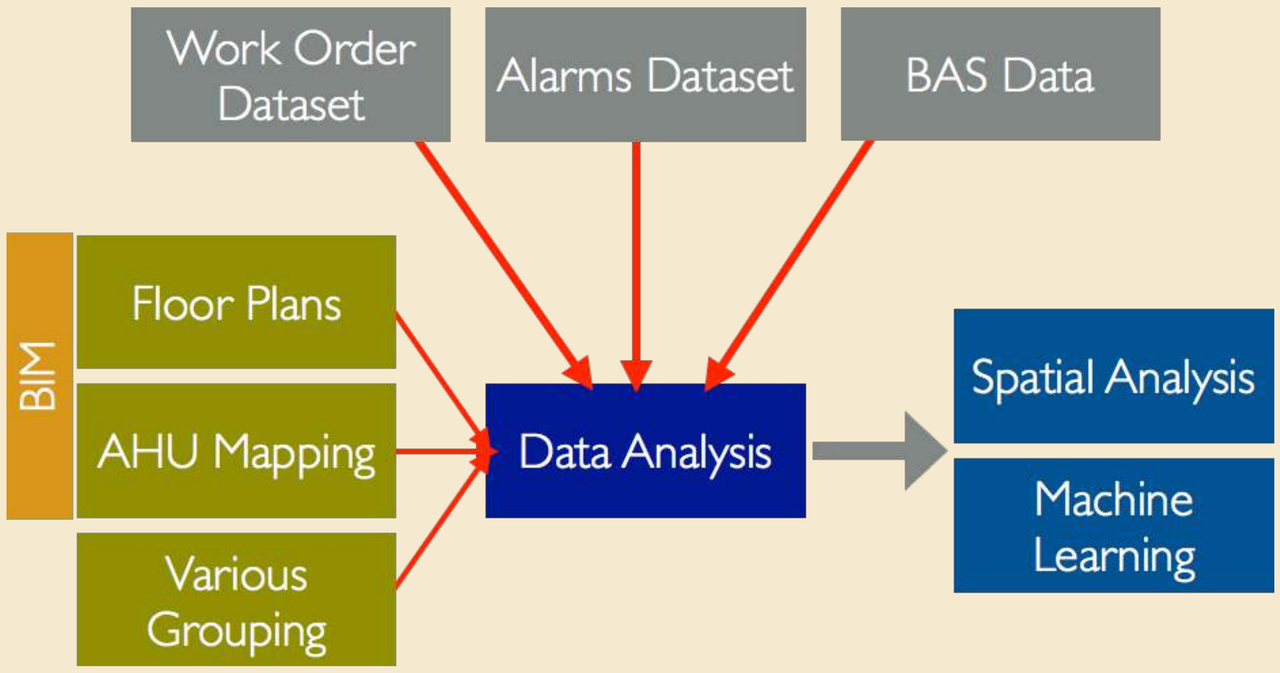
Work Orders

Predictive Analysis Algorithm



- Automatically Initiate Preventive Maintenance WOs
- Sensor Problem Identification
- Suggest BAS improvement in spaces for better operational performance

Research Method

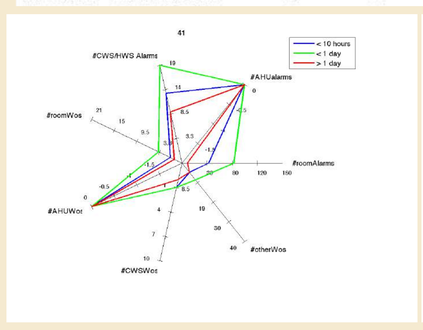


Work Order Dataset

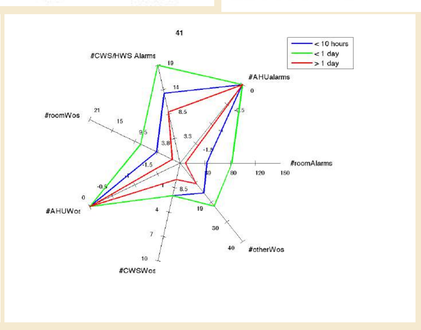
WO#	Date	Work Type	Fail Type	Craft	Room
3541923	1264775979	6	7	1	5501
3541923	1264775979	6	7	1	1101
3541923	1264775979	6	7	1	1102
3545599	1265218812	3	7	1	8108
3532629	1263917404	3	1	1	4215
3544049	1265036015	6	4	1	1101

Alarm Dataset

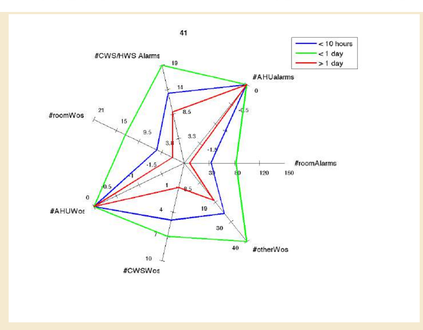
Date	Length	Floor	Room	Alarm
1266552202	12007	4	41	46
1266553707	1684	3	227	2
1266555934	59	3	227	2
1266556301	343	3	227	2
1266557424	77376	4	40	46



1 day



3 days



1 week

Expected Contributions

- Framework to enable integrated analysis of BAS and WO data with temporal dimensions
- Lead to better insights from the different data sources about real behaviors of building systems over time in relation to their spatial setting.
- Fewer redundant maintenance problems and waste due to such redundant work will be experienced
- Eliminate waste due to unidentified problems in building systems