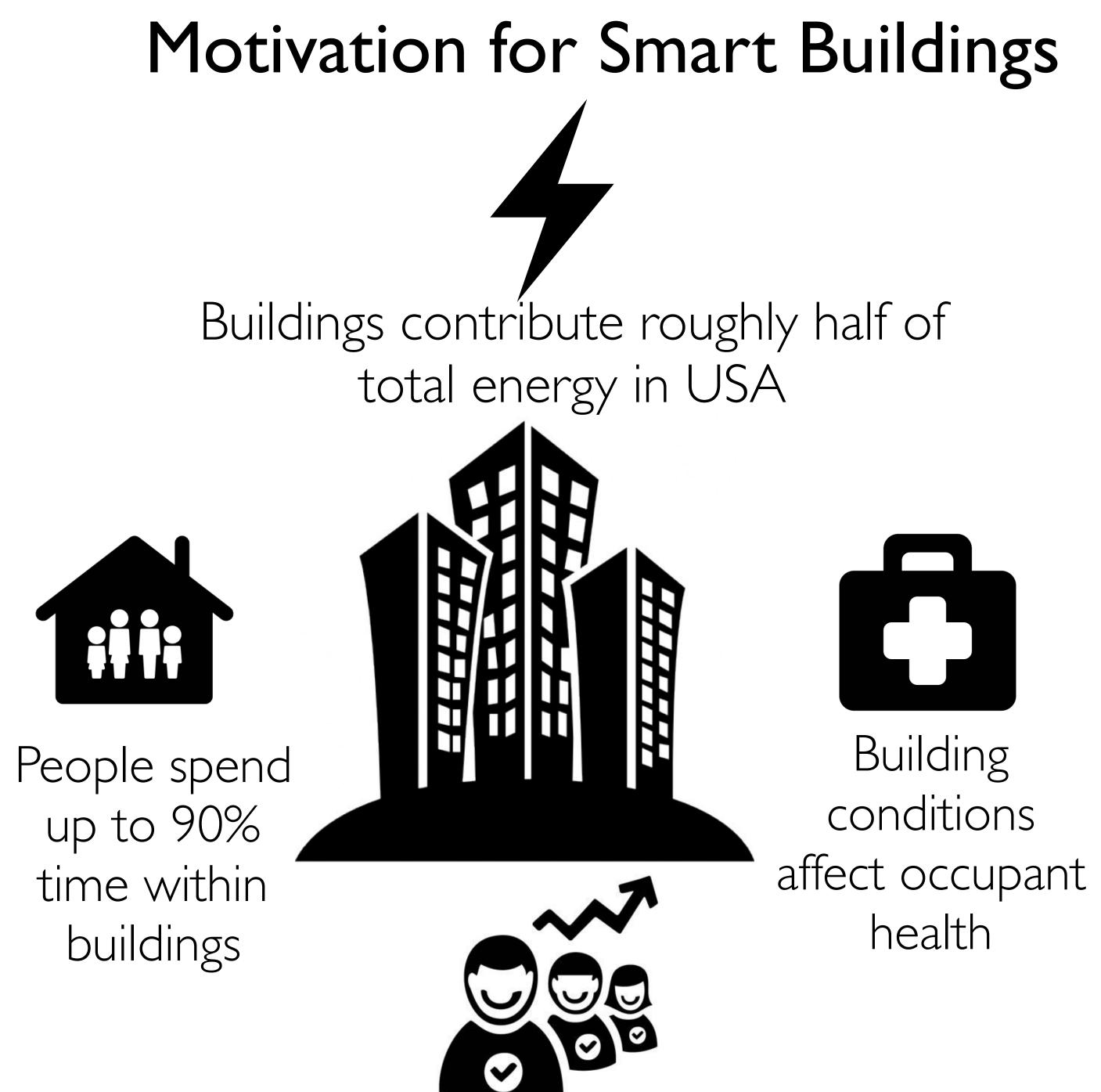
## Collaborative Sensing: An Approach for Immediately Scalable Sensing in Buildings Kamin Whitehouse, Hongning Wang University of Virginia



Indoor building conditions can impact productivity by up to 11%

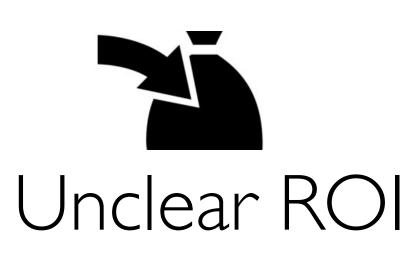
The Billion Building Challenge "'To enable smart building functionality for a billion buildings across the globe, including homes, apartment buildings, office buildings, restaurants, and hotels."

### Current State

Buildings not extensively instrumented:



Expensive



# Example Application: Energy Breakdown

## Electricity Company

Account number: 4123 Start units: 415 End units: 540

Total: 500\$



AC repair can save up to 20% Lighting usage above normal

You are in top 5% of energy efficient homes in your neighbourhood

Energy breakdown can help occupants save up to 15% energy

### Related Work

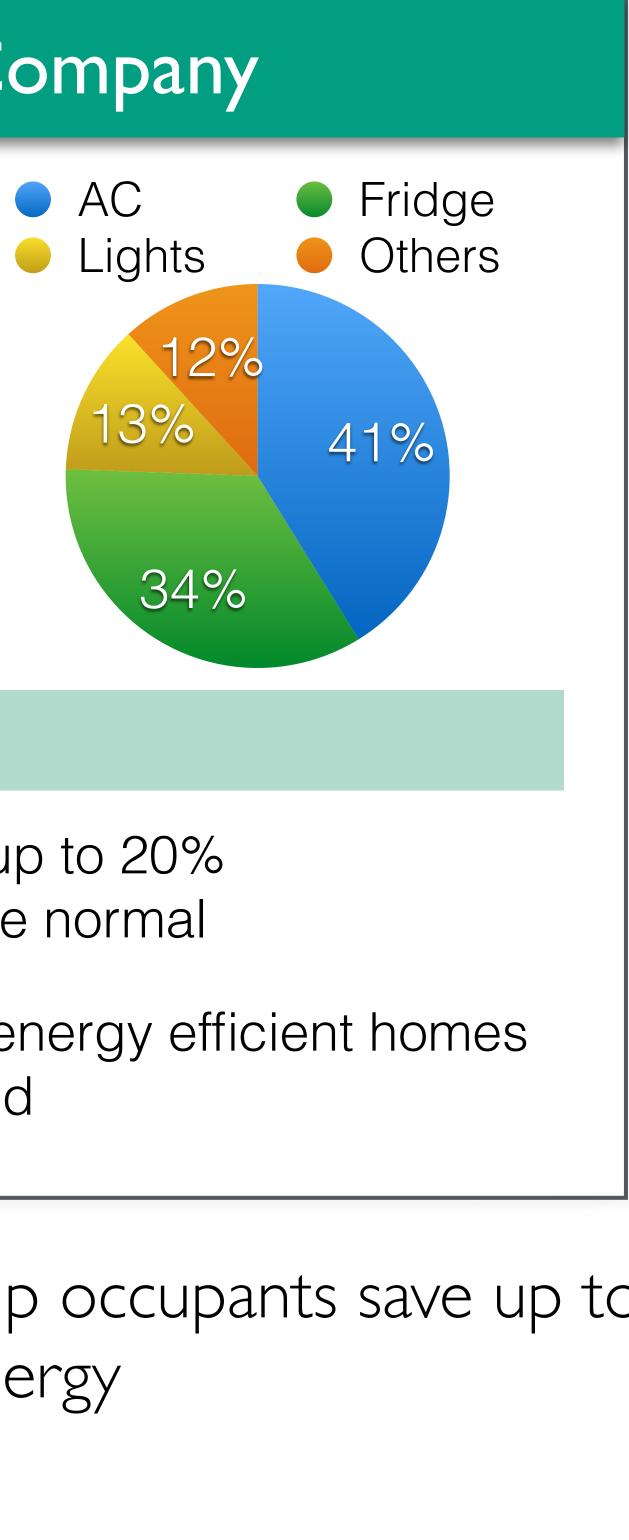


Existing solutions for energy breakdown require sensors in each home

Labour intensive



Plug load monitor

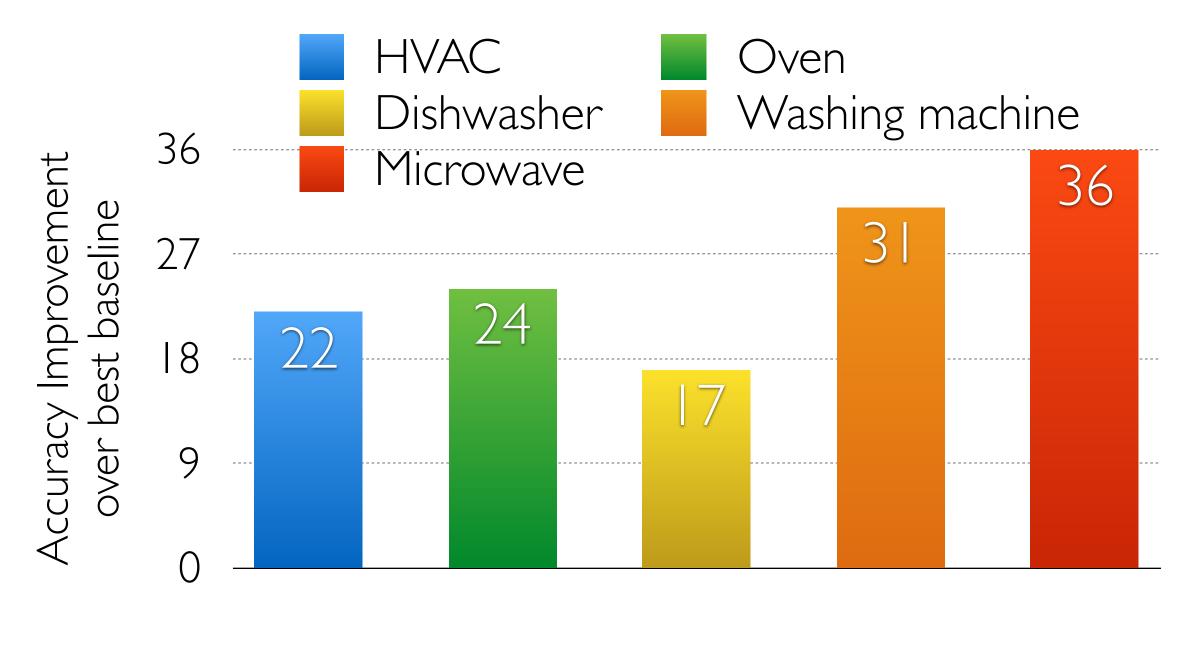






Smart meter

Approach											
	А	sgrega	ate e	energy A	Applia	ance		hom	ally sp ne fea	oecified atures	
n	#	Aggregate Jan	•••	Aggregate Dec	Jan		Dec				
	1	400		400	400		400				
	2	500		500	500		500	=			
= D										Month features	5
	100	300		400							





Input Parameters

#Rooms	2				
#Occupants	1				
Total Square Feet	990 Central Park South				
Neighborhood					
	Run Model				

Reconstruct the sensor data of one building based on sensor data collected in other buildings

### Results

Our approach is up to 36% more accurate than the state-of-art

### Web Application for 60M Homes

