Towards Backscatter-enabled Networked Utensils

UPPSALA UNIVERSITET

Andreas Soleiman
andreas.soleiman@it.uu.se

Ambuj Varshney
ambuj.varshney@it.uu.se

Haebangchon

Highlight

Monitoring the quality of food is an increasingly important problem

Augmenting kitchen utensils with sensors could be a key solution

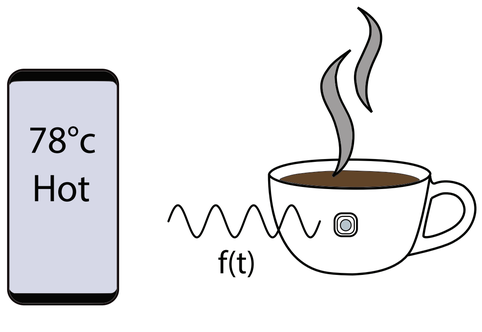
However, existing sensors are battery-powered and bulky

Backscatter communication enables simple, and small battery-free sensors!

Overview

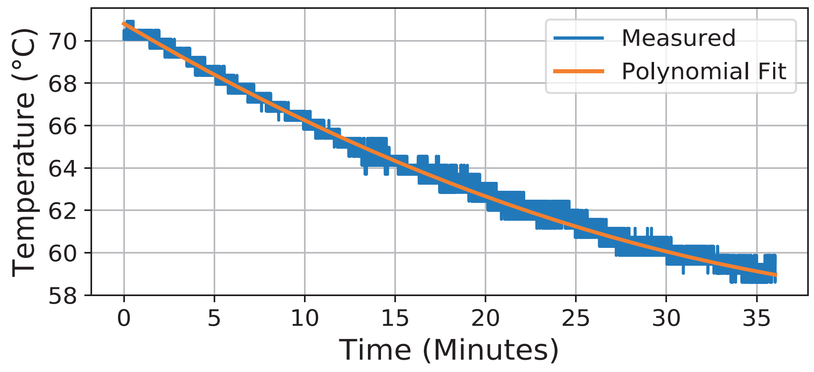
Flex sensors

- We design battery-free wireless sensor tags, called *Flex Sensors*
- The flex sensor communicates using frequency shift (FS) backscatter
- The flex sensor communicates at a peak power of 161 microwatts



Scenario: what is the temperature of my coffee?

- Flex sensor can augment a coffee-cup with networking capabilities
- The cup communicates temperature information in real-time



Challenge

Key challenge that we encounter is dealing with unreliable FS backscatter

- We build on MIMO, and leverage receiver diversity to improve reliability
- Our design spreads backscattered signals over wider bandwidth