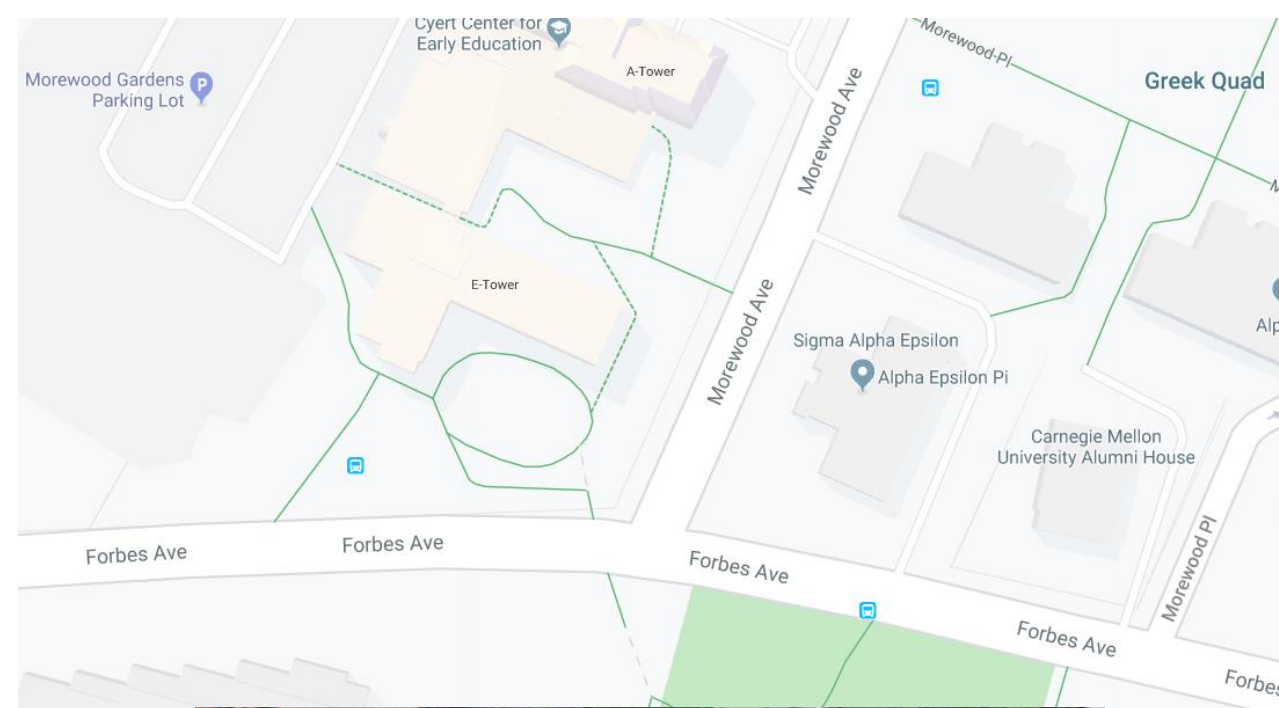
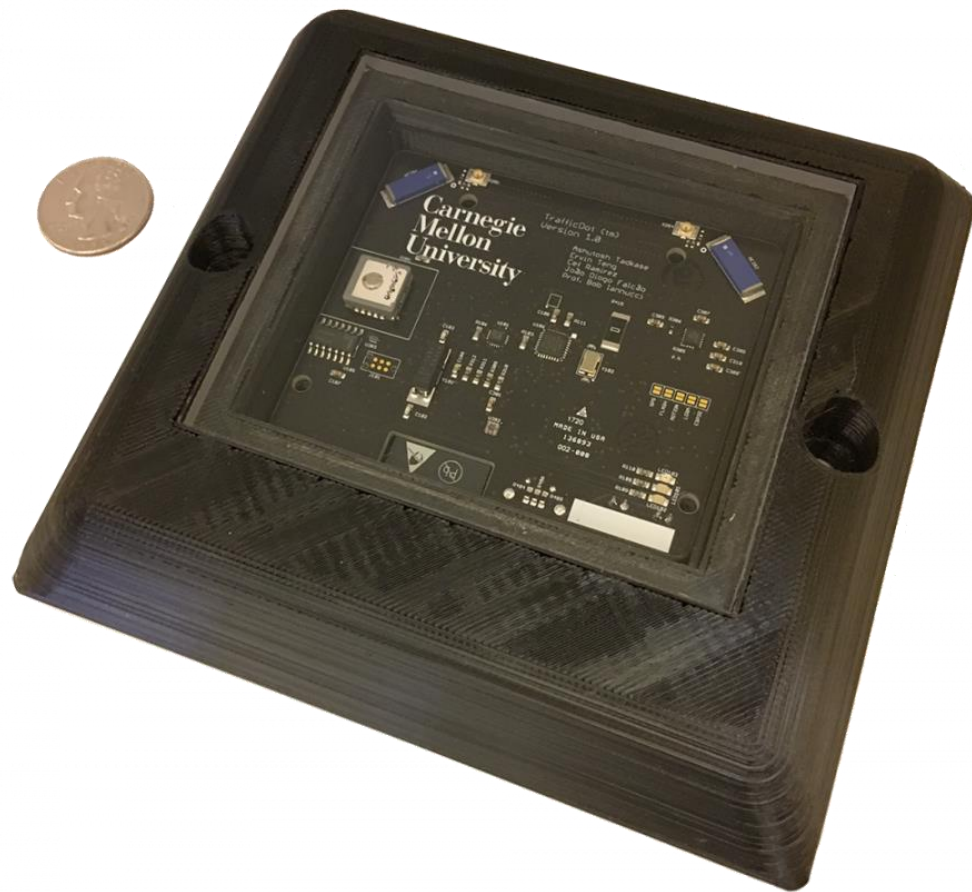


# TickTalk – Language Design for Large-Scale IoT Apps

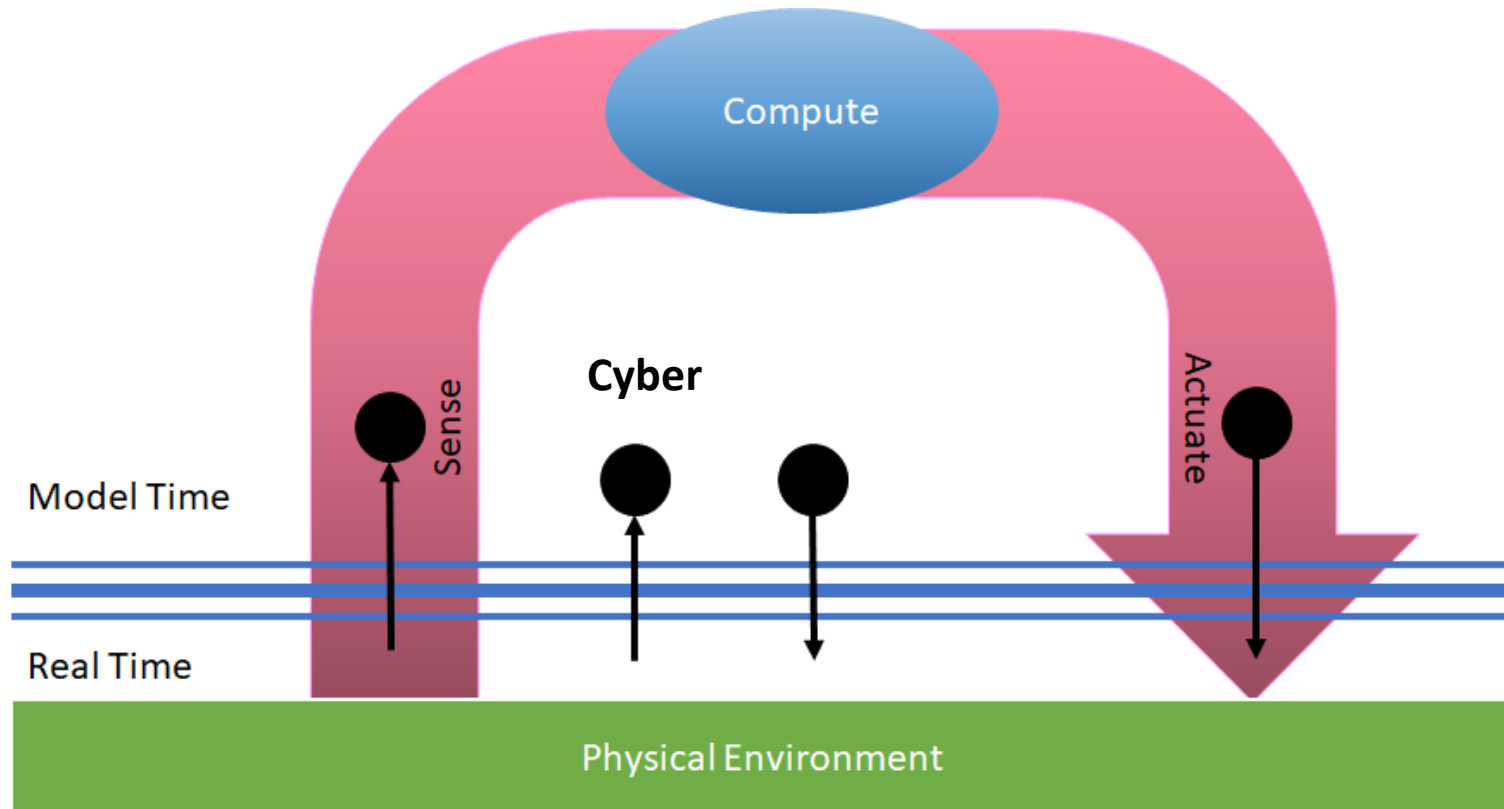
Kyle Liang

2021-3-9

# IoT for Traffic Sensing



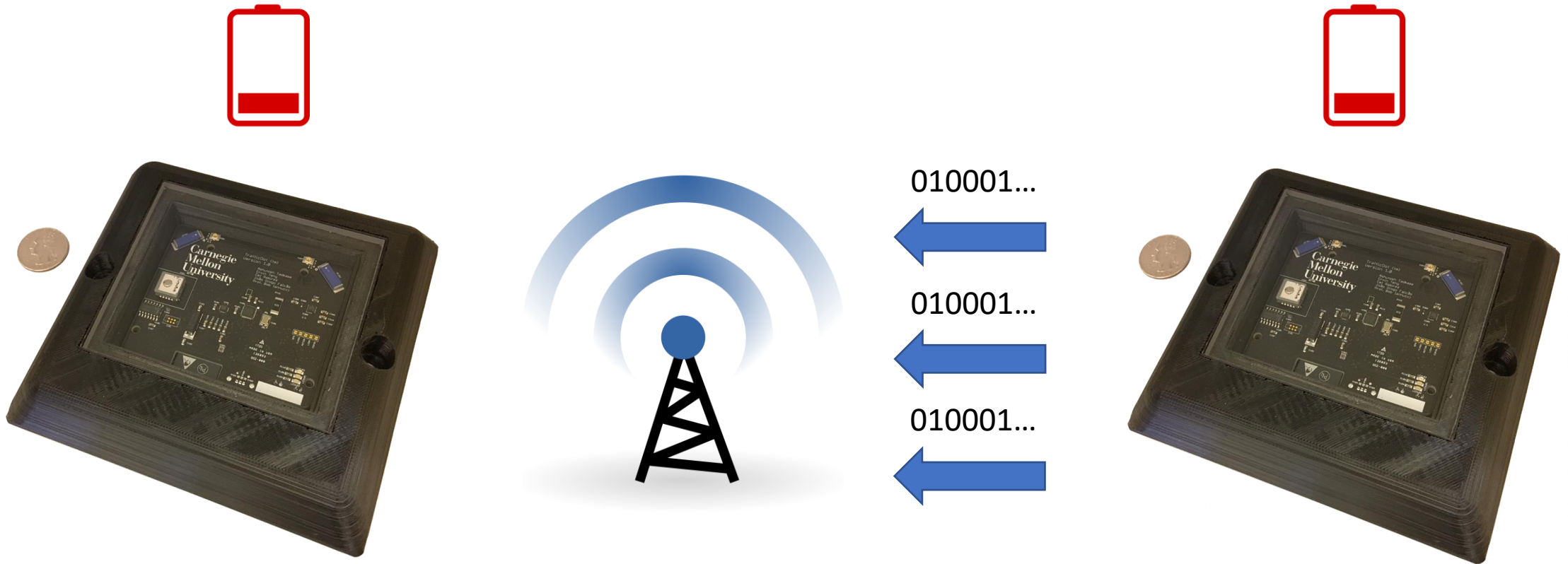
# Time is Essential in Many IoT Applications



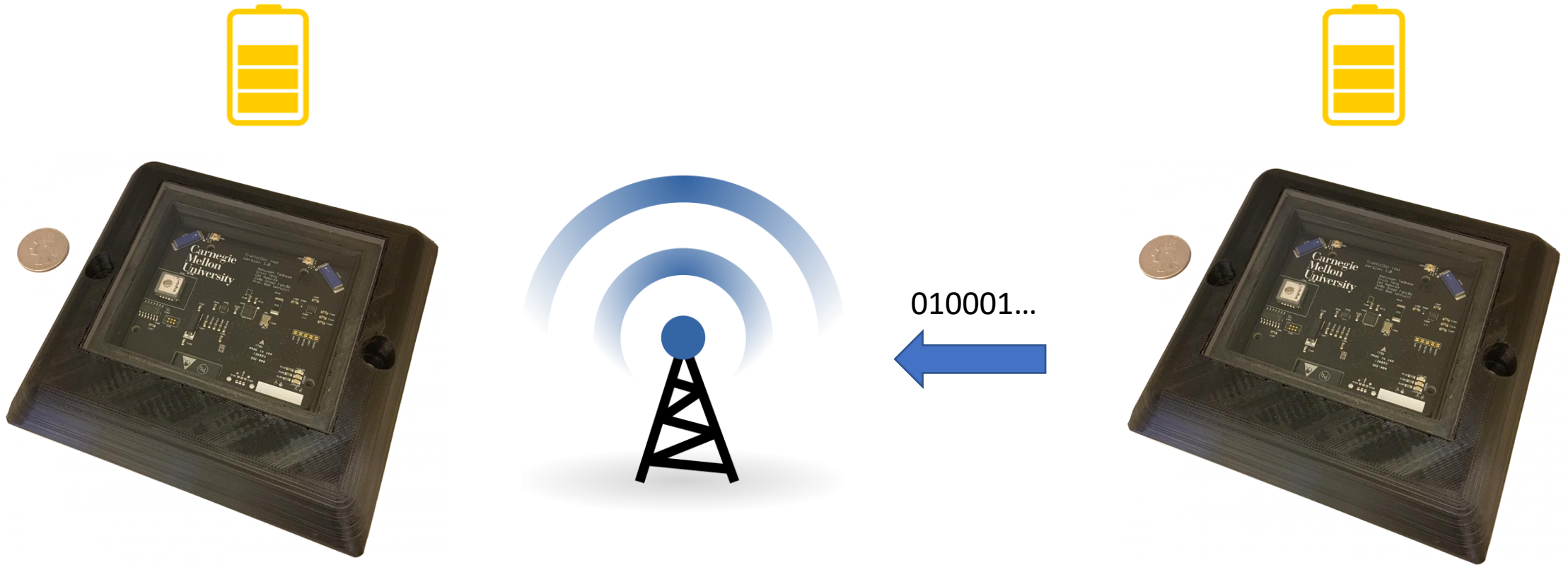
- Periodically Sample
- Wait for sensor interrupts

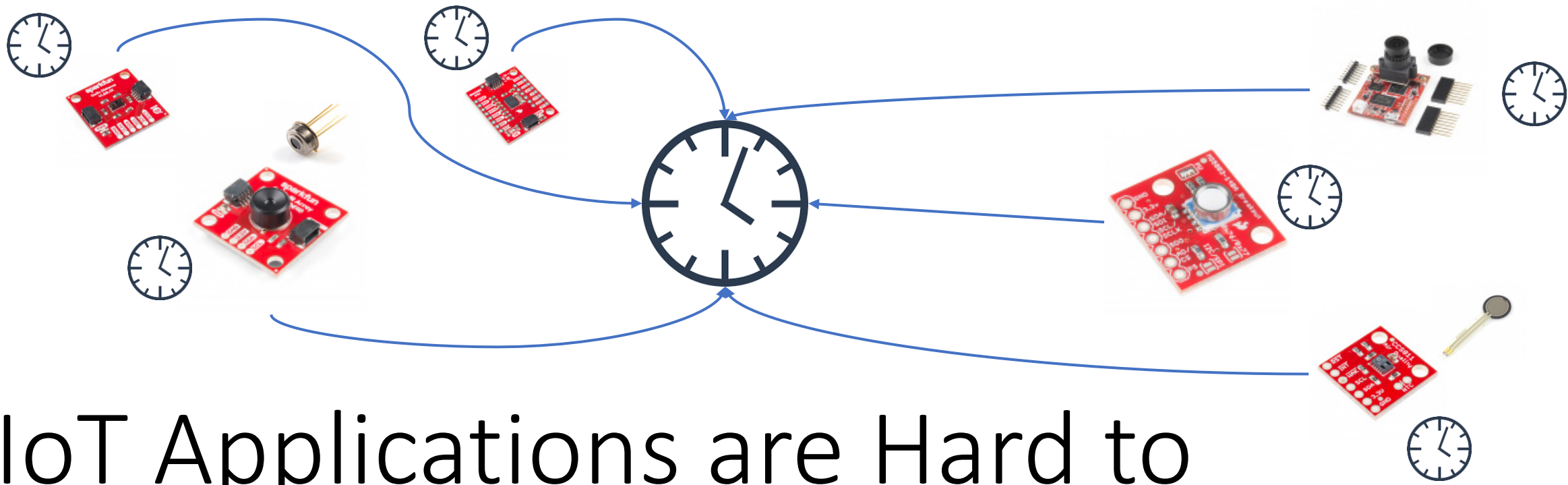
- Turn on a motor

# Timing Requirements affect Battery Lifetime



# Timing Requirements affect Battery Lifetime



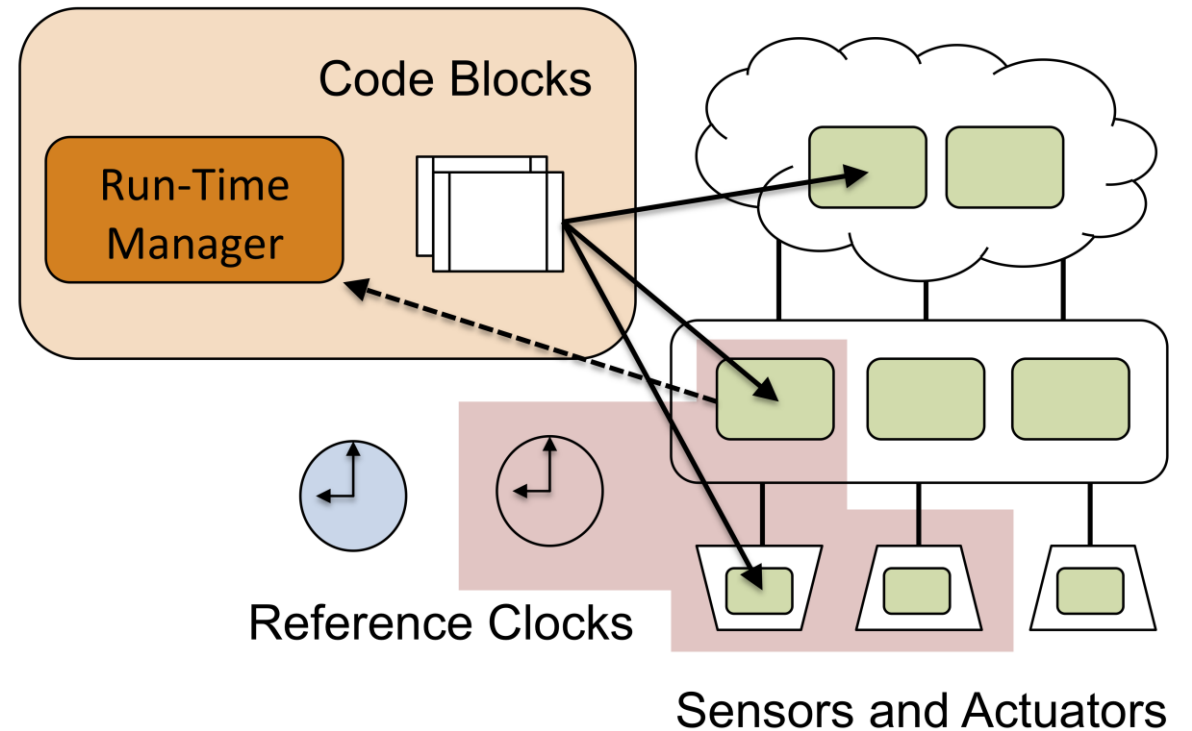


# IoT Applications are Hard to Design

Distribution and Time

# TickTalk

- API and infrastructure to interface with distributed, low-power IoT devices and cloud computing
- Encapsulate system interface through a language



# Research Questions

- RQ1
  - Is the TickTalk language usable and expressible to describe large-scale IoT applications?
- RQ2
  - Is having timing-constructs as first-order concerns in a language helpful in development of large-scale IoT applications?



# Methodology

- Focus on User Studies
  - [RQ1] – Is the TickTalk language usable and expressible to describe large-scale IoT applications?
    - Interview case-studies of IoT applications
      - USGS, Large-scale sensing projects
    - Design a tutorial introducing the TickTalk language.
    - Prepare sample IoT application requirements to quiz and test the participant's ability to learn and use TickTalk
    - Ask for voice recording and talk-aloud coding

# Methodology

- Focus on User Studies
  - [RQ2] – Is having timing-constructs as first-order concerns in a language helpful in development of large-scale IoT applications?
    - Find competitor languages/systems used to develop IoT applications
      - FreeRTOS, nesC, PRET-C
    - Prepare multiple sample applications for IoT applications
    - Randomly assign participants to use competitor language or TickTalk
    - Ask for voice recording and talk-aloud coding

# TickTalk Team

CMU



Dr. Bob Iannucci



Dr. Carlee Joe-Wong

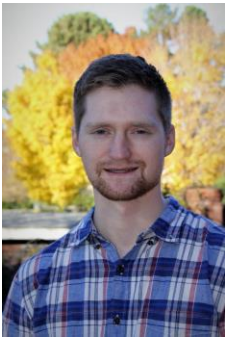


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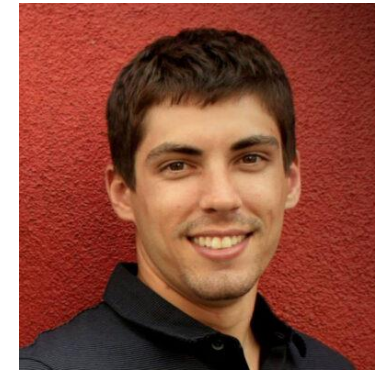
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Mohammad Khayatian