
Sensing, Communication and Networking for Smart Wireless Devices

Amitangshu Pal

Welcome to CS724A

- ❑ **Timings:** W/F 1 – 10:15
- ❑ **Location:** RM 101
- ❑ **Instructor:** Amitangshu Pal
Email me at amitangshu@cse.iitk.ac.in
Visit me at 203 KD Building
- ❑ **Course TAs:** To be announced

Welcome to CS724A

❑ **Prerequisite:** Basic math (linear algebra, matrix, probability etc.)
Some programming (Python, MATLAB)

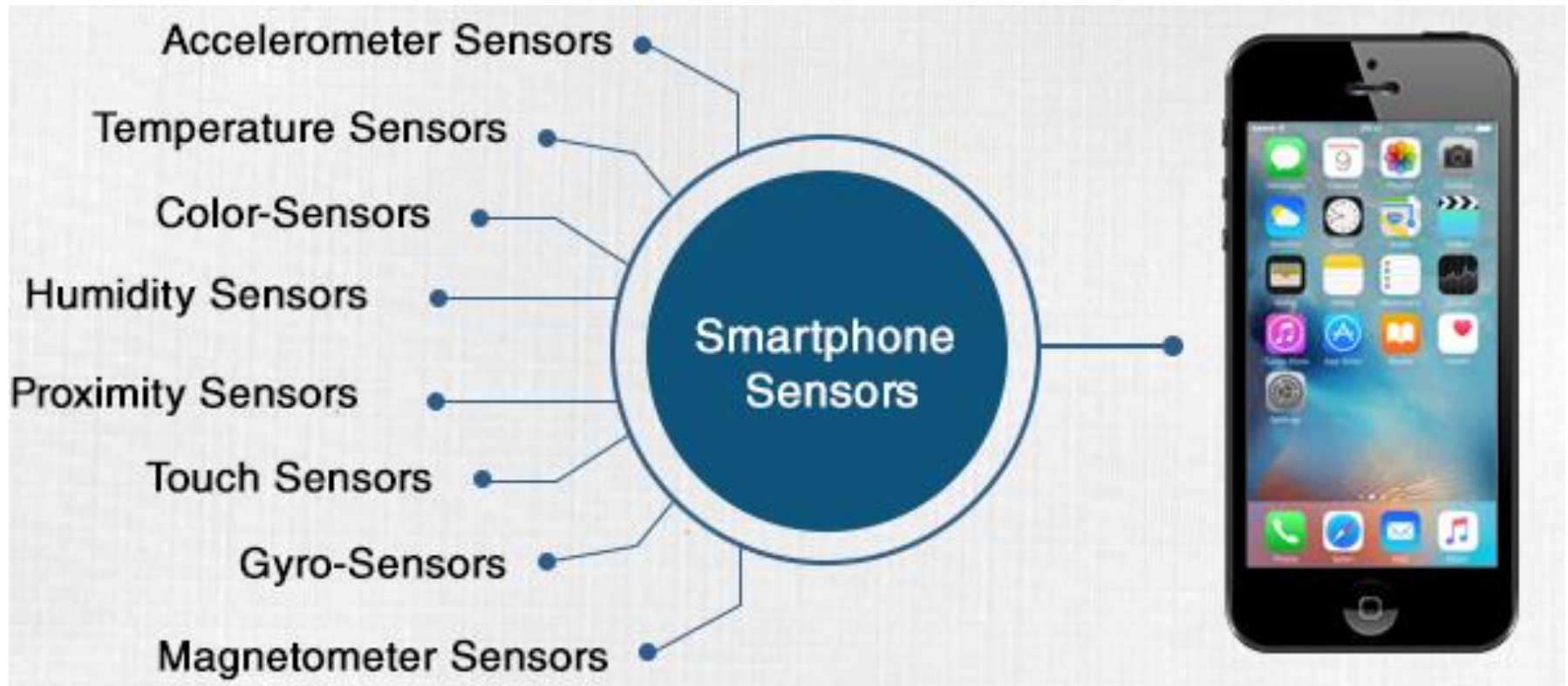
❑ **Grading:**

HWs/Assignments:	20%
Midterm:	40%
Paper presentation:	10%
Final Project, presentation, viva:	30%

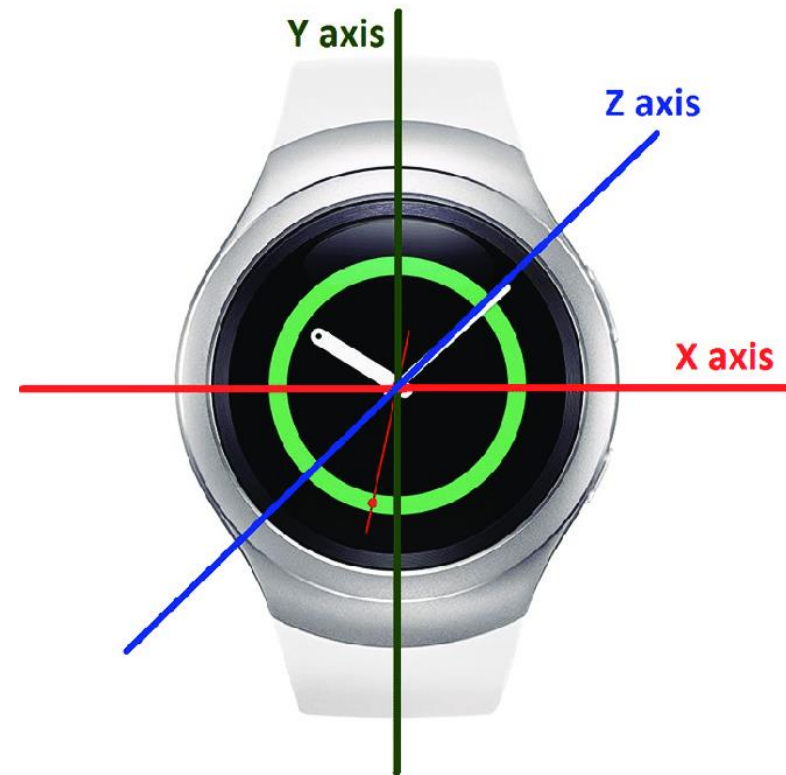
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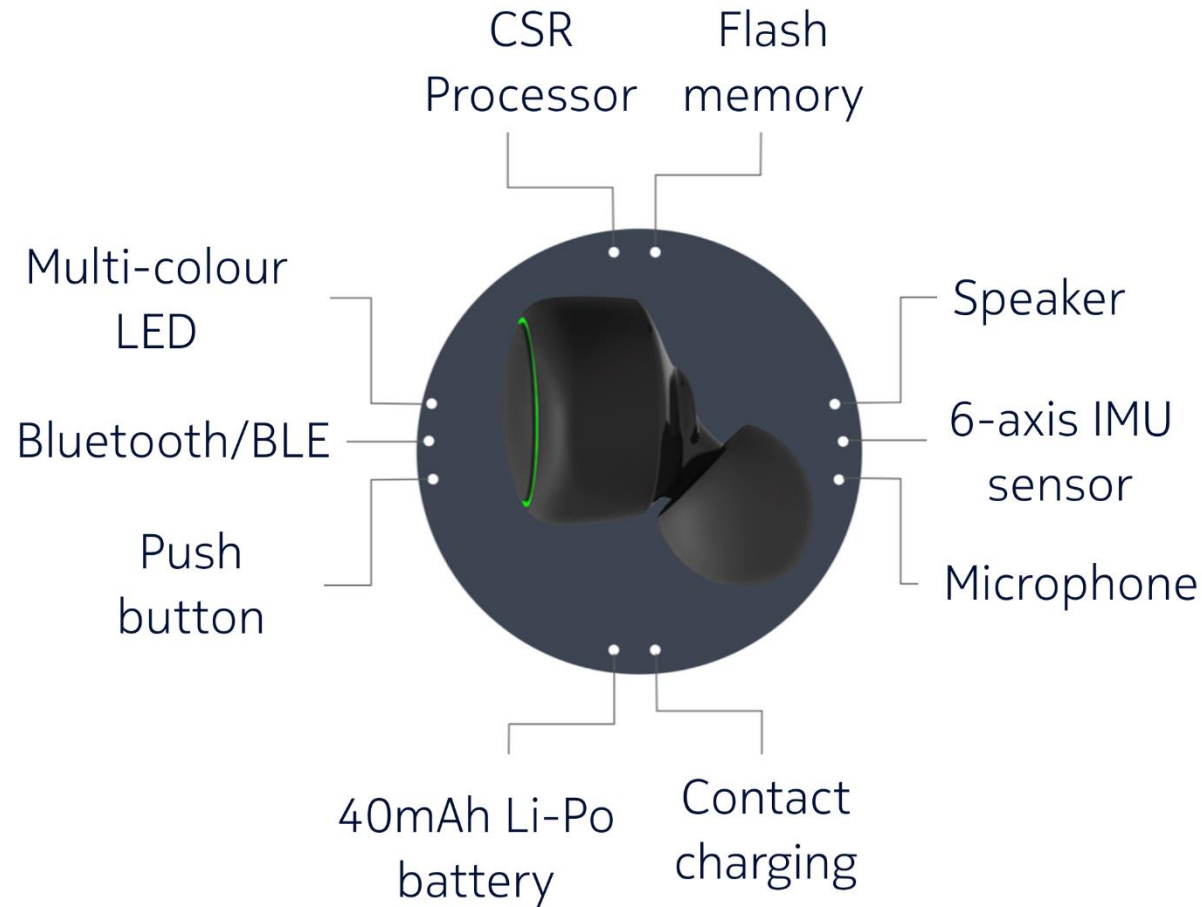
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GPS Localization



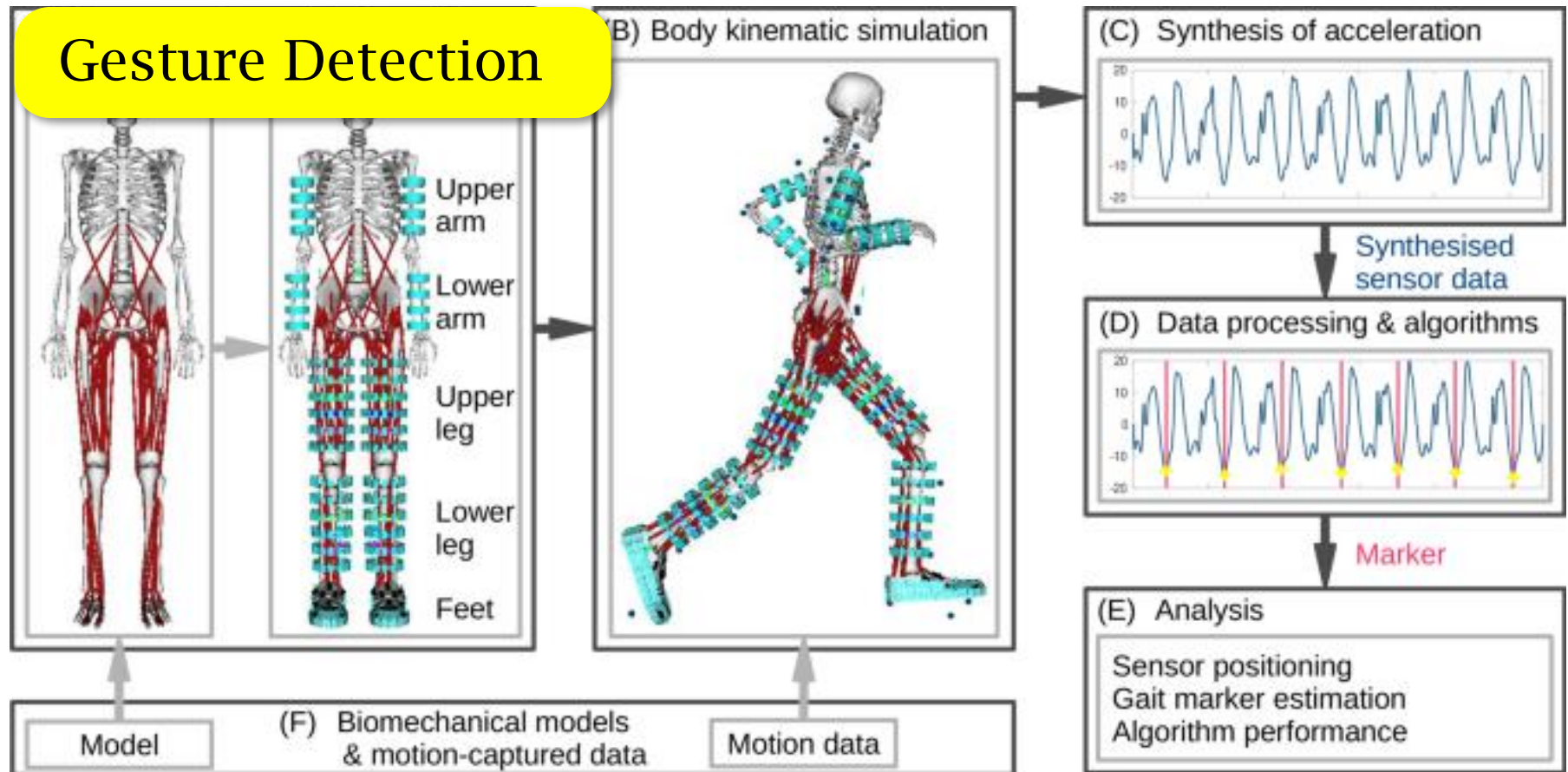
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Indoor Localization



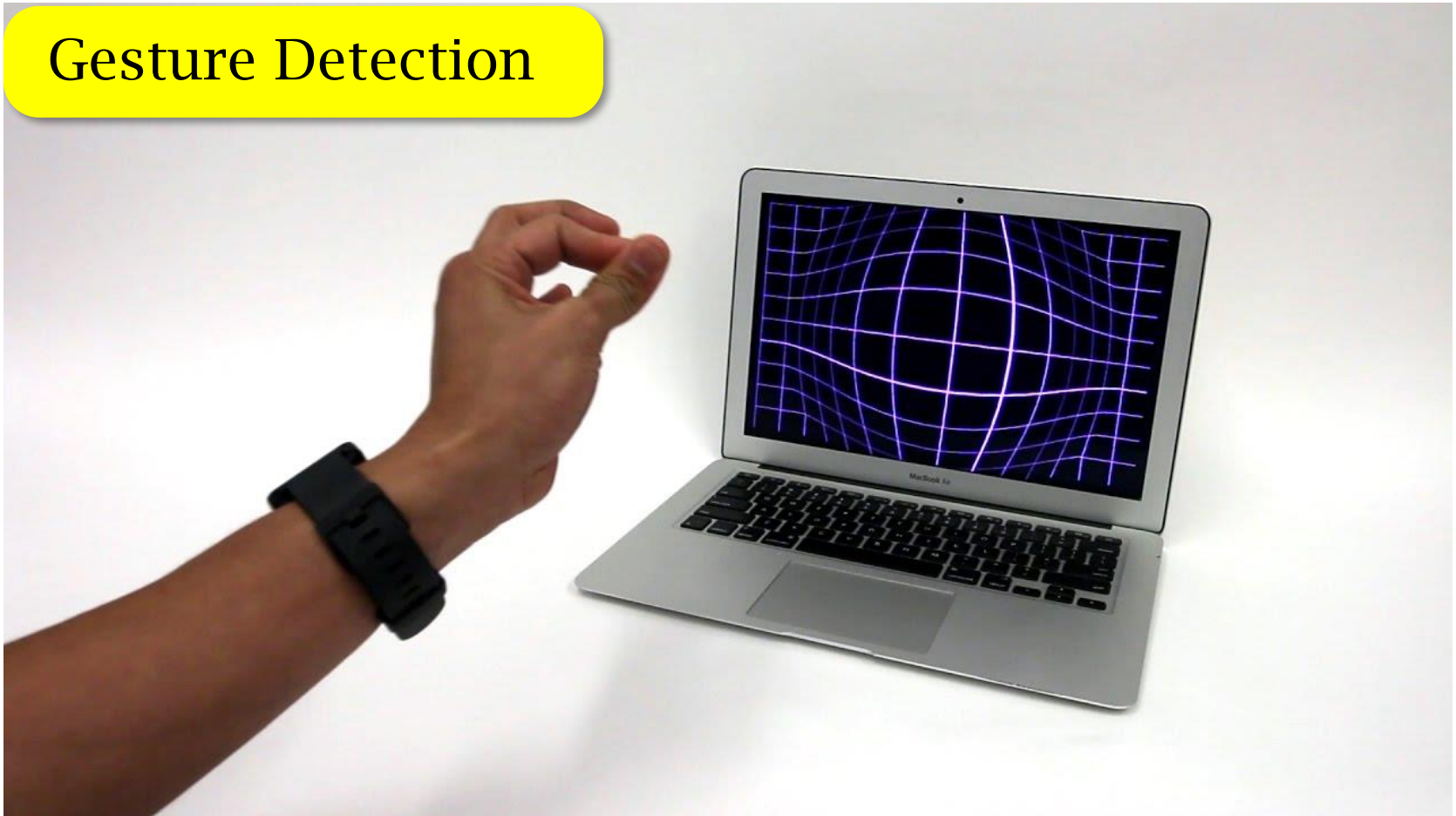
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Gesture Detection



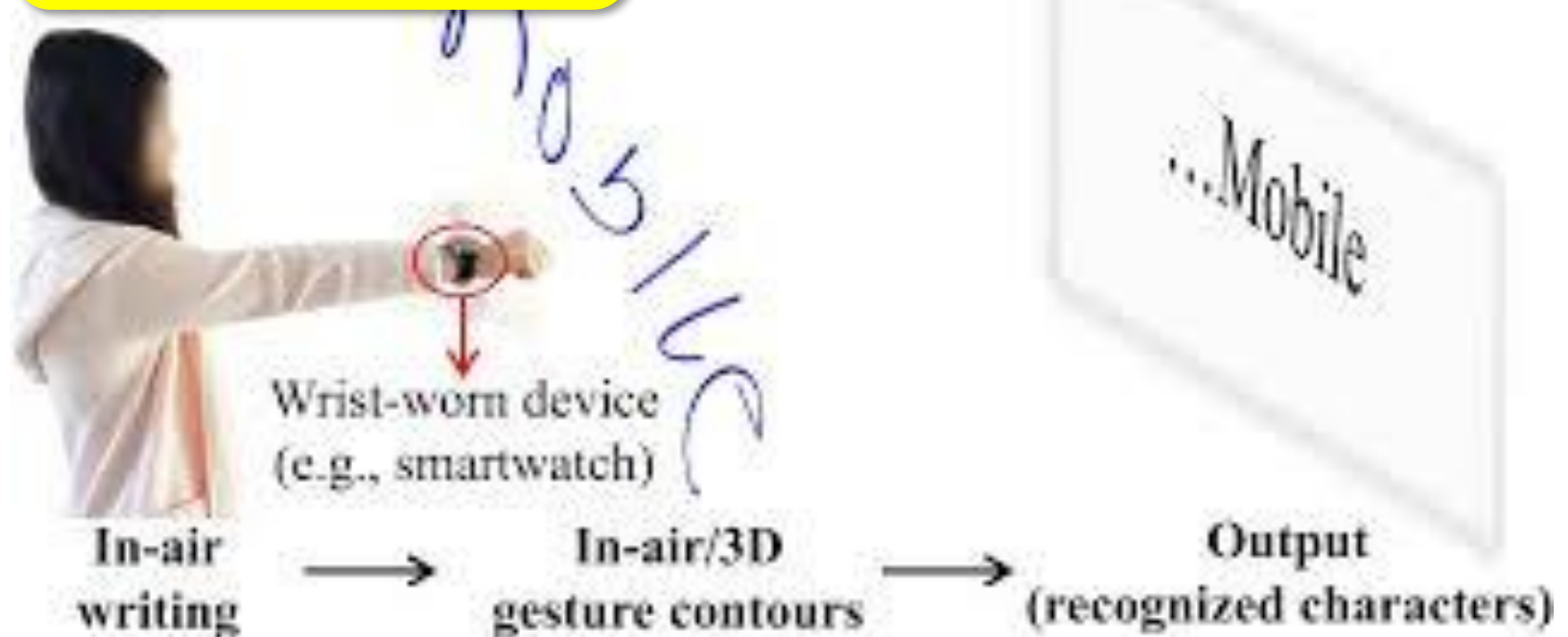
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Gesture Detection



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Gesture Detection

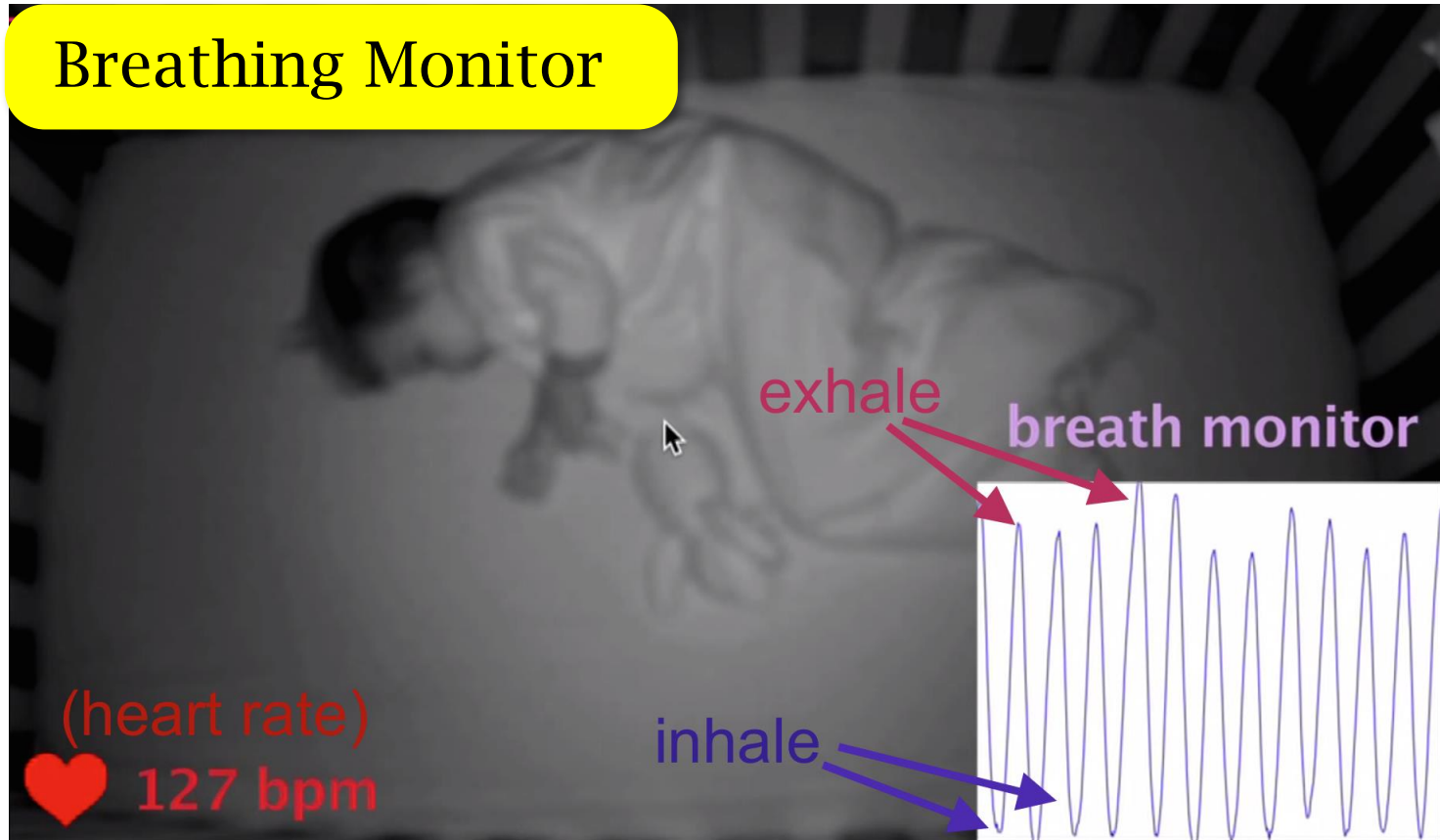


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Device Free Sensing

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Breathing Monitor

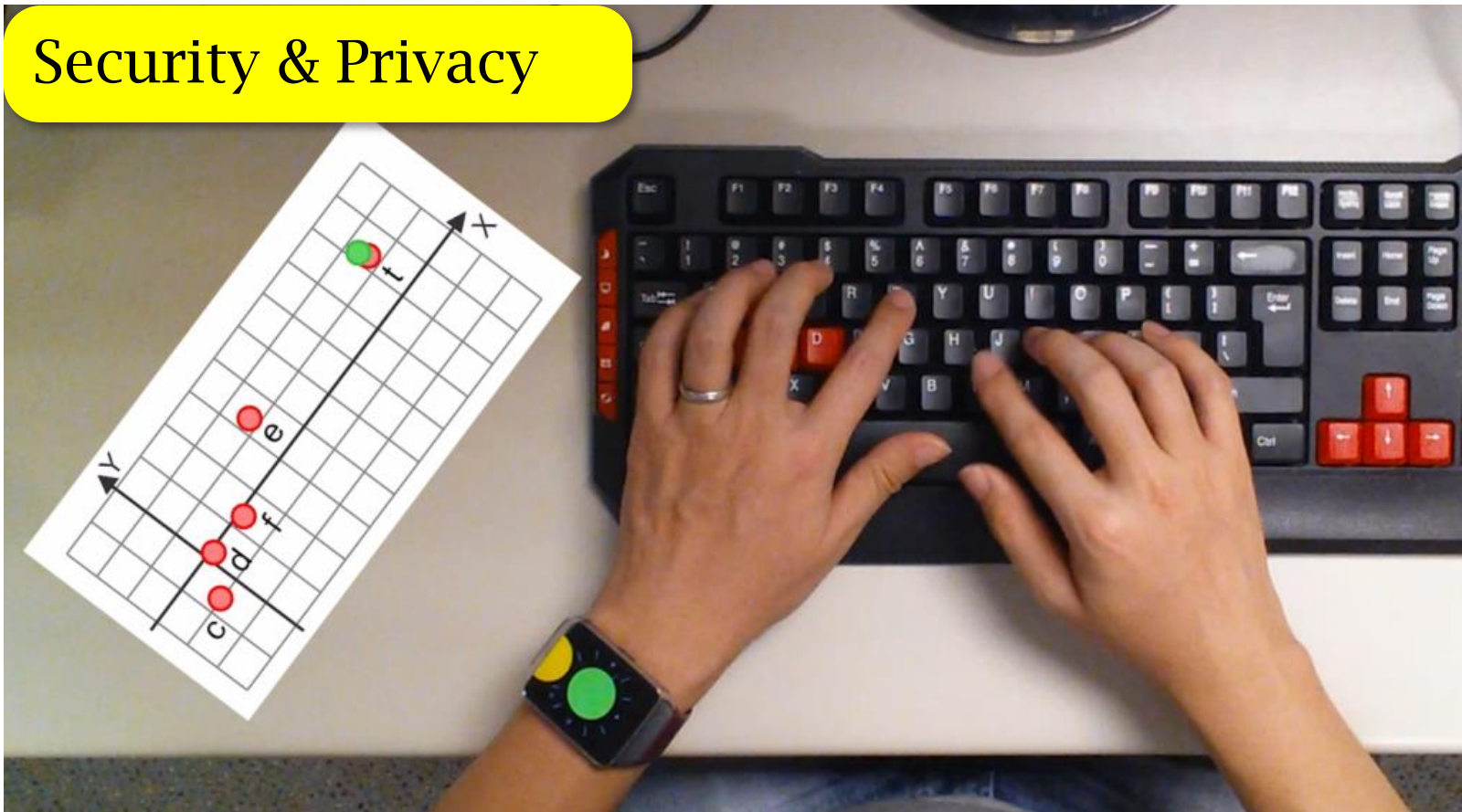


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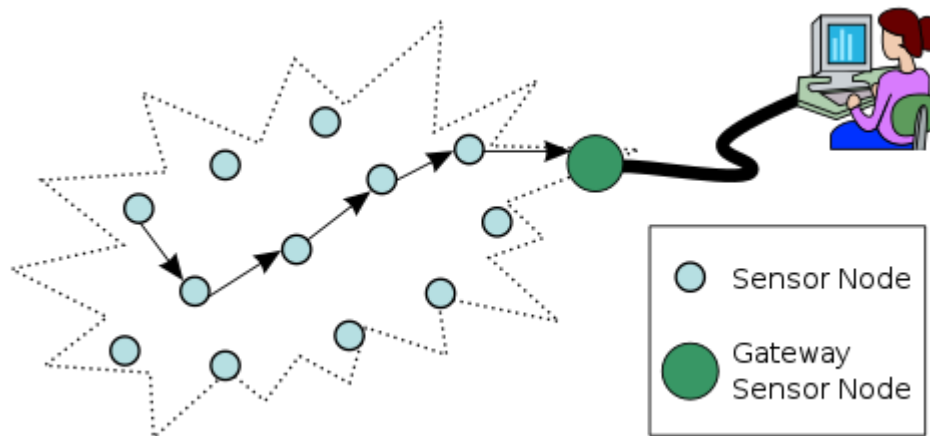
Security & Privacy

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Security & Privacy



Networking of Sensors → Habitant Monitoring

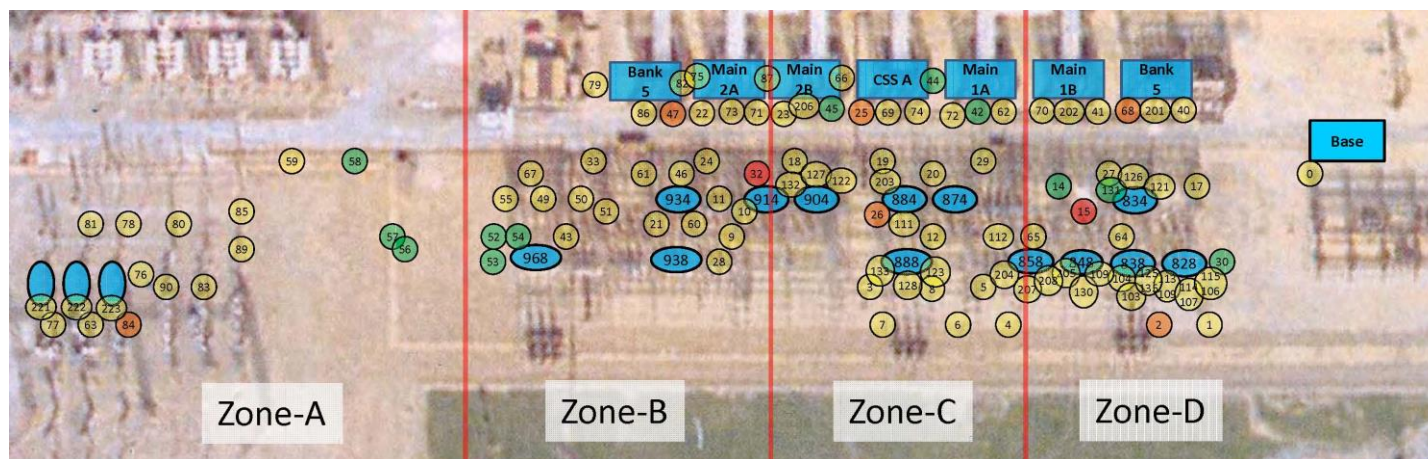


Structural Health Monitoring → *ParadiseNet*



TVA's Paradise substation in KY

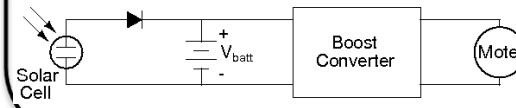
- Health monitoring of :
 1. Oil-filled circuit breakers
 2. Oil-cooled transformers
 3. SF₆ gas density
 4. Ambient temperature
- Total nodes: 122
- Area: 1000x400ft



Monitoring Applications Developed



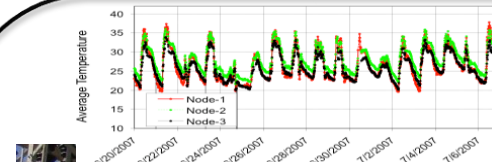
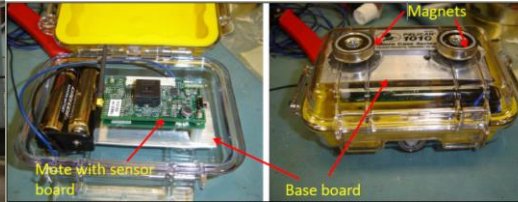
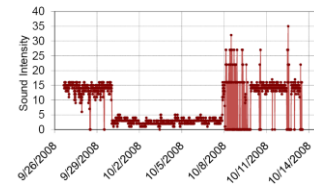
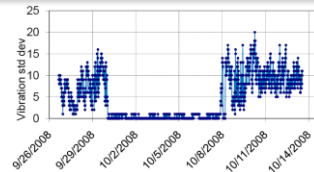
Ambient temperature monitoring nodes



SF₆ density monitoring

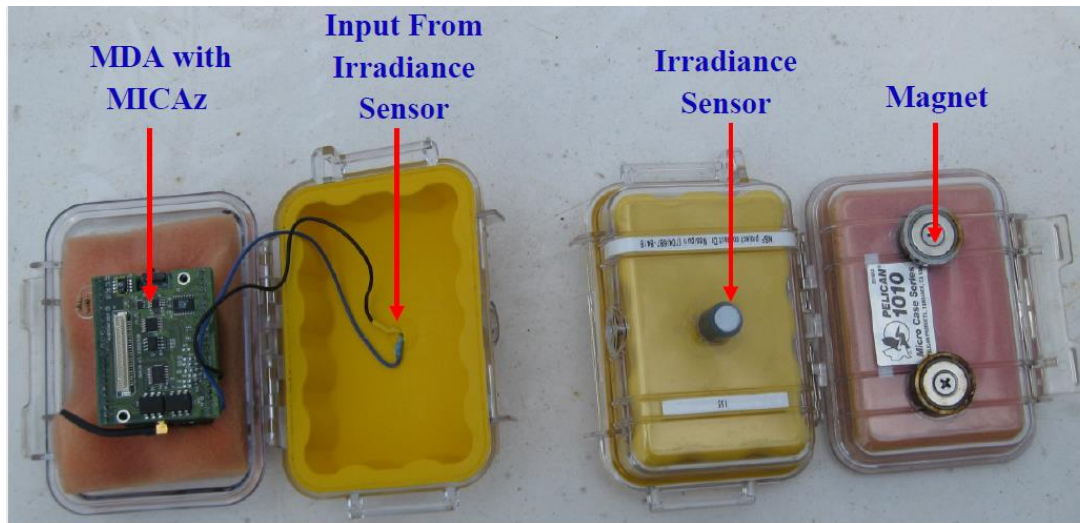
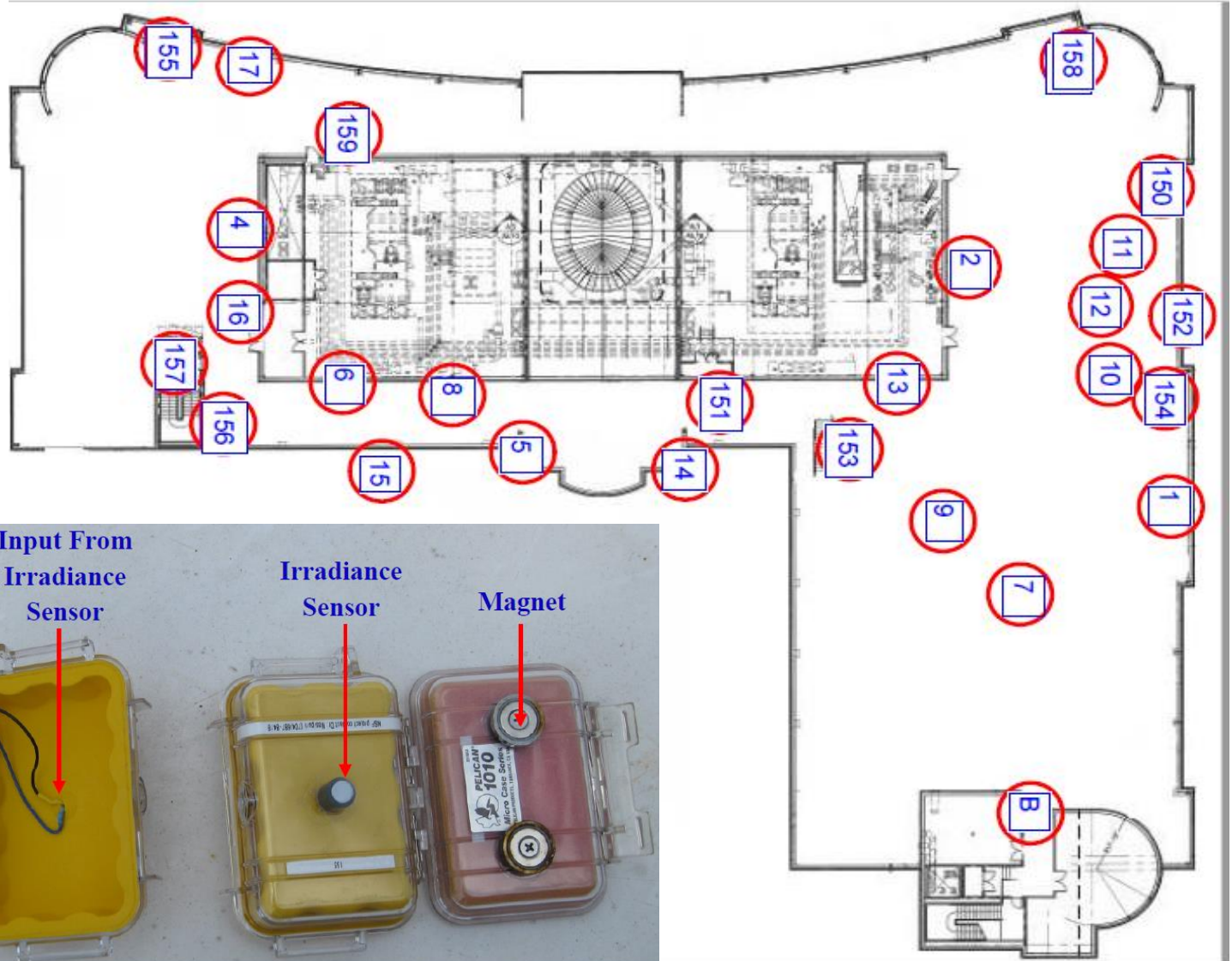


Wireless sensors on transformers



Wireless sensors deployed on circuit breakers

Experimental Testbed *EPIC-RoofNet*



Irradiance data is made available at: https://github.com/Amitangshu/Irradiance_sensing

Few comments...

- It will be an inter-disciplinary course, we will cover multiple angles
 - Please bear with me if the materials are too easy or too difficult

- We will cover some exciting topics, some of these areas are very active research areas
 - Read a lot of research papers → interact among your classmates

- Some materials have been adopted from *Prof. Roy Choudhury's* course on Mobile Computing Algorithms and Applications at UIUC

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