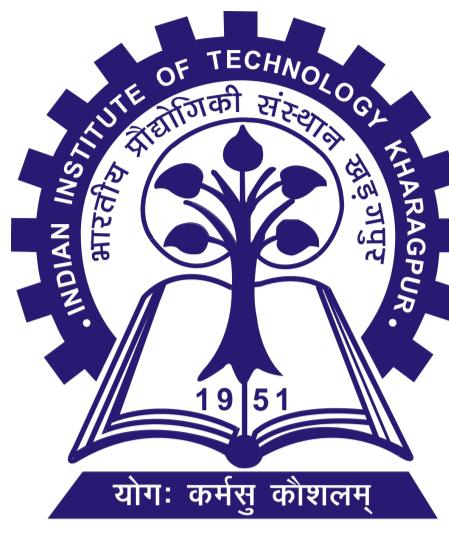


Exploiting Air Quality Monitors to Perform Indoor Surveillance: Academic Setting

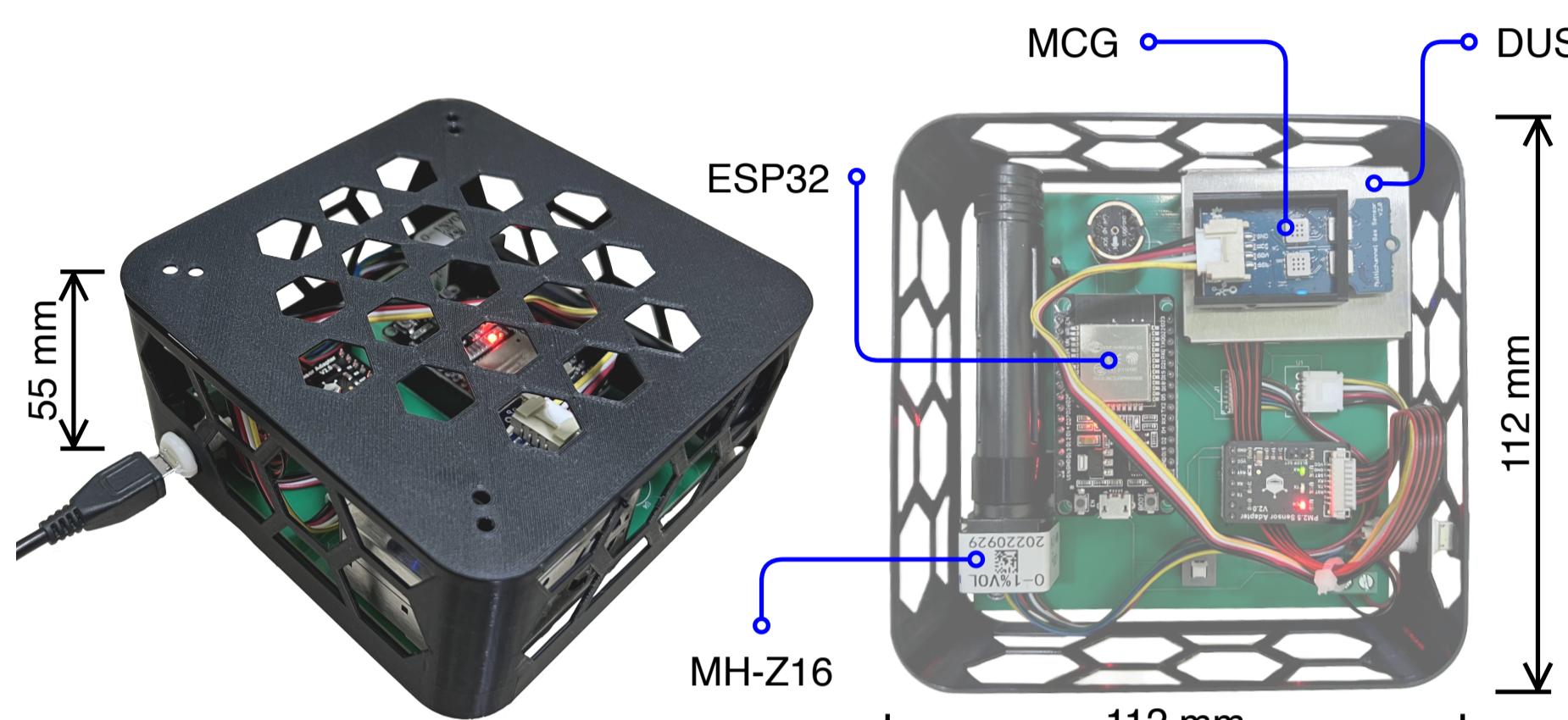
COMPASS
2024



Prasenjit Karmakar[†], Swadhin Pradhan[§], Sandip Chakraborty[†]

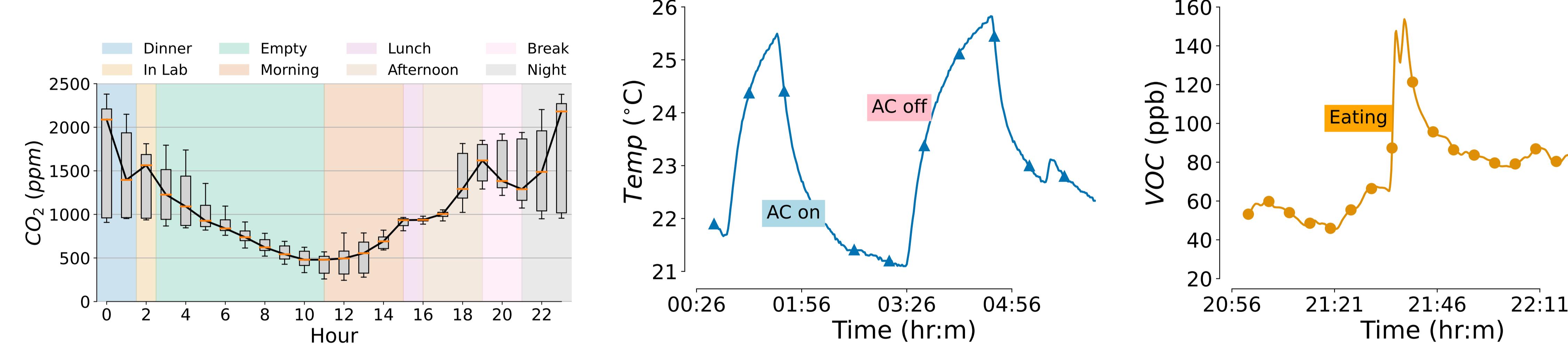
[†]Indian Institute of Technology Kharagpur, India, [§]Cisco Systems, USA

1. DALTON Air Quality Monitor

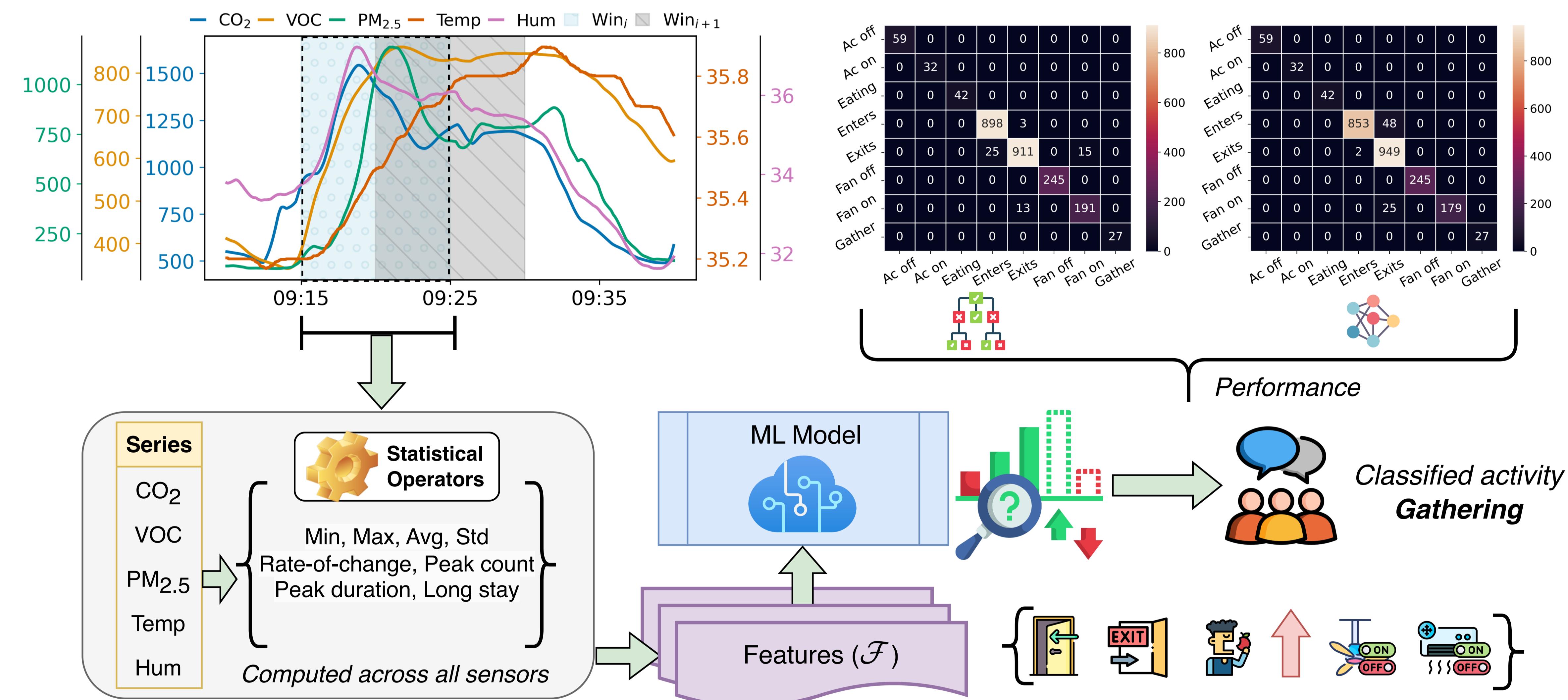


- Particulate Matter (PM_x)
- Ethanol (C_2H_5OH)
- Carbon Monoxide (CO)
- Temperature (T)
- Nitrogen Dioxide (NO_2)
- Volatile Organic Compounds (VOCs)
- Carbon Dioxide (CO_2)
- Relative Humidity (RH)

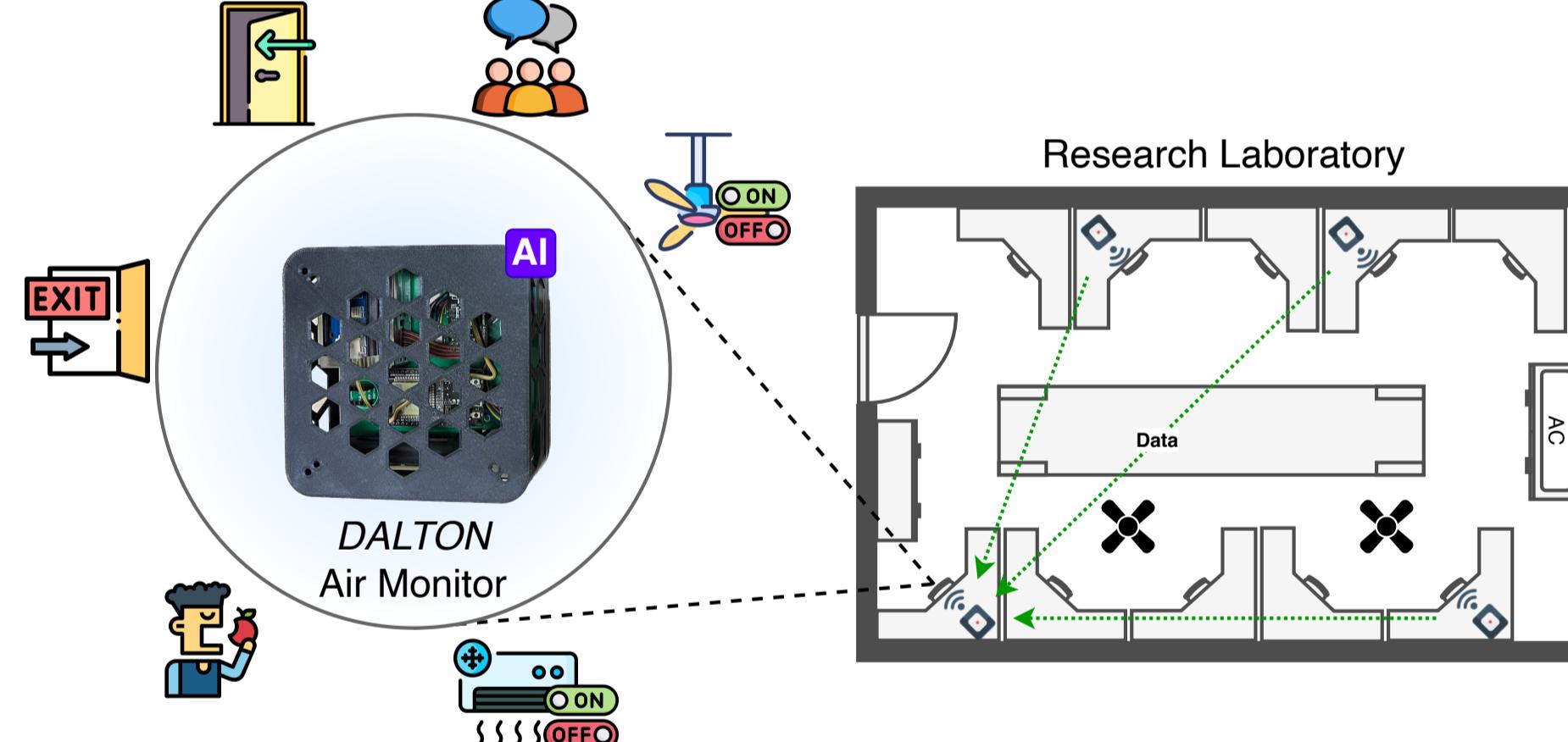
4. Indoor Air Pollution & Activities



5. Side-channel Activity Detection Pipeline using ML Models

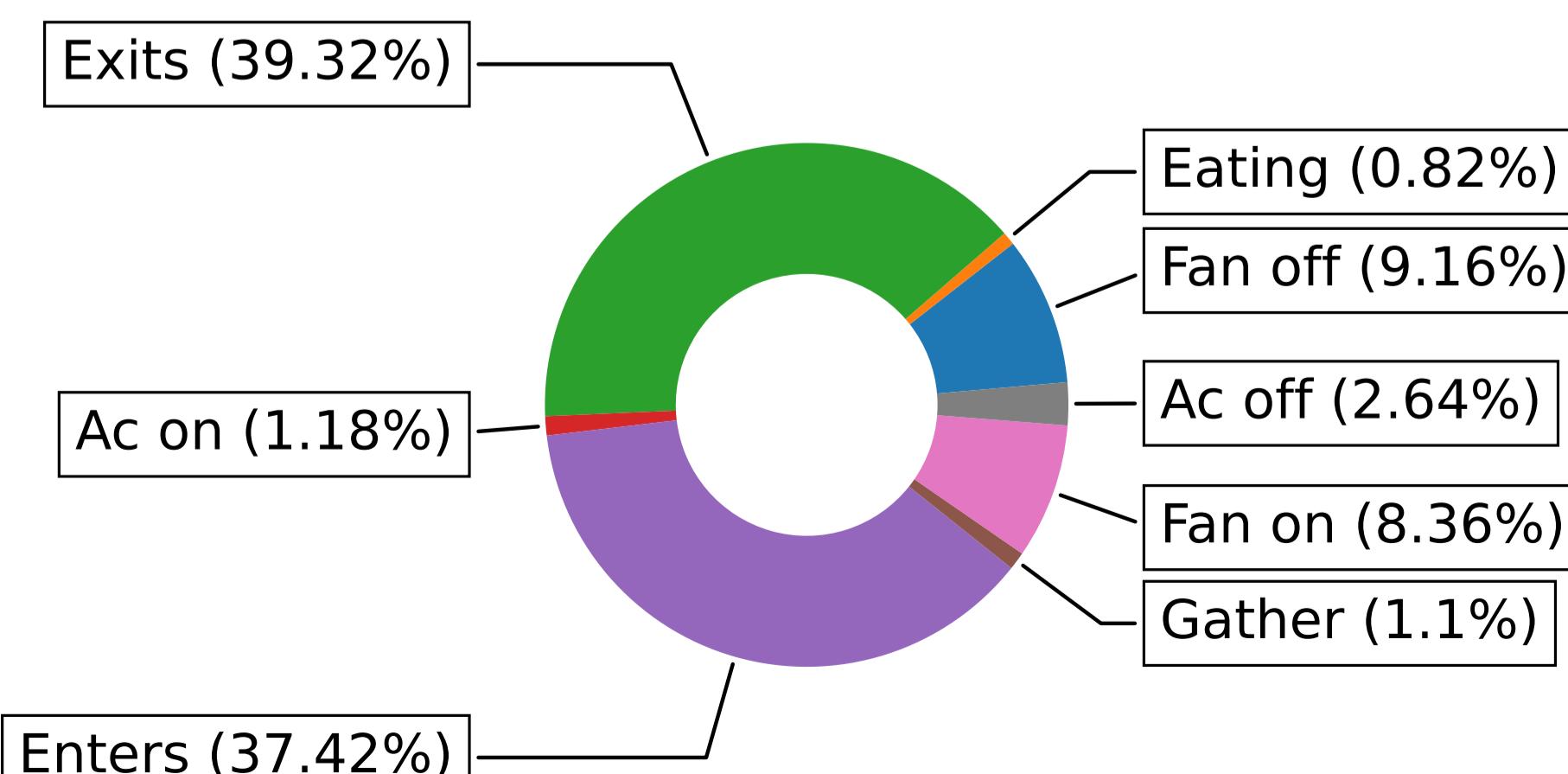


2. Deployment in Research Lab



- The DALTON air monitors are deployed for more than one month
- In total, seven volunteers annotated their activities in the lab
- We recorded 833 hours of data with 705 activity annotations

3. Collected Dataset



6. Conclusion

- We explored potential side-channel applications of ubiquitous air monitoring solutions
- Sharing indoor pollution data with third parties may cause privacy concerns
- We can detect specific indoor activities with 97.7% F₁ score from the pollution patterns

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