Training Schemes in Non-Intrusive Load Monitoring

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TRAINING IN NILM

-The process through which the *characteristic signatures* of the different appliances' state transitions are learned

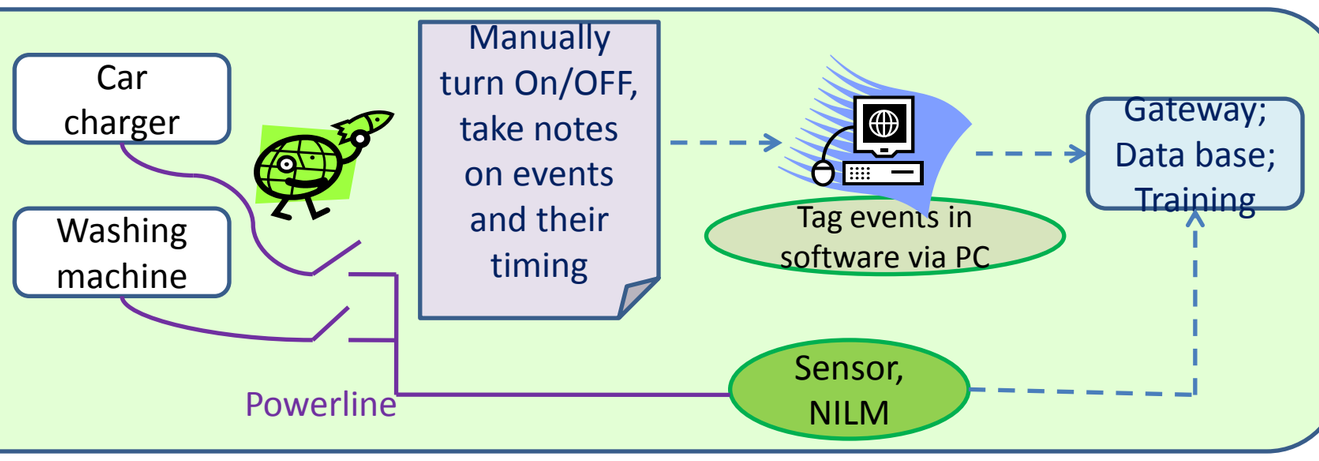
- Important process in NILM

Manual Training

-Manually turning on/off appliances

-Manually labeling the events and time stamps

-Tagging the events in software

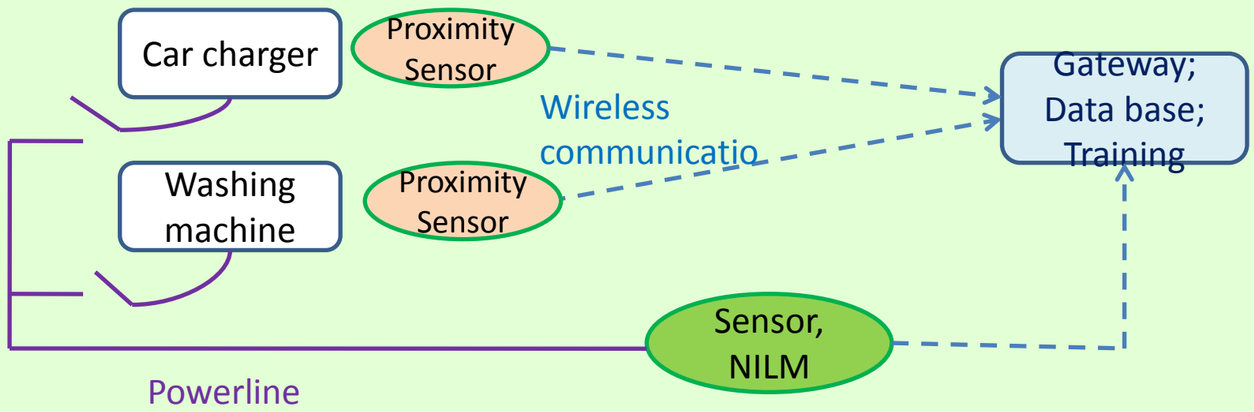


Sensor Assisted Training

-Individual sensors close to each of the appliances to monitor the states of the appliances

- Sending the results to the gateway

-Automated labeling



Cloud Based Training

- A database in the cloud, including characteristic signatures , appliances makers, models, years, etc.

-An automatic training setup can set itself up as it measures the load

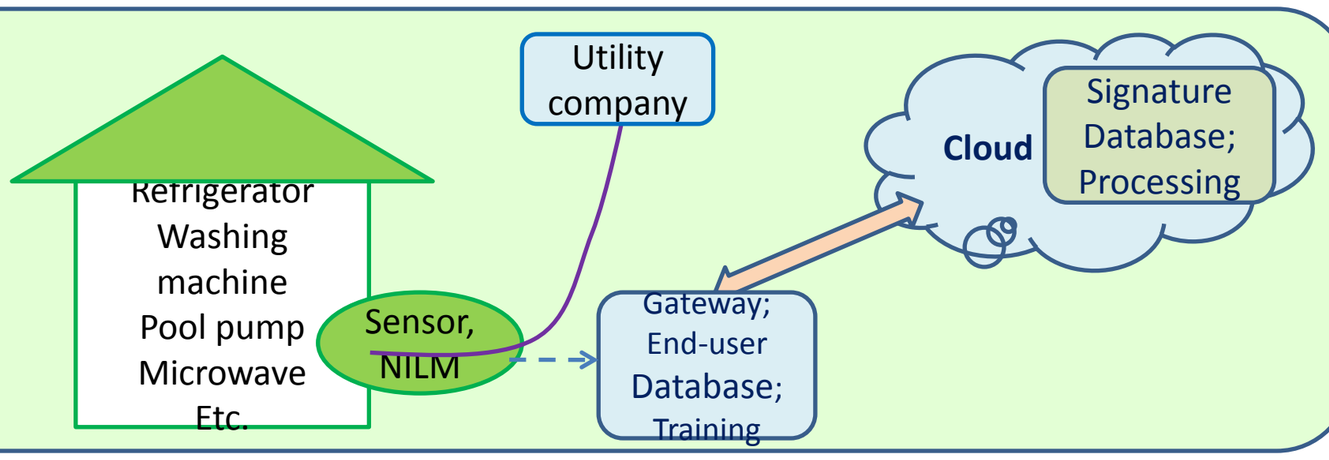


Table : Comparison of different training schemes

	Manual training	Sensor assisted training	Cloud based training
ON/OFF states	Yes	Yes	Yes
Internal states	Very limited	Yes or Limited	Yes
User interaction	Manual labeling	Input of pairing the sensor with the appliance it monitors	Answer the polling. Or input appliances' information
Database	Local, small	Local, small	Large database in the cloud. Local database can be established based on the cloud.
Online or offline	Mostly offline	Mostly online	Online & offline
Challenges	Capturing internal multiple states. Much Involvement of human.	Tradeoff of the local sensor complexity and accuracy. Not aligned with the purpose of single point sensing.	Database establishment in the cloud.

Summary

- We analyze different training schemes in NILM via their operations.
- Efficient and effective training schemes in NILM need yet to be developed.
- Cloud based scheme is promising with merits if overcoming the efforts to establish the database in the cloud.