Vasudha : Technology for green energy & sustainable earth

Millend Roy, Akshay Nambi, Tanuja Ganu, Shivkumar Kalyanaraman, Srinivasan Iyengar

Q. How Greenhouse Gas Emissions add up? 15GT Transportation: 27% 24GT Energy: 41%

A. Pathway to Climate Action: tracking and measuring carbon emissions accurately, reducing emissions through alternatives like renewables, optimizing the use of green resources.

Reliable Energy Consumption Modeling for an Electric Vehicle Fleet

Motivation: Limited Driving Range per charge

At the end-user Level: (Range Anxiety)

Naïve Solution:
- Increase battery capacity
- Increase no. of charging stations

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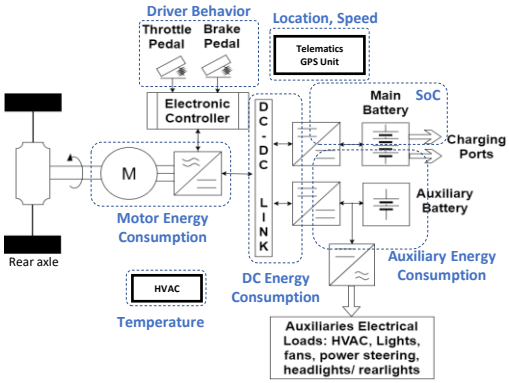
At the organizational Level: (Planning Dilemmas)

- Route Planning and logistics
- Driver Planning
- Battery Sizing
- Maintenance Planning
- Bidding Prognostics for a particular route segment

EV Schematic and Data Telemetry

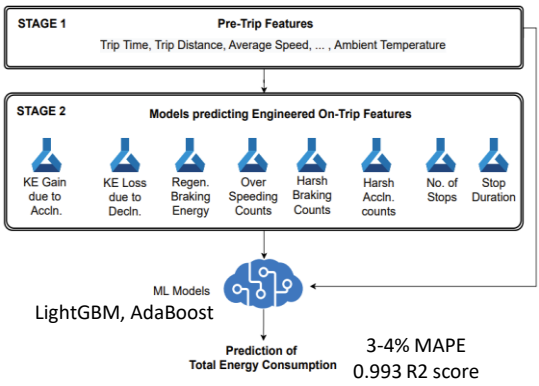


Solution : Energy Consumption Modeling by using info available prior to the start of a trip

Exhaustive set :

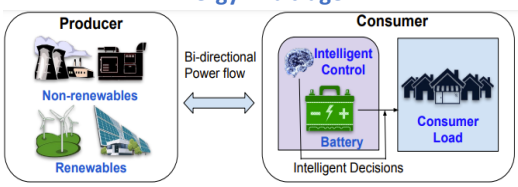
Naive Features
Estimated On-Trip Features

	Logged Features	Engineered Features
Pre-Trip Features	I: Trip Time, Trip Distance, Average Speed, Ambient Temp., Saloon Temp.	II: Time of day, Peak/ off-peak, Speed Categories, Trip Length Range, Average Altitude, Diff. bw. Amb. and Saloon Temp., Initial SoC, Motor Efficiency
On-Trip Features	IV: Consumed SoC, DC-DC EC, Auxiliary EC, Motor EC	III: Number of stops, Stop Duration, Regenerative Braking Energy, KE Loss due to Deceleration, KE Gain due to Acceleration, Harsh Acceleration Counts, Harsh Braking Counts, Over Speeding Counts

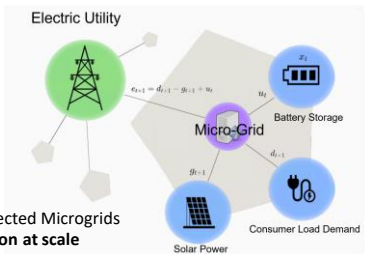


EnCortex: Decision Management Framework for Future Energy Systems

Energy Arbitrage:

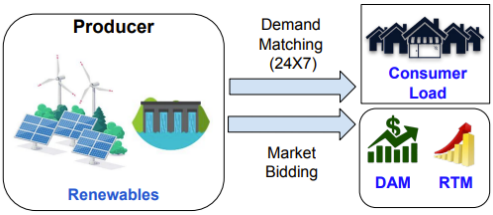


Microgrid:



100s of interconnected Microgrids **– Optimization at scale**

Demand Matching and Market Bidding:



Research Questions:

1.Develop an optimization layer that considers uncertainties, safety constraints and supports both neural network based and traditional optimizers.

2. Build a **scalable framework** to manage and optimize numerous energy entities in real-time.

Solution: EnCortex