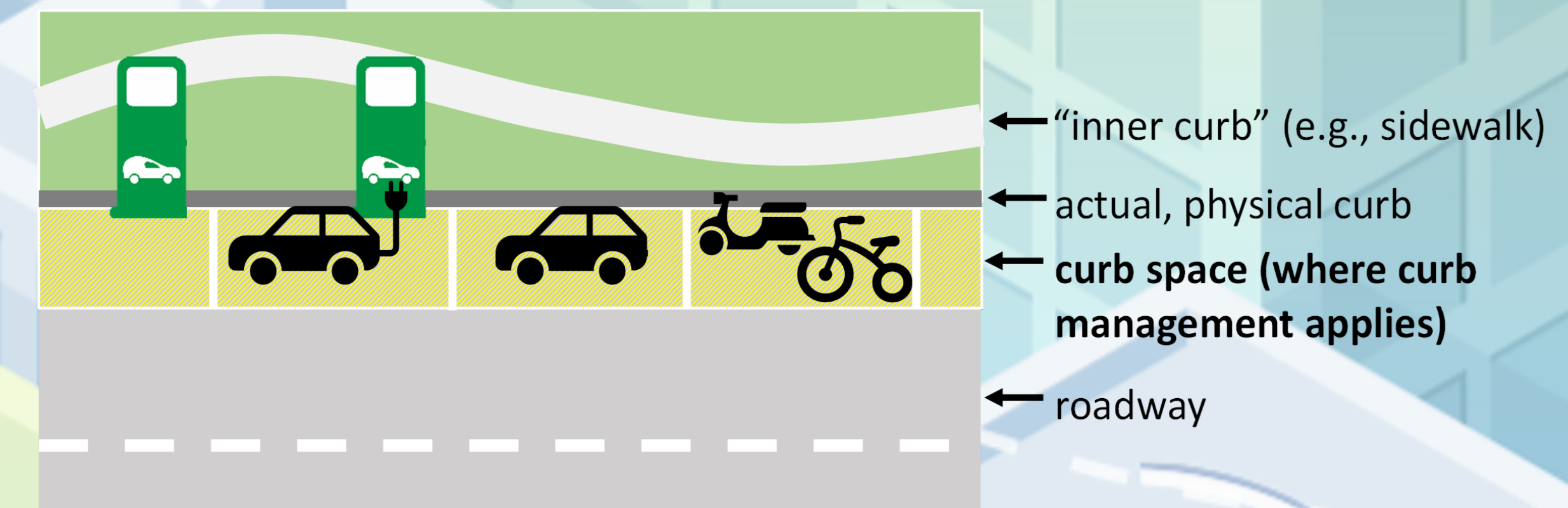


SmartCurb: Building Smart Urban Curb Environments

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Curb environments serve as a unique nexus that connects on-road traffic and pedestrian sidewalks across urban communities but are burdened in urban cores due to space competition for pick-ups and drop-offs, freight loading, EVs charging, bicycle, and scooter parking.

Problem Identification

@City of Gainesville Downtown & University of Florida Campus

Planning	Curb location and capacity impact traffic congestions.
Uses	Temporary parking of delivery/vendor trucks, emerging micro-mobility, underused reserved parking and misused space.
Management	Lack of adaptive regulations and real-time coordination Technologies.

Intellectual Merits

- Plan and manage curb environments to address congestion, safety, and accessibility issues collectively across cyberinfrastructure
- Precisely predict the evolvement of curb uses across time and space
- Creatively coordinate various curb uses in real time
- Design innovative technologies to support operations and mitigate privacy threats

Project Activities

	Collected multi-source data depicting curb environment, on-road vehicles, and humans;		Developed deep learning model to anticipate the impacts of potential curb regulations on the spatio-temporal dynamics of different curb uses;
	Interviewed stakeholders to understand communities' needs for curb spaces and management;		Investigated the impact of curb infrastructure on traffic and developed long-term optimization and real-time coordination plans for efficient co-use of curb spaces;
	Investigated the deployment of data collection, video processing, vehicle counting, privacy-aware AI approaches, streaming processing approaches on cloud computing platforms;		Designated PUDO zones to address the increasing PUDO trips brought by Mobility-on-Demand services for downtown curbs with data-driven simulation method.

Broader Impact

Well-coordinated curb uses consider diverse transportation modalities and user groups and help: (a) reduce traffic **congestion** and GHG emission, (b) achieve traffic **safety**, (c) improve **accessibility** and **well-being**, and (d) benefit living **environment** and commercial **development** in college cities and downtown communities.



Sustainability

SmartCurb research and solutions benefit the local communities in long term to prepare them for the **burgeoning technology** and **mobility innovations**.



Next steps

- Develop a localized curb environment addressing challenges from diverse uses.
- Build a cyber-physical framework for community-wide curb environments.
- Establish a cloud-based real-time computing and analytics platform to support operations.

