Smart Parking System on the University of Florida Campus

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Background and Significance

Campus parking inventory

- **23,000-24,000 parking spaces, largely unchanged for 20 years**

- **New buildings often take away parking spaces-will continue**

- **Campus Development Agreement caps campus parking spaces at 25,377**

Parking service

- **Peak occupancies for all types of Decal is about 93% on average**

- **Parking permit oversell rate of UF is 1.4 decals per parking space; much higher than peer comparisons, average oversell rate = 1.27**

Significance

- **Parking on the UF campus can be very difficult at times (sporting events, special events), giving rise to 'parking anxiety'**

- **It significantly affects the efficiency of campus activities and city traffic**

Challenge, Opportunities

- **Supply: Parking Facility**

  - ☐ **Need parking lot monitoring system**

  - ☐ **Need space availability information and service**

- **Customers: visitors, students, staff, and faculty**

  - ☐ **Flexible and diverse schedules**

  - ☐ **Can potentially be coordinated**

  - ☐ **Need such service**

- **There is still room to improve the usage of the spaces**

- **Advanced sensing, information, and data analysis will help**

Solution and Project Tasks

Establish a smart online parking service system, which

- **Provides real-time parking occupancy information**

- **Suggests smart trip plan to campus**

- **Coordinates the usage of different types of decals**

Tasks

- **Task 1: Monitoring parking supply**

- **Task 2: Understanding parking demand**

- **Task 3: UF Smart Parking APPs and Testbed**

Task 1 Monitoring Supply

- **Implement smart parking facilities monitoring the utilization of the system**

- **Detect and collect the following information for future analysis**

  - ☐ **Vehicle entrance and exit data at all parking surface lot/garage entrances/exits**

  - ☐ **Vehicle identification data, which help with parking duration and the apportionment of space sizes within any given lot (e.g., much higher percentage of small cars vs large cars, or vice versa)**

  - ☐ **Parking space utilization of surface lot or garage at any given time**

  - ☐ **Scooter and motorcycle parking data**

- **Facilities**

  - ☐ **Vehicle identification technology at entrance/exit points (License Plate Recognition)**

  - ☐ **RFID or Cameras**

  - ☐ **WGI (https://wginc.com/about-us/) has expressed interest to support**

# Task 2 Understanding and Managing Demand

- **Understanding the utilization of parking facilities**

  - ☐ **Parking durations, space turnover rate**

  - ☐ **Variation of the availability over a day and weekdays,**

  - ☐ **Predicting open parking spots for short-term parking duration**

- **This knowledge enables to serve/manage parking demand on-campus better**

  - ☐ **Provide real-time parking facility service on campus**

  - ☐ **Optimize course schedules considering parking capacity**

  - ☐ **Determining the best oversell rate**

  - ☐ **Provide incentives for parking in less utilized lots or taking public transit, etc**

  - ☐ **Suggest more options for parking of certain durations (2-hr, 4-hr, etc.) or certain weekdays with unique characteristics**
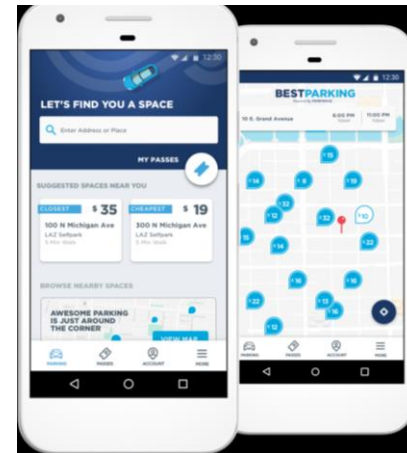
Task 3: Building UF Smart Parking APP and Testbed

- **Improve Parking Map**

1) Real-time usage information
2) Prediction
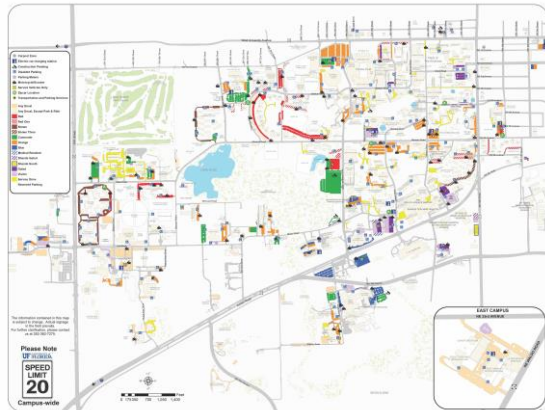
- **A Mobile APP or Website**

1) Provide parking and trip suggestions

- **Testbed (O'Connell lot)**

1) Major events: Sesame Street Live, Career Fair, sporting events
2) Help develop signal timing plans for peak demands
3) Affected roadways: 2nd, University, Gale Lemerand.

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Broader Impacts of this Project

The success of this project will

- **Improve the service level of the parking facilities on the UF campus.**

- **Provides a good testbed to promote cutting-edge research as well as high-tech education.**

  - **Incrementally build up such a smart parking system, involving advanced sensing, communication, information, and data analytics technologies**

- **Students will have the hands-on experience on how new technology will affect and improve the quality of people's daily life.**

- **Help traffic congestion reduction and establish an eco-friendly transportation system in the city of Gainesville.**

Venders in Contacts

- **WGI (involves another two parking technology vendors)**
  - □ **T2: For a single access point to a facility with one (1) entry and one (1) exit**
    - ➤ Option 1: Fixed <u>LPR</u> system with a <u>video</u> camera for each lane ($40,000 for Year 1 and then $5,500 recurring annual charge per camera)
    - ➤ Option 2: Similar to Option 1 only using <u>video counts</u> ($25,000 for Year 1, and the recurring annual charges would be $3,000 per camera)
    - ➤ Option 3: Use surface mounted industrialized flat mats with counting sensors ($11,000 for Year 1 and the recurring annual charges would be $750 for the two lanes).
  - □ **Genetec**
    - ➤ Offer a LPR product called "Free Flow"
    - ➤ $8,000 to $11,000 per lane including infrastructure improvements (curbing, channelization if needed, power, poles for mounting, Wi-Fi).
    - ➤ $6,500 per lane if the infrastructure work is done by the university.
    - ➤ The Genetec hosted software solution is $300/month. Each "lot" is an additional $100
    - ➤ For the O'Connell test location it would be considered two lots and the hosted software would total $500/month, which could be discontinued at any time
  - □ **Temple. Inc**
    - ➤ Offer in-ground sensor for vehicle count; $30.365k – $38.565k for initial cost and ($3000) for recurring annual cost if the vender host the service.

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Stakeholders Involved

- **UF Chief Operating Officer (Charlie Lane)**
- **UF Herbert Wertheim College of Engineering (Dean Cammy Abernathy)**
- **UF Transportation and Parking Service Office (Scott Fox and Ron Fuller)**
- **UF Infrastructure Council (Bernard A Hauser)**
- **UF Faculty Senate (Katherine Vogel Anderson)**
- **UF Director of the Office of Sustainability (Matt Williams)**
- **UF Business Affairs (Craig Hill, Associate VP)**
- **Florida Department of Transportation (Tom Byron)**
- **Assistant City Manager, Gainesville (Dan Hoffman)**
- **RTS director (Jesus Gomez)**
- **University of Florida Health, Shands Hospital (Edward Jimenez)**
- **Others**

Thank you and Discussion

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