IMPROVING OUR CAMPUS PARKING

Catherine, Keying, Jacky, Yaozong, Jubin

November 19th, 2024

INTRODUCTION

There are multiple lots on campus designated for different types of permits (faculty, residential zones, standard commuter, commuter premium, etc...).

Despite the various parking lots on campus, many people find that these lots are congested, causing everyone to take longer to even find an open spot to park their car.

PROBLEM

Our proposal focuses on the problem of **students, faculty, and anyone else that parks on campus** not being able to find open parking spots quickly and efficiently.

Many people who park on campus find that they wander aimlessly through parking lots wasting time and gas looking for a spot to park their cars.

For example, it is incredibly difficult to find parking spots in Lot 40 (South P Lot) which is designated for standard commuter students.

Recently, Stony Brook University started charging for residential parking permits, so the residents who do not pay for permits must park in Lot 40 and take the shuttle bus to their dorms. This adds to the already large number of people required to park in Lot 40, making it harder for everyone to find available parking.

SURVEY RESULTS

OUR SOLUTION

- An application that points students/faculty/anyone who parks their car on campus to available parking spots in each lot

- Cameras through parking lots would be utilized to track the amount of cars in each lot, monitor cars entering and leaving the lot, as well as track which individual spots are open

BENEFITS

Our solution would benefit Stony Brook University students, faculty, as well as others who park on campus such as visitors.

Quickly Locate Parking Spots

A real-time parking system allows students and staff to quickly find available spots on campus, reducing the need to circle parking lots, especially benefiting commuting students.

Save Time

Significantly cuts down on time spent searching for parking, ensuring that students and faculty can arrive on time for classes or work, enhancing daily time management.

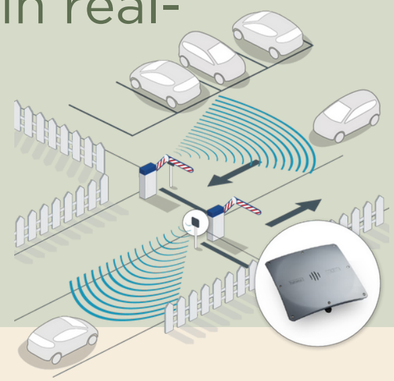
Reducing Parking Stress

The system will effectively divert parking demand, relieve parking pressure in specific parking areas such as Lot 40, and reduce the burden on popular parking spots on campus.

FEASABILITY

Proven Technology

- Similar systems have been implemented successfully at other universities (e.g., East Tennessee State University).
- Software that provides effectiveness in real-time parking management.

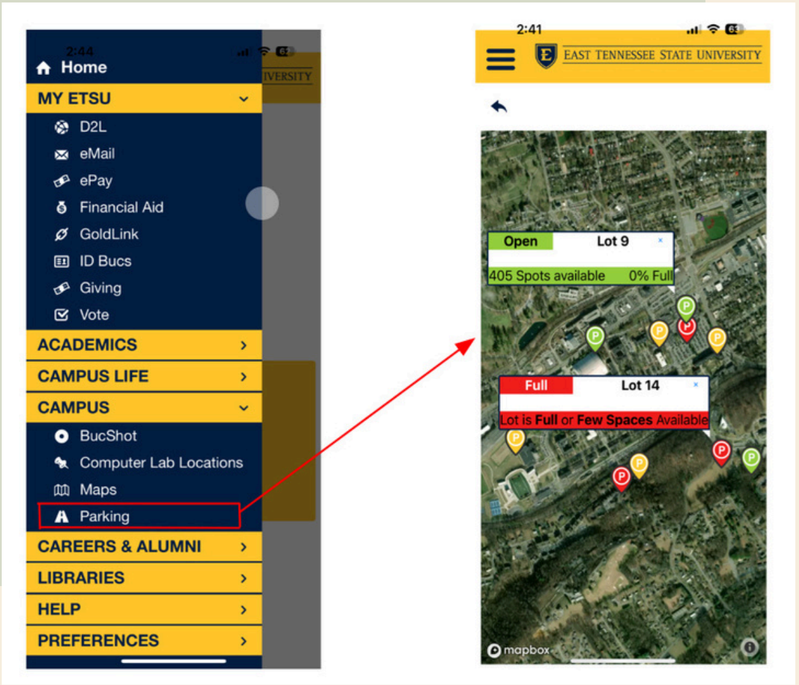


Relatively Quick Installation

- Includes
  - Planning
  - Installation
  - Testing phases

Cost-Effective

- Initial investment: $80,000 - $113,000 depending on system.



POTENTIAL RESULTS

- **Improving Campus Experience:** Provide real-time parking data to help students and staff spend less time searching for parking spaces, thereby making campus life more convenient.

- **Improving Efficiency/Sustainability:** Reducing the time it takes to find a parking space will reduce unnecessary fuel consumption and lower carbon emissions

- **Reducing Congestion in Campus Parking Lots:** Reducing the number of vehicles looking for parking will improve the overall traffic flow on campus

- **Enhanced Appeal to Potential Students/Staff: E**fficient parking solutions, including the application of real-time parking information, demonstrate the school's commitment to innovation and quality of life. This will enhance Stony Brook's appeal to prospective students and faculty

- **Optimize Resource Allocation and Management:** Parking data collected through cameras can be used to analyze peak parking periods, trends, and patterns. This data can help schools optimize parking policies and better manage the allocation of parking areas for different groups such as students, faculty, and staff.

PROPOSED TIMELINE

Planning & Ordering

Installation

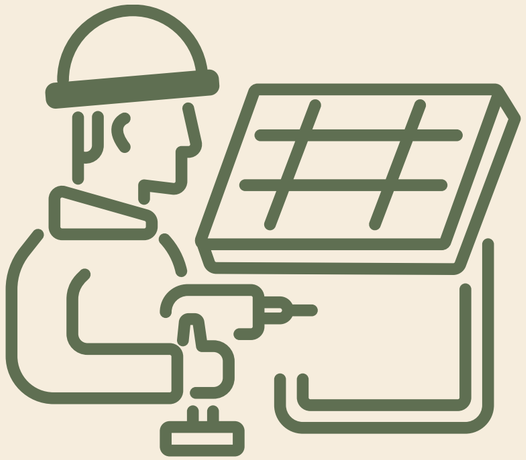
Software Integration & Testing

Final Testing, Adjustments, & Release!

Our timeline is expected to take 3-6 months, and could begin near the end of Spring semester to be ready for the start of Fall semester. Some steps can be completed in parallel for efficiency.

Planning & Ordering (2-6 Weeks)

- Assess all campus parking locations to determine where cameras should be placed and how many
- Plan network connectivity & power access for all cameras, and place orders for necessary equipment
- This stage should have minimal impact on parking access, as no work will be done to the lots in this stage
    - Thus, it should be safe to begin this process during the Spring semester, as there will be minimal impact on parking spaces that would be in use during this time
- Design of the mobile app should also be done at this time to ensure it is ready for testing in later phases



Installation (4-8 Weeks)

- Physical installation of cameras across all selected parking spaces
- Installation will vary based on locations but will have already been planned in the previous phase
- This stage is likely to have an impact on access to affected parking lots, which is why this stage will want to begin in the Summer, when less people will be parking
- Work on software integration can also begin at this time, as cameras begin to be installed & gain network access

Software Integration & Testing (4-6 Weeks)

- This can begin in parallel with installation, as some cameras will be fully installed early in the Installation phase
- Integration of physical cameras with software that processes video feed, data & displays parking in real-time via mobile app
- Begin testing to ensure that the app displays accurate data and the system is reliable in different circumstances (ie different weather conditions)
- Develop processes for staff to address issues that come up with the system

Final Testing, Adjustments, Release! (2-4 Weeks)

- With all cameras installed, fully test the system to ensure that it is able to work under load.
- May require offering incentives to those on campus during the summer to park in camera-monitored spots to ensure load
- Train staff to monitor the data-collection systems and address issues with the plans and processes developed in the testing phase
- By the time this is completed, we should be at or near the beginning of the Fall semester - time to release!

RESOURCES

- For about 3000 parking spots
- Hardware
  - 360 outdoor cameras that are waterproof with night vision
    - Hikvision DS-2CD6984G0-IH(S)(AC)
  - Mounting bracket
  - Poles for camera
- Labor and other costs
  - Installation of camera
  - Creating software and the integration of it
  - Networking and Infrastructure
    - Cabling and networking setup
    - Networking equipment (switches and routers)
    - Data storage solutions
  - Cloud hosting and storage
  - Maintenance

COSTS

- Hardware
  - Cameras: $1500 each (each covers 150-300 parking spots)
  - Mounting bracket: $10-$30 per mount
  - Pole: $100-$300 per pole
- Labor and other costs
  - Installation of camera ($500 - $1000 each)
  - Creating software and the integration of it ($50,000- $100,000)
  - Networking and Infrastructure ($10,000- $20,000) ($8000-$35000)
    - Cabling and network setup ($5,000 - $20,000)
    - Networking Equipment ($2,000-$5,000)
    - Data Storage Solutions ($1,000-$10,000)
  - Cloud hosting and storage ($1,000-$10,000)
  - Ongoing Maintenance and Support (10%-15% of initial investment)
- Assuming 15 cameras, estimated initial investment: $90,650 - $187,450
- Annual Maintenance and support cost: $9065 - $28,118

CONCLUSION

- We’re seeking to address the issue of parking on campus - often times it’s difficult to find an open spot, leading to a long search that wastes gas and time.
- Our solution is the implementation of a camera-based system to monitor parking spots and provide easy access to this data via a mobile app
- This solution will allow for our students, faculty and staff to spend less time worrying about parking and more time on learning and teaching.

QUESTIONS?

WORKS CITED

https://www.hikvision.com/en/products/IP-Products/Network-Cameras/Panoramic-Series/DS-2CD6984G0-IH-S--AC---NFC-/

https://homeguide.com/costs/security-camera-installation-cost

https://www.baytechconsulting.com/blog/cost-to-develop-software-in-2024 https://cloud.google.com/storage/pricing

https://www.fixr.com/costs/hardwired-computer-network