

# SMART CITIES + ACTIVE CITIZENS

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**PROJECT BY**

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### STRAVA ROUTE BUILDER BETA

atlanta, ga

Undo Redo Clear

Save

When are you running?

5:00 p.m.

**TODAY**

- Restrooms
- Water fountains
- Sidewalks only
- Well-lit areas only
- Temperature
- Road closures
- Vehicle speed
- Air quality

**Generate Routes**

0.0 mi Distance   0 ft Elevation Gain   0s Est. Moving Time

The screenshot shows the Strava Route Builder interface. At the top, the search bar contains "atlanta, ga" and there are navigation icons for Undo, Redo, and Clear. A "Save" button is visible. A central panel titled "When are you running?" has a time selector set to "5:00 p.m." and a "TODAY" button. Below this are several filter options with toggle switches: Restrooms, Water fountains, Sidewalks only, Well-lit areas only, Temperature, Road closures, Vehicle speed, and Air quality. A "Generate Routes" button is at the bottom of the filter panel. The map shows a purple route starting from the bottom left and moving north, then east, and then south. The route passes through areas labeled "4th St NE", "Myrtle St NE", and "North Ave NE". There are also icons for restrooms and water fountains on the map. At the bottom, a summary bar shows "0.0 mi Distance", "0 ft Elevation Gain", and "0s Est. Moving Time".

**PROBLEM SPACE**

**BACKGROUND RESEARCH**

**DESIGN**

**PROTOTYPE TESTING**

**DISCUSSION**

**PROBLEM SPACE**

BACKGROUND RESEARCH

DESIGN

PROTOTYPE TESTING

DISCUSSION

# **SMART CITIES** **(many)**

**DATA**

**INFORMATION**

**TECHNOLOGY**

**EFFICIENCY**

**ARCHITECTURE**

**CITY PLANNING**

**GOVERNMENT**

**CITIZENS**

**NETWORKS**

**SERVICES**

**ECONOMY**

**ENERGY**

**RESILIENCY**

**EDUCATION**

**HEALTH**

**SAFETY**

**COMMUNICATION**

**PROBLEMS**

**INFRASTRUCTURE**

**ENVIRONMENT**

**RESIDENTS**

**TRANSPORTATION**

# SMART CITIES (1&2)

DATA

**INFORMATION**

**TECHNOLOGY**

EFFICIENCY

ARCHITECTURE

CITY PLANNING

GOVERNMENT

CITIZENS

NETWORKS

SERVICES

ECONOMY

ENERGY

RESILIENCY

EDUCATION

HEALTH

SAFETY

COMMUNICATION

PROBLEMS

INFRASTRUCTURE

ENVIRONMENT

RESIDENTS

TRANSPORTATION

# SMART CITIES (1)

DATA

**INFORMATION**

**TECHNOLOGY**

EFFICIENCY

ARCHITECTURE

CITY PLANNING

GOVERNMENT

CITIZENS

NETWORKS

**SERVICES**

**ECONOMY**

ENERGY

RESILIENCY

EDUCATION

HEALTH

SAFETY

COMMUNICATION

PROBLEMS

INFRASTRUCTURE

ENVIRONMENT

RESIDENTS

TRANSPORTATION

# SMART CITIES (1)

“(Cities) can improve their current **SERVICE DELIVERY** capabilities (as well as lay the foundation for new and expanded services) by making their core systems – transport, public safety, government services, education and health – “smarter.” This can be achieved through the application of advanced **INFORMATION TECHNOLOGY**, analytics and systems thinking to improve how a city works and how it stimulates a thriving, knowledge-driven **ECONOMY.**”

- IBM Executive Report



# SMART CITIES (2)

DATA

**INFORMATION**

**TECHNOLOGY**

EFFICIENCY

ARCHITECTURE

CITY PLANNING

GOVERNMENT

CITIZENS

NETWORKS

SERVICES

ECONOMY

ENERGY

RESILIENCY

EDUCATION

HEALTH

SAFETY

COMMUNICATION

**PROBLEMS**

**INFRASTRUCTURE**

ENVIRONMENT

RESIDENTS

TRANSPORTATION

## SMART CITIES (2)

“I...define smart cities as places where  
**INFORMATION TECHNOLOGY**  
is combined with **INFRASTRUCTURE**,  
architecture, everyday objects, and even our  
bodies to address social, economic, and  
environmental **PROBLEMS.**”

- Anthony Townsend,

*Author of Smart Cities: Big Data, Civic Hackers, and  
the Quest for a New Utopia*

## SMART CITIES (ATLANTA)

“In utilizing a **DATA-CENTRIC** model, we are able to use descriptive, prescriptive, and predictive capabilities to radically improve city **OPERATIONAL** efficiency, service delivery, and transparency.”

- <http://smartatl.atlantaga.gov/>

# North Avenue – A smart corridor demonstration

## Goal Summary



Establish first-ever high-speed public WIFI on a City of Atlanta corridor



Deploy over 100 connected devices/sensors on North Ave to baseline **mobility, public safety, and sustainability** KPIs



Demonstrate autonomous vehicle capability and interaction with city infrastructure (V2I)



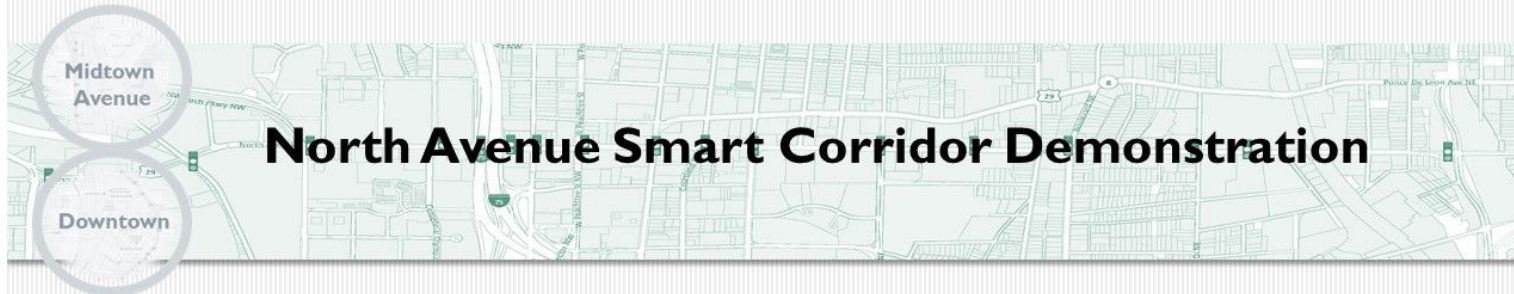
Establish comprehensive and scalable smart city data platform



Demonstrate use-cases across description, prescriptive, and predictive using advanced analytics and data visualization technologies



Establish a one-of-a-kind smart city deployment support model with Georgia Tech





## SENSOR V0

TEMPERATURE

HUMIDITY

HUE

BRIGHTNESS

CARBON MONOXIDE

## SENSOR V1

INFRARED

ULTRASONIC

MICROPHONE

VIDEO CAMERA

GPS

**WHAT DOES IT MEAN TO BE  
A RESIDENT IN A SMART  
CITY?**

**WHAT DOES IT MEAN TO BE  
A RESIDENT IN A SMART  
ATLANTA?**

**WHAT DOES IT MEAN TO BE  
A **RUNNER** IN A SMART  
**ATLANTA**?**





# WHY RUNNERS?

They are **ACTIVE & HEALTHY** // **LIVEABILITY**

They move through the city as a **PEDESTRIAN** // **TRANSPORTATION**

Many runners already use **DATA** // **INFORMATION TECHNOLOGY**

PROBLEM SPACE

**BACKGROUND RESEARCH**

DESIGN

PROTOTYPE TESTING

DISCUSSION

# **OBSERVATIONS AT THE BELTLINE**



**CONSTRUCTION**



**SURFACES**



**GROUPS  
WATER**

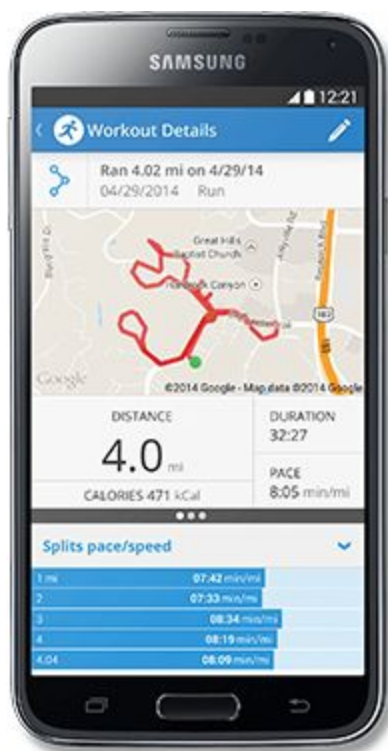
# EXISTING (DIGITAL) TOOLS

**Personal data collection**

**Route planning**









**Record**

SEGMENTS   STATS   SPLITS   MAP

GPS

00:00:00  
ELAPSED TIME

0.0 mi      0:00 /mi  
DISTANCE      SPLIT PACE

Upgrade To Premium

Navigation icons: Home, Profile, etc.

Following    Me

DECEMBER 2013    6

6

Morning Run  
Dec 22, 2013   5.7 mi   8:01 /mi  
7

Morning Run  
Dec 21, 2013   0.7 mi   6:48 /mi  
1

Morning Run  
Dec 21, 2013   0 mi   6:23 /mi

OCTOBER 2013

Morning Run  
Oct 30, 2013   9.3 mi   8:12 /mi  
2   1

Navigation icons: Home, Profile, etc.

# ROUTE GENIUS

9.8 KM

Get It.

Start from:

Georgia Tech

Length (approx):

10

km

Hide Options



Heading: Random

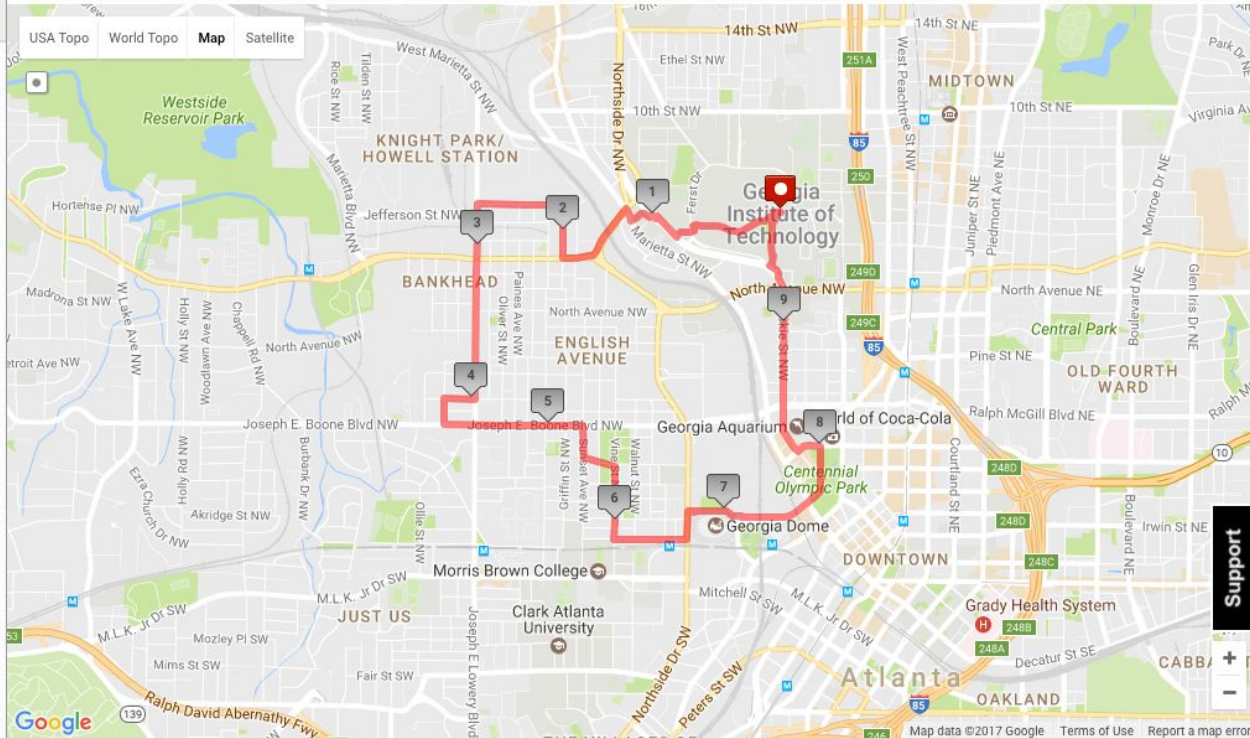
Rotation: Random

Avoid highways:

Avoid ferries:

RECOMMEND A NEW ROUTE

Sponsored by Naked Juice



# Segment Explore

Atlanta, Georgia



Cycling

Running

All

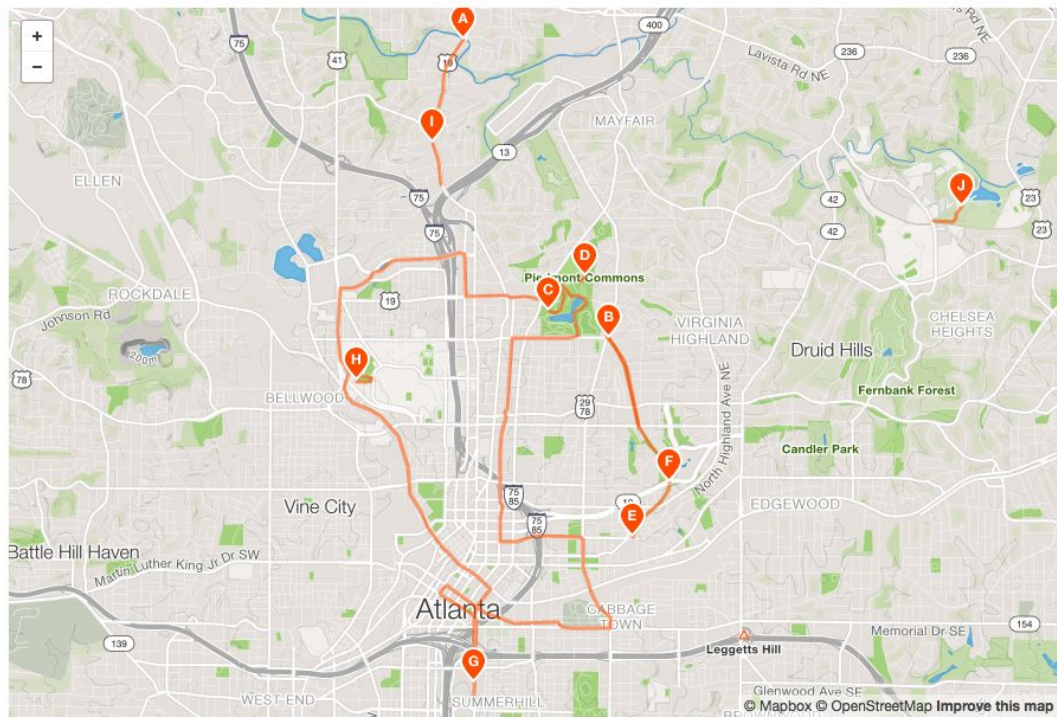
Flat

Hilly

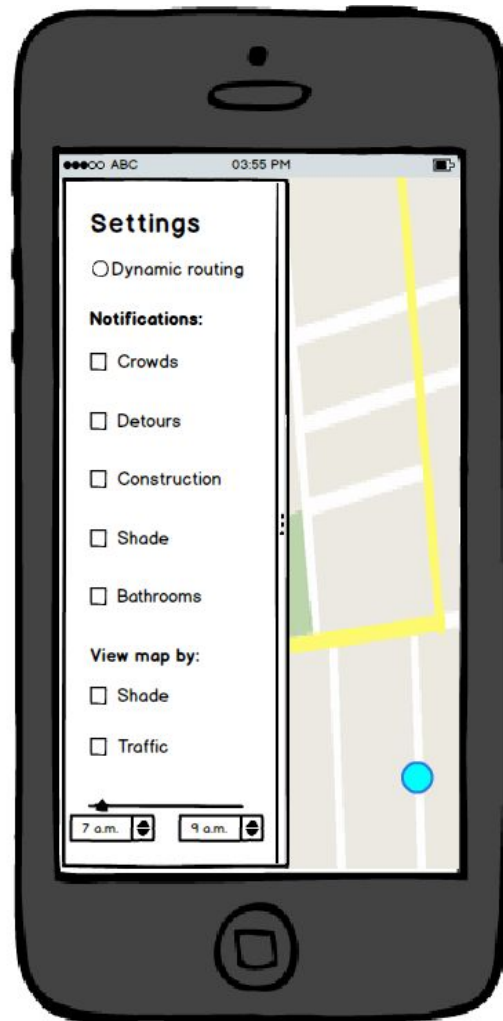
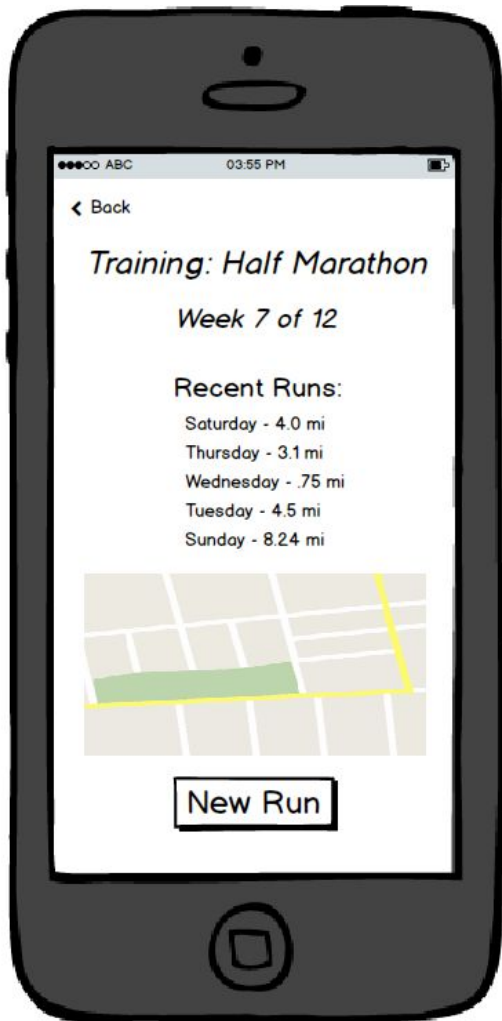
Steep

## Segments

- A Heartbreak Hill**  
0.7 mi 3.6%
- B Beltline first leg**  
0.7 mi 0.5%
- C Piedmont Oval R**  
0.5 mi -0.0%
- D Dog Park Hill**  
0.0 mi 6.5%
- E South Eastside Trail**  
0.5 mi -1.0%
- F Park to Park Northbound Da...**  
1.3 mi -1.1%
- G Atlanta Half Marathon**  
13.1 mi -0.0%
- H SAC Fields Track**  
0.3 mi 0.0%
- I Buford Spring Connector Cl...**  
0.3 mi 7.6%
- J Lullwater Exit climb**  
0.3 mi 7.1%

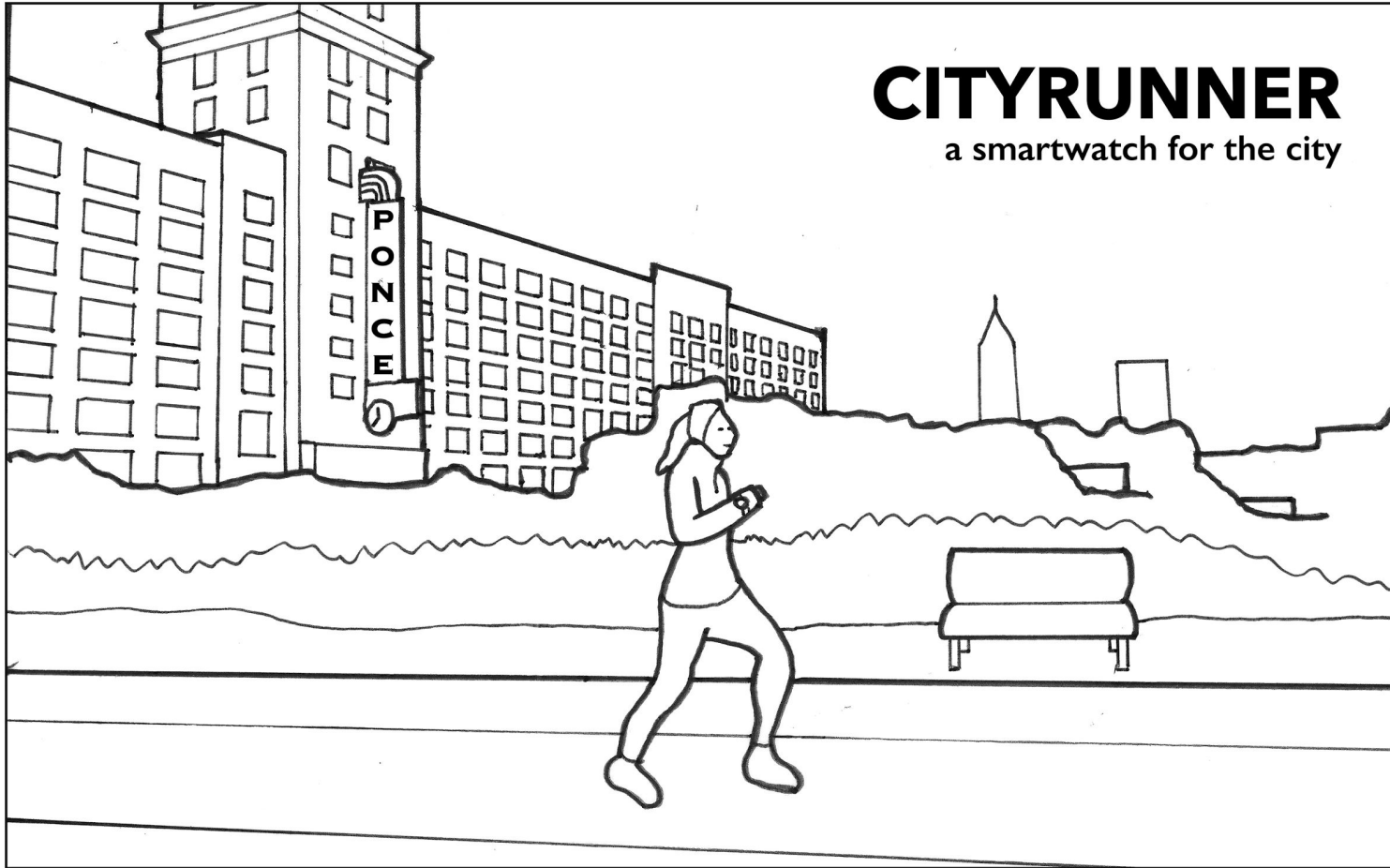


**INITIAL DESIGN WORK**

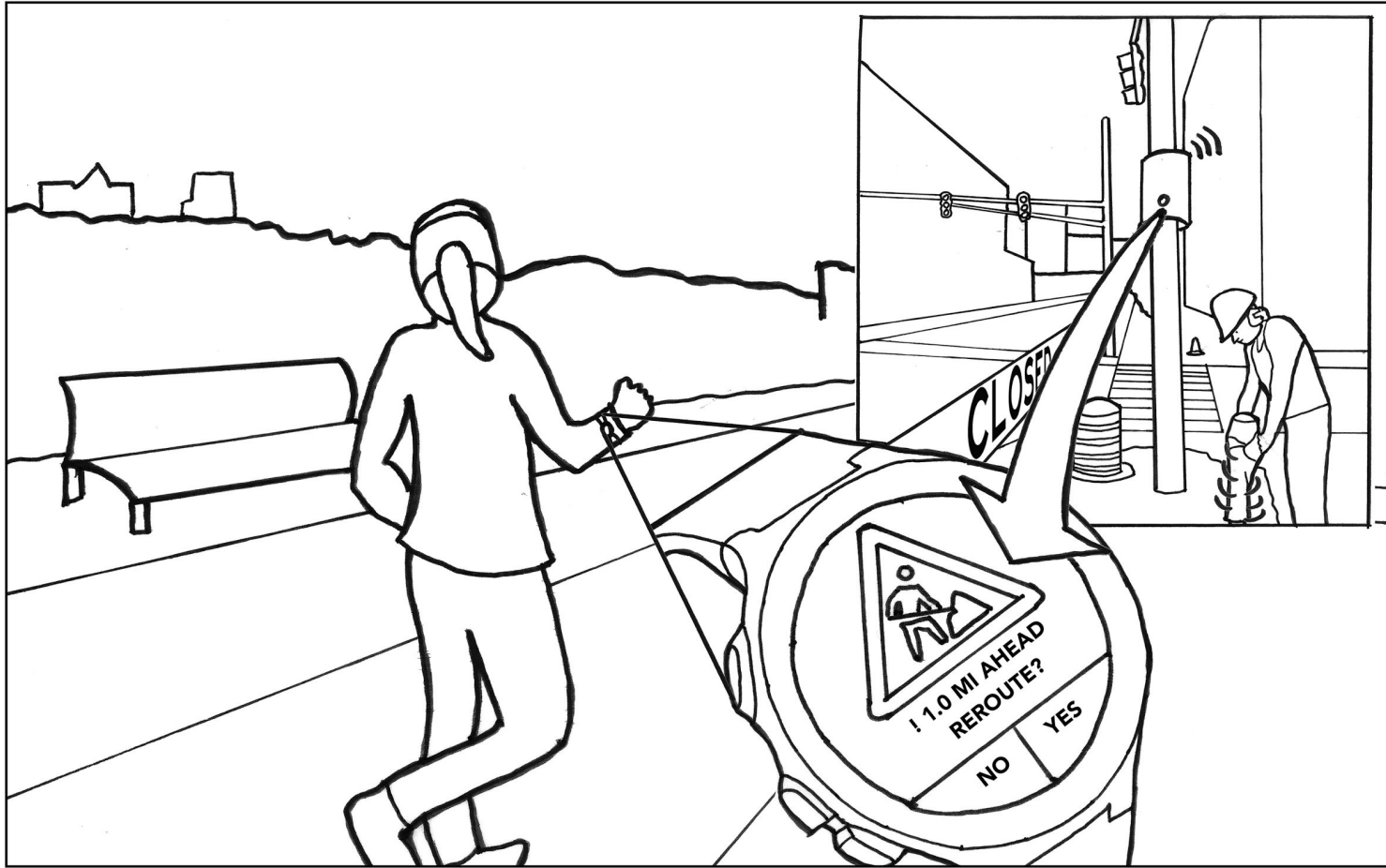


# CITYRUNNER

a smartwatch for the city







# INTERVIEWS

# QUICK FACTS

Pilot interviews with GT students, professors

17 runners training with Atlanta Track Club

Wednesday training at ATC's headquarters

Saturday trainings at Candler & Piedmont Park

20-30 minute qualitative semi-structured interviews

1:1, in pairs, in groups of 3



# KEY QUESTIONS

**EXPERIENCE IN ATLANTA** How long have you lived in Atlanta? Where?

**EXPERIENCE RUNNING** Do you own any wearables? Track data with wearable or phone? How long have you been running? Races? Weekly mileage? How do you plan your runs?

**EXPERIENCE RUNNING IN ATLANTA** Think about where you run. What do you want to know about the area? Are there intersections that you cross? Tell me about them.

# RESULTS

**17** own smartphones

**15** own wearables

**15** track data generated from watch or phone

**12** use GPS watch when running (11 Garmin, 1 fitbit)

**11** run w/ phone (for safety, music, running app, just to have)

**6** use mapping tools for run planning, at least occasionally

**6** expressed they don't want to be "bothered" by tech during their run

# 4 KINDS OF RUNNERS

	# INTWWD	WEEKLY MILEAGE	TRAINING PRIORITY	RUNS W/ PHONE	RUNS W/ GARMIN	WHO WITH?
<b>BEGINNER</b>	2	<15	General fitness	Yes	No	Group
<b>CASUAL</b>	8	15-25	General fitness	Yes	Maybe	Partner
<b>COMPETITIVE</b>	4	20-60	Faster time	No	Yes	Solo
<b>ELITE</b>	2	60+	Faster time	No	Maybe	Solo

# NOTABLE STATEMENTS

“The **LESS DECISIONS** I have to make the better when I’m running”

“Tech can help you to a certain point. Runners just want **TO TAKE EVERYTHING OFF** and have a good time.”

“Notifications for a **CROSSWALK** coming up, or **SIDEWALK ENDS** in 1000 feet.”



# RUNNERS CARE ABOUT...

Safety (general) - 12

Safety (at intersections) - 12

Traffic - 12

Sidewalks - 12

Crowds\* - 9

Construction\* - 9

Stopping at intersections - 8

Temperature\* - 7

Air quality\* - 6

Surfaces - 5

Shade\* - 4

Events\* - 4

Bathrooms and/or water - 3

Crime stats - 3

# **RUNNERS CARE ABOUT...**

Safety

Route obstructions

Comfort

PROBLEM SPACE

BACKGROUND RESEARCH

**DESIGN**

PROTOTYPE TESTING

RESULTS

DISCUSSION

CONCLUSION

# DESIGN REQUIREMENTS

1. Should not be dependent on runners using **WATCH OR PHONE** during run.
2. Should require **MINIMAL INTERACTION** w/ tech during run.
3. Should enable runners to **MAKE DECISIONS** to improve personal safety.
4. Should enable runners to **PICK ROUTES** with minimal obstructions.
5. Should enable runners to **PLAN** for comfort.

**DESIGN DECISION**

**ROUTE PLANNING TOOL  
+ CITY DATA**

atlanta, ga



Undo



Redo



Clear



Use Popularity



Min Elevation



Manual Mode

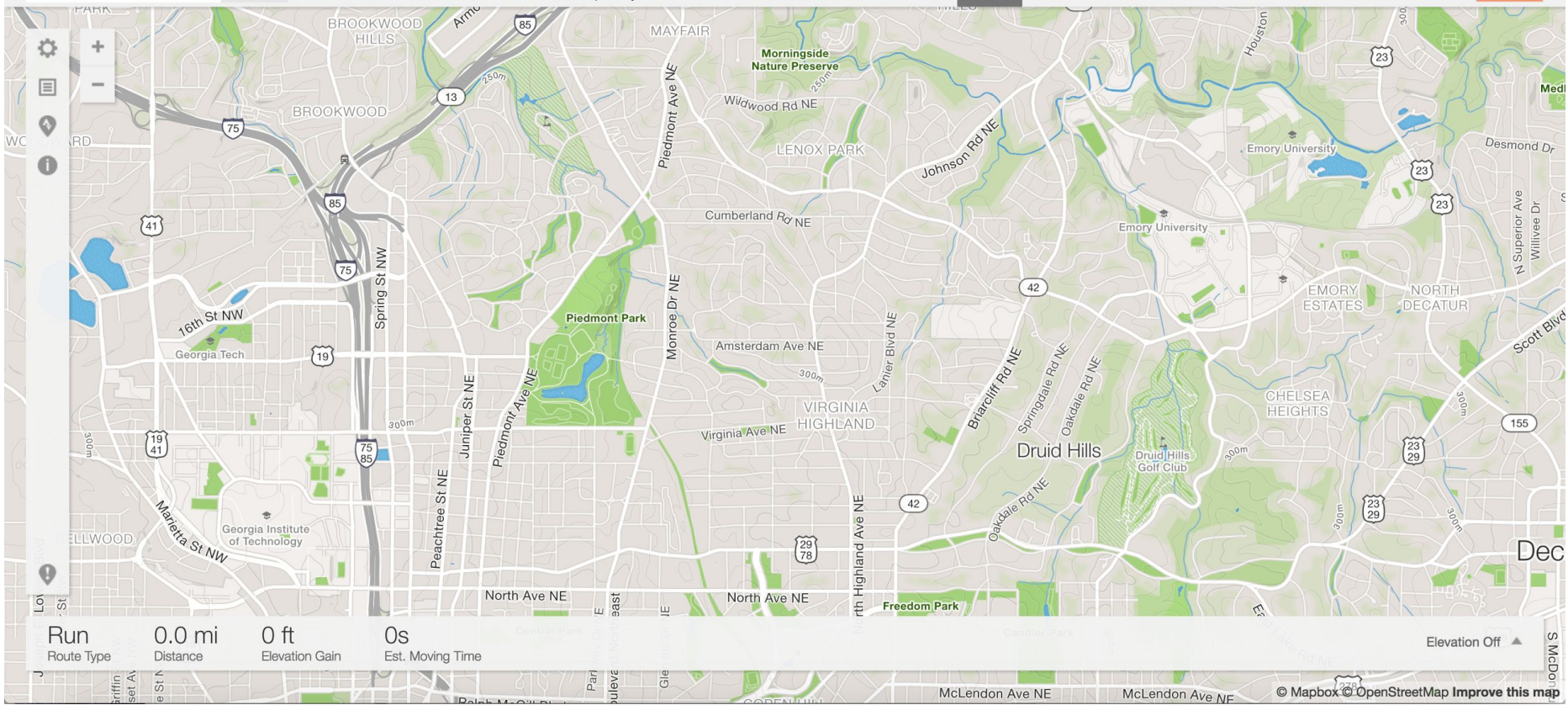


Ride



Run

Save



Run

0.0 mi

0 ft

0s

Route Type

Distance

Elevation Gain

Est. Moving Time

Elevation Off ▲

# BUILDING ON TOP OF STRAVA

1. Cleanest interface in terms of **MINIMAL DETAIL**
2. Runners are more **UNFAMILIAR** with it so they are less likely to be constrained by their reality
3. Strava is working on providing governments with data generated by its users for city planning, so it fits within the **"SMART CITY"** space

atlanta, georgia



Exit Builder

Save

COMPLETE ROUTE

CITY VIEW OPTIONS

PUBLIC RESTROOMS

WATER FOUNTAINS

SIDEWALKS ONLY

WELL-LIT AREAS ONLY

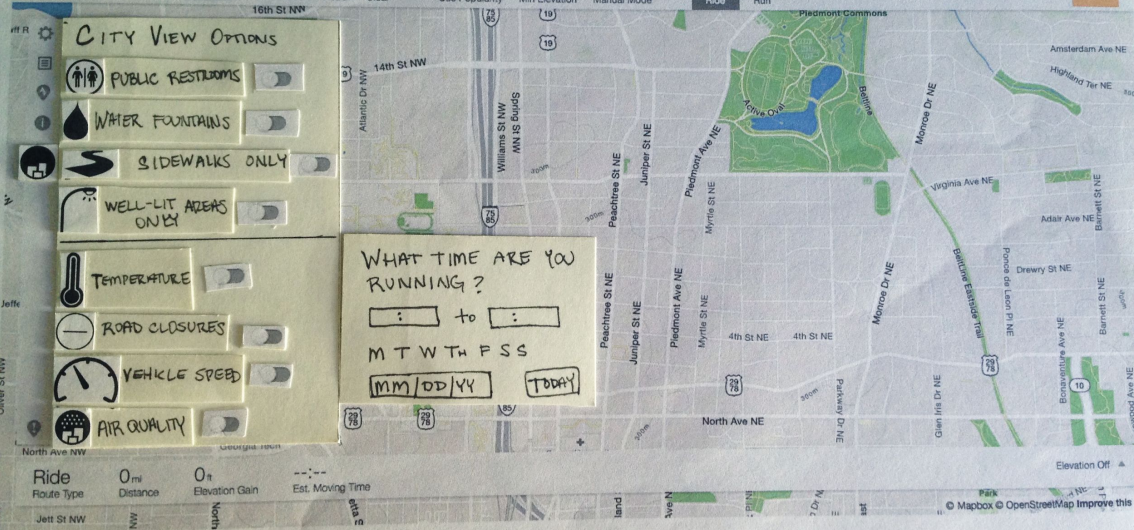
TEMPERATURE

ROAD CLOSURES

VEHICLE SPEED

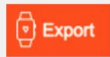
AIR QUALITY

WHAT TIME ARE YOU RUNNING?  
: to :  
MTWTFSS  
MM/DD/YY TODAY





atlanta, ga



When are you running?



5:00 p.m.

TODAY



Restrooms



Water fountains



Sidewalks only



Well-lit areas only



Temperature



Road closures



Vehicle speed



Air quality



Generate Routes

Export notifications:

Make the crosswalk

Updated data

Directions if off route

GO

0.0 mi

Distance

0 ft

Elevation Gain

0s

Est. Moving Time

Elevation Off

atlanta, ga

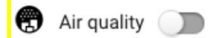
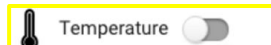
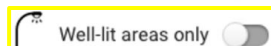
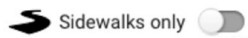
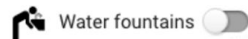


When are you running?



5:00 p.m.

TODAY



Generate Routes

Temperature

Humidity

Hue

Brightness

Infrared

Ultrasonic

Microphone

Video Camera

GPS

Export notifications:

Make the crosswalk

Updated data

Directions if off route

GO

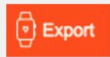
0.0 mi  
Distance

0 ft  
Elevation Gain

0s  
Est. Moving Time

Elevation Off

atlanta, ga



When are you running?



5:00 p.m.

TODAY



Restrooms



Water fountains



Sidewalks only



Well-lit areas only



Temperature



Road closures



Vehicle speed



Air quality



Generate Routes

0.0 mi

Distance

0 ft

Elevation Gain

0s

Est. Moving Time

Elevation Off

Export notifications:

Make the crosswalk

Updated data

Directions if off route

GO

atlanta, ga



Undo

Redo

Clear

Export

When are you running?



5:00 p.m.

TODAY



Restrooms



Water fountains



Sidewalks only



Well-lit areas only



Temperature



Road closures



Vehicle speed



Air quality



Generate Routes

0.0 mi

Distance

0 ft

Elevation Gain

0s

Est. Moving Time

Export notifications:

Make the crosswalk



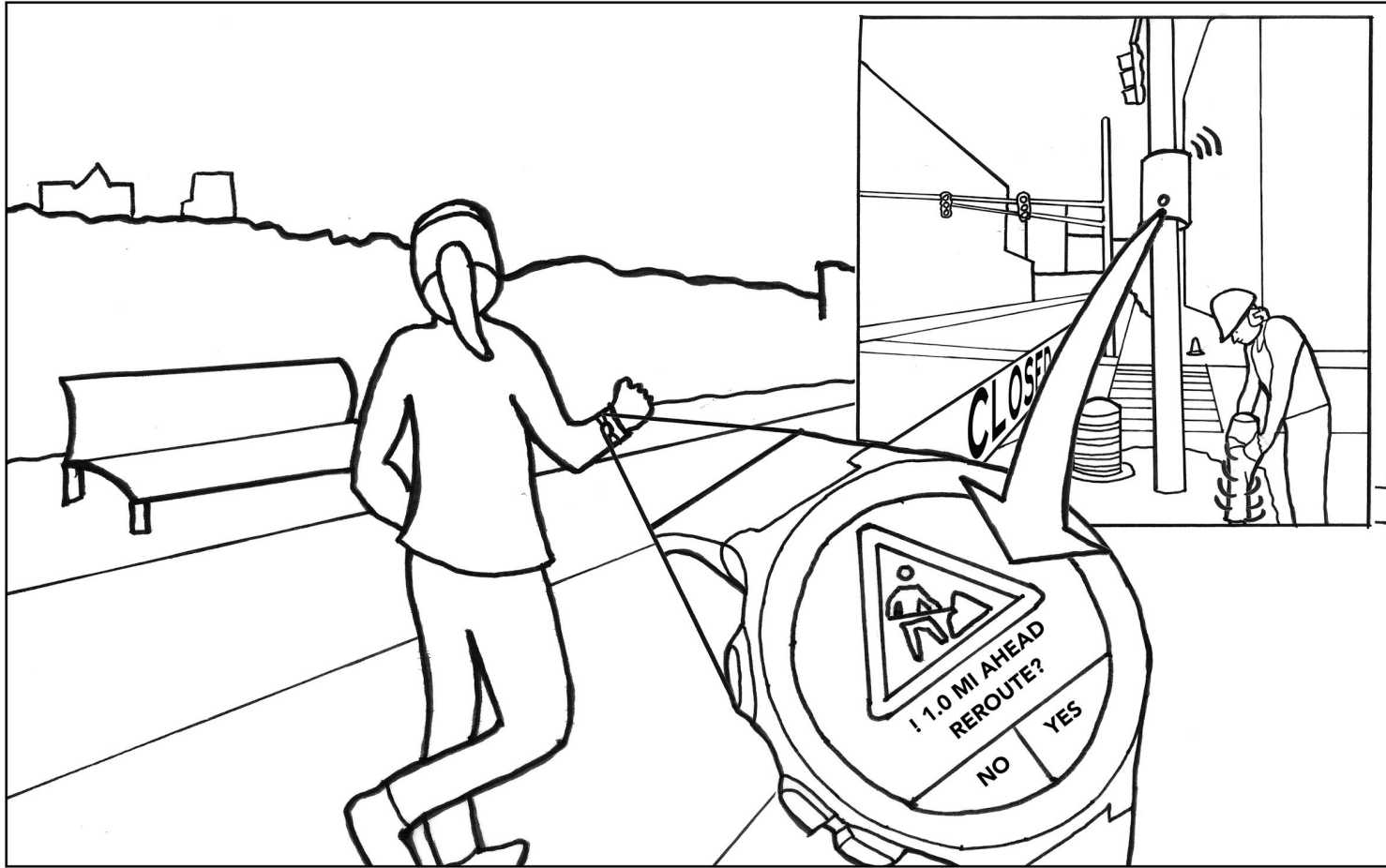
Updated data



Directions if off route



GO



atlanta, ga



When are you running?



5:00 p.m.

TODAY



Restrooms



Water fountains



Sidewalks only

Well-lit areas only



Temperature



Road closures

Vehicle speed



Air quality



Generate Routes

0.0 mi

Distance

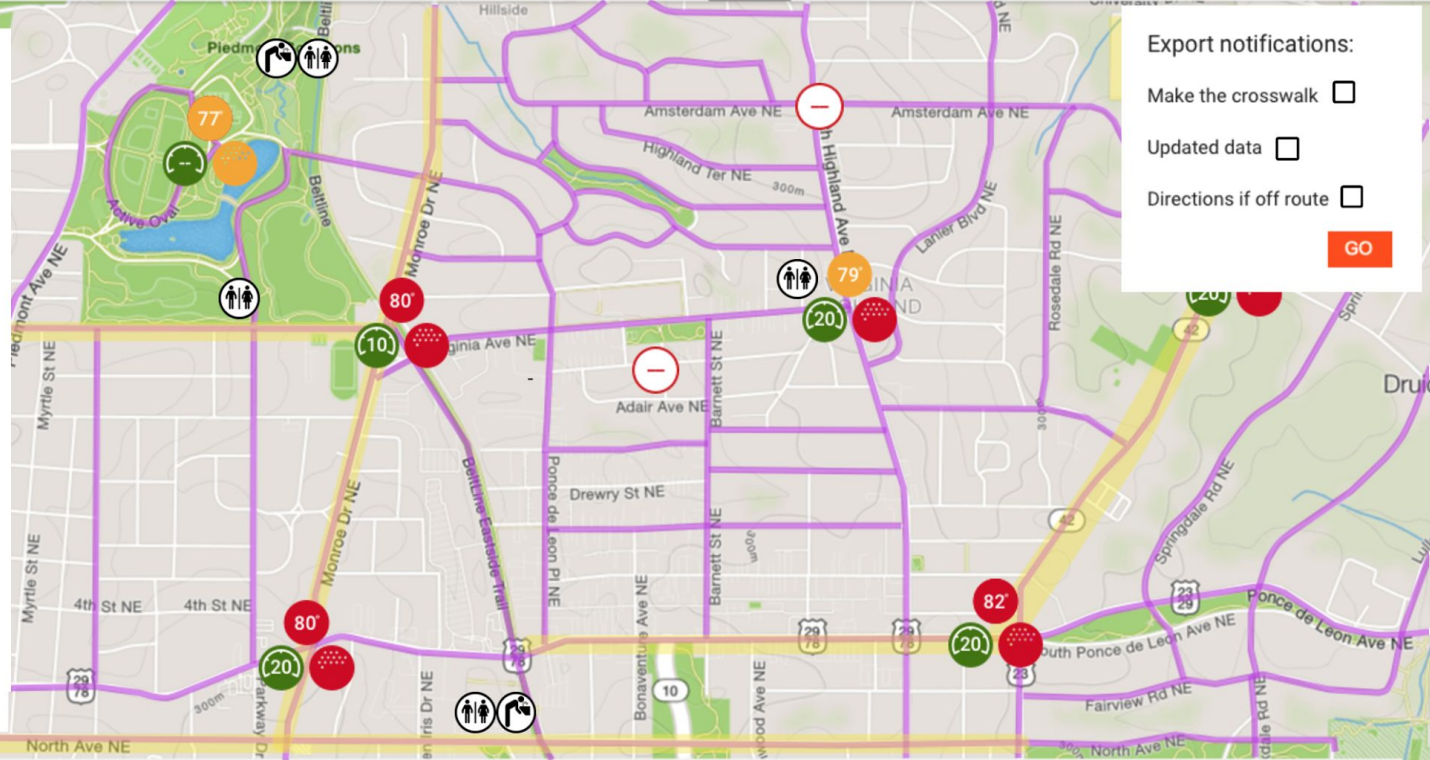
0 ft

Elevation Gain

0s

Est. Moving Time

Elevation Off



Export notifications:

Make the crosswalk

Updated data

Directions if off route

GO

atlanta, ga



When are you running?



6:00 p.m.

TODAY

Restrooms

Water fountains

Sidewalks only

Well-lit areas only

Temperature

Road closures

Vehicle speed

Air quality

Generate Routes

0.0 mi

Distance

0 ft

Elevation Gain

0s

Est. Moving Time

Elevation Off

Export notifications:

Make the crosswalk

Updated data

Directions if off route

GO

atlanta, ga



When are you running?

7:00 p.m.

TODAY

Restrooms

Water fountains

Sidewalks only

Well-lit areas only

Temperature

Road closures

Vehicle speed

Air quality

Generate Routes

0.0 mi

Distance

0 ft

Elevation Gain

0s

Est. Moving Time

Elevation Off

Export notifications:

Make the crosswalk

Updated data

Directions if off route

GO



atlanta, ga



When are you running?

8:00 p.m.

TODAY

Restrooms

Water fountains

Sidewalks only

Well-lit areas only

Temperature

Road closures

Vehicle speed

Air quality

Generate Routes

0.0 mi

Distance

0 ft

Elevation Gain

0s

Est. Moving Time

Elevation Off

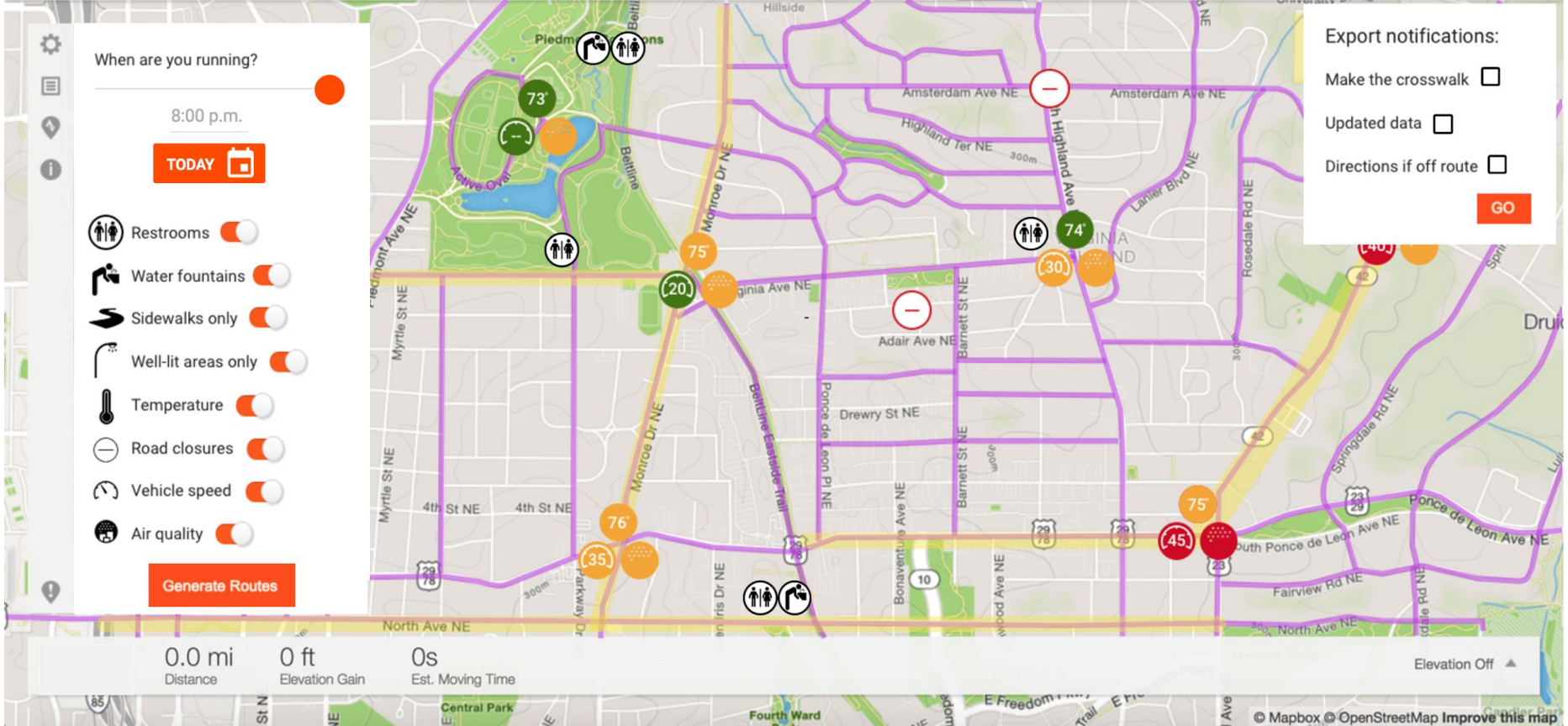
Export notifications:

Make the crosswalk

Updated data

Directions if off route

GO



atlanta, ga



When are you running?

8:00 p.m.

TODAY



Restrooms

Water fountains

Sidewalks only

Well-lit areas only

Temperature

Road closures

Vehicle speed

Air quality

Generate Routes

Export notifications:

Make the crosswalk

Updated data

Directions if off route

GO

0.0 mi  
Distance

0 ft  
Elevation Gain

0s  
Est. Moving Time

Elevation Off ▲

atlanta, ga



When are you running?

8:00 p.m.

TODAY



Restrooms



Water fountains



Sidewalks only



Well-lit areas only



Temperature



Road closures



Vehicle speed



Air quality



Generate Routes

Distance: 3 mi

GO

0.0 mi

Distance

0 ft

Elevation Gain

0s

Est. Moving Time

Elevation Off

Export notifications:

Make the crosswalk

Updated data

Directions if off route

GO

atlanta, ga



Undo Redo Clear

Export

When are you running?

8:00 p.m.

TODAY

- Restrooms
- Water fountains
- Sidewalks only
- Well-lit areas only
- Temperature
- Road closures
- Vehicle speed
- Air quality

Generate Routes

Route 1

Route 2

Run 3.3 mi 199 ft 34:00  
Route Type Distance Elevation Gain Est. Moving Time

Elevation Off

Export notifications:

- Make the crosswalk
- Updated data
- Directions if off route

GO

atlanta, ga



Undo Redo Clear

Export

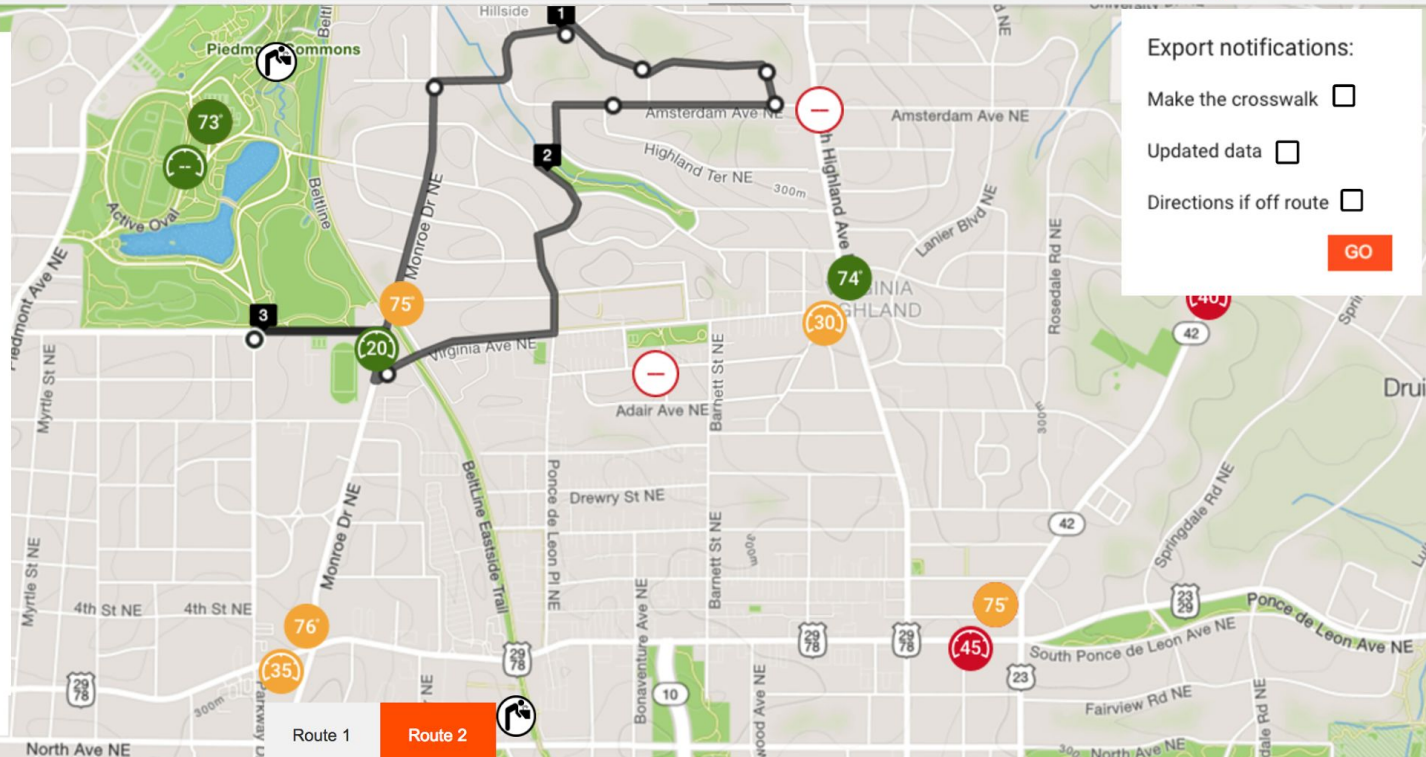
When are you running?

8:00 p.m.

TODAY

- Restrooms
- Water fountains
- Sidewalks only
- Well-lit areas only
- Temperature
- Road closures
- Vehicle speed
- Air quality

Generate Routes



Export notifications:

- Make the crosswalk
- Updated data
- Directions if off route

GO

Run 3.0 mi 215 ft 30:19  
 Route Type Distance Elevation Gain Est. Moving Time

Elevation Off

PROBLEM SPACE

BACKGROUND RESEARCH

DESIGN

**PROTOTYPE TESTING**

DISCUSSION

# TESTING SETUP

5 USERS, 1:1

(1 user did not use mapping tools)

Given TASKS to complete w/ prototype

Follow-up questions for clarification

After Saturday training run

# RESULTS: CURIOSITY

“WHAT IS ‘well-lit’ areas? Street lamps? Sometimes they are out.”

“What would this (routes generated) be BASED ON? Other numbers built into the route?”

“WHAT IS the Virginia Highlands bathroom? Is red bad air quality?”



# RESULTS: PRIORITIZATION OF DATA POINTS

Sidewalks (5)

Restrooms (4)

Water fountains (2)

Well-lit areas (2)

Vehicle speed (1)

# RESULTS: MISSING POINTS

Elevation (2)

# of major roads to cross (2)

Sidewalk changing side of road (2)

Safety, beyond well-lit areas (1)

# RESULTS: GENERATE vs MAKE MY OWN

3 explicitly preferred for ROUTES TO BE GENERATED for them, rather than planning them out

- To be more precise about mileage
- Random exploration
- Ease of use

# RESULTS: PHRASING

Make the crosswalk (2)

Updated data (1)

Directions if off route (4)

Export notifications:

Make the crosswalk

Updated data

Directions if off route

GO

# RESULTS: MISSING DESIGN!

Only one participant noticed a critical feature missing:

“You would have to tell it your temperature preference and pass at least one restroom...your thresholds.”

The screenshot shows a mobile application interface for route generation. On the left is a vertical sidebar with icons for settings, a list, a location pin, and information. The main content area is titled "When are you running?" and features a red circular marker on a horizontal timeline, with "5:00 p.m." displayed below it. An orange button labeled "TODAY" with a calendar icon is positioned below the time. Below this is a list of filter options, each with an icon and a toggle switch:

- Restrooms (restroom icon)
- Water fountains (water fountain icon)
- Sidewalks only (sidewalk icon)
- Well-lit areas only (light icon)
- Temperature (thermometer icon)
- Road closures (minus sign icon)
- Vehicle speed (speedometer icon)
- Air quality (air quality icon)

At the bottom right, there is an orange button labeled "Generate Routes". A location pin icon is visible at the bottom left of the main content area.

PROBLEM SPACE

BACKGROUND RESEARCH

DESIGN

PROTOTYPE TESTING

**DISCUSSION**

# DESIGN MODIFICATIONS

Order and placement of toggles based on user priority

Additional information

Design for user input of preferences/thresholds

Rephrasing of notifications

**WHAT SHOULD THE CITY  
TAKE FROM THIS?**

**OPEN + CONNECTED DATA  
>  
SENSOR NETWORKS**



**DO RUNNERS CARE?**

**PEDESTRIAN-FRIENDLY  
CITY...**

**ROUTE PLANNING FOR  
CITY CHALLENGES**

"I...define smart cities as places where **INFORMATION TECHNOLOGY** is combined with **INFRASTRUCTURE**, architecture, everyday objects, and even our bodies to address social, economic, and environmental **PROBLEMS**."

- Anthony Townsend,

*Author of Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia*