NEARC

Simulating Pedestrian Traffic

A Lot of Assumptions and a Little Python

Harvard University Planning Office

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Common Space Project Goals

- Program space to build community and increase opportunity for interaction for all affiliates

- Integrate common social spaces into daily campus life.

- Develop major campus focal points by strategically enhancing and repurposing underutilized spaces.

49% of surveyed students identify pathways and associated spaces as a place that facilitates interaction with others

Areas of inquiry

- How is space used?

- What are the connections?

- What areas need improvement?

- What are strategic locations for facilities?

Where do people go?
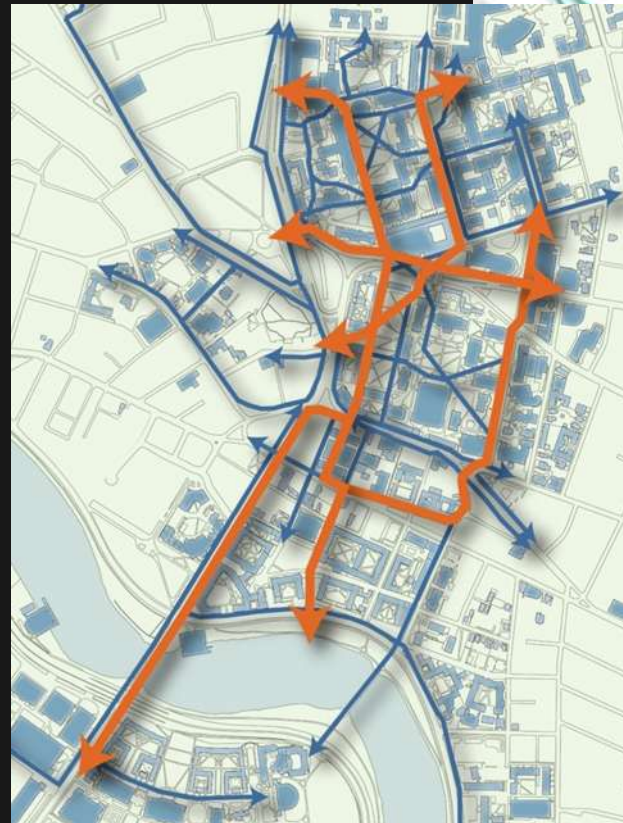
Measuring & Analyzing Pedestrian Traffic

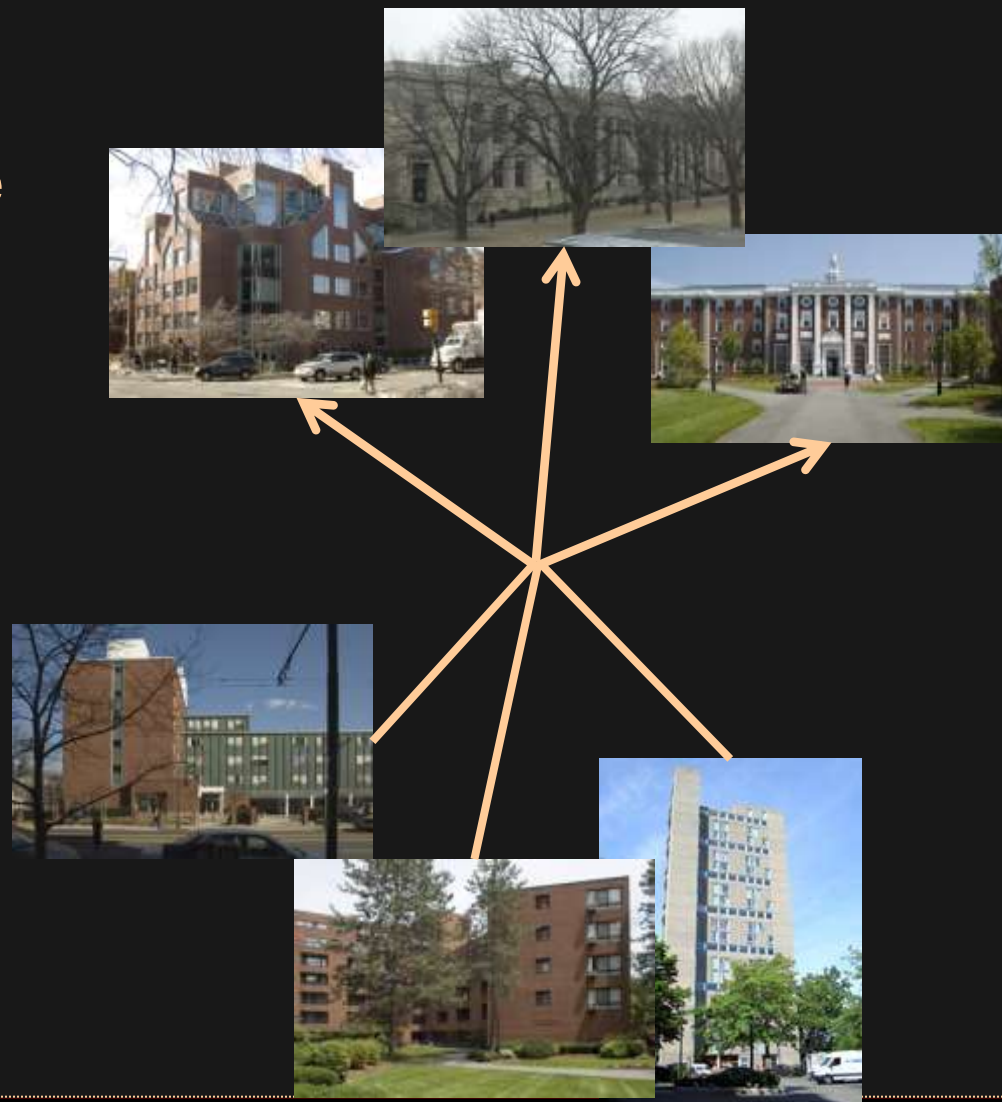- Tools similar to vehicular traffic analysis

    Traffic counts

    Surveys

    Proximity and walk-time

- Analysis can sometimes be subjective

- Examine the routes traveled by graduate students from their place of residence to their academic departments

Data prep

- Pedestrian network

    Sidewalks, crosswalks, pathways

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- Origin/Destination points (106)

  w/ student or "trip" counts

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- Find the route for 1 pair

Model Development

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- Origin/Destination pairs (106)

  w/ student counts

- Find the route for 1 pair

- Repeat 106 times

- Assign "traffic" count for each segment

A little Python

```python
# -----------------------------------------------------------
# CountTrips.py
# Created on: Thu Dec 11 2010 10:17:47 AM
#   (generated by ArcGIS/ModelBuilder)
# Usage: CountTrips
# -----------------------------------------------------------

# Import system modules
import sys, string, os, arcgisscripting

# Create the Geoprocessor object
gp = arcgisscripting.create(9.3)
gp.overwriteoutput = 1

# Check out any necessary licenses
gp.CheckOutExtension("Network")

# Load required toolboxes...
gp.AddToolbox("C:/Program
Files/ArcGIS/ArcToolbox/Toolboxes/Network Analyst Tools.tbx")
```

A little Python

```python
# LOOP
rows = gp.SearchCursor(ODList)

row = rows.next()while row:
# get field values for origin, destination, and # of trips
origin = row.ROOT
destination = row.ROOT_Dest
num_trips = row.CountOfHUI

qry = "[Root] = '" + origin + "' or [Root] = '" +
destination  + "'"
```

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A little Python

```python
# Process: Make Route Layer...
  gp.MakeRouteLayer_na(Ped_network_ND_nd, "Route",...)

# Process: Select...
  gp.Select_analysis(Hu_bldgs_Root, Stops_shp, qry)

# Process: Add Locations...
  result = gp.AddLocations_na(Route, "Stops", Stops_shp, ...)

  try:
      # Process: Solve...
      result = gp.Solve_na(Route__2_, "SKIP")
  except:
      gp.addmessage("Route solution failure")
      error_count = error_count + 1
```

A little Python

```python
else:
# Process: Select Data...
gp.SelectData_management(Route__3_, "Routes")

gp.SelectLayerByLocation_management(Ped_only_network,
"CONTAINED_BY", Routes, "", "NEW_SELECTION")

# Process: Calculate Field...
gp.CalculateField_management(Ped_only_network, "Num_trips",
"[Num_trips] + " + str(num_trips), "VB", "")

#end except
count = count + 1
row = rows.next()
```

Results

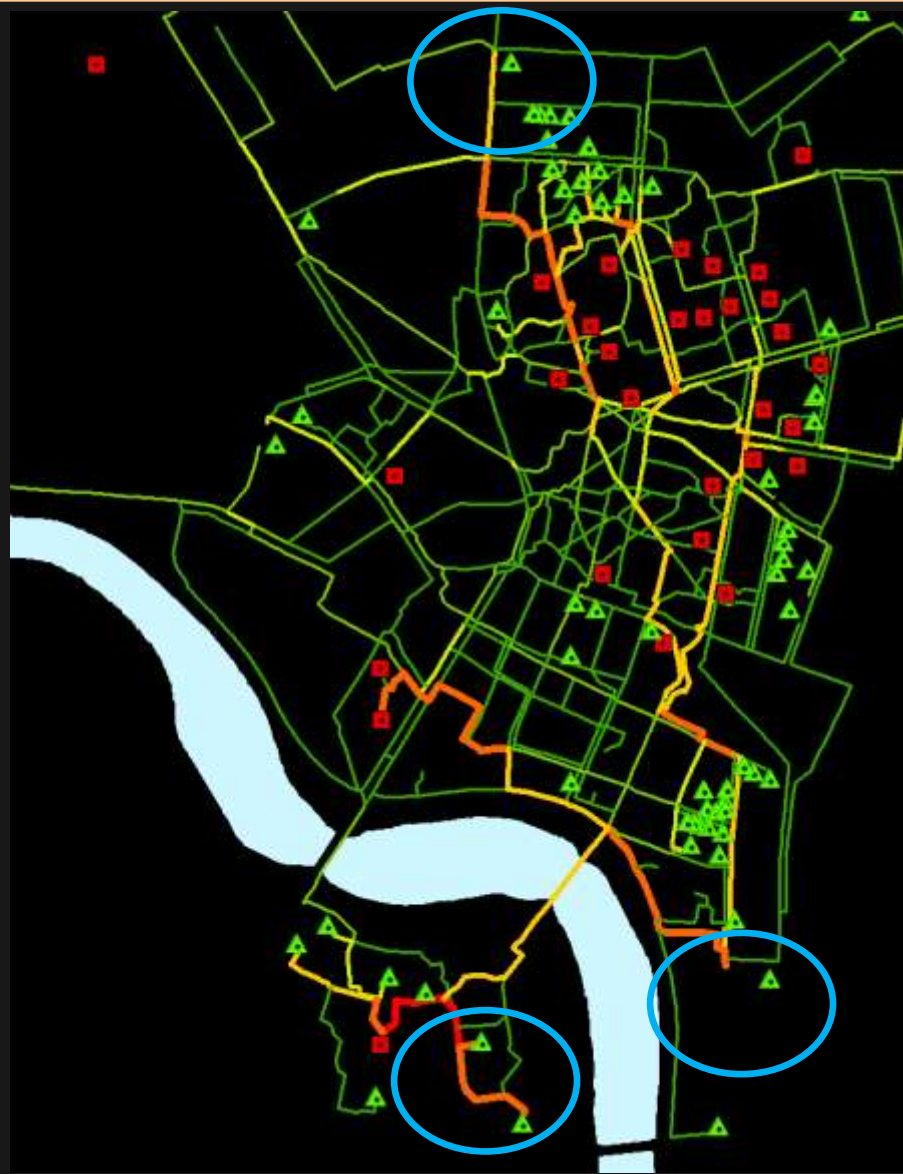- Eastern bias to N-S axis

Results

- Eastern bias to N-S axis

- Influence of large complexes

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Results

- Eastern bias to N-S axis

- Influence of large complexes

- Harvard Yard is peripheral

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The Fine Print

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  • Do people really follow same route?
  • What about temporal factors?

Postscript

- Spatially enabled phones may prove the ultimate data collector for this type of inquiry