Urban Agents & Citizen Apps
Towards an Autonomous Interactive Urban Planning Platform

Fabio Carrera
WPI / MIT
Fabio

½ Ma 1961-1977
½ Ve 1977-1978
½ SFe 1978-1988 (today)
Venice 2.0 1988-2008
Mit 1996-2004
2007-
Academic Interests

Venice Project Center
City Knowledge/City Lab
Santa Fe Project Center
Academic Interests

Venice Project Center
City Knowledge/City Lab
Santa Fe Project Center
Venice Project Center

• Founded in 1988
• 500+ alumni
• 125+ projects
• 10+ Awards
• 15+ Major media stories
Venice 2.0

- Web page
- Blog
- Venipedia (wiki)
- Alumni Network (ning)
- Project Repository (Dspace)
Web site

Venice 2.0

Best of ...

Everyone in Venice refers to elements of the canal system using the geospatial reference system we developed.

Blog

Shady business (Venice 3D)

After the recent release of the Google Sketchup 3D buildings for the entire city of Venice, all kinds of possibilities are opening up for us at the Venice Project Center. We could map our numerous GIS layers onto the 3D city, as Kyle has done with our fountains dataset, but we can also start to attach information to each building as the fasoloco del fabbricato has never been able to really do.

Buzz

Over 20 WPI projects are cited in this coffee-table book, co-edited by

venice2point0.org
Shady business (Venice 3D)

After the recent release of the Google Sketchup 3D buildings for the entire city of Venice, all kinds of possibilities are opening up for us at the Venice Project Center. We could map our numerous GIS layers onto the 3D city, as Kyle has done with our fountains dataset, but we can also start to attach information to each building as the *fascicolo del fabbricato* has never been able to really do.

VENICE 2.0
CELEBRATING 20 YEARS OF RESEARCH FOR VENICE (ITALY)

Venice2point0.blogspot.com
Welcome to Venipedia
A free online resource all about Venice, Italy.
225 articles about Venice...and growing!

Welcome to the Venice Project Center’s Venipedia, where you can find everything you ever wanted to know about Venice. This is an effort to create an online resource that contains all of the results produced and information gathered over 20 years by more than 400 WPI students who have conducted research in and for Venice.

New to wiki?
Consult the Editing Guide for more information on how to begin.
Note: You must be a registered member to edit this wiki.

Random article: Hydrodynamic Effects of Cruise Ships in Venice

Hydrodynamic Testing Results

In 2009, a group of students from Worcester Polytechnic Institute found evidence of water flow acceleration as these cruise ships pass. After...
Worldwide Recognition
National Geographic Video

Channel: National Geographic Video
Series Title: Out There
Program Title: City under Siege
Aired around the world: 2002-today
Academic Interests

Venice Project Center
City Knowledge/City Lab
Santa Fe Project Center
City Knowledge

transforming municipalities from hunter-gatherers to farmers of urban information
Premises of CK

- Municipalities are the *locus* of change
- Cities = Structures + Activities
- Reality = Backlog + Future Change
- Middle-out = Top-down + Bottom-up
- Space Is the Glue
- Government only has 6 tools for implementation and data collection
Principles of CK

- Use all 6 tools when making policies
- Extract Informational returns everywhere
- Re-use Information
- Put onus on “agents of change”
- Leverage self-interest
Academic Interests

Venice Project Center
City Knowledge/City Lab
Santa Fe Project Center
Santa Fe Project Center

- Santa Fe Institute (WPI Connection)
- Steve Guerin and Redfish
- Santa Fe Complex
- WPI Santa Fe Project Center
Flocking and swarming
A Simple Agent
Repel
Ants and Pheromones

While running you can:
- Click and drag obstacle.
- Change all sliders below.

- Population: 250
- Max-pheromone: 35
- Diffusion-rate: 0.31
- Evaporation-rate: 0.010
- Wiggle-angle: 30

Plot:
- Ants vs. Ticks
Crowd dynamics
Pedestrian evacuations
Crowd Egress from Pittsburgh’s PNC Park
Wildfire modeling
Sandtable
Grants and Projects

Venice Simtable (EU Mobilis)
Energence
DEW (NASA)
StreetBump
Grants and Projects

Venice Simtable (EU Mobilis)
Energence
DEW (NASA)
StreetBump
Canal Logistics Venice, Italy
DEW (NASA)
Bump

Venice Table Video
Grants and Projects

Venice Simtable (EU Mobilis)
**Energence**
DEW (NASA)
StreetBump
Energence

Energy Data-Gauge©

The Energy-DataGauge© is an automated web-based subscription service for helping municipal government, energy companies, social housing associations, and property owners to map and monitor energy generation and consumption in buildings.

Energy Data-Gauge
Birth Certificates
Monitor Energy
Analyze Energy

Council Goes International with Merton Rule
from 24 Dash com

Merton Council welcomed members from the Spanish Federation of Local Authorities (FEIMP) to the borough yesterday (Tuesday 17 March) to share with them the merits of the Merton Rule and the future of monitoring and researching carbon dioxide emissions.
Grants and Projects

Venice Simtable (EU Mobilis)
Energence
**DEW** (NASA)
StreetBump
Digital Earth Watch

Featured Picture Post panorama: Portland, ME - Back Cove (Yardscaping Project).

<table>
<thead>
<tr>
<th>N</th>
<th>NE</th>
<th>E</th>
<th>SE</th>
<th>S</th>
<th>SW</th>
<th>W</th>
<th>NW</th>
<th>UP</th>
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</thead>
<tbody>
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<td><img src="image2.png" alt="Panorama Image" /></td>
<td><img src="image3.png" alt="Panorama Image" /></td>
<td><img src="image4.png" alt="Panorama Image" /></td>
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<td><img src="image8.png" alt="Panorama Image" /></td>
<td><img src="image9.png" alt="Panorama Image" /></td>
</tr>
</tbody>
</table>

**picture post**

Picture Post is a part of the Digital Earth Watch (DEW) network. DEW supports environmental monitoring by citizens, students and community organizations through digital photography and satellite imagery.

You can...

- contribute photographs to any Picture Post
- add your own Picture Post
- measure environmental change in your neighborhood and

Use the navigation buttons on the left of the map to zoom. Click and drag to pan around.

Click on one of the icons on the map to see pictures.
Find Picture Posts

By Current Location
By Picture Requests
By Urgency
By Date
By Popularity
By Trend
Name: Santa Fe Rose Park
Distance from current location: 2311 feet
Last Photographed: 01/04/2010
Photographs: 39
Creation Date: 11/01/2009

Description: A small grass park surrounded by residential buildings. The park's perimeter is lined with native rose bushes. A large sequoia tree stands in the center of the park. The park was established in 1963.
Grants and Projects

Venice Simtable (EU Mobilis)
Energence
DEW (NASA)
StreetBump
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
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<td>recording</td>
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</tr>
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<td>Lat</td>
<td>0.0</td>
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<tr>
<td>Lon</td>
<td>0.0</td>
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<tr>
<td>accelX</td>
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</tr>
<tr>
<td>accelY</td>
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<tr>
<td>accelZ</td>
<td>0.57399994</td>
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<td>magnitude</td>
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<td>orientX</td>
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<tr>
<td>orientY</td>
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<td>orientZ</td>
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<td>Num Datum</td>
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<td>Num in Buffer</td>
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<tr>
<td>Num in Write Buffer</td>
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</tr>
<tr>
<td>Num in Pool</td>
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</tr>
</tbody>
</table>

City of Boston
Ambient Urban Platform

Cloudsourcing
Mobile/Automated Sensing
Modeling and visualization
Participatory decision-making
Agents Cloud?
Cloudsourcing
Mobile/Automated Sensing
Modeling and visualization
Participatory decision-making
Agents Cloud?
The “Google Docs” of GIS
Private, Public or Shared Maps
Serve and/or Embed
GIS functionalities and APIs
Dino Ravnic + Marko Santic
Cloudsourcing
Mobile/Automated Sensing
Modeling and visualization
Participatory decision-making
Agents Cloud?

Ambient Urban Platform
Cloudsourcing w/Mobile Apps

Straight-to-cloud data collection

StreetSigns (GIScloud)
StreetBUMP
DEW
ButONE
Taxi
Parking
StreetSigns

For Cities and Citizens...
Self-interested subliminal cloudsourcing...
Capture urban change...
ButOneApp is actually an AppWidget. After you install it via the link to the right, long-click your homescreen, select widgets, and select ButOne.

**Use**

To configure ButOneApp, click the settings button on the left of the widget. In the dialog that opens, you can add tags or click on a tag to link it to your ButOne widget. To change the color of a tag, long-click it in the list. To change your username, press the settings button on your phone while in this ButOne tag dialog. You can also have multiple instances of the ButOne widget open in case you want to tag different things without going into your ButOne settings every time.

Download ButOneApp (alpha 1.1)
Venice Taxi App

Taxi App

Change #  Send SMS

Download TaxiApp (alpha 1.0)
Park and Pay

CityZapps
Cloudsourcing
Mobile/Automated Sensing
Modeling and visualization
Participatory decision-making
Agents Cloud?
Public Transportation

DC Metro Subway
Traffic
Traffic Behavior

number-of-cars: 20

setup   go

red car speed: 0.2
acceleration: 0.0080
deceleration: 0.058

Car Speed

speed

0 1.1
0 2830
time

ticks: 2367
3D
Pedestrians
Sensor Harvesting
Cloudsourcing
Mobile/Automated Sensing
Modeling and visualization
Participatory decision-making
Agents Cloud?

Ambient Urban Platform
Venice Table Video
Cloudsourcing
Mobile/Automated Sensing
Modeling and visualization
Participatory decision-making
Agents Cloud?
Autonomous Urban Agents

Mobile agents (Venice Table)
Structure agents (PubSubHubbub?)
Birth Certificates (Energence)
A new paradigm?
Urban Information Systems Seminar
MIT Department of Urban Studies and Planning

**Urban Agents & Citizen Apps**
Towards an Autonomous Interactive Urban Planning Platform

Fabio Carrera, PhD
Worcester Polytechnic Institute

Wednesday
October 13, 2010
5 – 6:15 pm
Room 9-554

**ABSTRACT:**

Fabio Carrera (DUSP Ph.D. '04) will present some real-world applications that begin to demonstrate how it is now becoming practical to "fill the City Knowledge pipeline" from data collection, to information visualization, to modeling and interactive participation in urban planning decisions. What is emerging is the potential for an Autonomous Interactive Urban Planning Platform that:

- leverages mobile applications for straight-to-the-cloud citizensourcing of urban phenomena
- harvests sensor networks for real-time information
- captures information as it flows through municipal administrative processes
- visualizes information in multiple dimensions
- models synthetic populations and their behaviors
- provides instant feedback about the urban and environmental impacts in planning scenarios
- allows tangible interaction in participatory planning contexts

Fabio Carrera is a graduate of DUSP (Ph.D. '04 in Urban Information Systems and Policy). He holds a B.S. in Electrical Engineering and an M.S. in Computer Science from the Worcester Polytechnic Institute (WPI), where he has been a full-time member of the faculty of the Interdisciplinary and Global Studies Division of WPI since 1998. He is the Director of the WPI Venture and Start-Up Project Center, as well as the Director of the Director of CityLab, an interdisciplinary research laboratory dedicated to Urban Technology and Information Systems.
CitizenPipe 2.0

Urban Assets
Behaviors

Administrative Processes
Sensors

Municipalities
Citizens