

Address, City, State, and/or Zip

3405 Michigan Union 530 S. State Street

Current City

-  Ann Arbor, Michigan
51,001 like this · 752,64...
-  Lake Ann, Michigan
785 like this · 8,350 wer...
-  Saint Ann'S Bay, Saint A...
742 like this · 3,583 wer...
-  Saint Ann, Missouri
533 like this · 3,920 wer...

Location
Where in the world are you?

家乡 :
安庆
安顺
安康

SKYHOOK
WIRELESS



YAHOO!
BOSS

Google
Developers

Positioning

Spatial Computing – University of Minnesota



Positioning

Spatial Computing – University of Minnesota

Learning Objectives

1. Know how your smartphone can figure out where you are (Hint: It's not just GPS!)
 - Never use the term “GPS” incorrectly ever again!
2. Be familiar with an important frontier in positioning: content-based positioning

Positioning is about a simple question:

“Where? ”



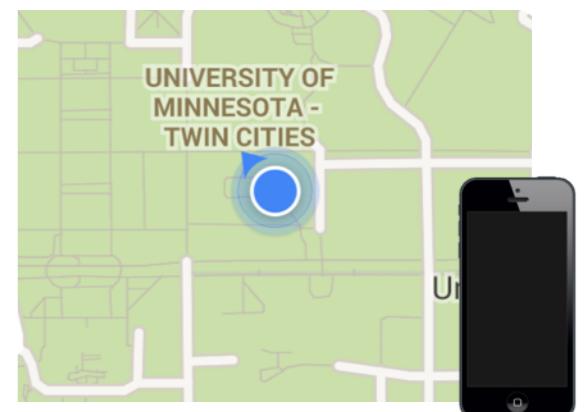
Where is this
property line?



Where should
this missile go?



Where is this
animal?



**Where is this
smartphone user?**

$\langle \mathbf{x}, z, z(\mathbf{x}) \rangle$

the “geo-atom”

(Goodchild et al. 2007)

Slides for Spatial Computing
by Brent Hecht
for the Spatial CCI Learning Mooc

$\langle \mathbf{x}, \mathbf{z}, z(\mathbf{x}) \rangle$

Main
subject of
this module!

Presence of cholera
Temperature
Population
Air Quality
Tweet content
Wikipedia article text

10°C
-10°C

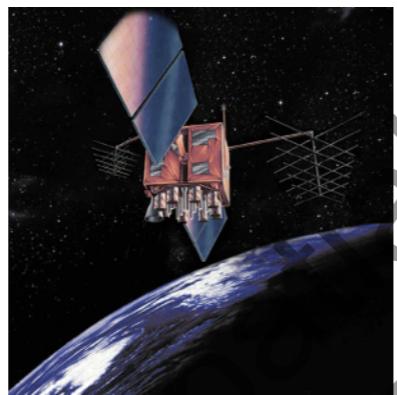




x is a vector, not a single value!

$$\langle \mathbf{x}, z, z(\mathbf{x}) \rangle$$

(44.97428, -93.232502, 264m, 10:33am)



Signal-based
Positioning

Content-based
Positioning

102.111.321.5

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Slides for Signal Processing by Brent Hecht
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Positioning

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