

# Collecting Field Data with a Smart Device

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Based upon work supported by the National Science Foundation under Grant DUE ATE 1304591, 1644409, 1700496. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.



*Growing the Workforce*

# What is field data collection?

- The ability to collect location data in the outside environment that includes attributes for specific research needs.
- Can be used for research purposes as well as citizen information gathering.

# What topics?

- For this discussion any item that requires a spatial position.
- Example
  - Water quality
  - Biological sampling
  - Infrastructure (bridges, snow removal, potholes)
  - Civil War Battlefields
  - Historical structures
  - Wineries

# Potential Attributes

- Location
- Name
- What sample was taken
- Why is this location important
- Pictures
- Information for others to use
- Costs

# Attributes Required

- Design the collection tool for field data gathering.
- What items used in the field data collection can be contained in pull downs (domains). To limit the amount of field typing, a photograph can capture the information and then transcribed in the office. Typographical errors can result in poor data collection, which will effect the search results.
- Include photographs of the sites.
- Always include a comment field, for items that don't match those designed.

# What is required?

- A smart device that is GPS enabled.
- App for the device (available on multiple platforms)
  - Must the user have a login ID?
  - Open source/commercial
- Storage location
  - Device, cloud
- Software
  - Free
  - Purchased
- Base map
  - Offline/online
  - Imagery/map

# What accuracy?

- What is the required accuracy for the research?
  - A few meters to sub-centimeter
  - External antenna or only the cell phone/tablet

# Smart Devices

- The device must have a true GPS enabled to be effective in collecting information.
  - All smart cell phones have GPS which is required by law.
  - Tablets that have the ability to connect directly to a cellular service have GPS devices
  - Other tablets may or may not have a GPS



# External Antenna

- Improved accuracy
- Generally require a middle ware to make a successful connection and the internal antenna may need to be turned off.
- Can be an expensive solution.
- Make sure the research requires this level of accuracy.
  - If you get within five to ten feet is that accurate enough? For example if a winery is being located, this would be enough of accuracy. A defect in a structure would require a higher degree of accuracy.

# Software

- An app is generally located at the devices application store and installed on the smart device. Therefore, different platforms would require different download locations. There are some applications that might not be written for every operating system or might require a version of the operating system that is not supported on older devices.
- Software (desktop or online) is required to design what is to be collected. The database must be designed appropriately before data can be collected. The database should be tested and modified as required before deploying the application.
- The field data collected can then be used on other maps that are used to display information via of a web interface or a mapping program such as ArcGIS Desktop or QGIS. This connection can be made to the 'live' data or static data.

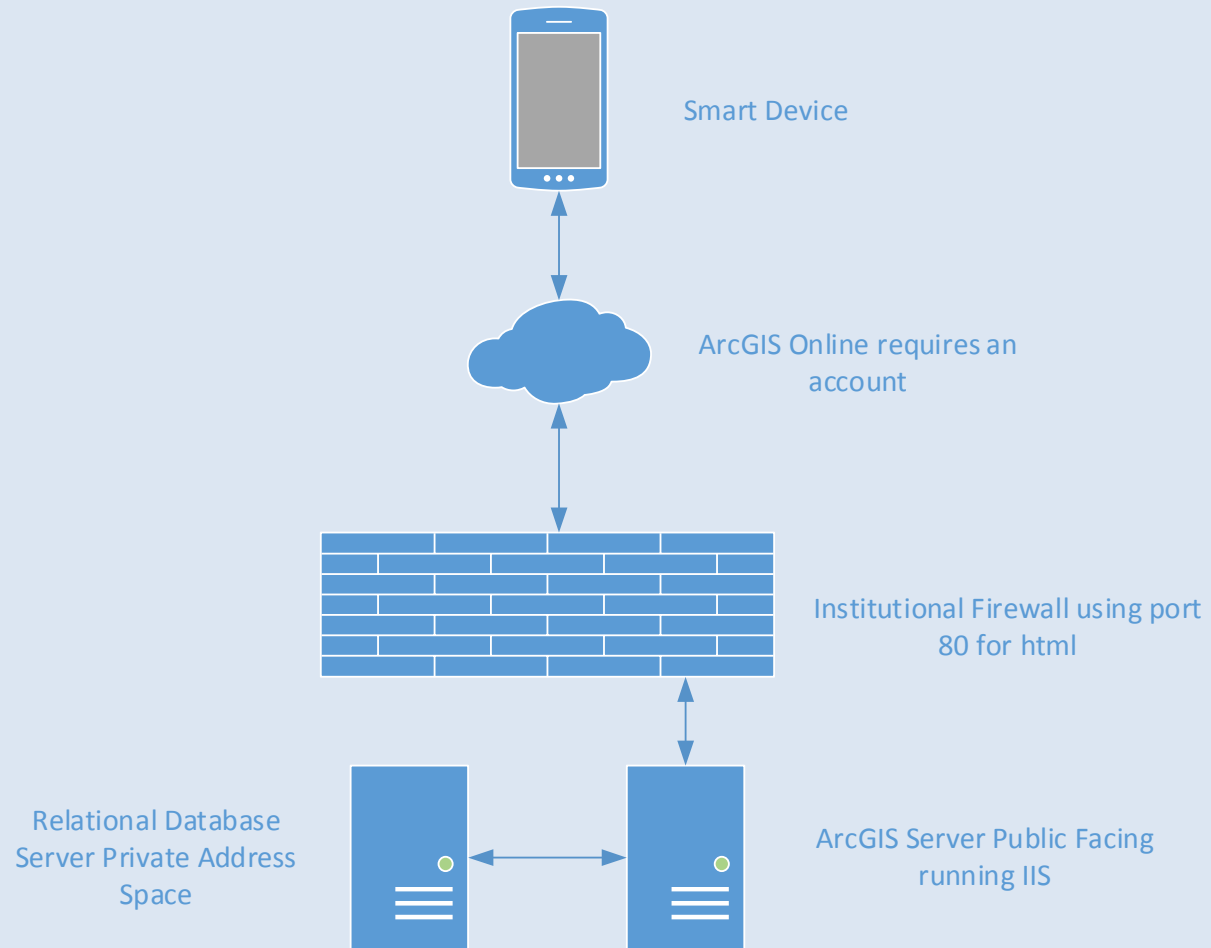
# Data Storage

- To do live data collection (most applications will allow off line collection), a connection to the Internet is required. This connection in the field will generally be cellular and the uploading of images can be slow depending on the connection speed. Some operating systems will automatically store the image on the device and in others this must be set. In general the images can be added later once back in the laboratory.
- The data is stored either in the cloud or behind a secure firewall. The purpose of the research will determine the level of protection that is required.
- A relational database is required.
- Who is allowed to collect data?

# Software we are Using

- Esri Collector with a connection to the Esri ArcGIS Online Cloud and to our local SQL Server (some application are only in the ArcGIS Online). The smart device app is free to download and use, a login is required. It is available on the three major smart device operating systems.
- There are some crowd sourcing applications for Citizen Science that also are a possibility. Currently they are programmed for specific applications.
- Open Source software that can work with multiple operating systems is also a possibility. Experimentation is being done on one known as the Geographical Open Data Kit.

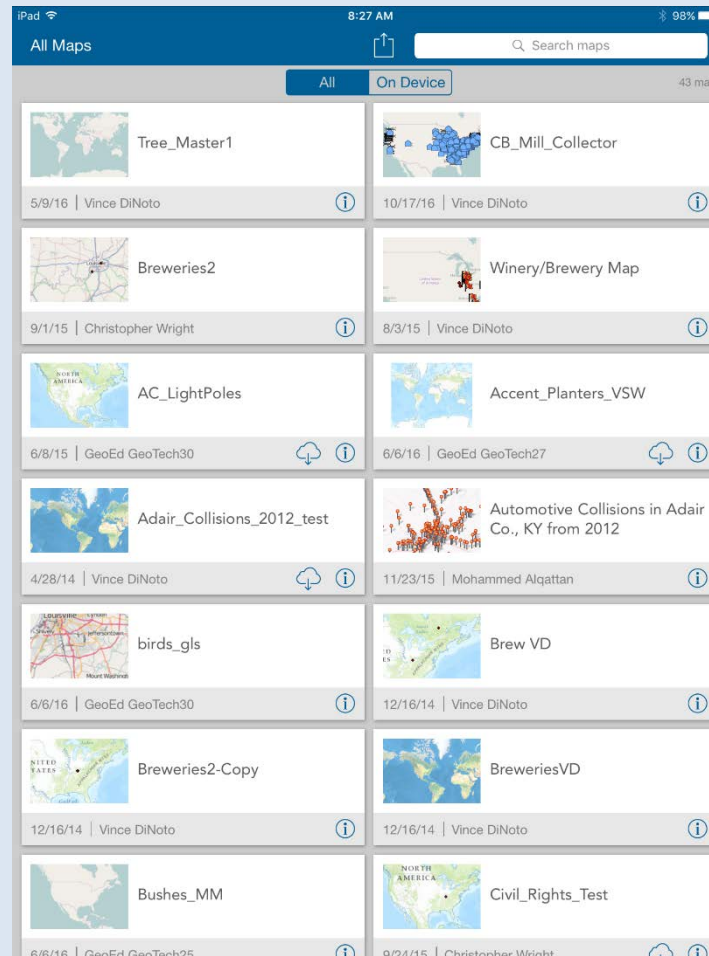
# Data Pathways



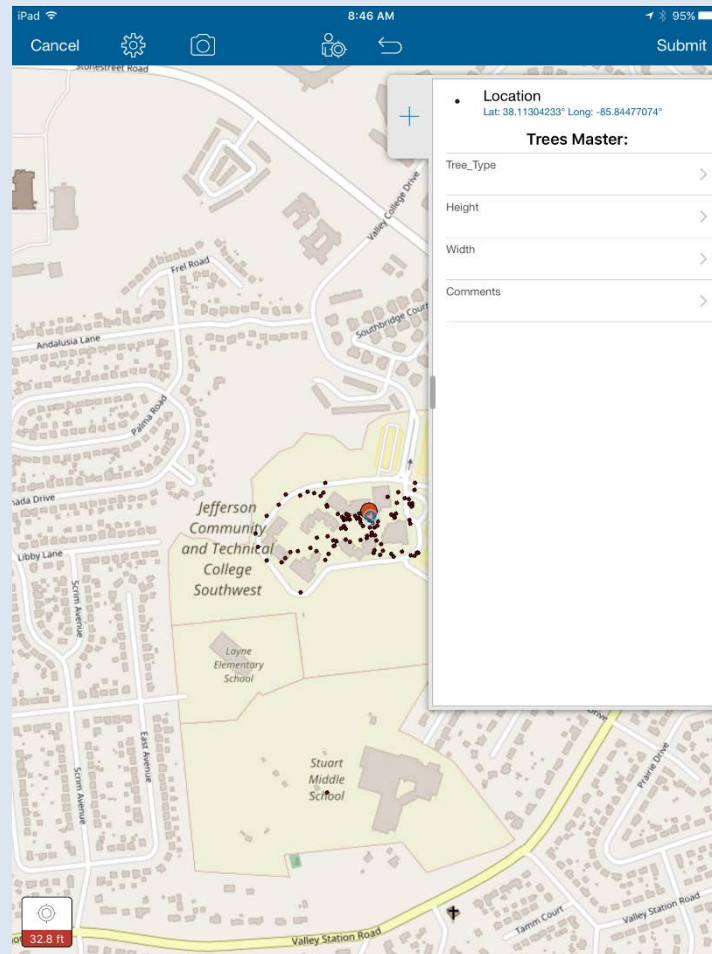
# What can the data be used for?

- Any mapping application that can utilize a service from an ArcGIS Server or connect to ArcGIS Online or connect to a relational database server.
- Data can automatically appear(may need to refresh) as data points are collected in the field if a live connection is made to the same database.

# Collecting Data

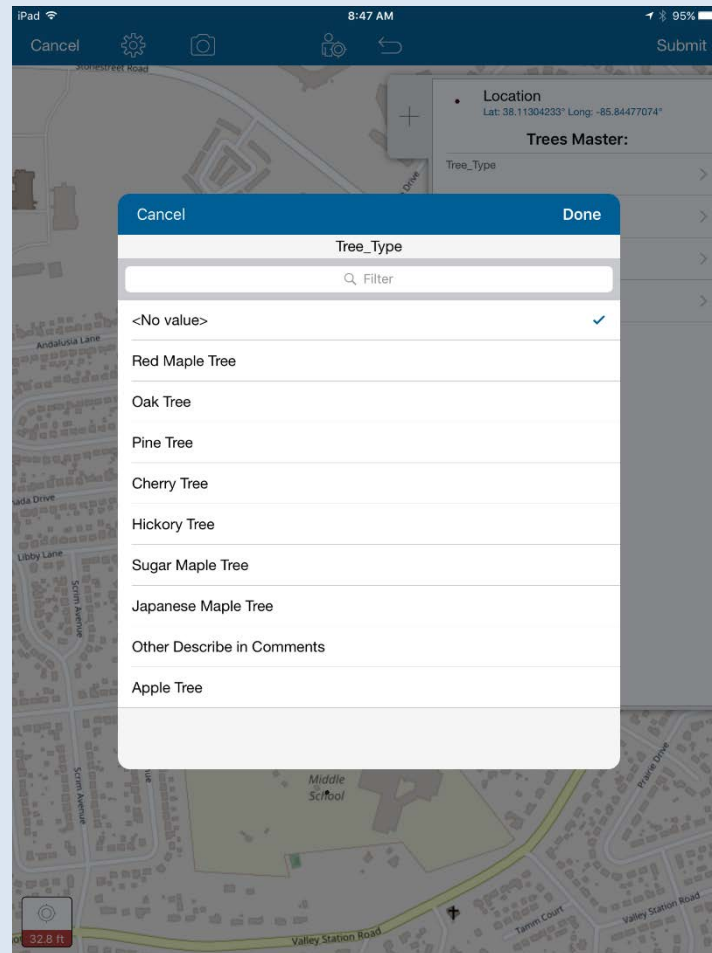


# Map and What is Collected

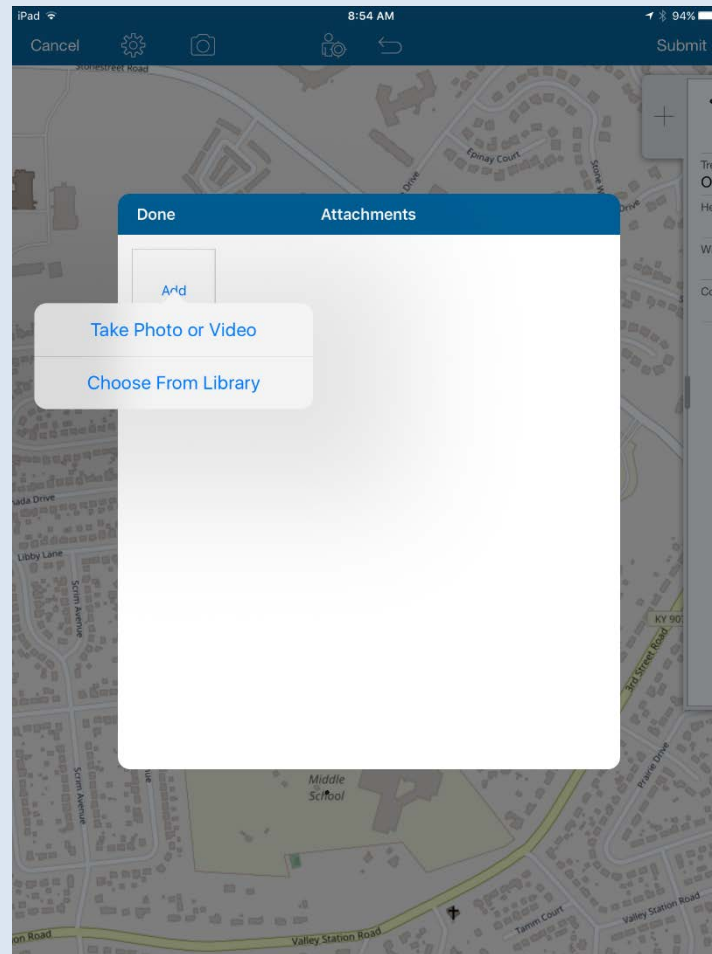




# A Domain



# Attachments



# Resources

- <http://cit225.weebly.com/field-data-collection.html> (Jefferson Learn on Demand Course)
- Workshops on this topic have been offered at GeoEd Exploratorium and KAMP, slides are available on request.
- <http://geoodk.com> (open source software)

# Questions and hopefully Answers

<http://www.geotechcenter.org/geotech-centers-presentations.html>

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