Goals for Today

- A bit of context: our organization and mission
- Getting acquainted with AR
  - Some Perspective
  - Brief History
  - How to use AR
  - AU & Elsewhere Examples
- Making your own Augmented Reality
  - Platforms
  - Fundamental Forms
  - Workflow
  - Analyst Tracking Breakdown
  - Concept of Tracking Sub-systems (Secondary Tracking)
- Resources, ready now!

Augmented Reality: The Role We Play

- Central AR Analyst Resource
  - Fresh introductory workshops offered
  - Key workflow documentation and video tutorials
  - Service
    - One-on-One Consulting
    - Tool/workflow selection
    - Development support
    - Available advanced systems (example: MSLabscan)
    - Hardware interface systems available (example: Leap Motion)

Augmented Reality: The Academic Perspective

- Central AR Analyst Resource
  - Fresh introductory workshops offered
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**Data Visualization Seminar:**

**Augmented Reality for Visualization**

Chauncey Frend

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**Brief History**

- 1901: Lyman Frank Baum, author of “The Masterkey,” imagines a kind of AR.
- 1968: Ivan Sutherland invents the head-mounted display “Ultimate Display” at the University of Utah.
- 1999: ARToolkit was created by Hirokazu Katoh at HITLab.
- 2010: Vu foria for AR Mobile Apps was released by Qualcomm.
- 2013: Google announces Google Glass.
- 2015: Microsoft announces the HoloLens.
- 2016: Niantic released Pokémon Go.

**How to use AR Tools**

<table>
<thead>
<tr>
<th>Usage Type</th>
<th>AR Application</th>
<th>Complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-existing AR + Pre-existing Data</td>
<td>Pre-existing</td>
<td>Simplest</td>
</tr>
<tr>
<td>Pre-existing AR + Your Data</td>
<td>Pre-existing</td>
<td>Moderate but interesting</td>
</tr>
<tr>
<td>Your AR App + Your Data</td>
<td>Your</td>
<td>Programming required</td>
</tr>
</tbody>
</table>

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**AR Visualization Today**

- **Experiences**
  - WWF Free Rivers
  - World Wildlife Fund

- **Commercial**
  - Trimble

- **Open Source**
  - ArcGIS
  - Microsof/MixedReality/Unity

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**AR Visualization Today: Open Source**

- **ArcGIS**
  - GitHub

- **Medical Example**
  - GitHub
  - MRTK (Mixed Reality Toolkit)
Data Visualization Seminar:
Augmented Reality for Visualization
Chauncey Frend

AR Visualization Today: At IU
Mechanical 2D to 3D Class Tool

AR Visualization Today: At IU
Biomedical Device Training

AR Visualization Today: At IU
Type 3: Your AR App + Your Data

AR Platforms: BYOD or Emerging Platforms
User-Owned/Provided (BYOD)
Emerging

Making your own Augmented Reality

AR Development Workflows
Base Package
AR Plugins
AR Technology
Desktop Apps
Mobile Device Apps
ARToolKit
Microsoft Hololens
ARCore
WikiTude
Unity

Emerging Platforms

Research Technologies
Pervasive Technology Institute
Initially defining AR tracking requirements for an application will inform which plugins and/or hardware tools are a good fit.

Analyst Breakdown: AR Tracking Systems

- Area Learning
- Marker Tracking
- Body Tracking
- Location Based
- Future/Based
- 3D Image Based
- 3D Object Based

Area Learning ($SLAM$)

Advanced Technique: Hybrid Tracking Scenarios

Tracking System Fusion

Tracking Sub-System

Advanced Technique: Digitized Occlusion

Tracking System Fusion

Tracking Sub-System

Thank You!

Announcement

- Data/Scientific Visualization course registration
- Local instructors and guest lecturers from AVL staff and others
- Techniques and algorithms for $SLAM$
- Human cognition & perception (heuristic for $SLAM$)
- Virtual and augmented reality interfaces
- 3D printing
- Client-oriented project work
- Monday/Wednesday 4:00-5:15 (vis lab)

Contact Us

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