Active RFID
for in-building positioning

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Goal of this project

Finding out approximated position of READER using reference Tags.
H/W SET UP

- READER : RF CODE
  SPIDERIII AR READER
- TAG : RF CODE (for SPIDER)
- COMPUTER : laptop(1.6GHz, 512M)
S/W SET UP

- RF CODE TAVIS concentrator
- Socket

- There was a problem
  : data lose occurred while extracting data
NOTE – The output socket is non-blocking, which means that if the client does not read fast enough, a client might lose data. If the concentrator is unable to send to this socket, due to a full socket buffer, the RFCP data will be lost.
Approach method

1. Initialization
2. Deploy Tags
3. Locate READER
4. Collect data, calculate position
Initialization

- Define the detecting length of each tag for each range degree.
Deploy Tags (1)

Reader Detected 4 reference tags.

This result can show where the Reader located.
Deploy Tags (2)
Deploy Tags (3)
Possible Problem

1. Expanded tag range due to the Conductors surrounded
   : but there were no conductors

2. Wrong tag range data due to the Conductors surrounded
   : So I went back to the first step again.
Conductor Effect

The tag which was not detected even in 10 feet was detected in 18 feet.
Angle Effect

The tag detecting range is different a lot refer to the angle between READER and Tag.
Detectable range

In case of Range 1
Interference

When the tags are located so close then all of a sudden, all of the tags start not to be detected even they are located within detectable range.
Calculate Algorithm

START

Extracting Data

Store 10 Data

Range_fn

END
Range_fn
Calculate Result Window
## Experiment

<table>
<thead>
<tr>
<th>Real</th>
<th>Estimated</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1, 1)</td>
<td>(1, 1)</td>
</tr>
<tr>
<td>(0, 5)</td>
<td>(1, 1)</td>
</tr>
<tr>
<td>(-5, -10)</td>
<td>{(-18<del>0), (-9</del>1)}</td>
</tr>
<tr>
<td>(-5, 0)</td>
<td>{(-8<del>0), (-9</del>1)}</td>
</tr>
<tr>
<td>(5, 2)</td>
<td>(1, 1)</td>
</tr>
<tr>
<td>(7.5, 0)</td>
<td>{(2~20), 1}</td>
</tr>
</tbody>
</table>
Improvement

- Active RFID can be influenced by surroundings both of conductors and insulator.
- In real world, there exists a lot of obstacles in surroundings. So more sophisticated algorithm will be requested.
- Each of the tags’ wave propagation ranges are not stabilized. In the process of manufacturing, the tags’ stabilizations are needed.