Tangible TableTop (TTT) Interface Based on Position/Orientation Measurement of Tags Using Photo Sensors and Accelerometers

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Supporting remote collaborative works between an expert and multiple field workers in direct and intuitive way

- Direct operations of GUI objects by using physical ‘tags’
- Affordances of the physical ‘tags’
- Asymmetric bimanual interaction technique with ‘tags’

**PROPOSED MEASURING METHOD OF PHYSICAL ‘TAGS’**

Complementary fusion of two types of sensors in each tag

**Photo sensors + fiducial marker patterns** shown on the display

- precise position/orientation measurement
- proposed marker pattern can alleviate the influence of ambient light and unevenness of display luminance

**Accelerometers**

- keep tracking the 3-D motion

### 3 Measuring Modes

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<th>Basic mode</th>
<th>High speed measuring mode</th>
<th>Reinitialize mode</th>
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<td>Used marker patterns</td>
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<td><img src="image2.png" alt="High speed measuring mode" /></td>
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<td>Information from accelerometers</td>
<td>Whether tags move</td>
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<td>Wide range Measurement Size &amp; direction of patterns change according to tag’s movement</td>
<td>Wide area search Time series changing of size, direction &amp; position of patterns</td>
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