

Smart fLAIr

a Smart App for Fast Leaf Area Index Retrieval

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¹Distributed Systems, ²Remote Sensing and Digital Image Processing

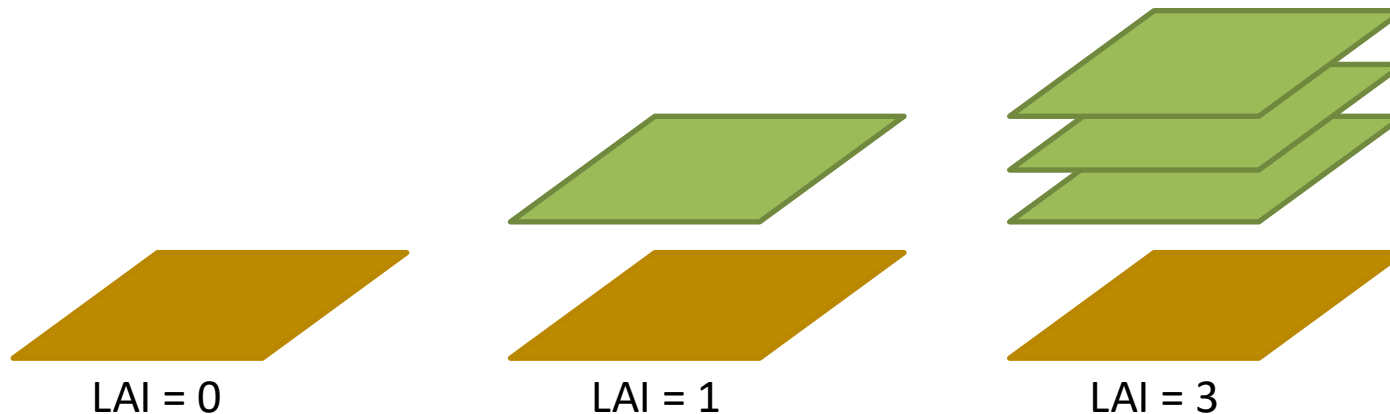


MobiCom App Contest 2016, New York – 2016/10/04

Leaf Area Index (LAI) in agricultural context

- parameter describing photosynthetic performance and vital condition of plants
- key variable in various models, e.g. yield models
- indicator for yield-reducing processes

$$LAI = \frac{(one-sided) \text{ green leaf area}}{\text{ground surface area}}$$



Smart fLAIr's objective: a fast and cost-efficient LAI assessment

Methodology

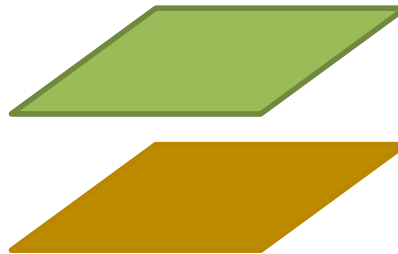
- radiation-based LAI estimation
- Ambient Light Sensor (ALS)
- above (A) + below (B) canopy light measurements

→ LAI derived from light transmittance (*Monsi and Saeki, 1953*)

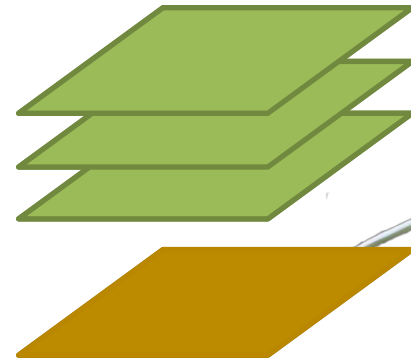
$$LAI = -\omega * \ln\left(\frac{\bar{B}}{\bar{A}}\right)$$



LAI = 0



LAI = 1



LAI = 3



Special Features (optional)

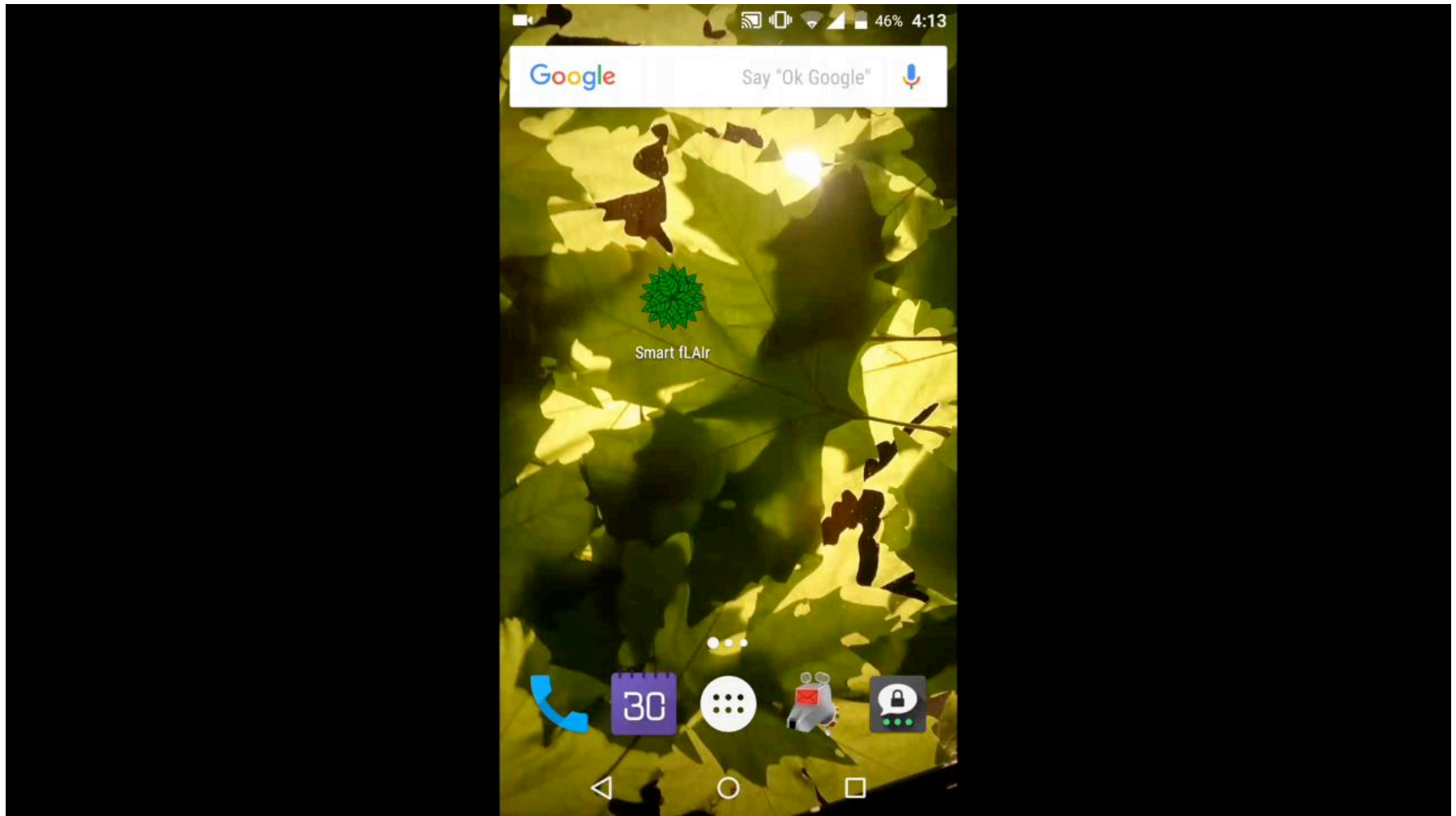
- selfie stick operation
- sensor accessory: diffuser and optical filter cap



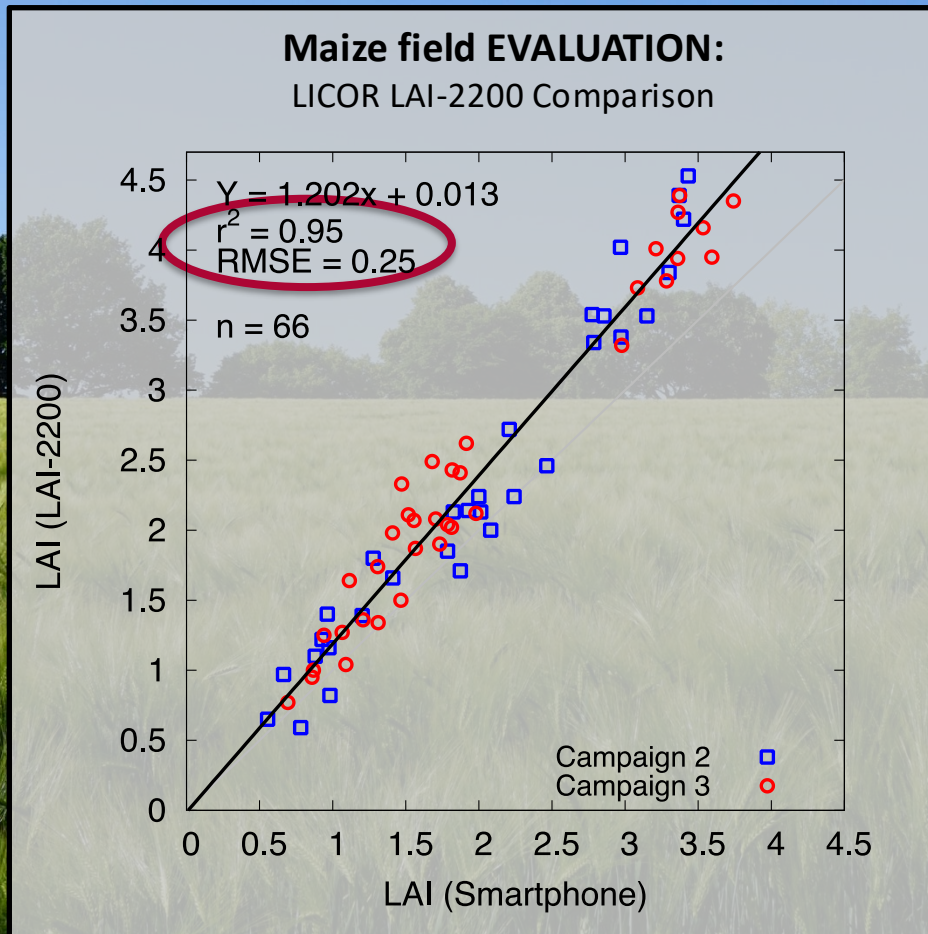
- WSN connectivity (via USB or Bluetooth)



Video Demo: Smart fLAIr in the wild



Thank you for your attention!



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