Strengthening Resilience to Water Emergencies through Citizen Participation

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Project Overview

- Case studies
- Knowledge management and decision support platform
- Integration of social and physical sensors and models
- Networks and models for social and natural processes
- Governance and stakeholders
- Technological infrastructure
- Social sensors
- Physical sensors
Participatory Sensing

Opportunistic Sensing

Passive Sensing

Remote and In-situ Sensing

Prediction/Visualisation
Citizen Participation/Engagement

Citizen — Science(tist)
Citizen Participation/Engagement

Citizen Observatory

Citizen → [handshake] → Science(tist)

- Observed
- 9 - Static
- 9 - Dynamic
- 9 - Intermittent
- 10 - Static
- 10 - Dynamic
- 10 - Intermittent

Discharge (m³/s)

Time (hours)
• Opportunistic Sensing - measuring physical (meteorological) phenomena from Social Media

<table>
<thead>
<tr>
<th></th>
<th>Daily</th>
<th>Hourly</th>
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<tbody>
<tr>
<td></td>
<td>Linear Regression</td>
<td>Support Vector Regression</td>
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<tr>
<td></td>
<td>Train 10-fold</td>
<td>Train 10-fold</td>
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<tr>
<td>Temperature</td>
<td>0.99 0.92</td>
<td>0.99 0.93</td>
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<tr>
<td>Sunshine</td>
<td>0.97 0.82</td>
<td>0.96 0.86</td>
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<tr>
<td>Precipitation</td>
<td>0.98 0.78</td>
<td>0.97 0.86</td>
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<tr>
<td>Wind</td>
<td>0.97 0.81</td>
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<td>Humidity</td>
<td>0.95 0.67</td>
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<tr>
<td>Snow</td>
<td>0.78 0.12</td>
<td>0.71 0.27</td>
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</tbody>
</table>
• Acoustic measurement of rainfall
• River Level and Snow Depth measurement
  • Location via QR Code or geocoding
• River flow velocity measurement with (smartphone) video
• Economical sensible heat flux measurement

3D sonic anemometer for sensible heat flux, ≈ 10k€

Estimated costs: < 1000€ for sensor

WSN station hosting future heat flux sensor

traditional sensor, off-the-shelf, expensive

novel instrument or modification (prototype)

commercialized product, “mass” production (SME’s)
- Models combining dynamic/static & citizen/scientific data
Citizen Engagement

Passive / Opportunistic Sensing

Citizen

No or little engagement

Participatory Sensing

Science(tist)

Engagement due to high motivation (flood wardens, council workers)
Activity Monitoring
Contextual Citizen Engagement
Thanks

Neil Ireson
Suvodeep Mazumdar