Harbour View: A Community-Owned Environmental Information Display for Coastal Climate Adaptation

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***Abstract*—This paper describes Harbour View, a public-facing digital display concept for coastal communities to access real-time environmental information in plain language, using local landmarks and actionable advice rather than technical data or probability scores. The display is being co-designed with the Eyemouth community (Scottish Borders) as part of a participatory action research PhD. The goal is not technical sophistication but practical utility, trust, and local ownership.**

I. Introduction / Background

Coastal communities like Eyemouth face increasing risks from flooding, storms, and coastal erosion. Scientists collect vast amounts of environmental data, but this information often fails to help people where they live because it misses local knowledge: where drains block, which roads flood first, where cliffs are crumbling.

Current AI-driven climate tools prioritise technical precision over practical utility. A highly accurate flood prediction model may represent a scientific success but become a practical failure if its complex output resists translation into a clear local evacuation plan. Conversely, simple trusted systems – a painted tide marker paired with a WhatsApp alert from the harbourmaster – often prove highly effective.

Harbour View addresses this gap. It is a public-facing display designed to translate environmental data into plain language, local landmarks, and actionable advice. The display is being co-designed with Eyemouth residents as part of a PhD research project on citizen-centred AI for climate adaptation.

II. Related work

This concept builds on several established research streams. Rollason et al. (2018) demonstrated that community generated volunteered geographic information (VGI) caught local errors missed by satellite models, proving that participation enhances technical accuracy. Le Dantec and Fox (2015) showed that trust in community-based research is built person-to-person, not institution-to-institution, through sustained engagement. Prost et al. (2023) used walking interviews as a method for place-based data collection, surfacing situated knowledge that does not emerge in static workshop settings. Costanza-Chock (2020) articulates Design Justice principles, demanding that communities lead design processes rather than merely being consulted.

Harbour View differs from typical smart city dashboards. Where most prioritise metrics and probability scores, Harbour View prioritises social understandability and community control.

III. Imagined or existing prototype sketches/drawings/photos

A. Hardware Concept

The prototype will consist of:

- A Raspberry Pi 4 (or similar low-cost single-board computer)
- A 15–24 inch LCD screen (weather-resistant enclosure if installed outdoors)
- Optional: Simple push-button interface for users to cycle through information screens

B. Software Concept

The display will pull data from:

- Tidal gauge APIs (e.g., UKHO)
- Weather APIs (e.g., Met Office)
- Community-generated data (e.g., resident-observed water heights via a simple web form)
- The interface avoids probability scores, heatmaps, or technical jargon.

Instead, it uses:

- Plain language ("High tide at 3pm, water expected to reach the lifeboat station")
- Local landmarks ("South Street", "Harbour entrance")
- Colour-coded risk levels green/yellow/red) with clear actions

C. Stage of Development

Early-stage concept. Community entry has begun with initial visits to Eyemouth (April 2026), unstructured conversations with residents, and volunteering with Berwickshire Marine Reserve. These early interactions have focused on building trust and listening, not on design requirements. Formal co-design workshops are planned for later in the PhD.

IV. Responsible innovation

- Community control: Residents decide what data is shown and how. Governance structures (a community advisory panel and Memorandum of Understanding) are being codesigned.
- Accessibility: The display uses plain language, large text, and colour-coding suitable for low literacy and older users.
- Low-tech alternatives: The display is designed alongside existing systems (tide marker, WhatsApp alerts) to ensure no one is excluded.
- Environmental sustainability: Low-power components, minimal e-waste, open-source design for repairability.
- Long-term sustainability: The prototype is designed for low maintenance, with a community handover plan.

V. Author bio(s) / experiences

I am a first-year PhD researcher at Newcastle University (Open Lab). My background is in computing, but my research is increasingly participatory and community-led. I have completed foundational training in qualitative methods, participatory design, and research ethics.
Key skills:

- Participatory design workshop facilitation
- Basic electronics prototyping (Arduino, Raspberry Pi)
- User research and community engagement

I am motivated by the gap between what AI can do and what communities actually need. I believe that technology should serve people, not the other way around.

VI. Acknowledgements

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VII. References

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