LINKod

AN AI-ASSISTED BARANGAY-BASED SOCIAL PLATFORM INTEGRATING NATURAL LANGUAGE PROCESSING AND RULE-BASED RECOMMENDATION ALGORITHMS

Buenaflor, Andrew James L. | Garcia, Jun Mark C. | Estrada, Kane Gabriel P. | Vistal, Charyniel C.

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North Eastern Mindanao State University, Tandag City

Chapter 1: Background of the Study

- **The Problem:** Traditional barangay communication (bulletin boards, assemblies) is inefficient, with delays, limited reach, and low engagement (Santiago et al., 2021).
- **The Current "Fix":** Adoption of fragmented digital tools (FB pages, Messenger) improves reach but lacks integration and official structure (Ecleo, 2023; Gallera, 2023).
- **The Untapped Potential:** Significant economic and social gaps persist. Local vendors have low visibility, and residents lack a formal platform for mutual aid (Nguyen & Le, 2020).
- **The Justification:** This study bridges these gaps, translating the abstract "smart city" concept into a tangible "smart barangay" initiative, reviving *bayanihan* digitally.

Statement of the Problem (General)

"Despite ongoing efforts toward digital transformation, many barangays continue to struggle with fragmented systems for communication, local commerce, and community assistance."

The Core Gap:

The absence of an integrated digital platform that can effectively connect barangay officials, vendors, and residents.

Statement of the Problem (Specific)

Communication

How can a digital platform address delayed, unclear, and inaccessible announcements by assisting officials in composing and targeting messages?

Livelihood

How can the limited visibility and promotion of local vendors' products be improved through an integrated digital marketplace?

Cooperation

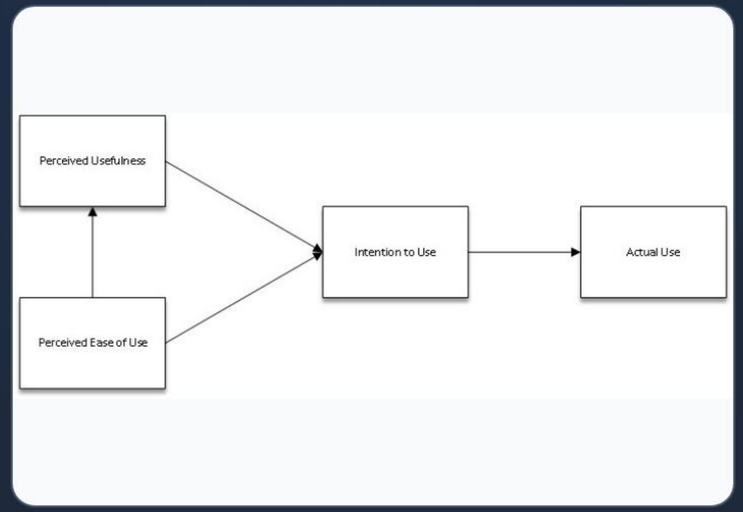
How can the lack of a formal system for residents to request or offer help (errands, jobs) be resolved through a community-driven module?

Objectives of the Study

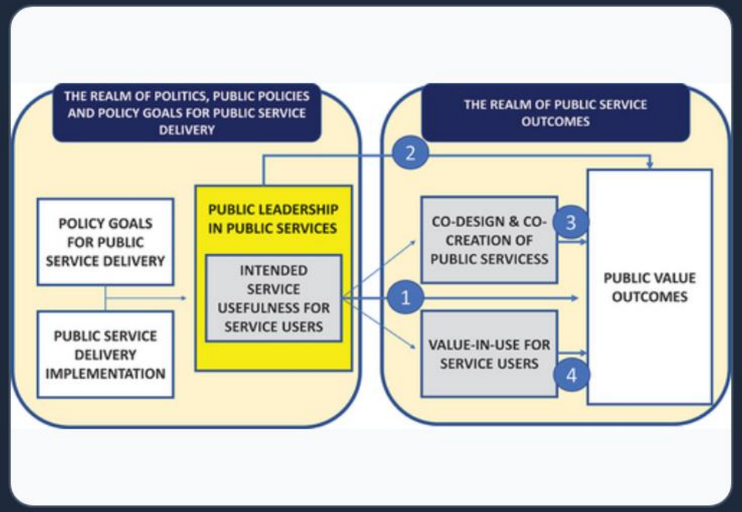
General: To develop and evaluate LINKod, an AI-assisted barangay-based social platform.

- **To Design** a communication module that supports officials in generating clear announcements using NLP and rule-based audience targeting.
- **To Develop** a digital marketplace module that allows local vendors to post, promote, and manage their products to increase online visibility.
- **To Create** a community task and service-sharing module to enable residents to request or offer help, fostering digital *bayanihan*.

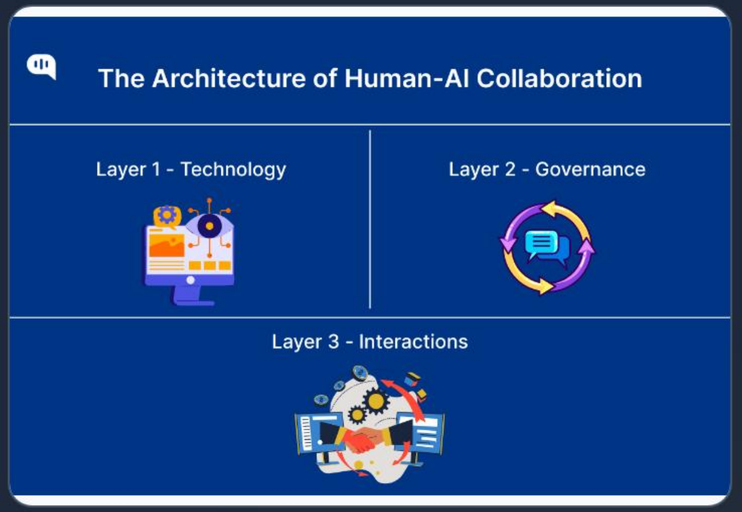
Theoretical Framework



Technology Acceptance (TAM)
(Davis, 1989)



Public Value Theory
(Moore, 1995)



Augmented Intelligence (AIM)
(Raisch & Krakowski, 2021)

Scope and Delimitation

Scope (In)

- **Focus:** Design, development, pilot test.
- **Locale:** Barangay Cagbaoto, Bayabas, Surigao del Sur.
- **Modules:** Communication (NLP, Rule-based), Digital Marketplace, Community Cooperation.
- **Users:** Officials, Local Vendors, Resident Volunteers.

Delimitation (Out)

- **Locale:** Single barangay only (no multi-location deployment).
- **Transactions:** Offline only (Cash-on-delivery). No payment gateways.
- **Security:** Standard mechanisms (no end-to-end encryption, MFA).
- **Impact:** Will not cover long-term economic/behavioral changes.

Significance of the Study (Stakeholders)

- **Barangay Officials:** Gain an efficient, reliable, and transparent channel for disseminating information.
- **Residents:** Benefit from instant access to updates, a directory of local goods, and a platform for mutual aid.
- **Local Vendors:** Gain a dedicated digital space to increase visibility, customer reach, and potential sales.
- **Community:** Fosters stronger social ties and resilience by promoting a "Digital Bayanihan."
- **Future Researchers:** Provides a foundational reference and a validated model for hyper-local e-governance.

Chapter 2: Review of Related Literature (Synthesis)

Foreign literature establishes models for Human-Centered AI (Shneiderman, 2020) and Augmented Intelligence (Raisch & Krakowski, 2021).

Local literature (Padilla et al., 2025) shows that while ICT adoption is growing, existing barangay systems are **fragmented** and lack integration.

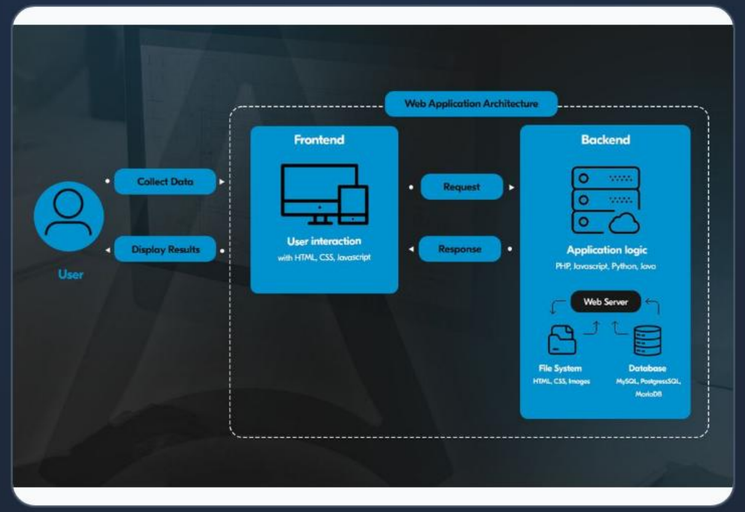
THE GAP:

A unified AI-assisted solution like LINKod—combining governance, livelihood, and community aid—is a needed innovation in the field.

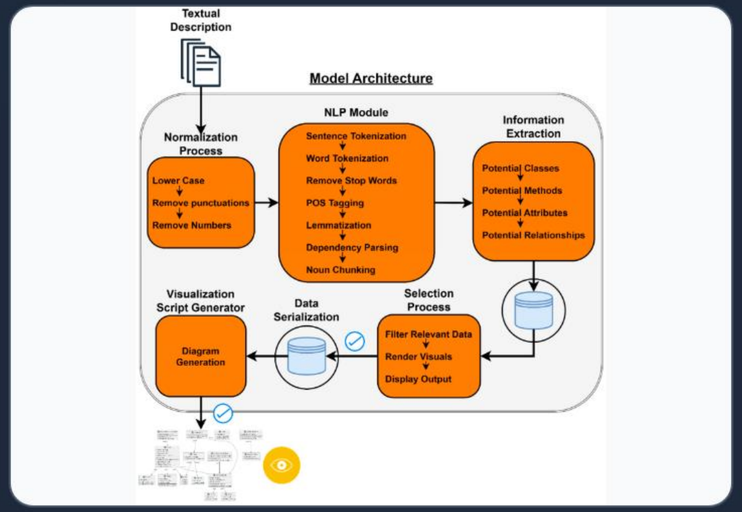
Chapter 3: Research Methodology

- **Research Design:** Developmental Research (Design Science) to build and evaluate the LINKod platform.
- **Research Locale:** Pilot test within **Barangay Cagbaoto, Bayabas, Surigao del Sur**.
- **Respondents:**
  - Barangay Officials
  - Registered Local Vendors
  - Resident Volunteers
- **Data Gathering:** Usability surveys, qualitative interviews, and direct system testing.

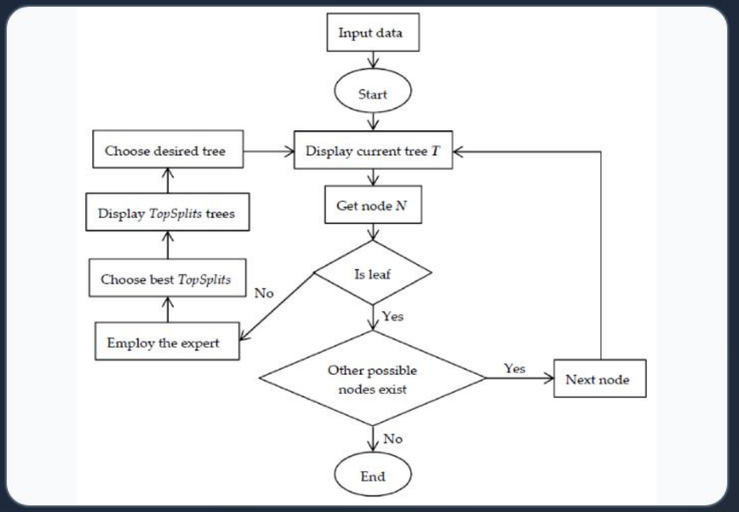
Chapter 3: System & AI Design (Conceptual)



1. System Architecture
(Frontend, Backend, Database)



2. NLP Module
(For clear message generation)



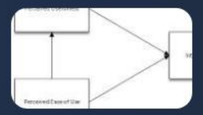
3. Rule-Based Algorithm
(For audience targeting)

Thank You

We are now ready to answer your questions.

LINKod: A "Smart Barangay" Initiative

Image Sources



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