Emerging technology unlocking the Circular Economy

T&I Lab Collaboration

March 30, 2022
Overview

The Urban GP and Technology & Innovation Lab (T&I Lab) made a collaborative effort exploring Artificial Intelligence and Natural Language Processing (NLP) to capture and visualize citizens feedback toward public spaces to provide valuable information to improve circular economy in Indonesia Cities.

Project Process & Objectives

Methodology: Prototype development

Results & Conclusion
**PROJECT PROCESS**

01 Discover
- Design Workshops
  - Understand the problem/opportunity
  - Find trends and drivers for the future scenarios
  - Stakeholder Mapping

02 Define
- Problem Deep-dive
  - Literature & Case study Review
  - Define the scope of the project and discuss potential solutions

03 Develop
- Prototyping(PoC)
  - Develop a prototype of the potential solution
  - Develop technical Architecture/ ML Model
  - Develop User Interface

04 Deliver
- Package Outputs
  - Viability Report including future roadmap
  - Code Packaging
  - Knowledge sharing event
Ideation Workshops

Collaborative sessions to better understand the context, Design and Prototype the solution using emerging technologies
Challenges & Objectives

- Lack of Urban Land & Public Spaces
- Great Number of Citizen Feedbacks and Responses
- Time-consuming
- Difficult to digest feedbacks

How can we effectively connect citizens’ feedback to the local governments and inform community and decision makers about the public spaces?

How can we help identifying underutilized public spaces and provide valuable analytics for operationalizing circular economy approaches in Indonesia Cities?
AI and Natural Language Processing (NLP) help improve this situation?

- NLP is the branch of artificial intelligence or AI—concerned with giving computers the ability to understand text and spoken words like human can.
- NLP helps machines to “read”, and “replicate”, and attempts to “understand”
- By leveraging NLP, we can detect the sentiment from sentences(Feedbacks), summarize documents, search the results or categorize them.
How can Natural Language Processing (NLP) help?

- Automatically Classify Sentiments from the feedbacks
- Sort Urgent Action Items
- Multi-lingual translation and opinion identification
- Provide Analytics of Feedbacks
- Find / Search Feedbacks
How this can AI / NLP can improve circular economy?

01 DATA (Feedbacks and ideas) from citizens and tourists collected through multiple sources with GIS Coordinates

02 By leveraging NLP, it automatically classifies sentiments, and show urgent places that needs attention and show analytics

03 Without manual work processing all feedbacks, we can identify, catalog and assess current conditions and potentials of public area extracted from feedbacks

04 This can help bringing the residents, informal sectors, private sector and local governments together to collaborate on development of areas and improve circular economy
Prototype Development Process

**Data Collection**
Identify Data (Citizens’ feedback on public spaces)

**NLP/Text Analytics**
Leverages Natural Language Processing to analyze text inputs

**Visualization**
Present the output that can be easily utilized for decision making
Develop

Solution Architecture & Algorithms
Used 28,824 Reviews scraped on 16 public sites in Semarang, Indonesia

Used two NLP algorithms
1) N-gram: approach to understand language by a sequence of words
2) Sentiment Analysis: approach to categorize sentences by its sentiment (e.g., positive, negative,...)
User Interface Dashboard
Results & Future Collaboration

Viability Report addressing feasibility of the solution

Collaborative Planning Tool:
TERMS OF REFERENCE

Code & Solution Architecture
User Interface Mock-up

Emerging Tech section on ToR to support future implementation
Let’s Work Together

Collaborate2Innovate

Learn2Innovate

Communicate2Innovate

Want more information? Contact us at TechnologyInnovation@worldbankgroup.org

Visit us on our website http://ITSInnovation and join us on the team’s Yammer Groups:

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