Chancellor and Humanitarian Leader, Amma
Mandates research for Societal Impact
Technical and non-technical courses
Available in 8 languages
Catered towards low-literacy audiences
MONITORING & EVALUATION

TRAINING CENTER MANAGEMENT VIA MYSANGHAM

ZONAL LEAD TO FACILITATOR COMMUNICATION VIA WHATSAPP

REMOTE MONITORING VIA AVIEW

COMMUNICATING ACHIEVEMENTS VIA FACEBOOK
Skills Learning Management System

Current
➢ Skill Metrics Analysis
➢ Skill Assessment & analysis reports
➢ Data mining
➢ Tracking skill improvement
➢ Performance Prediction
➢ Performance Modelling
➢ Customized feedback

Accurate comparison of Expert and Novice performance
WE is a process that is continuously changing ...
WE is a process that is continuously changing ... over geography
WE is a process that is continuously changing ...

.... and between contexts
Women’s Empowerment

The process of increasing women's choices & capacity to make discerning decisions towards sustainability & resilience

**Domains of WE**

**ACCESS**
The range of elements (including the right or privilege) impacting ability to obtain or make use of opportunities related to women empowerment.

**OPPORTUNITIES**
The range of resources or assets (material, financial, human, social, political, etc.) that are available to empower individuals, groups, or communities.

**AWARENESS**
The range of elements that reflect the consciousness, knowledge and understanding of factors, constrains, and processes surrounding women empowerment.

**MENTAL SPACE**
Range of beliefs, norms, or values held by individuals or groups or entire society, which affect attitude and behavior towards elements or processes influencing women empowerment.
Contexts of Women Empowerment

The scale or level at which women empowerment is observed or measured.
WOMEN - DIMENSIONS

- Economic Vitality
- Social, Political, Cultural
- Environmental Quality
- Safety & Security
- Education & Skills
- Health
Hurdles to Overcome?

- Capturing all Domains
- Integrating all Dimensions
- Mapping links within and between contexts
Introducing AWESOME!!

**Resistance**: elements or processes increasing or preventing women’s ability to maintain psychological, financial, social, health and welfare balance and to make discerned decisions when faced with external shocks or stressors.

**Resilience**: elements or processes increasing women’s speed of recovery from stresses or hard circumstances.

**Intervention**: Element, event, process, and/or action resulting in the change within empowerment domains and their interrelations.

**Impact/Feedback**: A change occurring within and between empowerment domains because of an intervention leading to either increase or decrease on the overall status of women empowerment at a given context(s).
Introducing AWESOME!!

**Women Vulnerability**: A state of women empowerment at a given point of time, determined as the net product of interactions between factors, constraints, interventions, and impact feedback shaping the ability of women’s choice and decision-making capacity at the individual, household and community levels.
AWESOME Goals

- Provide clear definitions and semantics for WVM and WE related concepts
- Define women vulnerability mapping requirements at various contexts, dimensions, and domains
- Effectively delineate context relations and interdependence
- Ability to measure and monitory progress overtime in quantifiable terms
- Set a solid foundation to propose interventions and model their impacts in advance over time, context, and geography
Guiding Theories
Complex System Thinking

• A functioning whole is more than the sum of its part.

• Hierarchical systems evolve from the bottom up. The purpose of the upper layers of the hierarchy is to serve the lower layers.

• The behavior of a system (e.g., increase or decrease of WE) is determined by the collective state of its subsystems and by how they interrelate.

• Systems behavior is fueled by flow of information and feedback loops among its subsystems. An imbalance in such flow affects the stability of the system leading to either growth or decline.

• Complex systems are intrinsically hazardous, containing a changing mixtures of failures hidden within them.
Theory of Change

- Provides a systemic process to design and achieve desired changes through a “causal pathway” that maps the desired changes backwards to the preconditions (activities, context and outcomes) that need to exist to result in the changes
- Helps achieve a shift from ad hoc reactions to farther-reaching and longer-term solutions
- Changes at various levels:
  - Individual, Collective
  - Top-down, bottom-up
Participatory Decision Making

- A proactive approach to identify chronic and acute threats and challenges, then deal with them
  - Economic
  - Governance/Institutional
  - Societal
  - Environmental

- Enforces resilience by increasing the “immunity” of societies either by eliminating risk threats or reducing vulnerability to them.
Some services using AI

- **Lens to look at the community as a whole**
  - A relative assessment of women’s empowerment across communities
  - What are the indicators of women’s empowerment?
  - Indicators and their scores revealing the strengths and weaknesses of a community

- **Gain insights on women’s problems and its roots in a holistic way**
  - What are the factors that empowers women?
  - What constraints the empowerment of women?
  - How does women network (interactions) within their community?

- **Focused lens on the individual vulnerabilities**
  - How far women is vulnerable to their health issues?
  - Does involvement in community activities make them feel more empowered?
  - Which are the leverage points to bring in a behavioral change towards sanitation?
  - What triggered the improvement in girls education?

- **Intelligent tools for data collection, integration and knowledge dissemination**
Whom can be benefited?

1. NGOs
2. Policy Makers
3. Social Workers
4. Government bodies
5. Local administration bodies
6. Researchers
7. Women in a community
## Some Applied domains of AI in WE

<table>
<thead>
<tr>
<th>Technical Domain</th>
<th>A scenario from the domain of WE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatio - Temporal Analysis</td>
<td>Analyse empowerment across geography and time</td>
</tr>
<tr>
<td>Exploratory Experiment Design and Analysis</td>
<td>Determine different factors of empowerment and their interplay</td>
</tr>
<tr>
<td>Natural Language Processing</td>
<td>Knowledge extraction from textual data like documents, messages, feedbacks etc.</td>
</tr>
<tr>
<td>Fuzzy models</td>
<td>To assess and measure relative concepts like ‘empowerment’</td>
</tr>
<tr>
<td>Analytical Social Networks</td>
<td>Women in the community as a network where their interactions forms the links</td>
</tr>
<tr>
<td>Simulation Modeling and Decision Support</td>
<td>To assess and measure the impact of the implementation of an intervention</td>
</tr>
</tbody>
</table>
Case Study - I

To Derive dominant factors and constraints for the current state of women empowerment

Location: Nellarachal, Wayanad, Kerala
Fieldwork: 94 houses, 10 Colonies
Implementation Phases

- Collect Primary Data
- Statistical Validation of Loops
- Revised AS-IS Systems Maps
- Consolidate into One Map System
- Drive Hot & Cold Spots of WE
The Individual Context: Initial AS-IS map for Education

The Family Context: Initial AS-IS map for Education
Initial AS-IS System Maps for other WE dimensions

Economic Vitality

Education

E-Governance

Organic Farming
Final integrated AS-IS systems map
Delineate Hot & Cold Spots of Women Empowerment

**Hot Spot**: Represents elements (individual, household and/or community) that rank lowest in one or more WE dimensions **RELATIVE** to the given context (i.e., a specific village) (that is, the one that should be prioritized for empowerment in a given dimension)

**Cold-Spot**: Represents elements (individual, household and/or community) that rank highest in one or more WE dimensions **RELATIVE** to the given context (i.e., a specific village)
Delineate Hot & Cold Spots of Women Empowerment

**Hot Spot:** Represents elements (individual, household and/or community) that rank lowest in one or more WE dimensions *relative* to the given context (i.e., a specific village) (that is, the one that should be prioritized for empowerment in a given dimension)

**Cold-Spot:** Represents elements (individual, household and/or community) that rank highest in one or more WE dimensions *relative* to the given context (i.e., a specific village)
Process Steps Ahead

1. Apply machine learning to hotspots and coldspots to delineate underlying factors contributing to differential WE over space
2. Apply machine learning to determine patterns of and factors contributing to WE state transition overtime
3. Use derived rules to simulate the impacts of interventions and possible leverage points of Women Empowerment
4. Identify the best intervention specific to the context of Nellarachal ward
Process steps ahead

Apply machine learning to hotspots and coldspots to delineate underlying factors contributing to differential WE over space

Apply machine learning to determine patterns of and factors contributing to WE state transition overtime

Use derived rules to simulate the impacts of interventions and possible leverage points of Women Empowerment

Identify the best intervention specific to the context of Nellarachal ward
Case Study - II

To design and implement software solutions for data collection, integration and dissemination

Project: Vocational Skill Training Programs
Tracking and Monitoring Skill Training Programs

Name of the Project
Pradhan Mantri Kaushal Vikas Yojana (PMKVY)

Reachability
# Skill Training Programs - 4
# Training centers - 10
# Tainers - 45+
# Students - 450+

Software Package as a solution
❖ Mobile App for Data Collection
❖ Web based data portal
❖ Cloud based data storage

Major Functional Support
❖ Day-to-day activity log
❖ Supports different types of activities
  ➢ (Training session, Center administration, Student Registration, Maintenance)
❖ Offline & Online support
❖ Reports Generation
❖ Analysis of feedbacks using NLP
Above graph demonstrates the daily updates logged through the software across the centers.

- Odisha Hub being the first center, reports maximum number of activities.

Given below is the screenshot of the mobile app that facilitates data gathering:

- 2500+ updates
- Open ended & Closed ended questions
- Image data
- Hashtags to support labelling
Text Processing to check quality of data
[Application of NLP]

Techniques for Improving Value of Data
❖ Handling mix up of languages
❖ Removal of meaningless words
❖ Removal of stop words

Observations
Even though 323 activities were reported from Odisha Hub,
❖ 25 of them included a meaningful feedback
❖ 57 of them reported challenges meaningfully

Lesser activities reported by Wayanad Hub, but they have reported their feedback and challenges much more effectively

<table>
<thead>
<tr>
<th>Centers</th>
<th>#Activities</th>
<th>#Feedback</th>
<th>#Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>odisha hub</td>
<td>323</td>
<td>25</td>
<td>57</td>
</tr>
<tr>
<td>tamilnadu hub</td>
<td>184</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>chhattisgarh hub</td>
<td>158</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>kollam hub</td>
<td>254</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>jharkhand hub</td>
<td>36</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>wayanad hub</td>
<td>237</td>
<td>42</td>
<td>136</td>
</tr>
<tr>
<td>jharkhand spoke 1</td>
<td>54</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>odisha spoke 1</td>
<td>81</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>jharkhand spoke 2</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>chhattisgarh spoke 1</td>
<td>19</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total reported</strong></td>
<td><strong>1307</strong></td>
<td><strong>1198</strong></td>
<td><strong>1203</strong></td>
</tr>
<tr>
<td><strong>Total after cleaning</strong></td>
<td><strong>1307</strong></td>
<td><strong>94</strong></td>
<td><strong>258</strong></td>
</tr>
</tbody>
</table>
Word Frequency Analysis
[Application of NLP]

(a) Word cloud generated for the Feedback given by the users across all the centers
- The general feedback of the users reflected how the training programs were running in an overall good manner.

(b) Word cloud generated for the challenges reported by the users across all the center
- Power Failure was one of the main challenge faced
- High frequency of the word ‘one’ in the challenges. Indicates a common scenario - One student finding it difficult to follow through the training
Sentiment Analysis to assess trainer’s satisfaction

[Application of NLP]

- We applied sentiment analysis on the challenges data provided by the trainers at the training centers.

> “Sentiment analysis is a contextual text mining technique that analyzes and extracts sentiments, people’s opinions, attitudes, emotions that helps to understand their sentiments towards the product, organizations, topics, events and issues”

- One third of the feedbacks were found positive.