

**Project:** Gyan CRM Mentorship Platform-**Suite (GYANCRM-S)**

**Subject Area:** Gyan CRM Mentorship Platform Tools (GYANCRM-T)

**Authored on:** 27/01/2022, and still work in progress as we at AOEC focused on the solution finding than coding the Gyan CRM Map Component

**Team:** AOEC and Senior Faculties of Sri Sharada Tutorials and DR's Academy

**Team members for the Gyan CRM Map Component and Team Suite:**

1. K.S.Venkatram      2. Abhiram      and      3. Aakkash K V

For: Hackers Earth CTR-ALT-DEBT

Submission: Gyan CRM Mentorship Platform

Problem solving: Help connect students (or mentees) to volunteering tutors (or mentors) via a Gyan CRM Map Component and Mentorship Platform that designs methodologies to address the problem statement of Gyandaan and addresses the Classroom-Teacher-Student connect dynamics problem due to the pandemic, post pandemic and social distancing scenarios.

### **About AOEC**

AOEC stands for Akaash Open Enterprise Centre (a Gap analysis and problem solving consultancy) with a team comprising of myself (K.S.Venkatram), Abhiram (Technical consultant and Operations Advisor) and Aakkash K V (BTECH Automotive Engineering).

We start with reviewing the Gyandaan problem statement.

## **Gyandaan Problem Statement**

CTRL ALT DEBT

Started: **Dec 15, 2021 06:00 AM IST**

**Ends on: Jan 27, 2022 11:59 PM IST**

Gyandaan is analogous to Shramdaan, which means voluntary contribution of knowledge. Gyandaan is made of two words, 'Gyan' means knowledge and 'daan' means donation. It means a voluntary contribution of citizens towards community education involving teaching, mentoring and helping someone in academics. It is a way of helping our society and contributing for the overall upliftment of the students specially from the underprivileged and poor backgrounds who can't afford to enrol themselves into coaching classes and other courses.

Design and develop a platform where students enrol to learn and obtain mentorship and volunteers enrol themselves to help / mentor those students.

Students mention what subjects / career goals they need help with or need mentorships. The topics can be anything from a specific topic like "trigonometry" to a broader subject like "Class 10th CBSE Math". Students can ask help for more than one topics with their preferences like time & day of the week.

Volunteers mention the areas of their expertise and their availability in a week. They can specify maximum hours they are willing to volunteer in a week.

The platform does the matching of students to volunteers and the sessions happen over electronic means like GMeet or Zoom or any similar online platform.

Use your creativity on how you make the platform engaging, safe and efficient (student to volunteer ratios).

<b>Table of contents</b>	<b>Page No</b>
<b>1. Background</b>	<b>4</b>
<b>2. Problem solving (background)</b>	<b>6</b>
<b>3. What it does (Solution and Approach)</b>	<b>8</b>
<b>4. Inference</b>	<b>10</b>
<b>5. Methodology</b>	<b>12</b>
<b>6. How we will build it</b>	<b>13</b>
<b>7. Code snippets</b>	<b>WIP</b>

## ## 1. Background

As per tradition, the past and today, the teaching methodologies and mapping of curriculums to classroom sessions form the science behind the timely supply of education. Today and since 2019, classroom environments have changed.

With the availability of virtual reality or online technology, we have Google classrooms, the G-Suite for Education helping deliver classroom sessions remotely.

We also have NPTEL that delivers technology enhanced learning to students in engineering, basic sciences and selected humanities and social sciences subjects.

NPTEL: National Programme on Technology Enhanced Learning (NPTEL) was initiated by seven Indian Institutes of Technology

We do know about online web portals but this does not mean timely supply of formal syllabus/curriculum/course outcome based education via educational institutions or different categories of service providers, in times of natural or man-made adversity or for the need to manage dynamics in time availability.

The Ministry could also air cognitive educational content via T.V. and other educational or institutional frameworks. The multimedia content for this is emerging. With all this mind, what we think is missing is a CRM bridge for any dynamic teacher-student connect or adaptive classroom environment.

Today the need for Social Accountability is a solution based on standpoints. We need to translate this to processes for Sustainable resource management, Responsive Educational System Development & Capacity Management, where educational institutions, or the facilitating businesses and/or the educational system and its links are

profiled to understand the FMCEA (Failure Mode Cause & Effects Analysis) that is critical to ensure student welfare.

Our CRM based Mentorship Platform addresses what is affecting the educational system today. It looks at social accountability to address the changing classroom environment and teacher-student connect. Our idea for mentorship innovatively helps both the poor, underprivileged and regular students.

## **## 2. Problem solving (background)**

Our Gyan CRM bridge uses a Design and Deliver framework & platform that helps a mentor (or volunteer) commit a level of learning assistance to the mentee. Our bridge includes specific learning functions such as

1. Level of mentorship (or tutoring) that is Basic, Intermediate, Advanced
2. Domain of mentorship (or tutoring) that is School and Pre-university level based or Undergraduate level based...
3. Gyan components (Gyan CRM Products or Gyan CRM Services)
4. A K-Choreograph that includes a Mentor-Mentee cycle and mentorship platform specific cycles such as a Mentor-Resource Allocation cycle, a Mentor-Process Management cycle etc
5. A Platform specific Network such as the Internet/Mobile /new CRM specific connectivity services etc
6. A Scalability factor (such as long duration Mentor-Mentee cycles and additional Mentees cycles)
7. A Pairing/Un-pairing Factor that uses 2-way ANOVA to determine the pairing in the Mentor-Mentee cycle, the Choreograph-Fast Track cycle

## **## Our Sense and Respond solution finding**

Our in-time problem solving via the bridge identifies that, what is needed, is the use of practices like Customer Relationship Management

With CRM, the projected insight is that we will be soon able to

- (i) Bridge Quality of Service gaps for learning assistance, outcome management and volunteered or prescriptive mentorship
- (ii) Scale up for choreographed accountability ensuring we can develop platforms, products and services as part of a management framework that can be fast tracked or adaptive (like all the Classroom-Teacher-Student e-Connect solutions available today), but is more conformant and sustainable for the educational system, which we state is evolving to keep up with remotely teaching students.

This potential management framework will include a choreographed mentor-mentee connect that can be leveraged by any institution, business or faculty expecting to address the issues of less conformant classroom-teacher to student (end to end) facilitation or volunteered learning guidance.

### **## 3. What it does (Solution and Approach)**

The GYANCRM-S and its tools implement a Mentorship platform Map based Platform-Mentor-Mentee Search, Recommend and Connect solution via

[a] Recommendation Engine/System solutions

[d] Search, Recommend and Connect solutions (with Classification or Supervised Learning) for Degrees of freedom, a Degree of Social Accountability and a Degree of Risk mitigation based on Post Pandemic and Environment factors

The Gyan CRM Map Component and its tools will help a mentee or student search for mentorship recommendations based on

1. Popularity of the Mentor
2. Content such as Domain, Area of mentorship, Subjects, Topics, Lessons, Course objective learning assistance
3. Classifications such as
  - a. Availability
  - b. Pre-requisite criteria
  - c. Topic modeling
  - d. Regular / Fast Track Schedules
  - e. Channels for online lessons
  - f. Case studies
  - g. Feedback (Positive, Negative, Comments (using the TFIDF practice)
  - h. Non-parametric criteria such as Nearest neighbor



4. Collaborative Filtering such as User-User collaborative filtering (that is mentee-mentee collaborative filtering) and Item-Item collaborative filtering (that is Subject-Subject, Topic-Topic, Lesson-Lesson)
5. Model categorization or Mentorship Platform categorization such as
  - a. Window functions (both Rolling and Expanding window functions)
  - b. Correlation (such as Environmental Factors Management, Risk Management, Time Interaction Performance (TIP) theory, Touch Point performance, Priority Area guidance, Schedules, Costs)
  - c. Time Series Forecasting based on the Pairing factor principle

## ## 4. Inference

We infer that a Gyan CRM Machine Learning Process is needed where it should involve the following steps

1. Define the mentorship platform problem, like the mainline classroom-teacher-student connect dynamics or the Gyandaan specific call for machine learning to help students enrol to learn and obtain mentorship and volunteers enrol themselves to help / mentor those students
2. Describe the problem based on Task, Experience and Performance
3. Ask / Assess the need for a solution based on the R2E CRM model and its different degrees of freedom, degree of social accountability and degree of CCMA / risk mitigation
4. Data collection using Enrolment/ Analytics / Surveys / Feedback
5. Prepare the data for machine learning via
  - a. Cleaning
  - b. Formatting
  - c. Sampling
  - d. Decomposition
  - e. Scaling
6. Select the algorithm based on
  - a. Classification, Regression, Clustering
  - b. Recommendation Systems.

7. Train the algorithm based on Pairing factors
8. Evaluate the performance based on Test data, use this to tune the pairing factors or parameters such as (1) Gyan Product / Service components, (2) Gyan CRM Choreographs (3) Levels of mentorship
9. Start using the model to plan, implement, manage and improve mentorship

For the prototype/model possible, you need to refer to the Code excerpts we have included as a proof of concept

## ## 5. Methodology

In the solution,

1. The Mentorship Platform codifications in the repository are clustered using a combination of
  - (a) **Text-analytics** of “text fields” with select choreographed mentor-mentee connect descriptions,
  - (b) **“trainable qualified-choreographed connect-experiences”**,
  - (c) **“trainable qualified-choreographed connect-information”** and
  - (d) **a categorization variable** that categorizes the nature of choreographed learning assistance, that is whether the recommendation is based on new Pairing factors, Data collection, Responsiveness.
2. The Text-analytics technique is based on **Word2Vector**
3. The clustering technique is based on **DBSCAN**
4. The **Cosine similarity algorithm** is used to classify choreographed learning assistance to fit within one of the buckets created (where this is based on text categorization)
5. `sklearn.neighbors` , `sklearn.linear_model`, `sklearn.model_selection` and `sklearn.metrics` – to import Logistic Regression, `train_test_split` and `accuracy_score` for choreographed mentor-mentee connects or choreographed learning assistance

## **## 6. How we will build it**

We at AOEC are developing the idea using the Python & Anaconda framework and different libraries for Recommendation systems, data analysis, array processing, Natural language processing, Text-analytics & clustering, visualizing of clusters, **choreographed learning assistance/mentor-mentee connect** description similarity

An enrolment form could include data such as

**1. Name**

**2. Type of enrolment: Tick as applicable**

**Student / Mentor / Service provider**

**3. Location**

**4. Address**

**5. Domain**

**6. Area of mentorship**

**7. Subjects**

**8. Topics**

**9. Lessons**

**10. Course objective learning assistance**

**11. Timing: Tick as applicable**

**a. Anytime/ During [ From \_\_\_\_ To \_\_\_\_ ]**

**b. Anywhere / Neighboring location/ Suitable location**

**c. Anyhow mode/Classroom mode/Online mode/Combo**

**d. Learning assistance/mentor-mentee connect preferences:**  
**Microsoft Teams/ Google classroom/ Zoom/ Volunteered solutions**  
**for Virtual classrooms**

**d. Planned sessions / Request and respond sessions / Subscription**  
**based sessions**

**12. At individual level, Health / Ability parameterization: Tick as**  
**applicable**

(1) **Physical ability** like Normal/Afflicted/Sick/Differently able

(2) **Mental ability** Normal/Afflicted/Sick/Differently able

(3) **Acclimatized ability** for this platform, like Knowledgeable/  
Partially knowledgeable/Not acclimatized

(4) **Accountability to assist like** Experienced/have Intermediate level  
Experience/New/Cannot help currently)

(5) **Health parameterization like** (Physical help needed for  
mobility/Companionship needed/Handicapped/Use different wear-  
ons that accentuate behavioral or stress vulnerability (Artificial limbs  
or prosthetics; Aids for hearing or speaking; Pacemaker for the heart)

**13. Agree to Participate in Lexio Ontology and the data (key metrics**  
**and drivers): Yes/No/Not sure now**

**For our promo, we recommend Supervised Learning for the Mentorship Platform experience to report data (key metrics and drivers) that can be converted into a data story via Lexio and a concept called Supervised Learning Ontology (URL: <https://narrativescience.com/data-storytelling>)**

**The implementation can be planned in the following manner:**

- 1. Define a GYANCRM cloud data warehouse that is integrated to a GYANCRM Mentorship Platform**
- 2. Let Lexio connect to the GYANCRM cloud data warehouse**
- 3. Understand the Context by mapping to the Lexio Ontology and the data (key metrics and drivers), thereon the Authoring engine determines what is to be written as Mentorship Platform Experience based on the related, adaptive or fixed questions for assistance, Lexio then runs analytics using Natural Language Processing & Generation to come up with a data story**
- 4. Lexio can then deliver briefs or what is to be read next insights**
- 5. Lexio can empower action by recipients or subscribers to comment, further share within Mentorship Platform groups and request for notification**

**This can create a data driven culture for Mentorship Platform Experiences and at the next level for *visual, tactile, auditory experiences via Gyan CRM Products/Services/Allied innovation. This is done by empowering every stakeholder, responder, interested party to report data that can then be a data story that can be read and experienced***

## **The Supervised Learning Ontology could use**

- Process-oriented factors
- Performance factors
- Gyan Product / Service components
- Gyan CRM Choreographs
- Levels of mentorship



## **## The details of the libraries follow:**

Specific libraries to load data, perform computation and display output are

- (a) Pandas – Data acquisition library
- (b) numpy – Array processing library
- (c) nltk.data and nltk.corpus – Natural language processing library
- (d) gensim and gensim.models – for text analytics and clustering, where the Word2Vector function is used
- (e) gensim.models.keyedvectors – to import keyed vectors
- (f) matplotlib – for visualizing clusters
- (g) sklearn.cluster – to import DBSCAN for clustering
- (h) sklearn.metrics.pairwise – to import cosine-similarity to find out sense and respond assistance description similarity
- (i) keras.datasets – to import the CIFAR-10 dataset
- (j) keras – to create a Convolutional Neural Network
- (k) scipy.misc - to import image functions
- (l) sklearn.neighbors – to import Nearest neighbors
- (m) statsmodels.tsa.stattools – to import adfuller
- (n) statsmodels.tsa.arima\_model – to import ARIMA
- (o) sklearn.linear\_model – to import Logistic Regression
- (p) sklearn. model\_selection – to import train\_test\_split
- (q) sklearn. metrics – to import accuracy\_score

(r) imblearn. over\_sampling – to import SMOTE

**Work in progress**

## **## Code snippets in the basic proof of concept for a Mentorship Platform tool that clusters / trains learning assistance**

(1) To import libraries and functions

(2) To load data

**Work in progress**