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Multi Feature Immigration Handling and Recommendation Model for Improved Migration Management Using Remittance and Psychology

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Abstract

Immigrant management and recommendation has been approached with several approaches. However, the existing models does not handle the problem with most efficient way as they does not consider variety of features related to the problem. To support the problem, an efficient multi feature immigration handling and recommendation model (MFIHRM) is presented in this article. The MFIHRM model focused on considering remittance provided to the immigrant and psychology of the migrant in handling them with more efficient way. To perform this, the immigrant data set has been utilized to obtain features like purpose of migration, educational standard, economic support, lifestyle, criminal records, remittance of country, and behavior of migrant. The data set has been preprocessed to eliminate the noisy records by applying Deep Averaging Technique. From the normalized data set, the method extracts the above mentioned features. With the features extracted, the method performs Immigrant Management by computing various support measures like Migration Target Support (MTS), Educational Support (ES), Economic Support (EcS), Social Support (SS), Remittance Support (RS). Using these support values, the method computes Migration Handling Measure (MHM). Similarly, the method performs Migration Recommendation by computing Migration Score (MS) for various countries to produce recommendations. The proposed method improves the performance of migration management and recommendation handling.

Keywords: *Management, Recommendation, Remittance, MFIHRM, MS, MHM.*

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1. Introduction

Migration of people between countries has been identifies as the key issue in many countries in recent times. The peoples of various countries move to another country for their personal, professional, and business needs. The changing economic conditions of many countries induce the peoples of the country to migrate to another country every year. For example, the younger society moves to another country for their education or professional needs. In case of educational migration, the people would complete their education in abroad and stay there for long years by getting employment but only few are returning to their own country after their completion of study. This increases the population in the migrated country and introduces employment challenges in the country as the migrated people took the jobs of own country people. This introduces challenges for the country in providing entry pass for the immigrant. Also, there are refugees who migrate to a country and this also introduces economic and employment challenges.

Apart from the challenges introduced by the immigrant, the selection of the country for migration is the problem for the immigrants. This article introduces such a recommendation model by analyzing the various factors of migration. Towards this, there are number of issues to be analyzed in detail in this part. First, the economic support produced by the immigrant to the country should be considered. By providing good economic support to the country, the immigrant as well as the country would be get developed. In this case, the economy of the country would get developed according to the educational support of the person. When the migrant is well educated, he would be more supportive for the development of the country. On the other side, the social support of the migrant must be considered. The social support of the person can be analyzed based on the behavior of the person and their lifestyle.

On the other side, the remittance support provided by the person should be analyzed. It has been analyzed based on the ratio of income being spent on the migrated country. If the person is intended to send the entire income to the own country then it would not be liked by the migrated country. Similarly, the psychology of the person should be analyzed for the migration management. It has been performed by considering the feedback of the migrant obtained through number of questions. By considering and analyzing these factors the migration management can be performed effectively. This article is focused on considering such multiple features towards efficient migration management and produces recommendations accordingly. The proposed MFIHRM model computes Migration Handling Measure (MHM) to perform migration management and estimates Migration Score (MS) for various countries to produce recommendations. The working of the model is detailed in the section 3. The article is structured to provide detailed introduction on Section 1, and Section 2 details the related methods of migration management. Section 3, briefs the working of the proposed model and evaluation results are detailed in Section 4. The conclusion is discussed in Section 5.

2. Related Works:

The methods of migration management and recommendation are analyzed and discussed in this section.

The impact of migrants in religious society is analyzed by Sweden church in [2], which analyze the impact of the refugees in integrating them with their own society. Also, they consider the psychology of the employees in the church about their integration.

An anthropological effect in diaspora forming in Ukrainian is discussed in [3], which consider the heritage reflection with the context of diaspora-forming. The possible psychological first aid to be given to the Mexican refugees is presented in [4], which analyzes the support of volunteers in providing first aid for them in a long term basis. Towards migrant management, how the local immigration partnership (LIP) can be used

is studies in [5], which works according to the lifestyle, family and affordability of house for them. The method focused on fitting the migrants with the market as per the skills they have and the government policy.

On the other side, the difference in attitude and education between the societies of minority and majority community is focused in migration management [6]. A local policy based decline model (LPDM) is sketched in [7], by integrating peoples in the rural and cities of Netherland. The issues behind integrating women staffs of NGO over the field of migrants with lesbian, bisexual and queer migrant [8], which target on the protection of staffs in the migrated country. The implication of income trajectories and the effect of integration in long term and short term is presented with a Longitudinal Immigration Database (IMDB) model [9].

The mobility of education and attitude in immigration is discussed in [10], which studies the mobility of education in different up and down streams.

The effect of sociopolitical violence challenged by the Venezuelan migrant and refugee women and girls (VMRWG) is discussed in [11], which performs a cross study using the Participatory Action Research (PAR). Different articles are published for the justice and rule by US against the migrants in [12]. Various challenges in integrating the refugees with their own society is presented in [13], with the non-availability of required policies.

A policy based integration and recommendation model is sketched in [14], which consider the house, life, legal status, emotion and employment features. The strategies to be integrated for in providing health service for the refugees is presented in [15], which uses various policies to predict the obstacles using the population centric approach.

The methods are focused on risk analysis, recommendation and migration management with small set of features which challenge their performance.

3. Multi Feature Immigration Handling and Recommendation Model (MFIHRM):

The proposed multi feature immigration handling and recommendation model (MFIHRM) uses the migration data set and consider purpose of migration, educational standard, economic support, lifestyle, criminal records, remittance of country, and behavior of migrant. The data set has been preprocessed to eliminate the noisy records by applying Deep Averaging Technique. From the normalized data set, the method extracts the above mentioned features. With the features extracted, the method performs Immigrant Management by computing various support measures like Migration Target Support (MTS), Educational Support (ES), Economic Support (EcS), Social Support (SS), Remittance Support (RS). Using these support values, the method computes Migration Handling Measure (MHM). Similarly, the method performs Migration Recommendation by computing Migration Score (MS) for various countries to produce recommendations.

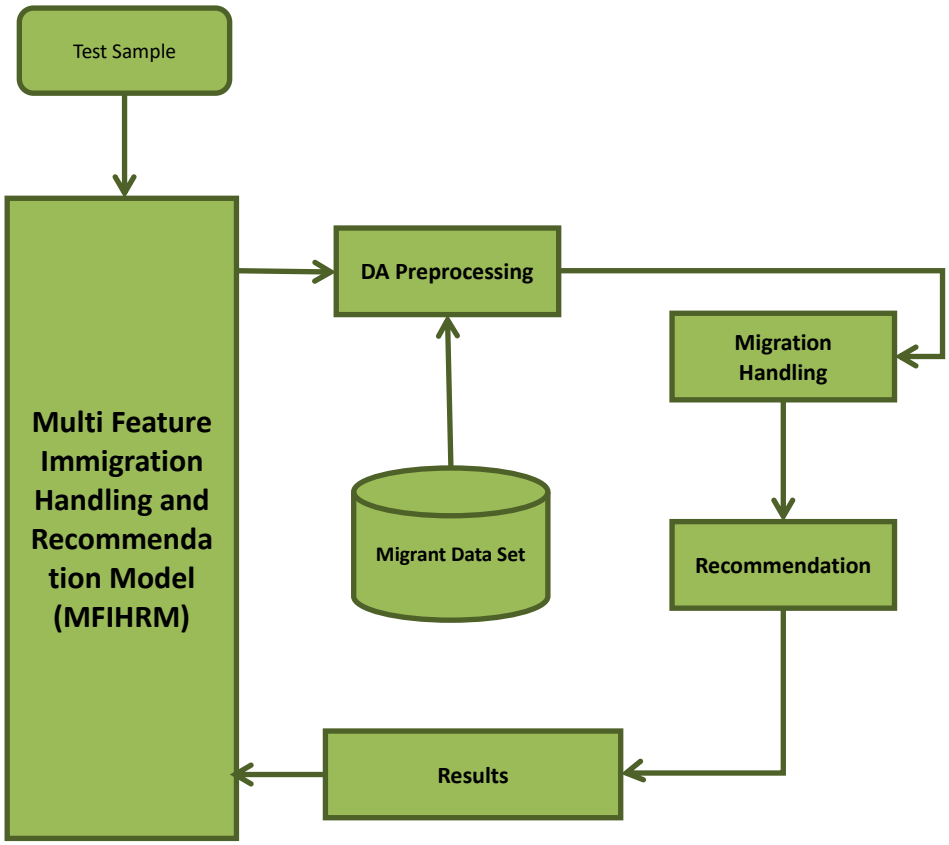

Figure 1: Architecture of MFIHRM Model

The working model of proposed MFIHRM model is presented in Figure 1, where the functional components of the model are detailed in this section.

DA Preprocessing:

The deep averaging preprocessing algorithm fetches the data set given and finds the set of features. With the feature set, the method estimates the feature averaging score (FAS) for each feature by counting the values of each tuple at the feature. With the FAS value, the method traverses through each record, and adjust the missing values with the concern FAS value. IF the trace is missing with the feature then it has been removed where the trace with missing value has been adjusted with the FAS value. The normalized data set has been utilized to support the migration management and recommendation process.

Algorithm:

Given: Migration Data set Mids.

Obtain: Normalized data set Nds.

Start

Read Mids.

Find Feature set Fset = $\left(\sum_{i=1}^{size(Mids)} Features(Mids(i)) \ni Fset\right) \cup Fset$

For each feature F

Compute Feature Averaging Score FAS.

$$FAS = \frac{\sum_{i=1}^{size(Mids)} Mids(F) where\ F\ is\ Numeric}{Size(Mids)}$$

Generate Value Set FVS

$$= (Mids(F) \cup FVS) where\ F\ is\ AlphaNumeric \quad i = 1 \text{ to } size(Mids)$$

End

For each trace T

For each Feature F

If F is numeric && F is null then

T(F) = FAS(F)

Else-if F is alpha numeric && F is null then

T(F) = Rand(F(Fvs))

End

If T∋ F then

Mids = Mids ∩ T

break

End

End

Nds = Nds ∪ T

End

Stop

The Deep averaging normalization technique preprocess the data set by removing the noisy records at the feature level and adjust the missing values by computing FAS score for the specific feature. The normalized data set has been used to perform migration management and recommendation.

Migration Handling:

The migration handling algorithm fetches the preprocessed and normalized data set produced at the previous stage. The normalized data set has been further used to compute Migration Target Support (MTS), Educational Support (ES), Economic Support (EcS), Social Support (SS), Remittance Support (RS). Using these support values, the method computes Migration Handling Measure (MHM). The value of MTS is measured according to the value of ranking provided by the immigrant for the country being considered and the value of ranking provided for others. Similarly, the method computes the value of Education score (ES) according to the education selected and the institutions provide such service. Also, the method computes the Economic support (ECS) according to the economic status of the person and the number of opportunities available for the class. Also, the method computes the social support according to the lifestyle of the person, religion of the person. Similarly, the method computes the remittance support (RS) based on the value of amount being remitted to his own country. Using all these measures, the method computes the value of MHS to be used in ranking.

Algorithm:

Given: Normalized data set Nds, Country C, Course Co, Economic State Ecos, Meta data md

Obtain: MHS.

Start

Read Nds, C, Co, Md.

Identify Country set Cs = $\sum_{i=1}^{size(Nds)} Nds(i).Country == C$

Compute MTS = $\frac{\sum_{i=1}^{size(Cs)} CS(i).Ranking \Big/ Size(Cs)}{\sum_{i=1}^{size(Nds)} Nds(i).Ranking \Big/ Size(Nds)}$

Compute Education Support ES = $\frac{\sum_{i=1}^{Size(Cs)} Count(Cs(i).Course==Co)}{\sum_{i=1}^{Size(Cs)} Count((Us=Cs(i).Institute \ni Us) \cup Us)}$

Where Co is the course and Us is the university.

Compute Economic Support EcS = $\frac{Ecos}{Md.Opps}$

Compute Social support Ss = $\frac{1}{Religion} \times Lifestyle$

Compute Remittance Support Rs = $\frac{\sum_{i=1}^{Size(Cs)} CS(i).Remittance\ where\ Cs(i).Home==H \Big/ size(Cs)}{\sum_{i=1}^{Size(Cs)} CS(i).Salary\ where\ Cs(i).Home==H \Big/ size(Cs)}$

Where H is the home country.

Compute MHS = $\frac{MTS}{Ss} \times \frac{Es}{Ecs} \times Rs$

Stop

The above discussed algorithm computes MHS value for a given country according to various factors and support values. The estimated value has been used to perform recommendation.

Recommendation:

The proposed approach performs Migration Recommendation by computing Migration Score (MS) for various countries to produce recommendations. The value of Migration score is measured according to the migration handling score (MHS) computed for any country and the ratio of migration approved. The method reads the data set and preprocesses the data set with the Deep Averaging normalizing technique. With the preprocessed set, the methods performs migration handling to compute MHS value and computes the migration frequency for various countries. Using these two values, the method computes the value of Migration Score to rank the countries as recommendation.

Algorithm:

Given: Migration data set Mds, Meta data md, Test sample T

Obtain: Recommendation Rm

Start

Read Mds, Md, T.

Nds = Perform DA Preprocessing (Mds)

For each country C

MHS = Perform Migration Handling (Nds, C, T.course, T.Economy state)

Compute Migration Frequency MF.

$$MF = \frac{\sum_{i=1}^{size(Nds)} Count(Nds(i).Country==C \;\&\&\; Nds(i).Approval==Yes)}{\sum_{i=1}^{size(Nds)} Count(Nds(i).Country!==C \;\&\&\; Nds(i).Approval==Yes)}$$

Compute Migration Score Ms = MHS×MF

End

Recommendation Rm = Sort Countries with Ms.

Stop

The above discussed recommendation algorithm computes MHS and MF values for the countries identified. Using these values, the method computes the value of MS to be used to perform ranking.

4. Results and Discussion:

The proposed Multi Feature Immigration Handling and Recommendation Model (MFIHRM) model has been implemented and evaluated for its performance. The performance of the method is measured at the presence of different number of traces in the data set. The results generated by various models are counted and mapped with the performance of others.

Table 1: Experimental Details

Parameter	Value
Data set	Mexican data set
No of features	20
No of traces	1 million

The experimental setup used to evaluate the performance of proposed model is presented in Table 1. Accordingly, the performance of the method are measured and compared with the results of other approaches.

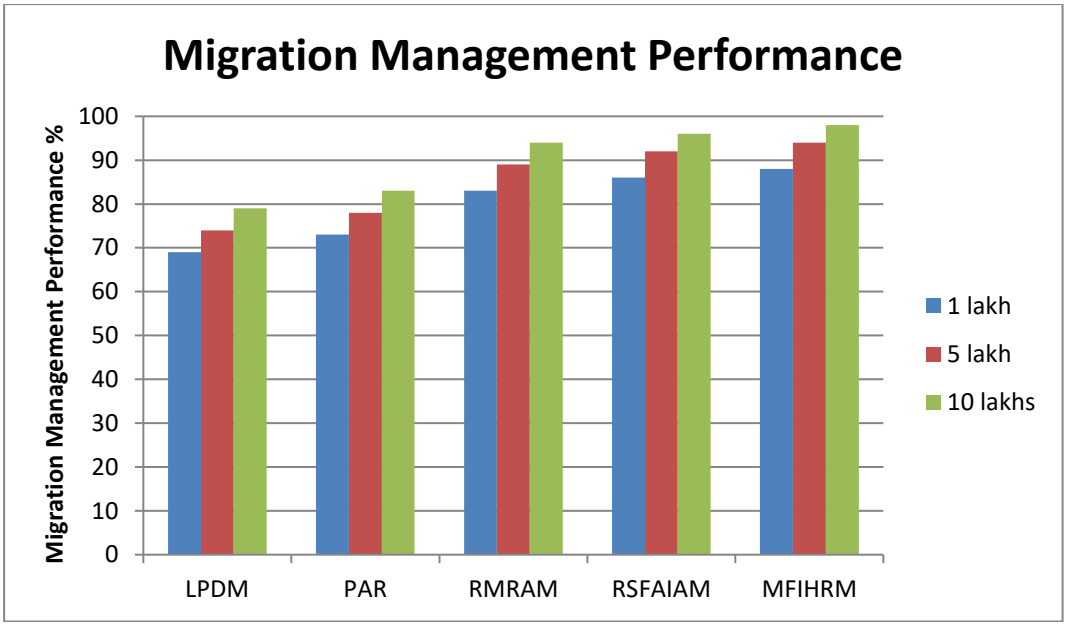

Figure 2: Migration Management performance

The performance in migration management introduced by various models are estimated and presented in Figure 2, which denotes the proposed MFIHRM model introduces higher accuracy up to 98%.

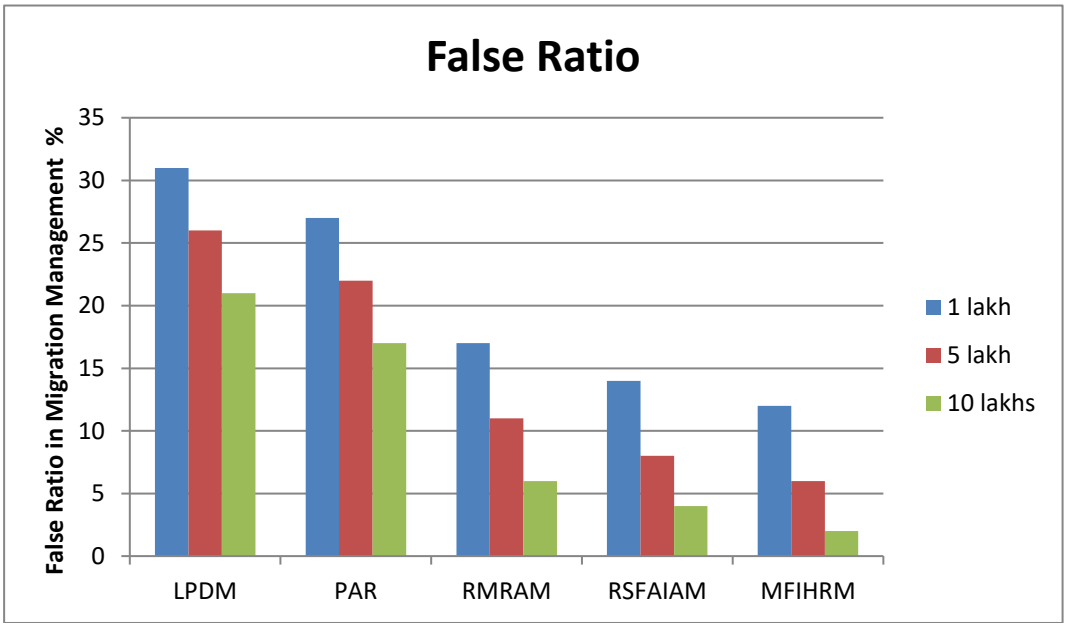

Figure 3: False Ratio in Migration Management

The false ratio introduced by the models in migration management is measured and compared with the results of other methods in Figure 3. The proposed MFIHRM model introduces less false ratio than other approaches.

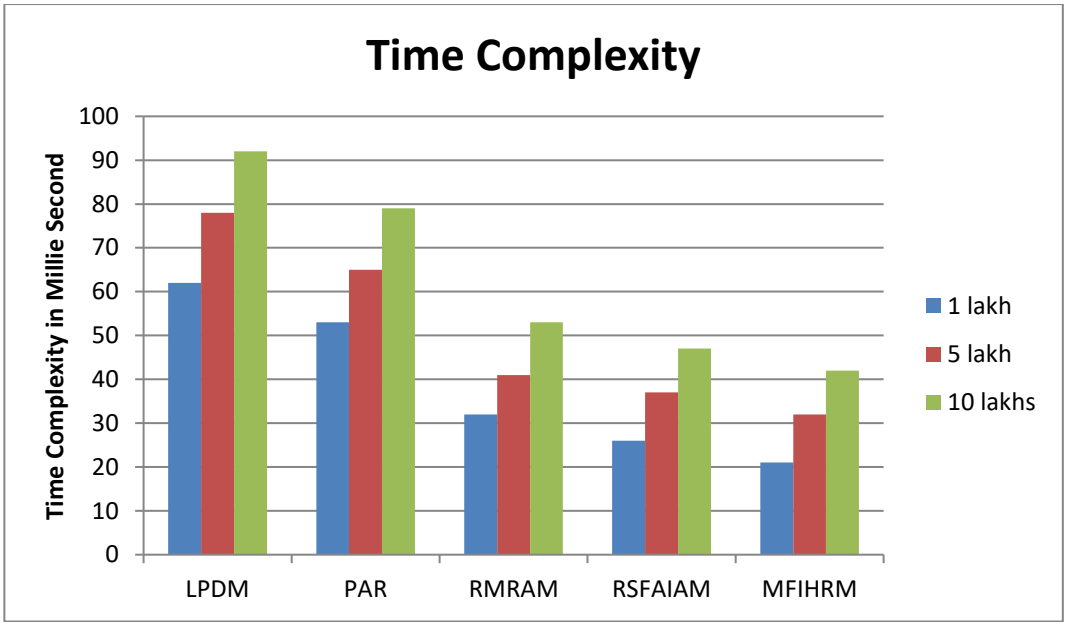

Figure 4: Analysis on Time Complexity

The value of time complexity produced by various approaches are counted and compared in Figure 4. The proposed MFIHRM model produces less time complexity in all the cases.

5. Conclusion:

This article presented an efficient Multi Feature Immigration Handling and Recommendation Model (MFIHRM) towards migration management. The model preprocesses the data set given with deep averaging technique and applies Migration handling to compute the value of Migration Handling Support (MHS) and performs recommendation by computing Migration frequency and Migration Score. According to the migration score the method ranks the countries according to the migration score. The ranked results are produced as recommendation for the users. The proposed approach improves the performance of risk analysis up to 98%.

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