LiBerated Social Entrepreneur
Using Business Metrics:
Migport Refugee Big Data Analytics

G.-W. Weber & B. Kjamili

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"Associated Project"

Knowledge Acceleration by Competences and Multivariate Adaptive Regression Splines

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Commercial Entrepreneur

Business metrics:
- Profit
- Revenue
- Increases in stock prices

Social Entrepreneur

Positive “return to society”

and, therefore,

belief that one has to use different metrics
Problems

Commercial Entrepreneurship = Profit
Social Entrepreneurship = Social Impact

Commercial Entrepreneurship: long run and creative destruction
Social Entrepreneurship: no creative destruction

Social entrepreneurship does not have products yet.

The perception problem of social entrepreneurs should use different metrics rather than for-profit entrepreneurs.

Geographical differences between developed and developing countries.
LiBerated Social Entrepreneur

Profit leads to Social Impact

“Middle Position Entrepreneur”

Business Metrics:
profit, revenue, products, stock prices

Social Impact:
employee profile, mission, vision, technology
Methods

- Definitions formulated by Knight, Schumpeter and Baumol
- Schumpeter’s creative destruction, monopoly
- Defining terms for social entrepreneurship, for-profit, non-profit
- Adam Smith’s 3 diversification model
- Demand-supply analysis
- Brand management and advertisement strategies
- Statistical data, financial derivatives, bonds
- Canvas model and Human Centered Design
Real-Life Examples

Professor Muhammad Yunus
Empowerment Plan
METU International Students Association
Migport Refugee Portal

Proof

Reduction in poverty and share of employment
Max-Flow - Min-Cut Theorem
Game Theory
Business Model

1) Problem
2) Solution
3) Product
4) Social Impact

a) Short Run
b) Medium Run
c) Long Run

5) Customers
6) Channels & Partners
7) Start-up Summary
8) Competition

10) Revenue
11) Profit = R - C
9) Cost
Introduction

*Learning* from data has become very important in every field of science and technology, e.g., in

- financial sector, economics,
- quality improvement in manufacturing,
- computational biology, bioinformatics, medicine,
- earth- and geosciences, engineering,
- social sciences, and humanities.

Learning enables for doing estimation, modeling and prediction.
Introduction

*Learning* named as

- Statistical Learning,
- Deep Learning,
- Theory of Inverse Problems,
- Data Mining,
- Analytics, and
- Artificial Intelligence.
Introduction

2 Projects:

• **Big Data Analytics** for **Knowledge Acceleration by Competences**:
  
  modeling of a *profession* (supply for a *labor market* demand in Greater Poland Province),

• **Small Data Analytics** for **Knowledge Acceleration by Competences**:
  
  modeling of *significance* (in *labor markets* of several European Erasmus partner countries),
MARS: Multivariate Adaptive Regression Splines

• To estimate general functions of high-dimensional arguments.

• An adaptive procedure.

• A nonparametric regression procedure.

• No specific assumption about the underlying functional relationship between the dependent and independent variables.

• Ability to estimate the contributions of the basis functions so that additive and interactive effects of the predictors are allowed to determine the response variable.

• Uses expansions in piecewise linear basis functions of the form

\[c^+(x, \tau) = [+(x - \tau)]_+, \quad c^-(x, \tau) = [-(x - \tau)]_+.\]

\([q]_+ := \max \{0, q\}\)
MARS

Let us consider

\[ Y = f(X) + \varepsilon, \quad X = (X_1, X_2, \ldots, X_p)^T. \]

The goal is to construct reflected pairs for each input

\[ X_j \quad (j = 1, 2, \ldots, p). \]
MARS

• Set of basis functions:

$$\varphi := \left\{ (X_j - \tau)_+, (\tau - X_j)_+ \mid \tau \in \{\tilde{x}_{1,j}, \tilde{x}_{2,j}, \ldots, \tilde{x}_{N,j}\}, j \in \{1, 2, \ldots, p\}\right\}.$$ 

• Thus, \( f(X) \) can be represented by

$$Y = \theta_0 + \sum_{m=1}^{M} \theta_m \psi_m(X^m) + \varepsilon.$$ 

• \( \psi_m \) \((m = 1, 2, \ldots, M)\) are basis functions from \( \varphi \) or products of two or more such functions; interaction basis functions are created by multiplying an existing basis function with a truncated linear function involving a new variable.

• Provided the observations represented by the data \((\tilde{x}_i, \tilde{y}_i) \ (i = 1, 2, \ldots, N)\):

$$\psi_m(x^m) := \left[ s_{i,j} \cdot (x^m_{i,j} - \tau^m_{i,j}) \right]_+, \quad$$

where \( x^m \) : subvectors of \( x \).
MARS

Two subalgorithms:

(i) \textit{Forward stepwise algorithm:}

• Search for the basis functions.
• Minimization of some \textit{“lack of fit” criterion}.
• The process stops when a user-specified value $M_{\text{max}}$ is reached.
• Overfitting.

(ii) \textit{Backward stepwise algorithm:}

• Prevents from over-fitting by decreasing the complexity of the model \textit{without degrading the fit to the data}. 
PRSS for MARS:

\[ PRSS := \sum_{i=1}^{N} (y_i - f(\tilde{x}_i))^2 + \sum_{m=1}^{M_{\max}} \phi_m \sum_{\|\theta\|=1}^{2} \sum_{r<s \in V(m)} \int_{Q^m} \alpha_m^2 [D_{r,s}^{\theta} \psi_m(t^m)]^2 dt^m \]

\[ D_{r,s}^{\theta} \psi_m(t^m) := \left( \frac{\partial^\theta \psi_m}{\partial t_r^m \partial t_s^m} \right)(t^m) \]

- **Tradeoff** between both accuracy and complexity.
- For a compact representation, we rewrite:

\[ PRSS = \|y - \psi(\tilde{b}) \alpha\|^2 + \phi \|L\alpha\|^2. \]

Tikhonov regularization

CMARS
CQP for MARS:

- **Conic quadratic** programming:

  \[
  \begin{align*}
  &\text{minimize} \quad t \\
  &\text{subject to} \quad \|\psi(\tilde{b})\alpha - y\|_2 \leq t, \\
  &\quad \|L\alpha\|_2 \leq \sqrt{M}.
  \end{align*}
  \]

- CQPs belong to the **well-structured** convex problems.

- *Interior Point Methods.*

- Better **complexity** bounds.

- Better **practical** performance.
Big Data Analytics with MARS for Knowledge Acceleration by Competences

modeling of a profession – supply for a labor market demand in Greater Poland (or Indonesian, Turkish …) Province.
Big Data Analytics with MARS for Knowledge Acceleration by Competences

Big Data Analytics with MARS for Knowledge Acceleration by Competences

Datasets

Train
Validation
Test
Big Data Analytics with MARS for Knowledge Acceleration by Competences

Datasets

Train
Validation
Test
Simulation
Simulation with MARS

different levels of fulfillment

different realizations of competences
Small Data Analytics with MARS for Knowledge Acceleration by Competences

modeling of *significance* –
in labor markets of several European Erasmus partner countries.
Small Data Analytics with MARS
for Knowledge Acceleration by Competences

After including Time as another input variable, the MARS model shows some improvement:

- Based on MAPE (mean absolute percentage error), accuracy error is around 17% - better than without the input variable Time.

- The following variables turned out to be significant:

  Average Acceleration of Creativity,
  Average Acceleration of Communicativeness,
  Number of Students,
  Rank of the Method in Matrix,
  Average Acceleration of Teamwork,
  Starting Time of the Method.
Results with MARS

- We study on 3 different MARS models with 26 inputs and different data sets.

- For Model 1, $\hat{Y}_1$, we apply MARS algorithm on 100 data with considering first 17 inputs.

- For Model 2, $\hat{Y}_2$, we extend our data size and we obtain MARS model using 340 data with regard to same (first 17) inputs.

- For Model 3, $\hat{Y}_3$, to improve our model performance, especially based on MAPE, we add Time as a new input and we use MARS algorithm on 340 data with regard to 26 inputs.

<table>
<thead>
<tr>
<th>$Y$</th>
<th>Average acceleration of Entrepreneurship</th>
<th>$X_{14}$</th>
<th>Masculinity (Hoffstede)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_1$</td>
<td>No of students</td>
<td>$X_{15}$</td>
<td>Uncertainty Avoidance (Hoffstede)</td>
</tr>
<tr>
<td>$X_2$</td>
<td>Rank of the method in matrix</td>
<td>$X_{16}$</td>
<td>Long-Term Orientation (Hoffstede)</td>
</tr>
<tr>
<td>$X_3$</td>
<td>No of the method in the process</td>
<td>$X_{17}$</td>
<td>Indulgance (Hoffstede)</td>
</tr>
<tr>
<td>$X_4$</td>
<td>No of the process</td>
<td>$X_{18}$</td>
<td>Timeline of the process</td>
</tr>
<tr>
<td>$X_5$</td>
<td>Size of tested group</td>
<td>$X_{19}$</td>
<td>Timeline of the method</td>
</tr>
<tr>
<td>$X_6$</td>
<td>Number of meetings</td>
<td>$X_{20}$</td>
<td>Start of the process</td>
</tr>
<tr>
<td>$X_7$</td>
<td>Number of test groups</td>
<td>$X_{21}$</td>
<td>End of the process</td>
</tr>
<tr>
<td>$X_8$</td>
<td>Duration of testing (min)</td>
<td>$X_{22}$</td>
<td>Starting time of the method</td>
</tr>
<tr>
<td>$X_9$</td>
<td>Average acceleration of Creativity</td>
<td>$X_{23}$</td>
<td>Ending time of the method</td>
</tr>
<tr>
<td>$X_{10}$</td>
<td>Average acceleration of Communicativeness</td>
<td>$X_{24}$</td>
<td>Cycle of the study</td>
</tr>
<tr>
<td>$X_{11}$</td>
<td>Average acceleration of Teamwork</td>
<td>$X_{25}$</td>
<td>Year</td>
</tr>
<tr>
<td>$X_{12}$</td>
<td>Power Distance (Hoffstede)</td>
<td>$X_{26}$</td>
<td>Semester</td>
</tr>
<tr>
<td>$X_{13}$</td>
<td>Individualism (Hoffstede)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Results  Small Data Analytics with MARS

- For MARS algorithm, first, the maximum number of BFs ($M_{max}$) and the highest degree of interactions are defined and, then, the optimally estimated models with reduced number of BFs are constructed for each model.

- For Model 1, $\hat{Y}_1$, $M_{max}$ is assigned to be 20, and the highest degree of interaction is assigned to be 3. Following the Backward Stage of MARS, the number of BFs are shortened to 6. Consequently, the final Model 1 of MARS is represented as:

$$\hat{Y}_1 = \alpha_0 + \alpha_1 \max\{0, x_3 - 0\}$$
$$+ \alpha_2 \max\{0, x_4 - 2.125\} \cdot \max\{0, 3 - x_1\} \cdot \max\{0, x_3 - 0\}$$
$$+ \alpha_3 \max\{0, 3 - x_4\} \cdot \max\{0, x_1 - 1\}$$
$$+ \alpha_4 \max\{0, x_2 - 23.2\}$$
$$+ \alpha_5 \max\{0, x_5 - 4.428\} \cdot \max\{0, x_4 - 3\} \cdot \max\{0, x_1 - 1\}$$
$$+ \alpha_6 \max\{0, x_5 - 4.571\} \cdot \max\{0, x_4 - 3\} \cdot \max\{0, x_1 - 1\}.$$

<table>
<thead>
<tr>
<th>$\alpha_0$</th>
<th>$\alpha_1$</th>
<th>$\alpha_2$</th>
<th>$\alpha_3$</th>
<th>$\alpha_4$</th>
<th>$\alpha_5$</th>
<th>$\alpha_6$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5539</td>
<td>0.7082</td>
<td>0.0246</td>
<td>-0.5260</td>
<td>-0.0164</td>
<td>-0.1537</td>
<td>0.2330</td>
</tr>
</tbody>
</table>

$Y$ Average acceleration of Entrepreneurship
$X_1$ No of students
$X_2$ Rank of the method in matrix
$X_3$ Average acceleration of Creativity
$X_4$ Average acceleration of Communicativeness
$X_5$ Average acceleration of Teamwork
Results  Big Data Analytics with MARS

- For Model 2, $\hat{Y}_2$, $M_{\text{max}}$ is assigned to be 20, and the highest degree of interaction assigned as 3. Following the Backward Stage of MARS, the number of BFs are shortened to 11. Consequently, the optimally estimated Model 2 is:

$$\hat{Y}_2 = \alpha_0 + \alpha_1 \max\{0, x_3 - 3.33\} + \alpha_2 \max\{0, 3.33 - x_3\} + \alpha_3 \max\{0, x_4 - 0.25\} + \alpha_4 \max\{0, 35 - x_1\} \cdot \max\{0, x_4 - 0.25\} + \alpha_5 \max\{0, 4.5 - x_4\} \cdot \max\{0, 45 - x_1\} \cdot \max\{0, x_3 - 3.33\} + \alpha_6 \max\{0, x_1 - 104\} + \alpha_7 \max\{0, x_2 - 19\} \cdot \max\{0, 104 - x_1\} + \alpha_8 \max\{0, 19 - x_2\} \cdot \max\{0, 104 - x_1\} + \alpha_9 \max\{0, x_5 - 0.143\} \cdot \max\{0, x_2 - 19\} \cdot \max\{0, 104 - x_1\} + \alpha_{10} \max\{0, 3.25 - x_4\} \cdot \max\{0, x_2 - 19\} \cdot \max\{0, 104 - x_1\} + \alpha_{11} \max\{0, x_3 - 0\} \cdot \max\{0, x_2 - 19\} \cdot \max\{0, 104 - x_1\}.$$

<table>
<thead>
<tr>
<th>$\alpha_0$</th>
<th>$\alpha_1$</th>
<th>$\alpha_2$</th>
<th>$\alpha_3$</th>
<th>$\alpha_4$</th>
<th>$\alpha_5$</th>
<th>$\alpha_6$</th>
<th>$\alpha_7$</th>
<th>$\alpha_8$</th>
<th>$\alpha_9$</th>
<th>$\alpha_{10}$</th>
<th>$\alpha_{11}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1640</td>
<td>0.4787</td>
<td>-0.6027</td>
<td>0.3554</td>
<td>-0.0058</td>
<td>0.0159</td>
<td>-0.0504</td>
<td>-0.0010</td>
<td>0.0003</td>
<td>0.0006</td>
<td>0.0005</td>
<td>-0.0003</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Y</th>
<th>Average acceleration of Entrepreneurship</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_1$</td>
<td>No of student</td>
</tr>
<tr>
<td>$X_2$</td>
<td>Rank of the method in matrix</td>
</tr>
<tr>
<td>$X_3$</td>
<td>Average acceleration of Creativity</td>
</tr>
<tr>
<td>$X_4$</td>
<td>Average acceleration of Communicativeness</td>
</tr>
<tr>
<td>$X_5$</td>
<td>Average acceleration of Teamwork</td>
</tr>
</tbody>
</table>
Results Big Data Analytics with MARS

- For Model 3, $\hat{Y}_3$, $M_{\text{max}}$ is assigned as 30, and the highest degree of interaction as 4. Following the Backward Stage of MARS, the number of BFs is shortened to 14. Consequently, the optimal MARS Model 3 is represented as:

$$\hat{Y}_3 = \alpha_0 + \alpha_1 \max\{0, 3.33 - x_3\} + \alpha_2 \max\{0, x_4 - 0.25\}$$

$$+ \alpha_3 \max\{0, 35 - x_1\} \cdot \max\{0, x_4 - 0.25\} + \alpha_4 \max\{0, x_6 - 5728\}$$

$$+ \alpha_5 \max\{0, x_1 - 104\} + \alpha_6 \max\{0, 104 - x_1\}$$

$$+ \alpha_7 \max\{0, 19 - x_2\} + \alpha_8 \max\{0, x_5 - 0.143\} \cdot \max\{0, x_2 - 19\}$$

$$+ \alpha_9 \max\{0, x_3 - 0\} \cdot \max\{0, x_2 - 19\}$$

$$+ \alpha_{10} \max\{0, x_4 - 2.75\} \cdot \max\{0, 0.143 - x_5\} \cdot \max\{0, x_3 - 0\} \cdot \max\{0, x_2 - 19\}$$

$$+ \alpha_{11} \max\{0, x_1 - 45\} \cdot \max\{0, x_3 - 3.33\}$$

$$+ \alpha_{12} \max\{0, 45 - x_1\} \cdot \max\{0, x_3 - 3.33\}$$

$$+ \alpha_{13} \max\{0, 1.87 - x_4\} \cdot \max\{0, 5728 - x_2\} - 22$$

$$+ \alpha_{14} \max\{0, x_2 - 3\} \cdot \max\{0, 4.57 - x_5\} \cdot \max\{0, 45 - x_1\} \cdot \max\{0, x_3 - 3.33\}.$$

<table>
<thead>
<tr>
<th>$\alpha_0$</th>
<th>$\alpha_1$</th>
<th>$\alpha_2$</th>
<th>$\alpha_3$</th>
<th>$\alpha_4$</th>
<th>$\alpha_5$</th>
<th>$\alpha_6$</th>
<th>$\alpha_7$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8094</td>
<td>-0.5714</td>
<td>0.3506</td>
<td>-0.0111</td>
<td>0.0041</td>
<td>-0.0614</td>
<td>0.0088</td>
<td>0.0193</td>
</tr>
<tr>
<td>$\alpha_8$</td>
<td>$\alpha_9$</td>
<td>$\alpha_{10}$</td>
<td>$\alpha_{11}$</td>
<td>$\alpha_{12}$</td>
<td>$\alpha_{13}$</td>
<td>$\alpha_{14}$</td>
<td></td>
</tr>
<tr>
<td>0.0096</td>
<td>-0.0089</td>
<td>-0.0666</td>
<td>0.0134</td>
<td>0.0203</td>
<td>-0.0001</td>
<td>0.0021</td>
<td></td>
</tr>
</tbody>
</table>

$Y$ Average acceleration of Entrepreneurship

$X_1$ No of student

$X_2$ Rank of the method in matrix

$X_3$ Average acceleration of Creativity

$X_4$ Average acceleration of Communicativeness

$X_5$ Average acceleration of Teamwork

$X_6$ Starting time of the method
Results with MARS

- For now we worked on Training. After improving model performance, especially based on MAPE, we shall obtain results based on both Train and Test data.

Presently, our values of performance measures for the MARS models are:

<table>
<thead>
<tr>
<th>Method</th>
<th>MARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure</td>
<td>Model 1</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.881</td>
</tr>
<tr>
<td>MAE</td>
<td>0.326</td>
</tr>
<tr>
<td>RMSE</td>
<td>0.436</td>
</tr>
<tr>
<td>MAPE</td>
<td>0.245</td>
</tr>
</tbody>
</table>
Small Data Analytics with MARS for Knowledge Acceleration by Competences

Plan:

- If future data are much later, then better not globally including Time as an input variable.

- Subdivision of a future time interval in smaller sub-intervals, step-by-step updating data and including Time as input variable.

- **Further input variables:**
  
  Level of Education in country/region,
  Level of Computerization in country/region,
  Level of Aging of society/region,
  Competitiveness Index of country/region, etc.

(databases by OECD, UNESCO, Pisa Study, THE Ranking, Word Economic Forum, etc.).
Robustification

• In real-life, both output and input data include noise and uncertainty.
• The presence of noise and data uncertainty raises critical problems on theoretical and computational sides.
• Consequently, after the global Financial Crisis, it has been realized that the known statistical models may not give trustworthy results.
• Robustification has started to draw a great attention in many fields; the corresponding regression problems usually depend on complex databases that are affected with uncertainty.
• Robust Optimization: a modeling and decision framework for immunizing against parametric uncertainty.
• It is a modeling methodology in which data are uncertain, and only known to belong to some uncertainty set.
Robust Optimization

- Robust counterpart may be much harder than original problem.

- Hence we may need to approximate.
RCMARS

\[ Y = f(\bar{X}) + \varepsilon, \quad \bar{X} = (\bar{X}_1, \bar{X}_2, \ldots, \bar{X}_p)^T \]

\( \bar{X}_j \) is random variable, and we assume that it is normally distributed.

\[ \bar{X}_j = \bar{X} + \zeta_j \]

To employ robust optimization on CMARS, a “perturbation” (uncertainty) is incorporated into the input data (for each dimension) and into the output data:

\[ \bar{x}_i = (\bar{x}_{i,1}, \bar{x}_{i,2}, \ldots, \bar{x}_{i,p})^T \] will be represented as  \[ \bar{x}_i = (\bar{x}_{i,1}, \bar{x}_{i,2}, \ldots, \bar{x}_{i,p})^T, \]

after perturbation \[ \Delta_i = (\Delta_{i,1}, \Delta_{i,2}, \ldots, \Delta_{i,p})^T \] \((i=1,2,\ldots,N)\).

\[ \bar{x}_{ij} \rightarrow \tilde{x}_{ij}; \quad \tilde{x}_{ij} = \bar{x}_j + \Delta_{ij}, \quad \left| \Delta_{ij} \right| \leq \rho_{ij} \quad (j = 1, 2, \ldots, p; \ i=1,2,\ldots,N). \]

Here, \( \bar{x}_j \) \((j=1,2,\ldots,p)\) is the mean of the data \( x_{i,j} \); the amount of perturbation in each dimension is restricted by \( \rho_{ij} \), which is the semi-axis length of the confidence interval.
RCMARS

\[ (\bar{x} - \tau)_+ \]

\[ |\bar{x} - \tau| \leq B \rho \]

\[ |\Delta| \leq \rho \]

\[ \Delta \]

semi-length of confidence interval

\[ \bar{X}_j \]

confidece interval

outlier

outlier

Control variable

\[ B := \max \{ B_a | a = 1, \ldots, K_m - 1 \} \]

- \( B \) is normally equal to 2, but for outlier it will be bigger than 2.
Based on polyhedral uncertainty sets $U_1$, $U_2$, the robust counterpart

$$\min_{\alpha} \max_{W \in U_1} \max_{z \in U_2} \|z - W\alpha\|_2^2 + \phi \|L\alpha\|_2^2,$$
Refugees and volunteers online knowledge-sharing platform
PROBLEM

5 M Refugees in Turkey

$ 30 B spent

15% - Government Support

4% - Living in Camps

68 M Refugees (UNHCR)

Lack of information

“inefficient spending”
Refugee Knowledge Platform: “migport.com”
Assistance for refugees, by volunteers

Easy access to information
Ranim Abadi

Ask your question

Popular Questions

- Sila Kurşun, Ankara
  2 minutes ago
  How can I register my children to school in Turkey?
  5 Answers
  ![Answer](image)
  ![Follow](image)

- Yelda Güngör, Ankara
  8 minutes ago
  Can I benefit from health care system in any city?
  3 Answers
  ![Answer](image)
  ![Follow](image)

- Berat Kjamili, Ankara
  14 minutes ago
  Which schools in Ankara have bilingual programmes for English?
  1 Answer
  ![Answer](image)
  ![Follow](image)

Ranim Abadi, Ankara
3 days ago

Which institution should I go to register my children for school in Turkey?

Answer
Follow

2 Answers

- Berat Kjamili, Ankara
  3 days ago
  You can find information to register your children in following link: [www.meb.gov.tr/en/registration](http://www.meb.gov.tr/en/registration)
  ![Upvote](image)
  ![Comment](image)

- Ranim Abadi, Ankara
  3 days ago
  I went to Migrant office and they helped me to register my children.
  ![Upvote](image)
  ![Comment](image)

Ask your question

education school children

Ranim Abadi, Ankara
3 days ago

Where can I find second hand bo|
Berat KJAMILI  
Co-founder  
Middle East Technical University  
Coordinator - Univ. of San Diego  
Founder - International Students Association  
GfK Market Research, *Book writer

Yelda Gungor  
Co-founder  
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Middle East Technical University  
TUBITAK SPACE  
KOC SISTEM

Prof. Dr. Gerhard-Wilhelm Weber  
Advisor  
METU, Poznań Univ. of Technology, IFORS, EURO

Mirac Aknar  
Co-founder  
Computer Engineer  
Bilkent University  
Arçelik
SOCIAL IMPACT

10 REDUCED INEQUALITIES

- # refugees received answer on question
- # refugees received assistance
- # people impacted by evidence-based projects with Migport’s data
<table>
<thead>
<tr>
<th>CLIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B 2 Government</strong></td>
</tr>
<tr>
<td>• Municipalities</td>
</tr>
<tr>
<td>- Labor market analytics with verified skill sets</td>
</tr>
<tr>
<td><strong>Regional Organizations</strong></td>
</tr>
<tr>
<td>- Information on allocating resources</td>
</tr>
<tr>
<td><strong>International Organizations</strong></td>
</tr>
<tr>
<td>- Information on macro-level impacts of refugees</td>
</tr>
</tbody>
</table>

| **B2B**                          |
| • Businesses                     |
| - *Responsible Consumption Allocation* |
| • Banks                          |
| - *Financial situations and forecasts* |
| • NGO’s                          |
| - *Prioritization of needs (financial and skillset)* |
| • Academics                      |
| - *Research on refugee impacts*  |
AWARDS

Social Impact Award, Toronto, Canada finals (56 countries)

Positive Impact → 36,000 Refugees
JAN
MIT Enterprise Forum, IFR, top 20, Jordan

FEB
Collective Global Accelerator London, Top 10 (5000 startups)

MAR
YTLI 2018 Turkey Fellowship, U.S. Department of State & Marshall Fund

APR
Social Impact Award, GSEA Entrepreneurs' Organization, CANADA
Social Cohesion Camping, Gaziantep, Turkey

Social Impact Award, TUBITAK, Samsun

YTWI 2018 U.S. Visit (Boston & D.C.)

Hollings Center of International Dialogue, Amman / Jordan

International Visitor Leadership Program, U.S. Department of State Fellowship
**PROGRESS**

- **In 2019**, Reach **40 K** Refugees
- **In 2021**, Impacted **200 K** Refugees
- In ten years, Solved **68 M** Refugees’ problems worldwide

- **Achieved:**
  - $74 K
  - 4 K Unique Users
  - 10 K Refugees
  - Website Application
  - Awards
  - Grants
  - Paying Customers

**LOADING...**
### Usage

<table>
<thead>
<tr>
<th>#</th>
<th>Country</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Turkey</td>
<td>(40.64%)</td>
</tr>
<tr>
<td>2</td>
<td>United States</td>
<td>(12.84%)</td>
</tr>
<tr>
<td>3</td>
<td>France</td>
<td>(9.11%)</td>
</tr>
<tr>
<td>4</td>
<td>Macedonia (FYROM)</td>
<td>(6.24%)</td>
</tr>
<tr>
<td>5</td>
<td>United Kingdom</td>
<td>(4.48%)</td>
</tr>
<tr>
<td>6</td>
<td>Brazil</td>
<td>(3.30%)</td>
</tr>
<tr>
<td>7</td>
<td>Peru</td>
<td>(2.71%)</td>
</tr>
<tr>
<td>8</td>
<td>India</td>
<td>(2.03%)</td>
</tr>
<tr>
<td>9</td>
<td>Italy</td>
<td>(1.44%)</td>
</tr>
<tr>
<td>10</td>
<td>China</td>
<td>(1.18%)</td>
</tr>
</tbody>
</table>
$ 300 K Support

- Operation expenses (startup)
- Technology development
- Wages (engineers, sales)
- Expanding to other countries
Conclusion

Social Impact + Profits

“Creative Destruction” and Monopolistic Competition

LiBeraTed Social Entrepreneurship Model which leads to successful start and combination of tools

+ profit, revenue, increases stock market price

+ employee profile, operation, mission and vision

Development
Conclusion and Outlook

- By robustifying CMARS we decrease the estimation variance and demonstrate very good performance with simulation studies, numerical experiences and real-world applications.

- RCMARS can produce more accurate models with smaller variances, when we compare with MARS and CMARS for testing.

- We have to solve an extra problem (by Software MARS, etc.), namely the knot selection in RCMARS.

- We will use our Robust Conic Generalized Partial Linear Model (RCGPLM).

- This new semiparametric model approach gains importance in reducing complexity and variance of estimation.

- Ellipsoidal uncertainty will be considered since it uses a more realistic assumption, which leads to a more robust approximation, although it may cause an increased model complexity.

- Distributional assumptions other than normal or robust estimators may also be considered in the construction of CIs.
Thank you very much!

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References


References


• [9] Hafjin, a 3-year-old Syrian refugee, looks at family photos from Syria on her father’s smartphone. PHOTO: Sumaya Agha for Mercy Corps.


References


References


References


References


• E. Ayyildiz, V. Purutcuoglu and G.-W. Weber, Loop-based Conic Multivariate Adaptive Regression Splines Is a Novel Method for Advanced Construction of Complex Biological Networks, EJOR 270, 3 (1 November 2018) 852-861, the Special Issue Extending the OR Horizons at the occasion of EURO 2016 in Poznan, Poland.