Chapter 60
Towards Harnessing Phone Messages and Telephone Conversations for Prediction of Food Crisis

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ABSTRACT

Food insecurity is a global challenge affecting millions of people especially those from least developed regions. Famine predictions are being carried out to estimate when shortage of food is most likely to happen. The traditional data sets such as house hold information, price trends, crop production trends and biophysical data used for predicting food insecurity are both labor intensive and expensive to acquire. Current trends are towards harnessing big data to study various phenomena such sentiment analysis and stock markets. Big data is said to be easier to obtain than traditional datasets. This study shows that phone messages archives and telephone conversations as big datasets are potential for predicting food crisis. This is timely with the current situation of massive penetration of mobile technology and the necessary data can be gathered to foster studies such as this. Computation techniques such as Naïve Bayes, Artificial Networks and Support Vector Machines are prospective candidates in this strategy. If the strategy is to work in a nation like Uganda, areas of concern have been highlighted. Future work points at exploring this approach experimentally.

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1. INTRODUCTION

Food insecurity is among of the terrors that have perturbed human welfare. Humans have lived with this challenge for many generations. Numerous sources have been documented to testify early manifestations of this challenge. Such sources include; scholarly works, religious books, story books and oral traditional. The famines that struck Europe in the years between 1343 and 1345 were deadly (Mellor, 1987). About 43 million people lost their lives in these famines. In the period from 1959 to 1961China fell into a similar trap (Mellor, 1987). It is estimated that between 16 and 64 million people in China perished for the same cause.

The effects of food insecurity especially those that were devastating compelled the world to seek appropriate solutions. As a result, success stories of reduced food insecurity cases have been recorded. According to Food and Agricultural Organization et al. (2014) hunger cases have reduced by 100 million people in the previous decade. The Millennium Development Goal one had a target to reduce hunger cases by half not later than 2015. Among the countries that have achieved this target, Latin America and the Caribbean have made the greatest progress (Food and Agricultural Organization et al., 2014).

It is important to examine the extent at which the world has managed to control or eliminate food insecurity. Unfortunately the hard fact remains that food insecurity is still a big challenge. The available statistics give limited room to doubt this. About 842 million populations in world are victims of chronic hunger (Food and Agricultural Organization et al, 2013). In the report released by Food and Agricultural Organization et al. (2014) it was established that 805 million populations are chronically undernourished. The Committee on World Food Security (2013) has disclosed that more than 200 million children under five years of age are malnourished. In the period from 1995-98 about 1 million people lost their lives in the famine attacks of North Korea (Committee for Human Rights in North Korea, 2005). In order to keep pace with population increase by the year 2050, food production should increase by 70% (International Fund for Agricultural Development, 2010). On the other hand factors such as climate change, soil exhaustion, and bio fuel practices are exacerbating this challenge (Faaij, 2008). It is therefore evident that any innovation that can assist in transmuting this challenge is worthwhile.

Prediction of food insecurity is a possible remedy to this challenge. This is instrumental in guiding stakeholders where to direct early intervention reliefs. These reliefs are helpful in several ways: (1) the impact of food insecurity can be reduced or eliminated completely, and (2) the expense involved in amelioration can be minimized (Okori and Obua, 2011; Brown et al, 2008). This has proved successful in some parts of the world. For instance, according to the United States Department of Agriculture –USDA (2005), reliable monitoring of food insecurity contributes to the effective operation of Federal programs, food assistance programs, and other government initiatives aimed at reducing food insecurity.

Several features have been proposed for prediction of food insecurity. These include but not limited to house hold information, price trends, biophysical features, and economic growth. Attention is needed in determining features suitable for predicting of food insecurity. While features used for one study can be applied to other studies, this is not always appropriate. This is because players for food dynamics are not necessarily the same. There situations when these features are the same but portray variation in the relevance. This can have a big impact on prediction performance. Inspection is a possible approach in determining which features are appropriate for a particular study. This involves examining the role of various features in food security dynamics. Correlations are commonly done to establish the strength between food insecurity and the proposed features. In this way the research is able to establish which features are appropriate for prediction of food insecurity. The second method is to review relevant lit-