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1. Introduction

Land mine detection is a constantly growing concern due to the danger that buried land mines represent to people. Land mines affect people and civilians all over the world. Most of these people has no relation with the conflict, and most of them are children.

To begin this research, we define a land mine as a device designed to kill or injure anyone that comes in contact with it through direct pressure or a trip-wire (Habib, 2001). The origin of antipersonnel land mines comes from World War II, where Germans and Italians improvised antipersonnel land mines with grenades and fuses in order to prevent allied soldiers from deactivating antitank mines placed on already determined defense lines (Russel, 2003). Land mines can be categorized in two types: Anti-tank (AT) mines and Anti-personnel (AP) mines. AT mines are larger and vary between 20 to 30 cms. in diameter, whereas AP mines range from approximately 5-15 cms. in diameter (Gader, 2002). Actually, there are more than 350 types of antipersonnel land mines being developed in more than 50 countries (Wen-Hsiung et al., 2007). Certain studies point out that there are around 50 to 100 million AP mines in more than 80 countries around the world. These mines kill or injure a person every 20 minutes, 70 persons a day, more than 20,000 people a year (Kowalenko, 2004). The cost of a mine is as little as \$3 to produce one and as much as \$1,000 to remove it.

Due to the long life of these mines, actual victims have no relation to the origin or reason why those mines were placed (Kowalenko, 2004).

The presence of landmines threatens people's lives, and also prevents much-needed economic growth and development. Long after wars are over, landmines make land unusable for farming, schools or living, preventing people from rebuilding lives torn apart by conflict.

If the actual land mine detection and deactivation rhythm of 100,000 mines per year continues, it is estimated that the time needed to remove all mines not counting new ones that will be placed, will be at least 500 years. Nieman et al. (2002) point out that this horizon will move away mainly because of new mines being constantly laid, because of the very limited use of technology for mine detection and clearance, and due to the lack of funds for detection.

It is expected that antipersonnel landmine use will decrease due to the 1997 Ottawa treaty that forbids new placement of mines. Additionally, Nobel Prize for Peace award given in 1997 to the International Campaign to Ban Landmines (ICBL) has helped people to promote a better awareness of the problem which has led to new fund assignment to develop new techniques in this area.

On the other hand, at a technical level, mine detection is a very complex problem far from being solved. Schreiner (2002) identifies two main obstacles for this:

