

Automatic Landmine Detection and Analysis: An Approach of Pattern Tracing

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Abstract

Landmines could be identified as an affordable and effective defensive weapon, but it has many complexities. Name to few are human deaths and injuries, agricultural land degradation, destruction to infrastructure, environmental destruction, economic cost for demining humanitarian aid, etc. Those complexities cause due to the unconventional landmine fields which could find it is difficult to demine. To avoid that, landmines had to be laid according to a universally accepted method in a standard pattern. As per the International agreements, Sri Lankan security forces also follow the standards in warfare. But their data recording mechanism is manual and not efficient. Also, there have been minefields laid by LTTE in the civil war. Even though some of their minefields are according to patterns, there are no records available. The objective of this study is to introduce a new system to identify the locations of landmines and analyze the data in a minefield. The design of this research was accomplished in three stages, Identifying the current practice of data recording in Sri Lanka, Developing a computer program to generate locations of landmines according to the pattern tracing technique, and Visualizing and analyzing the result. Therefore, through reviewing the existing mechanism, the lapses of the existing system could be identified. By developing a computer program we could be able to auto-generate locations of landmines in a minefield according to two scenarios. One is for details available via record sheets, while in the other case no such data exist but some randomly identified landmine records. MATLAB has been used to develop the program which is a very powerful platform. QGIS and Google Earth Pro software are used for the visualization and analysis of data. The proposed system will be a more convenient, efficient, effective, and accurate system that will avoid the malpractices of recording landmines and useful for landmine detection and landmine data management.

Keywords: Landmines, Minefield, Pattern Tracing, Strip Method