

SQUAD 2.0
SeQUence Anomaly Detection Package
User Manual

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Varun Chandola
chandola@cs.umn.edu

1 Introduction to SQUAD 2.0

This document describes the **squad 2.0** package, a collection of anomaly detection tools for univariate continuous sequences (time series data) and univariate discrete sequences. The package depends on the *tools* library package, which is a collection of routines to read/write such sequences, as well as routines for distance/similarity computations.

2 Installing SQUAD 2.0

SQUAD 2.0 package contains the sources codes for anomaly detection techniques. The package has been tested for Linux, SunSolaris, FreeBSD, and Cygwin platforms. The package is available for download at <http://www.cs.umn.edu/~chandola/squad/downloads>.

2.1 System Requirements

SQUAD 2.0 is written in GNU C++ and tested on Linux, Sun Solaris, FreeBSD, Cygwin platforms. The code is written using the *Standard Template Library* (STL).

2.2 External Libraries

The installation requires two external libraries — *libtools*¹ and *libfft3*².

2.3 Installation

To install the package first copy the files to a local directory - *\$local-home*. By default, **squad 2.0** will be installed in *\usr\local*, which requires root privileges. To install in a different directory, the directory name should be provided as *\$install-dir* when installing.

Untar the files

```
> cd $local-home  
> tar -zxf squad-2.0.tgz
```

Install

```
> ./configure --prefix $install-dir  
> make  
> make install
```

Note: The installation assumes that the *libtools* and *libfftw3* libraries are installed into a standard location, i.e., *\usr* or *\usr\local*, or in *\$install-dir*. If installed in a different directory, say, *\$toolsdir* and *\$fft3dir*, the configuration should be run as:

```
> ./configure --prefix $install-dir LDFLAGS -L$fft3dir/lib;$toolsdir/lib CXXFLAGS $fft3dir/include;$toolsdir/include  
> make  
> make install
```

References

- [1] V. Chandola, D. Cheboli, and V. Kumar. Detecting anomalies in a timeseries database. Technical Report 09-004, University of Minnesota, Computer Science Department, February 2009.

¹<http://www.cs.umn.edu/~chandola/squad/downloads>

²<http://www.fftw.org/download.html>

- [2] V. Chandola, V. Mithal, and V. Kumar. A comparative evaluation of anomaly detection techniques for sequence data. In *Proceedings of International Conference on Data Mining*, 2008.
- [3] J. Lin, E. Keogh, L. Wei, and S. Lonardi. Experiencing sax: a novel symbolic representation of time series. *Data Min. Knowl. Discov.*, 15(2):107–144, 2007.