**TMBstable Deployment Guide**

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1. Document Overview

This document provides comprehensive procedures for the deployment of TMBatable software on high-performance computing systems. It is tailored for data analysts in the fields of bioinformatics and high-performance computing, particularly system administrators and bioinformatics engineers.

1. System Environment Requirements
   * Operating System: CentOS Linux 7.9.2009 (Core)
   * Kernel Version: 3.10.0-1160.31.1.el7.x86\_64
   * Processor: Intel Xeon Gold 5218, 2.30GHz
   * Architecture: x86\_64
   * Cache: 32K L1 data cache, 32K L1 instruction cache, 1024K L2 cache, 22528K L3 cache
   * Virtualized Environment: VMware
   * Supported CPU Features: SSE, SSE2, AVX, AVX2, AVX512
2. Dependency Software Packages
   * Python Libraries: os, csv, math, pysam, numpy, random, Metrics, argparse, matplotlib, scipy.sparse, scipy.spatial.distance
   * sklearn Libraries: sklearn.externals, sklearn.ensemble, sklearn.datasets, sklearn.cluster, sklearn.mixture, sklearn.decomposition, sklearn.model\_selection, sklearn.neighbors, sklearn.neural\_network, sklearn.linear\_model, sklearn.tree
   * Additional Tools: skmultilearn.problem\_transform, quickgt, samtools, bedtools
3. Installation Steps

4.1 System Preparation

Ensure the system is updated to the latest state and equipped with a Python runtime environment.

4.2 Installation of Python Libraries

Utilize pip or conda to install the aforementioned Python libraries, ensuring compatibility with the system architecture.

4.3 Configuration of Tools

Configure samtools and bedtools in the system environment variables to ascertain their correct invocation by TMBatable.

4.4 Installation of TMBatable

Download the TMBatable software package and follow the provided instructions for installation.

1. Performance Optimization

Adjust the runtime parameters of TMBatable based on the system configuration to fully leverage advanced CPU features, thereby enhancing processing efficiency.

1. Verification and Testing

Upon completion of the installation, conduct a series of functional and performance tests to ensure that TMBatable operates normally in the current environment and achieves the expected performance.

1. Troubleshooting Common Issues

Provide solutions and debugging suggestions for common problems that may arise during the installation process.

This document is designed to provide advanced users with a clear and exhaustive guide to ensure the effective deployment and operation of TMBatable in a high-performance computing environment. Please note that the deployment process may require appropriate adjustments based on the specific environment.