1. Purpose

This project performs Activity Recognition on the benchmark data set.

2. Data Set

We have used data from Washington State University. Refer data readme placed inside data folder

Data path: ~\CS561_Team_Alphabet_EnergyProject_v1.1\data

3. Tools and Software used.

The project is built on Java 8 using NetBeans IDE 8.1

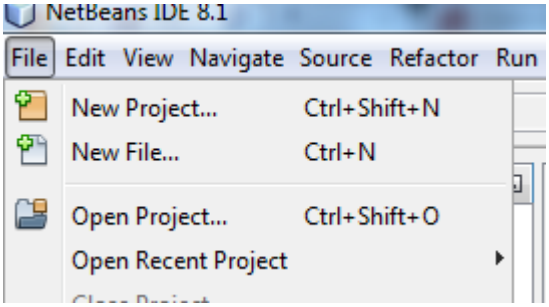
Libraries: Placed at ~\CS561_Team_Alphabet_EnergyProject_v1.1\lib

j-text-utils-0.3.3.jar: For drawing tabulated result

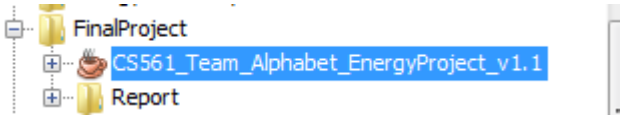
apache-commons-lang.jar: Helper class for java.lang class used by above mentioned jar

4. Steps to Configure the project in Net Beans

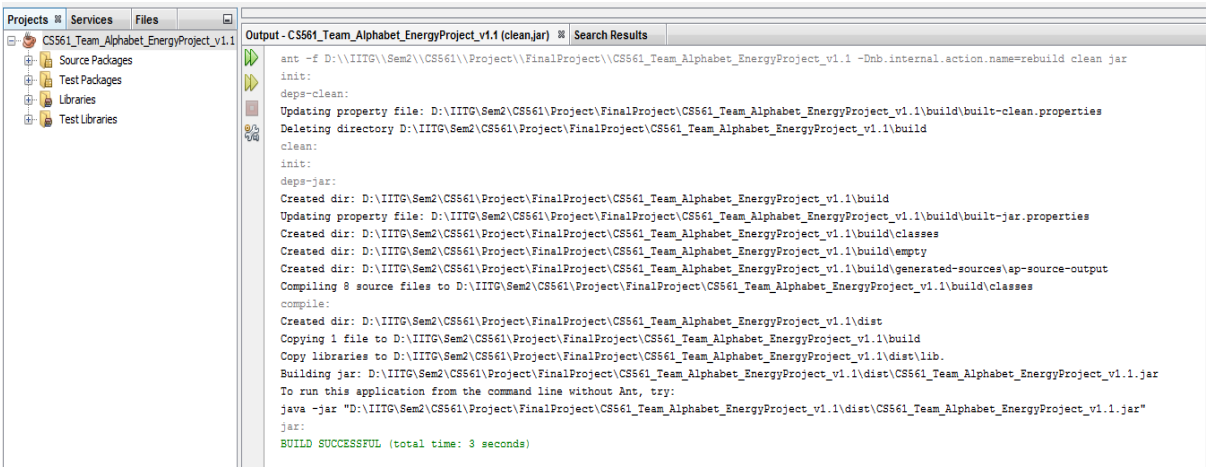
- ✓ Install jdk 8.
- ✓ Download from here or use APT http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html
- ✓ Download and Install NetBeans IDE 8.1
- ✓ Open NetBeans. Goto File-> Open Project



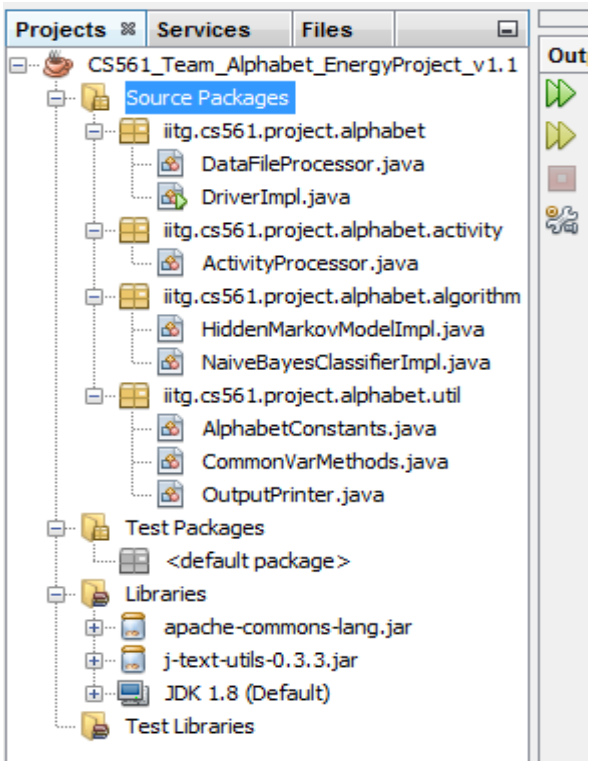
- ✓ Locate the project CS561_Team_Alphabet_EnergyProject_v1.1 in your system and open.



- ✓ Right click on the project and choose 'clean and build'. You should get Build Successful message. If not, please contact us.



5. Project Overview



DataFileProcessor.java

This program processes the data file and extract events.

DriverImpl.java

Drive class which initiates the program

ActivityProcessor.java

It calls Model's training and test routines.

HiddenMarkovModelImpl.java

Implementation of Hidden Markov Model

NaiveBayesClassifierImpl.java

Implementation of Naive Bayes Classifier

AlphabetConstants.java

Configure properties and parameters here. Details are given in below section

CommonVarMethods.java

This holds methods and variables commonly used in different modules.

OutputPrinter.java

Utility program to produce output.

6. Running the code

- ✓ Configure paramters:

  AlphabetConstants.java: Configure the parameters here.

  DATA_FILE_PATH = data/cairo.data

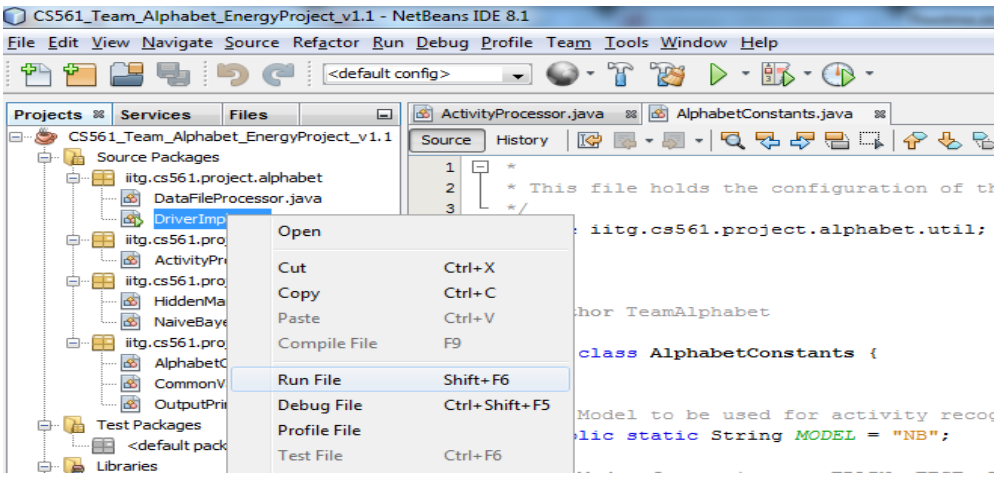
  Upper limit of events present in data set. We have 647487 events

  MAX_EVENTS = 700000;

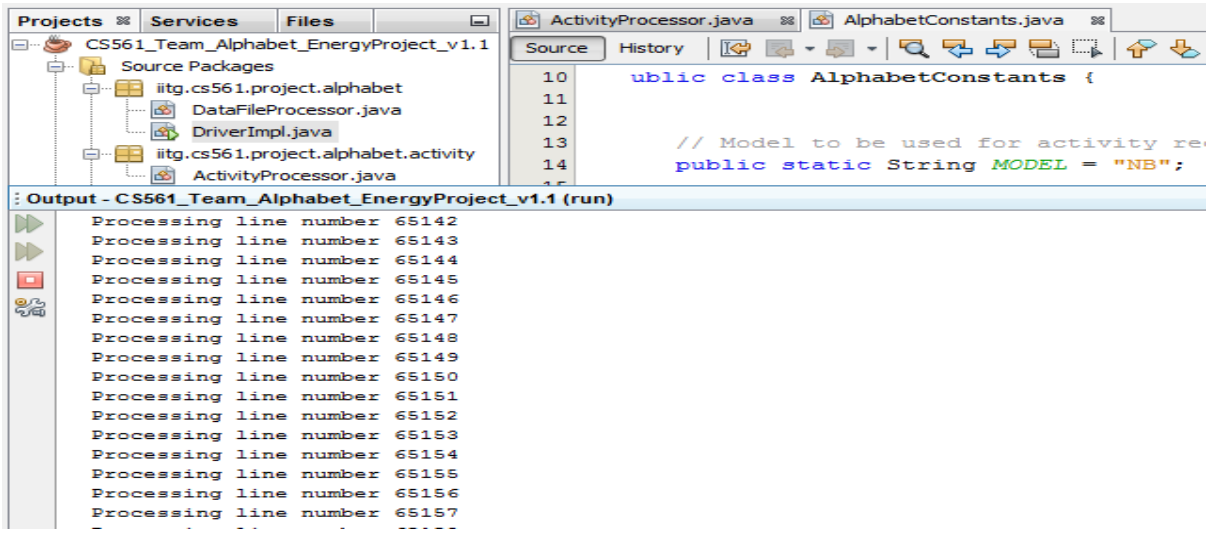
  Model to be used for activity recognition. Naive Bayes (NB) or HMM

  MODEL = "HMM"; or MODEL = "NB";

- ✓ Right click on drive program **DriverImpl.java**



✓ Program will start executing like below. It will take upto 3 or more minutes depending upon your system's configuration.



✓ At the end you can see the results as below, showing a table for actual vs predicted activities

Actaul/Class Label	Bed_to_toilet	Breakfast	Bed	C_work	Dinner	Laundry	Leave_home	Lunch	Night_wandering	R_medicine	Accuracy
Bed_to_toilet	22	0	4	0	0	0	0	0	4	0	0.73333335
Breakfast	0	8	5	0	26	0	0	7	2	0	0.16666667
Bed	4	0	139	0	0	0	0	0	64	0	0.6714976
C_work	0	1	16	25	0	0	0	0	4	0	0.54347825
Dinner	0	3	4	0	25	0	0	6	4	0	0.5952381
Laundry	0	0	0	0	0	5	2	2	1	0	0.5
Leave_home	0	0	0	0	0	0	69	0	0	0	1.0
Lunch	0	6	1	0	16	0	0	11	3	0	0.2972973
Night_wandering	0	0	5	0	0	0	0	0	62	0	0.92537314
R_medicine	0	2	3	0	0	0	0	0	2	37	0.84090906

Result:

Right 403
Wrong 197
Average accuracy is 0.6716667

First row shows that activity 'Bed_to_toilet' has been predicted as 'Bed_to_toilet', 'Bed', 'Night_wandering' as 22, 4, 4 times respectively giving accuracy 22/30 = 73%