Applied Artificial Intelligence Project -2

Username: bolt

Domain: Parkinson's Disease Symptom Recognizer (PDSR)

Abstract: The PDSR is designed using Fuzzy JESS and can predict based on the information provided by patients whether the patient is exhibiting symptoms of Parkinson's Disease. In this system, each patient is asked to answer 8 questions which the most prevalent symptoms in Parkinson's Disease are. All these eight parameters are the basic checklist when it comes to Detecting Parkinson's Disease. Apart from the above-mentioned parameters, I have also considered age as a factor in determining the chances of patient exhibiting symptoms of Parkinson's Disease. All symptoms do not carry the same weightage.

Features: The Recognizer is designed to interact with the patient by letting the patient enter integer value in the range of 0 – 10 corresponding to the degree at which mentioned problem/ symptom is faced, it then arrives at the conclusion whether the patient is exhibiting symptoms of Parkinson's Disease and if so what are the chances of him actually having the disease and accordingly recommends patients next step for example: if he/she should visit a doctor for further confirmation.

The various input parameters to the system are:

- Age of the patient
- Rate at which the issue of sleeping problem is faced
- Rate at which the issue of slowness of motion problem is faced
- Rate at which the issue of decreased facial expression problem is faced
- Rate at which the issue of unsteady balance is faced
- Rate at which the issue of constipation or urinary problems are faced
- Rate at which the issue of abnormal tone or stiffness in trunk and extremities is faced
- Rate at which the issue of shuffling gait and stooped posture problem is faced

Rules and Description: Once we get all the parameters from the patient, we can now run the PDSR, which has rules in Fuzzy JESS pertaining to all the various permutations and combinations of values for these nine factors. It evaluates the symptom-score of a patient based on the value provided by the patient for each symptom and gives the evaluation as the output accordingly. As mentioned earlier different weightage is given to the symptoms based on their contribution towards the final verdict.

Usage manual:

Using Eclipse IDE: Save the "bolt.clp" file in the "Jess71p2\bin\" folder on your local system. Run it as a Jess Application and in Run configuration change Jess main class to "**nrc.fuzzy.jess.FuzzyMain**".

Using Command-Line interface: Go to the command line interface for Jess and execute the file using the batch command along with the correct location of the file on the system (batch "bolt.clp").

Valid cases/ Constraints:

• You can try out any test case with numeric value for every symptom between 1 and 10 only. If input value is greater than 10 or less than 0, then for evaluation purposes values considered are 10 and 0 respectively.

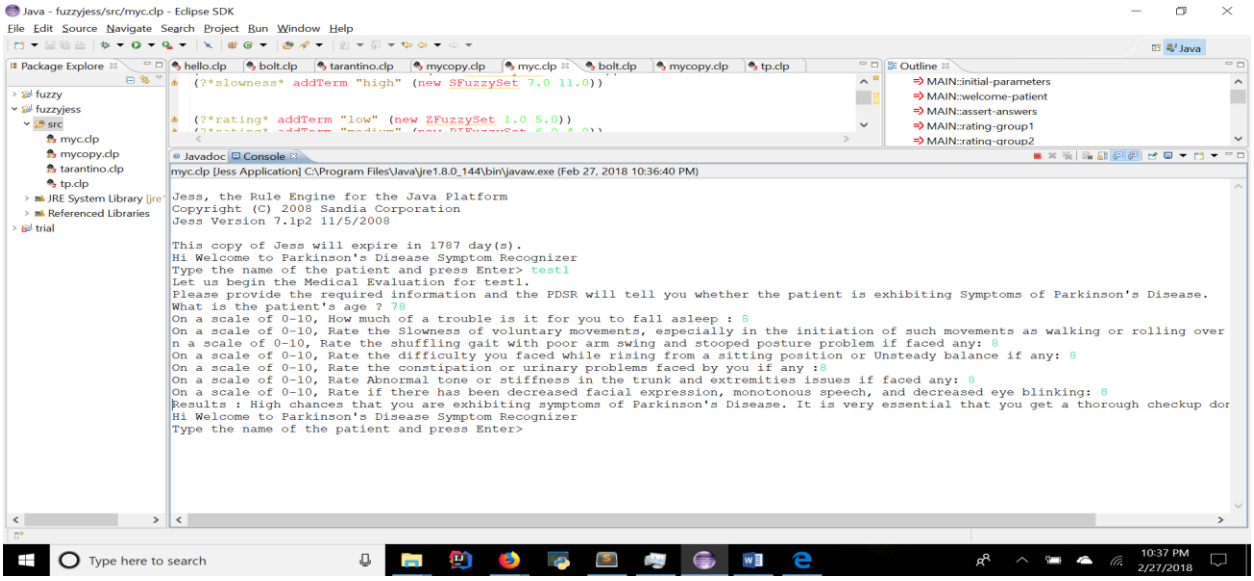
• Age brackets have been defined in rules in a manner that it covers infants as well as elderly people. However, age is restricted to an integer value and cannot be over 100 or below 0.

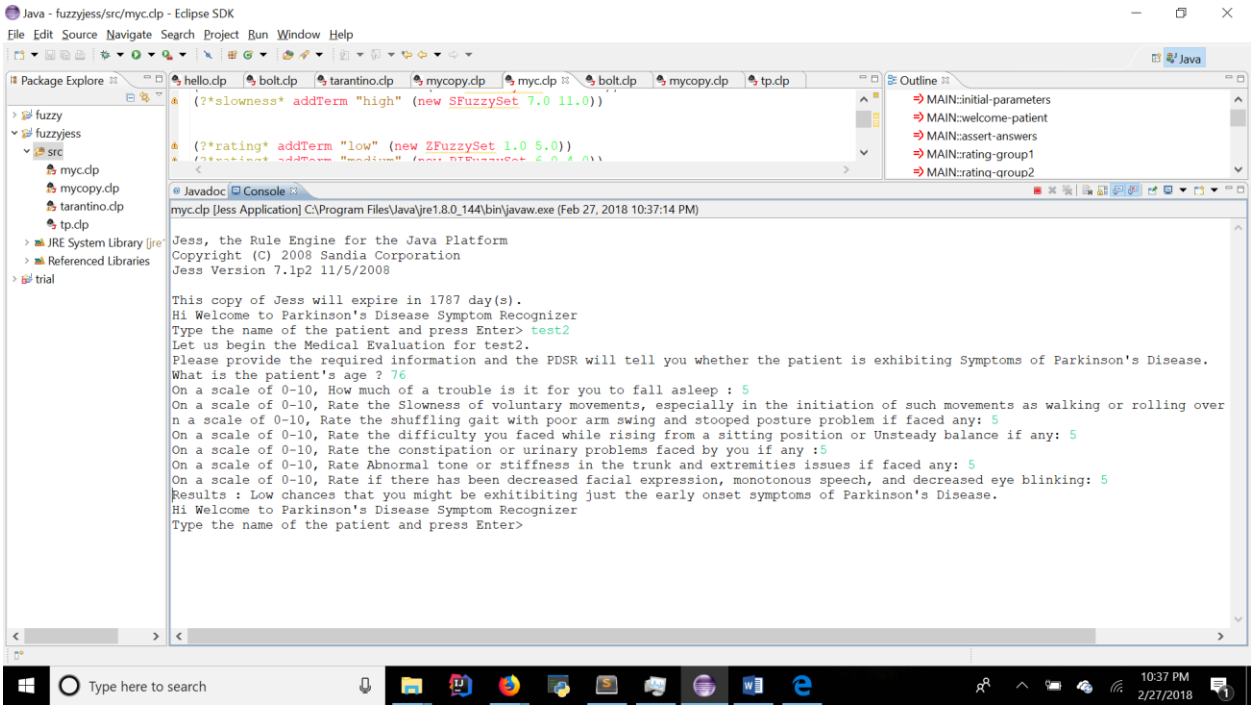
The Fuzzy Jess throws error if the values entered are outside of the range and values are anything other than a numerical value.

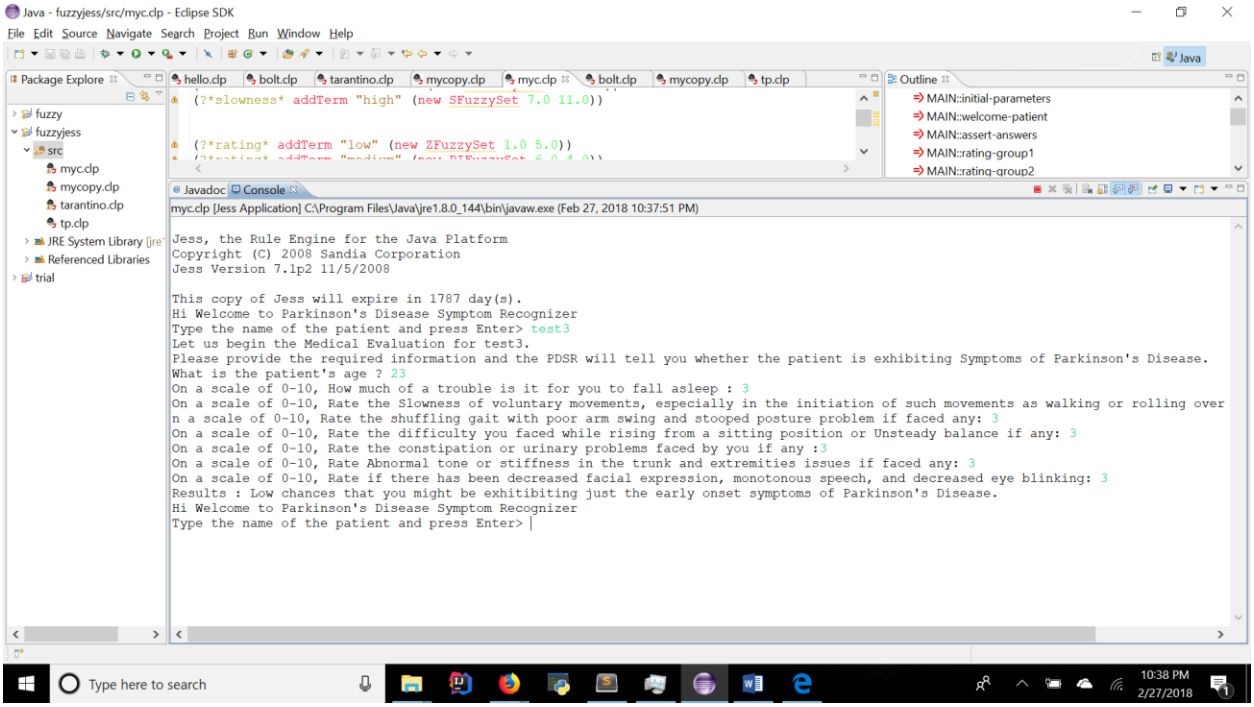
Expected Output:

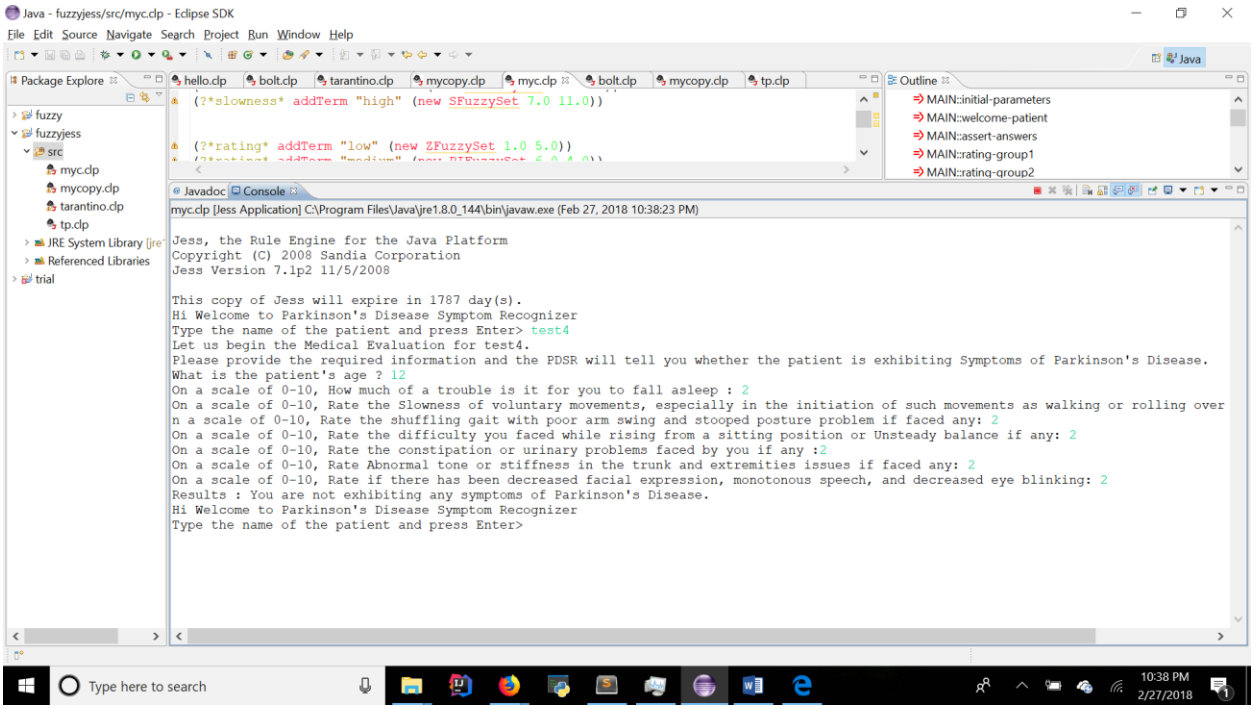
• The Recognizer would give you a verdict whether the patient is exhibiting symptoms of Parkinson's Disease or not along with the chances of it being Parkinson's Disease and recommending next step of advised action.

Screenshots:






Java - fuzzyjess/src/myc.clp - Eclipse SDK
File Edit Source Navigate Search Project Run Window Help
Package Explorer
fuzzy
fuzzyjess
src
myc.clp
mycopy.clp
tarantino.clp
tp.clp
JRE System Library [jre
Referenced Libraries
trial
hello.clp
bolt.clp
tarantino.clp
mycopy.clp
myc.clp
bolt.clp
mycopy.clp
tp.clp
(?*slowness* addTerm "high" (new SFuzzySet 7.0 11.0))
(?*rating* addTerm "low" (new ZFuzzySet 1.0 5.0))
Outline
MAIN::initial-parameters
MAIN::welcome-patient
MAIN::assert-answers
MAIN::rating-group1
MAIN::rating-group2
Javadoc
Console
myc.clp [Jess Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Feb 27, 2018 10:37:51 PM)
Jess, the Rule Engine for the Java Platform
Copyright (C) 2008 Sandia Corporation
Jess Version 7.1p2 11/5/2008
This copy of Jess will expire in 1787 day(s).
Hi Welcome to Parkinson's Disease Symptom Recognizer
Type the name of the patient and press Enter> test3
Let us begin the Medical Evaluation for test3.
Please provide the required information and the PDSR will tell you whether the patient is exhibiting Symptoms of Parkinson's Disease.
What is the patient's age ? 23
On a scale of 0-10, How much of a trouble is it for you to fall asleep : 3
On a scale of 0-10, Rate the Slowness of voluntary movements, especially in the initiation of such movements as walking or rolling over
n a scale of 0-10, Rate the shuffling gait with poor arm swing and stooped posture problem if faced any: 3
On a scale of 0-10, Rate the difficulty you faced while rising from a sitting position or Unsteady balance if any: 3
On a scale of 0-10, Rate the constipation or urinary problems faced by you if any :3
On a scale of 0-10, Rate Abnormal tone or stiffness in the trunk and extremities issues if faced any: 3
On a scale of 0-10, Rate if there has been decreased facial expression, monotonous speech, and decreased eye blinking: 3
Results : Low chances that you might be exhitibiting just the early onset symptoms of Parkinson's Disease.
Hi Welcome to Parkinson's Disease Symptom Recognizer
Type the name of the patient and press Enter>
Type here to search
10:38 PM
2/27/2018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Jess, the Rule Engine for the Java Platform
Copyright (C) 2008 Sandia Corporation
Jess Version 7.1p2 11/5/2008
This copy of Jess will expire in 1787 day(s).
Hi Welcome to Parkinson's Disease Symptom Recognizer
Type the name of the patient and press Enter> test4
Let us begin the Medical Evaluation for test4.
Please provide the required information and the PDSR will tell you whether the patient is exhibiting Symptoms of Parkinson's Disease.
What is the patient's age ? 12
On a scale of 0-10, How much of a trouble is it for you to fall asleep : 2
On a scale of 0-10, Rate the Slowness of voluntary movements, especially in the initiation of such movements as walking or rolling over
n a scale of 0-10, Rate the shuffling gait with poor arm swing and stooped posture problem if faced any: 2
On a scale of 0-10, Rate the difficulty you faced while rising from a sitting position or Unsteady balance if any: 2
On a scale of 0-10, Rate the constipation or urinary problems faced by you if any :2
On a scale of 0-10, Rate Abnormal tone or stiffness in the trunk and extremities issues if faced any: 2
On a scale of 0-10, Rate if there has been decreased facial expression, monotonous speech, and decreased eye blinking: 2
Results : You are not exhibiting any symptoms of Parkinson's Disease.
Hi Welcome to Parkinson's Disease Symptom Recognizer
Type the name of the patient and press Enter>
Type here to search
10:38 PM
2/27/2018