Zhang Yu

Individual report on IRS – Singapore Intelligent Issuance Recommender System (SINRA)

(1) personal contribution to group project

I worked on the backend mainly which includes

- Setup the initial PoC – static policy reasoning
  - Set up Spring MVC as the project skeleton (repository name: ispm)
  - Set up jBPM as workflow manager which using policy reasoning rules to either return a static policy object or "Not found Error", designed in KIE workbench on school VM (repo name: Integrated_Shield_Plan_Master)
  - Integrated Integrated_Shield_Plan_Master into ispm (ISPMIntegration.java)
- Set up Opta as constraint solver, designed in KIE workbench on school VM (project name: OptaISP) and tested with postman (repo: postman)
  - Designed the data model, rules in Opta based on Grey Relational Analysis (GRA)
  - Converted to configurable rules which can take in user's preference important level as weight and delta between user's expectation and policy provider as reward/penalty
  - Integrated OptaISP into ispm (ISPMIntegration.java)
- Set up data mining on policy historical records and do prediction, designed in Orange 3 work together with Veda (repo: orange-policy-workflow)
  - Performed data preparation, clean up and accuracy test in Orange 3 workflow
  - Integrated into ispm (DMIntegration.java)
- Enhanced workflow, data model, rules across the system and expanded the feature list
  - Enabled age and Singapore residency status check in rules.
  - Smart routing either to Opta or Datamining in workflow
  - Added more features to font-end question list and backed across SpringMVC, jBPM and Opta
- Performed various testing during different stages with different tools.
  - tune the system by adjusting the importance calculation or policy benefit normalized value for some non-straightforward features
- Built the standalone runnable(repo: runnable)
- Studied the problem and did research on the internet
  - I am influenced by the journal paper - Multicriteria Recommender System for Life Insurance Plans based on Utility Theory
  - and the dataset provided by Ministry of Health Singapore - Integrated Shield Plans for Private Hospitals
  - we designed the data model and picked up the tools together
- Helped on documentation
  - Installation instruction
  - Some system diagram like Opta entity. Interference diagram

(2) what learnt is most useful for you

- Most of the knowledge I used in this project is from MR module: knowledge modelling is used to analyse the problem and derive the facts; jBPM with agenda

group rules to validate user input and do smart routing; Opta to do constraints solving.

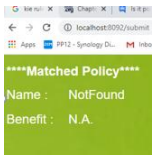
- It makes the system configurable, easy to enhance the data model, rules and do the performance tuning. We did coefficient calculation by giving the delta only in the score rule, but we can enhance it with more complicated formula, together with the impotence level/weight set on the rule can be trained to reach higher user's satisfaction on opta suggestion

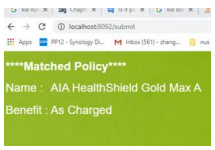
(3) how you can apply the knowledge and skills in other situations or your workplaces

- The framework we set up in this project can be reused on any rule-based system by replacing the data model and rules. It can reach self-refinement by connecting the feedback table to historical data analytic flow (orange-policy-workflow) to improve the accuracy of prediction. I can apply it on equity trading event validation by cross checking on FIX tags in messages in my work.

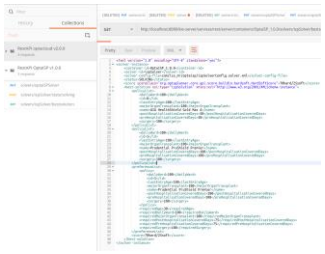
Appendix

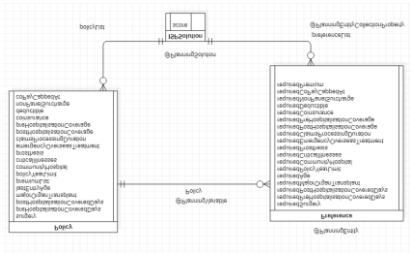
Screenshot of PoC



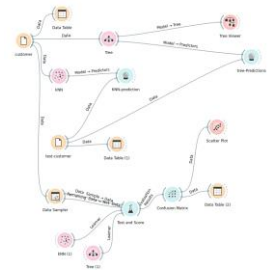


Screenshot of Opta and Postman Test





Screenshot of historical data analytics in Orange 3



Screenshot of workflow in jBPM –age and residency status validation and smart routing