

Machine Reasoning Workshop
KIE
Enhanced Mortgage Process

[Please note that all the data that will go through the system will not be recorded or used in anyway. Everything is used solely just for demonstration purpose]

Enhanced Version

The system that we present is an enhanced version of the basic workshop system of mortgage process. Many additional features has been added to make the process looks more realistic (and more complicated). There are 4 main features that has implemented in this system:

1. Citizenship ID and its validation

User now will be able to key in his citizenship particular details. This is also another important factor to consider when deciding application status for a company. This feature also come with basic validation to validate that the user has correctly give the data. Here are some validation that we have:

- For Singaporean, the nationality must be Singapore and its NRIC should be started with “S” or “T” followed by 7 digits and ended with characters ABCDEFGHIZ ^[1]
- For Permanent Resident the nationality must not be Singapore. However Permanent Resident has the same rule of Singaporean NRIC while Foreigner FIN rule must start with F or G and end in either one of these character: KLMNPQRTUWX ^[1]

The screenshot shows a web form titled "Form" with a sidebar on the left containing menu items like "provalPro", "ageApp", "Mortgage", "Process", "ISS_MR_", "val", "Approval", "r" - Final A", "er" - Corre", "required b", "space.mo", and "myspace.r". The form contains several input fields and sections:

- Email ***: A text input field containing "ray-cap@hotmail.com". A red box highlights this field, and a red message above it says "Please use real email. Currently there is no email verification or validation check".
- Application**: A section with two input fields: "Down Payment" (containing "50") and "Years of amortization" (containing "2").
- Applicant**: A section with a "Name" input field containing "Raymond".
- Citizenship ***: A section with three radio buttons: "Singaporean" (selected), "Permanent Resident", and "Foreigner". A red box highlights this section.
- Nationality ***: A text input field containing "Singapore".
- NRIC / FIN ⁱ**: A text input field containing "G102123A".
- Age ⁱ**: A text input field containing "23".
- Credit Rating ⁱ**: A text input field containing "2".
- Has Job (check) ⁱ**: A checked checkbox.
- Own House (check) ⁱ**: An unchecked checkbox.

^[1] Extracted and simplified from many sources: <https://ayumilovemaple.wordpress.com/2008/09/24/validation-singapore-nric-number-verification/>, https://en.wikipedia.org/wiki/National_Registration_Identity_Card

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2 - Correct Data

[Work](#) [Details](#) [Assignments](#) [Comments](#) [Admin](#) [Logs](#)

Outputs:

Application

Error details

Error and cause

Wrong NRIC format. NRIC is not in the correct format.

Down Payment

50

Applicant

Name

Raymond

Citizenship *

☒ Singaporean ☐ Permanent Resident ☐ Foreigner

Nationality *

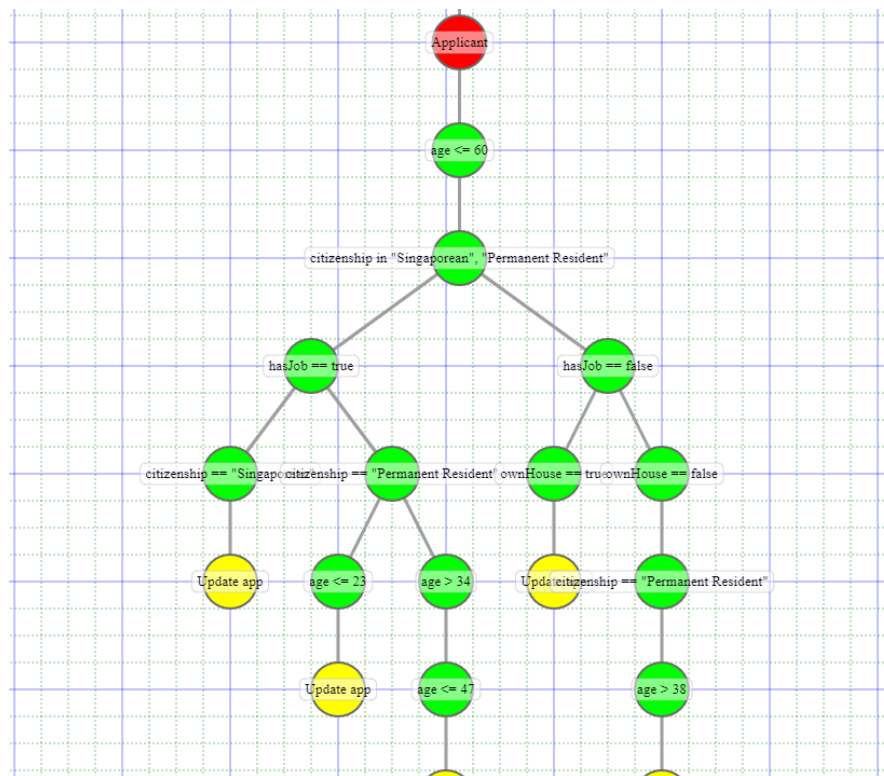
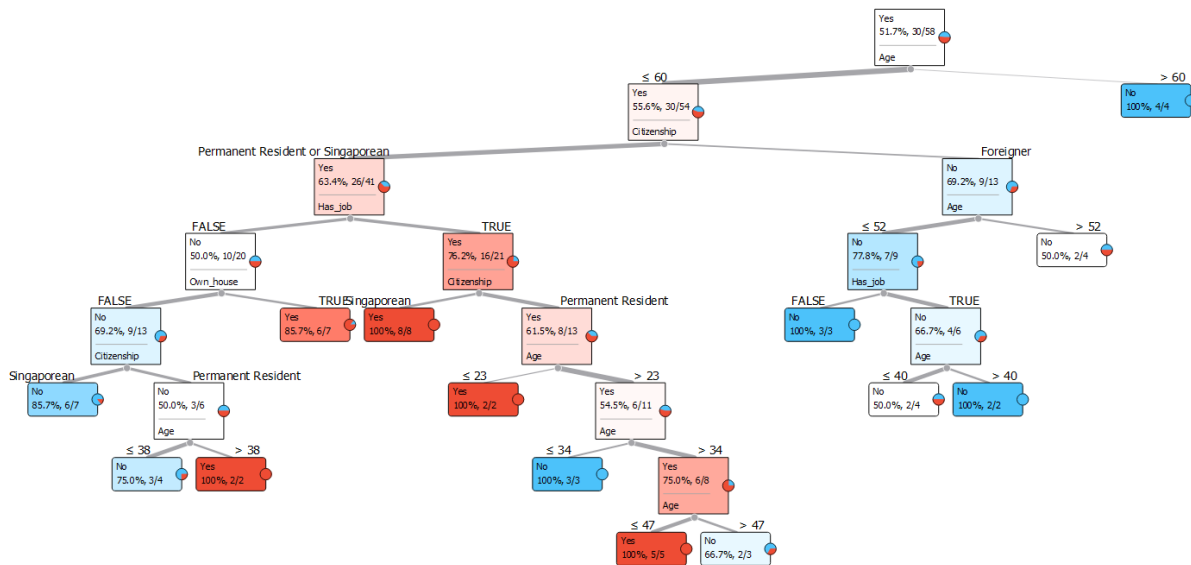
Singapore

NRIC / FIN ⓘ

G102123A

2. Enhanced Decision Tree Machine Reasoning approval based on knowledge discovery from more complicated data.

Now with citizenship details, we can further improve machine reasoning rules that will take into account of applicant nationality. We try to simulate the knowledge discovery process of the data by generating random data and use Orange software to generate new decision tree. This new decision tree is far more complicated than the basic one. The new version then is implemented into KIE process with Guided Decision Tree.



3. Mocking documents approval process

Here we also try to simulate the process of documents submission and verification. However there is no machine reasoning added into this feature. So the process is still a manual parallel process together with application process.

ortgage
process
S_MR_

Annual Income

Annual Income

SSN

SSN

Property

Age of property

Age of property

Address of property

Address of property

Locale

Locale

Sale Price

Sale Price

Documents ⓘ

Copy of NRIC/FIN, Bank Statement & Payslip

Search items ...

Copy of NRIC/FIN

Bank Statement

Payslip

IRAS Tax

Proof of Address

Clear Selection

✓

✓

✓

Task	Process Definition Id	Status	Actual Owner	Created On	Errors	Actions
Documents Approval	Mortgage_Process.MortgageApprov...	Ready		04-Mar-2019 00:15:33	0	⋮
Final Approval	Mortgage_Process.MortgageApprov...	Ready		04-Mar-2019 00:15:33	0	⋮

4. Email Notification feature

The system is capable of sending a rejected notification email to the application together with a simple reason (whether it is rejected due to documents or application itself). (Please check your junk email if you do not find it in Inbox)

[Rejected] Mortgage Loan Application



raycap.iss@gmail.com <raycap.iss@gmail.com>

12:18 AM



To: ray-cap@hotmail.com

Dear Sir/Madam Thank you for submitting mortgage application to us. Unfortunately your application is rejected with reason: rejected on Application Please contact our admin for more details. Thank you.
This is computer generated message.



Virus-free. www.avg.com

Limitations and Improvements

Due to limited time constraint and manpower, there are still lot of improvements that can be done. Here are some list of to do that can be done immediately to further improve the system:

1. Email validation process.

Currently there is no email validation process. It will be useful to add validation to ensure the email is correctly formatted.

2. Machine Reasoning for Documents Approval

Obviously we can try to add machine reasoning system in the documents verification process itself.

3. Gracefully handle the errors when sending emails

Currently the whole process task might break in case email cannot be sent. This is bad and should be fixed immediately. One can catch the error and then silent it so that the process can finish properly.

4. Email template

As of now there is now good template for the email. We can write one in the future for nice email.