

வேலை மேட்சர்

Velai metcar. Job matcher

Seminar Group 1, Team 2

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Business Problem



Model



Data Preparation



Implementation & Implications

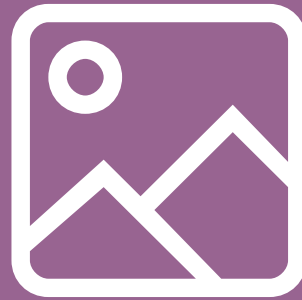


Variable Selection



Limitations & Development

Business Problem



Traditional Job Portals

Showcase technical skills and past experiences

Resume Irrelevance

Recruiters looking for potential, rather than past experience

Changing HR Needs

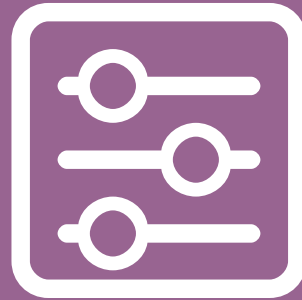
Need good team players and potential hybrid managers

Ineffective Job Portals

High attrition rate and high attrition costs incurred

*So what is our
analytics
approach?*

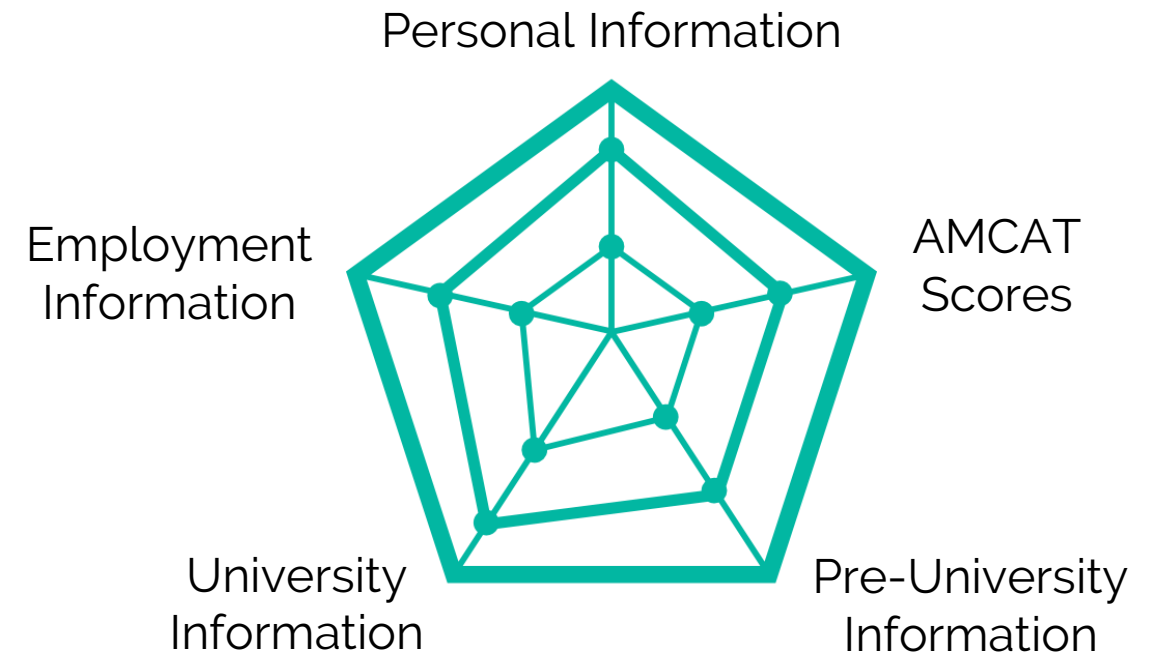
Data Preparation



Our Dataset



A set of engineering candidates from **India** and their employment outcomes



Data Cleaning



Variable Selection



Variable Irrelevance

“ Some of the behaviour of the output remains unexplained by the selected input variables or disturbed by ‘noise’ from insignificant variables. ”

(May, Dandy & Maier, 2011)

Models



Multivariate Adaptive Regression Splines (MARS)

earth()



Decision Trees

rpart()
randomForest()

MARS

```
9 ## Model: MARS
10 library(earth)
11
12 library(caTools)
13 set.seed(2018)
14 train <- sample.split(Y = indian$Designation, SplitRatio = 0.7)
15 trainset <- subset(indian, train == T)
16 testset <- subset(indian, train == F)
17
18 # Degree of interactions = 1
19 mars1 <- earth(Designation ~ ., degree = 1, nfold= 10, data=trainset, glm=list(family=binomial))
20 summary(mars1)
21
22 # Degree of interactions = 2
23 mars2 <- earth(Designation ~ ., degree = 2, nfold= 10, data=trainset, glm=list(family=binomial))
24 summary(mars2)
25
26 # Degree of interactions = 3
27 mars3 <- earth(Designation ~ ., degree = 3, nfold= 10, data=trainset, glm=list(family=binomial))
28 summary(mars3)
29
30 # Degree of interactions = 4
31 mars4 <- earth(Designation ~ ., degree = 4, nfold= 10, data=trainset, glm=list(family=binomial))
32 summary(mars4)
33
```

9:1 (Top Level) ↕

1 family = binomial

2 Degree of
Interaction (*1 to 4*)

3 n-fold remains at 10

Models



Multivariate Adaptive Regression Splines (MARS)

earth()



Decision Trees

rpart()
randomForest()

Decision Trees

```
9 ## Model: CART
10 library(rpart)
11 library(rpart.plot)
12 library(randomForest)
13
14 library(caTools)
15 set.seed(2018)
16 train <- sample.split(Y = indian$Designation, SplitRatio = 0.7)
17 trainset <- subset(indian, train == T)
18 testset <- subset(indian, train == F)
19
20 # Unpruned Tree
21 tree1 <- rpart(Designation ~ ., data = trainset, method="class", control=rpart.control(minsplit=73,cp=0))
22 summary(tree1)
23 prp(tree1,varlen = 8)
24
25 # Pruned Tree
26 cp.opt <- tree1$cptable[which.min(tree1$cptable[, "xerror"]), "CP"]
27 tree2 <- prune(tree1, cp = cp.opt)
28 summary(tree2)
29 prp(tree2,varlen = 8)
30
31 # Random Forest
32 set.seed(2018)
33 rf <- randomForest(Designation~., data = trainset, type = class, ntree = 500, importance = TRUE) #mtry, nod
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minsplit = 73
(For-loop to test optimal minsplit)

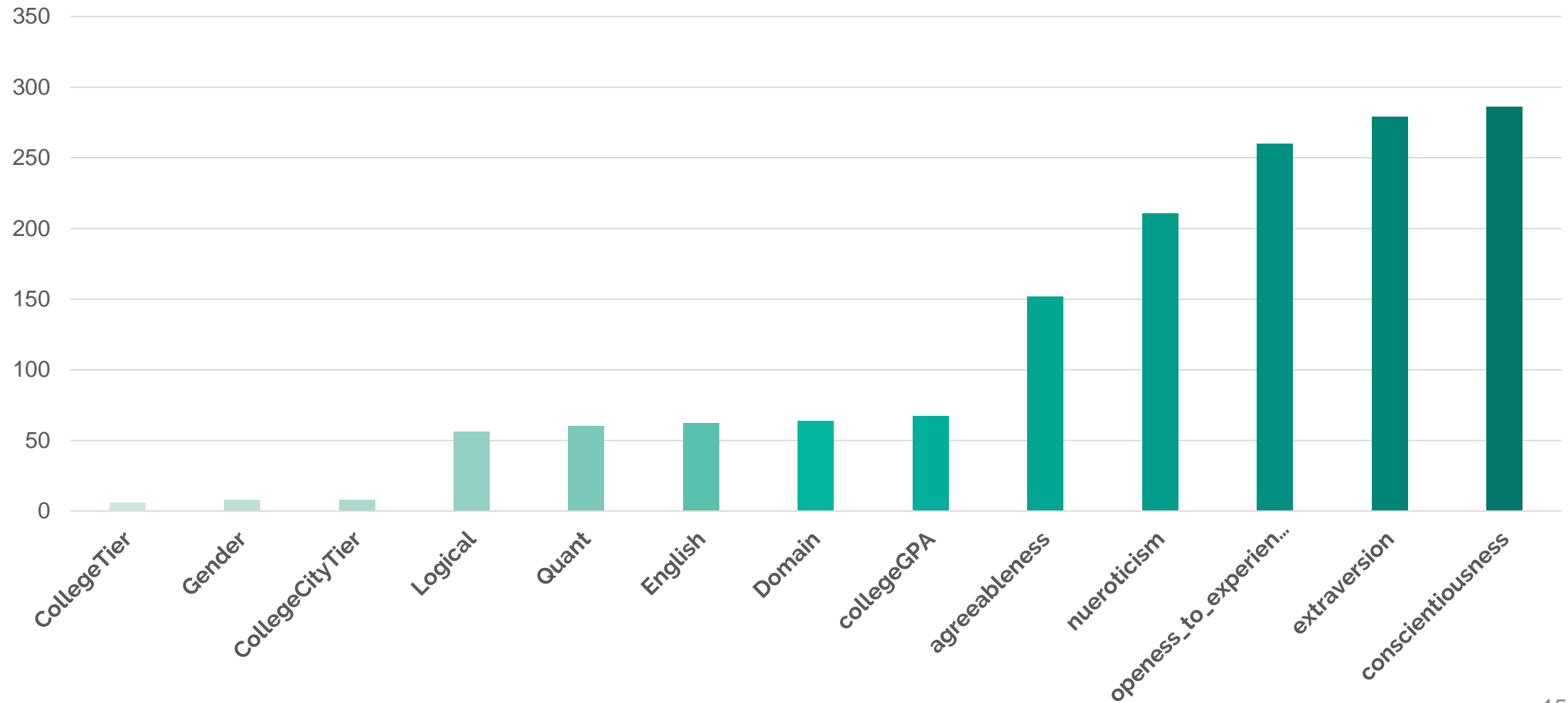
2

Prune via optimal CP

3

Random Forest

Mean Decrease in Gini Index for *Random Forest*



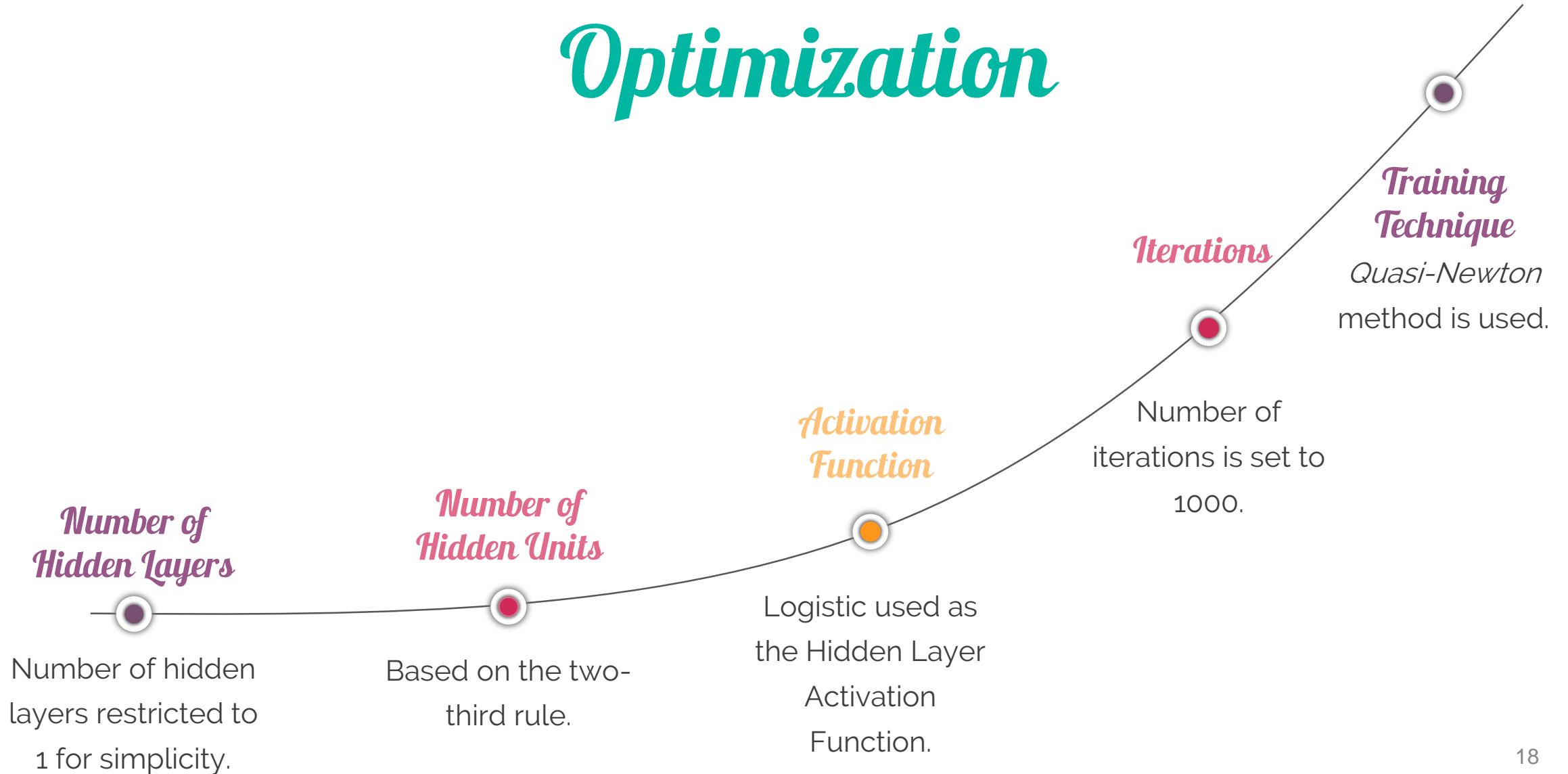
Results

Model	MARS				Decision Tree		
	<i>Degree = 1</i>	<i>Degree = 2</i>	<i>Degree = 3</i>	<i>Degree = 4</i>	<i>Not Pruned</i>	<i>Pruned</i>	<i>Random Forest</i>
Misclassification Rate (%)	18.1	19.4	19.4	19.4	21.8	20.3	17.8
Absolute Improvement in Neural Network (%)	1.8				5.7	1.6	5.6
Subset of Variables	neuroticism extraversion conscientiousness openess_to_experience agreeableness				collegeGPA Quant Domain agreeableness conscientiousness extraversion openess_to_experience nueroticism	extraversion conscientiousness openess_to_experience agreeableness	collegeGPA English Logical Quant Domain agreeableness conscientiousness extraversion openess_to_experience nueroticism

Model



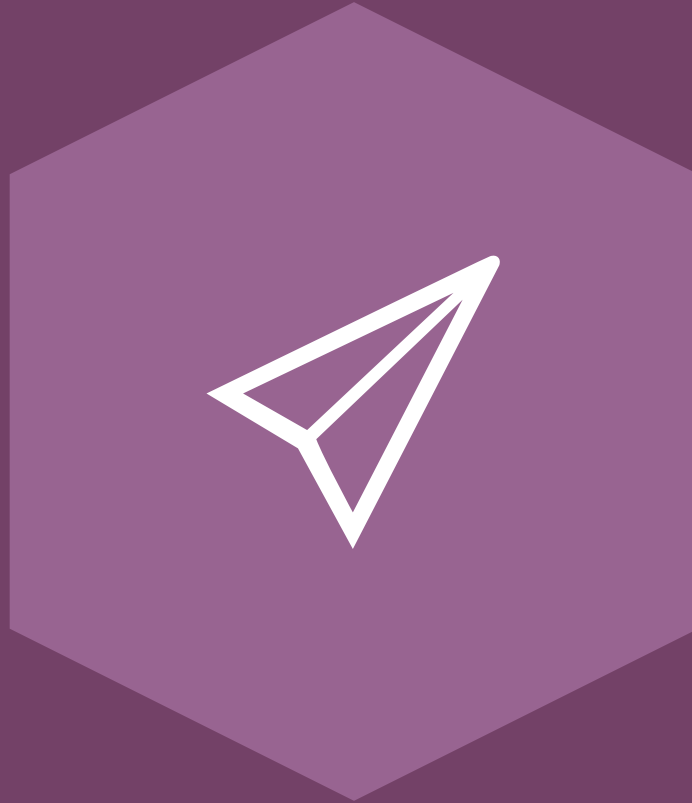
Optimization



20.9%

Final misclassification rate of the final neural
network model

Implementation & Implications



Short Run



Hybrid Portal

Digital recruitment consultant that provides guaranteed responses to the client.



Point of Application

Applicant will know probabilities relating to suitability to job. Implore them to apply for suitable jobs.



Recruitment

HR department will search for the job title. Company will be given a list of applicants ranked by suitability.



Point of Application

MOCK UP



Welcome, JOHN DOE



Dashboard



Profile



Jobs Applied



Preferences

[Contact Us](#)[Terms and Conditions](#)

LOGOUT

JOBS APPLIED

Date	Organization	Job Title	Role
13/4/2018	ABC Pte Ltd	Java Developer	Software Developer
13/4/2018	DEF Pte Ltd	.net Developer	Web Developer
05/4/2018	GHI Pte Ltd	C++ Developer	Software Developer



Short Run



Hybrid Portal

Digital recruitment consultant that provides guaranteed responses to the client.



Point of Application

Applicant will know probabilities relating to suitability to job. Implore them to apply for suitable jobs.



Recruitment

HR department will search for the job title. Company will be given a list of applicants ranked by suitability.



Recruitment

MOCK UP

Welcome, EMPLOYER

Dashboard

Profile

Job Postings

Preference

Contact Us

Terms and Conditions

LOGOUT

Location
Select... ▼

Role
General Engineer ▼

Date Posted
Select... ▼

Applicant Name	Date Applied	Suitability
Tom Doe	12/4/2018	<div><div></div>93%</div>
Dick Doe	N.A.	<div><div></div>88%</div>
Harry Doe	12/4/2018	<div><div></div>87%</div>

- Software Developer
- General Engineer
- Applications and Systems Programmer

Long Run



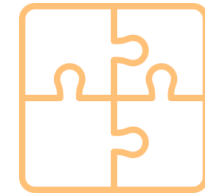
Career Portal

Provides a full suite of career resources.
Enhances the 'Recommended for you' function.



Online Resource

Creates additional data touch points where more data can be captured about the applicant.



Enhanced Recommendations

Multi-dimensional data can aid in a holistic review of applicant.
May find the right fit more accurately.

Limitations & Development



Possible Business Extension

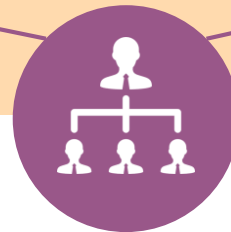
Classification of Jobs

Sparse data & Seniority



Targeted Head Hunting

Premium service for automatic matching



Salary

Predict salary range

A person with long dark hair, wearing a light-colored sweater, is sitting at a wooden desk. They are looking at a laptop screen which displays a website with a logo. To the left of the laptop is a dark-colored mug. In the foreground, there is a white notebook with handwritten notes and a black pen. The text 'THANK YOU' is overlaid in a large, pink, cursive font, and 'Any Questions?' is overlaid in a smaller, white, sans-serif font below it.

THANK YOU

Any Questions?