

A REPORT

ON

AUTOMATION OF PROGRAMMING

By

Name (s) of the student (s)

ID No.(s)

Shah Parth Jayesh

2013A3PS309

AT

HERE MAPS, Mumbai

A Practice School II Station of

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI

(September, 2016)

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Prepared in the partial fulfillment of the
Practice School II Course

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ACKNOWLEDGEMENTS

First and foremost, I would like to extend my heartfelt gratitude to my mentor, **Mr. Subhendu Roy**, without his support and guidance; these project would not have been possible. I would like to thank him for helping me whenever I was in doubt, for encouraging me to come up with new solutions to the problems and giving me ample time to learn and implement. I have really learnt a lot under his mentorship.

I would also like to thank senior co-workers, Mr. Ashish Mishra, Mr. Shahid Kamal, and Mrs. Rupinder Bhatta for all their support.

Besides, I would like to thank the management of Here Maps for providing me with an environment conducive for learning & producing the best results. Also, I would like to take this opportunity to thank Birla Institute of Technology & Science for offering this program. It gave me the opportunity to enhance not only my theoretical but also my communication skills.

Last but not the least, I would also like to thank my Practice School instructors Mrs. Swarna Chaudhary for their continuous guidance throughout the program.

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE
PILANI (RAJASTHAN)**

Practice School Division

Station : Here Maps

Centre: Goregaon, Mumbai.

Duration: 5 Months

Date of Start: 05 / 07 / 2016

Date of Submission: 15 / 09 / 2016

Title of the Project: **Automation Of Programming**

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Key Words: Blockly, maps, Here maps, Graphical user interface.

Project Areas: Big data, visual programming.

Abstract: This project mainly deals with the techniques used to achieve the required level of accuracy in big data.

Signature(s) of Student(s)

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Date

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INTRODUCTION

Company Overview

[Here Maps](#)^[4] provides automotive grade digital mapping resources to consumers and businesses. It was acquired by a consortium of German carmakers (Audi, BMW and Daimler) in December 2015. For the delivery of high precision location based services, Here maintains a massive database of location content. Since this data is used in real world scenarios, the accuracy of the information is of paramount importance. This project mainly deals with the techniques used to achieve the required level of accuracy in big data.

1. FCNR

FCNR stands for Fee calculation on Navigable Routes. This is a feature that Here plans to integrate with its existing offerings. It computes what the total expense would be in the way of toll fees on any route for a particular (user's) vehicle. We can then compare the cost incurred on alternate routes. This can be useful to plan journeys in advance and decrease the operational costs.

For example, if there are two routes which lead you from your home to your destination. Let us say route 'A' has a toll booth while 'B' has two of them.

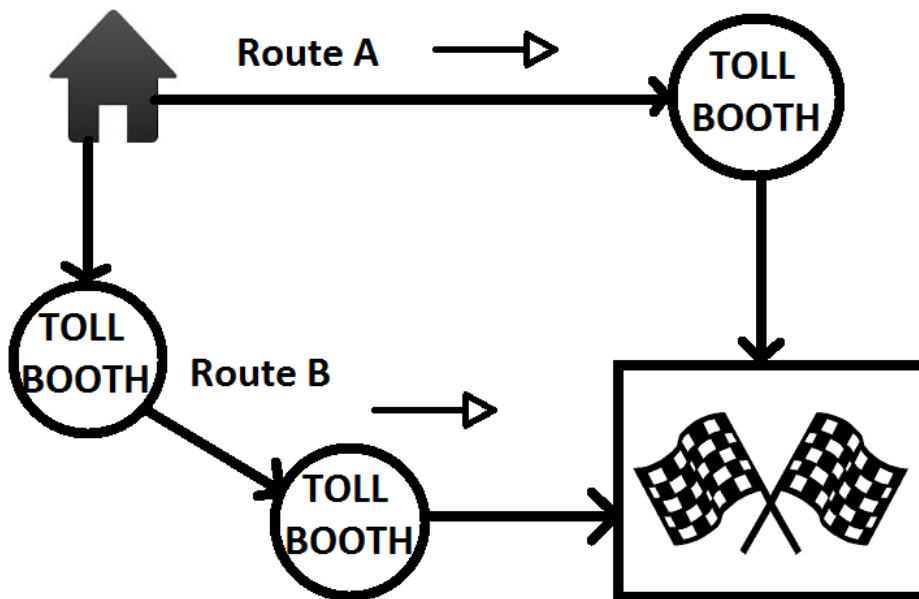


Fig: Toll costs calculation

In this scenario, the algorithm will compare the toll fees of the booth in route 'A' with the sum of toll fees of toll booths in route 'B' and indicate the cheapest route of transport. The user can then choose between them according to their preferences keeping in mind the other information like time required, distance, road quality, etc. which is provided by the map or application.

2. VALIDATIONS

The beauty of a digital map is that it can be updated regularly to reflect the constant changes taking place around the world. In fact, Here makes millions of changes to its maps every day. Fresh data is collected through various sources like satellite imagery, autonomous probes, car sensors, Here true vehicles and the community. This data is uploaded to the central database. But before this can happen, the data must be checked for accuracy. This data is integrated with the database only if it clears the assessment. This validation process is largely automated and is conducted with the help of certain predetermined rules. The computer checks whether each unit of data complies with every rule and publishes the result.

The role of a developer here is to understand the requirements and the logical functioning of these rules mentioned above and subsequently develop an algorithm to implement them in a computer program. Subject matter experts (SMEs) are the ones who formulate the rules in accordance to business logic.

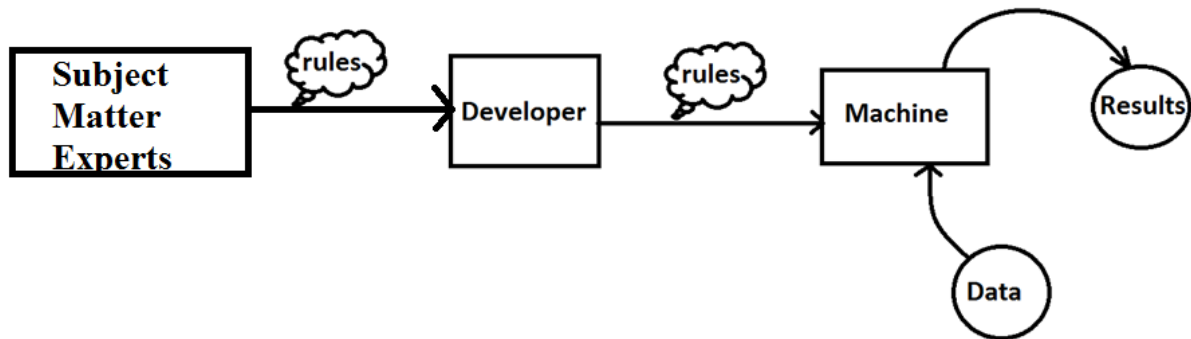


Fig: Validation workflow

2.1. AUTOMATION OF VALIDATION PROCESS

The validation process described earlier eliminates the need for manual verification of data which would have been outright impractical given the amount of data being generated. However, it also has some drawbacks:

1. There is no guarantee that engineering/developer team understands the whole context and the underlying objective behind a validation rule.
2. A very engaged and consistent co-ordination between the engineering team and SMEs is needed.
3. A very high turnaround time is required for the implementation of each rule.
4. Development outcome is often not good enough and a lot of cases require multiple cycles of rework before final acceptance.

Due to these limitations, there is need to overhaul the current process. An approach redefining creation and managing of validation rules is required. The SMEs need to have full control on rule definition and outcome. There is a dire need for the process to be highly integrated, automated and self-testable.

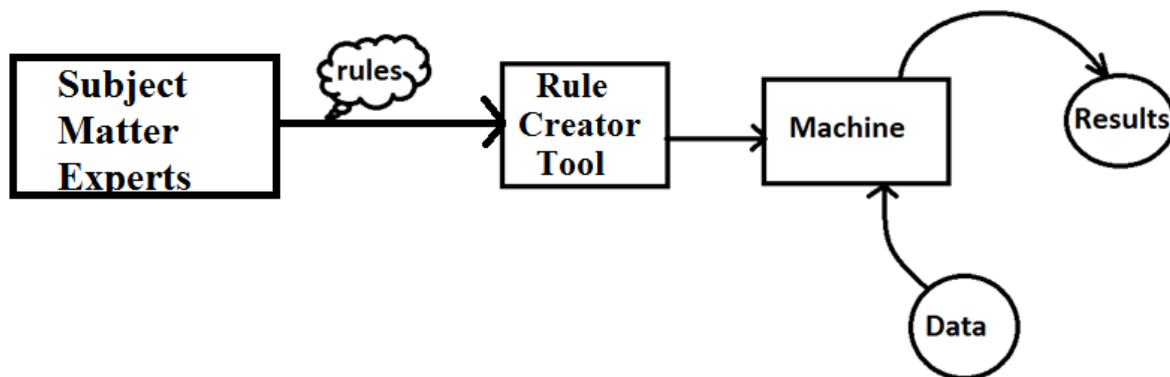


Fig: Automation of validation process

2.2.BLOCK BASED GUI

In order to eliminate the requirement of developers from the validation workflow, we need to enable the SMEs to define, author, test and implement the rules by themselves. This can be done by introducing a Graphical User Interface (GUI). This GUI would convert the rule into the required format.

The GUI identified for this purpose is [Blockly](#)^[3]. It is a completely visual programming language that lets you build software without typing a single character. Blockly uses blocks that link together to make writing code easier, and can generate JavaScript, Python, PHP or Dart code. It can also be customized to generate code in any computer language.

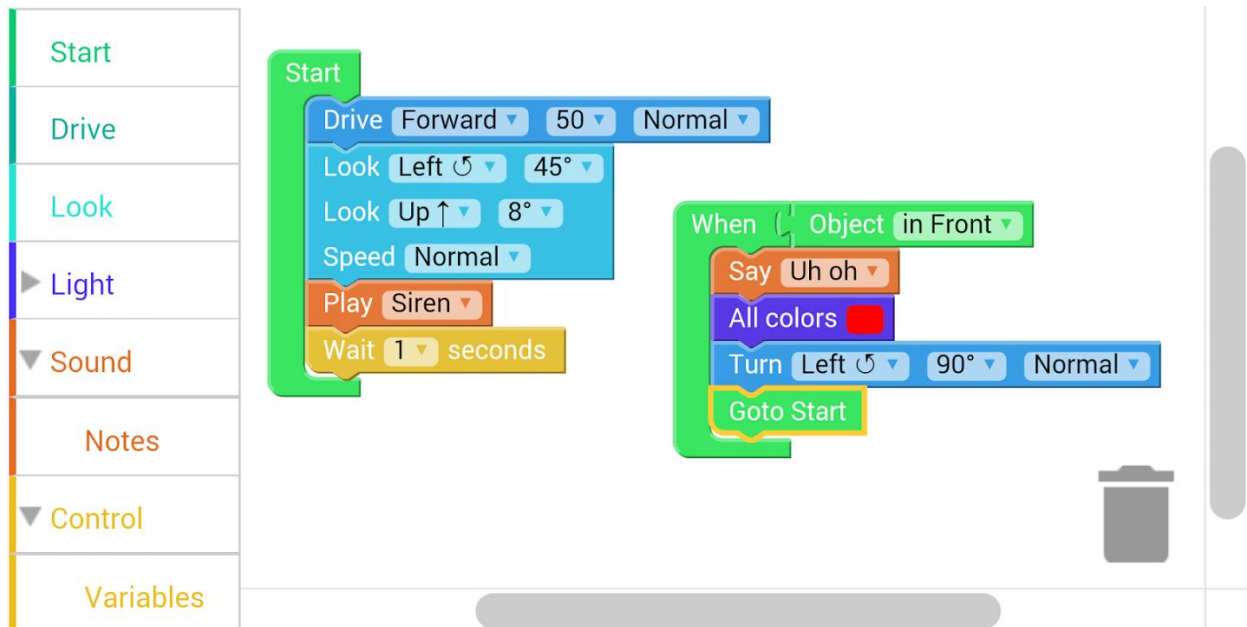


Fig: Blockly

This tool is free and open-source under the [Apache License](#)^[2]. Thus, it can be modified to suite our needs.

Custom blocks are now in development which will form mini-rules and logic blocks. These blocks can then be joined together to form a fully-functional rule. Thus the need of coding and subsequently developers is eliminated. This has the following benefits:

1. SME driven development.
2. Faster turn around time due to less coordination and more automation.

REFERENCES

1. play.google.com
2. [Apache License](#).
3. [Blockly](#).
4. [Here Maps](#)