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[1] Student Details

Name: Thomas Plumpton

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[2] Project Title

Analysing the Random Nature of Social Media

[3] Date of Production

13/10/2017

[4] Background & Overview

Randomness is a mathematical concept that is commonly misunderstood. Computer-generated random numbers are not *truly* random, they are actually *pseudo*-random. This means that although they appear to be random, they are really pre-determined. Although Pseudo-Random Number Generation (PRNG) is efficient and deterministic, these are not desirable attributes in scenarios that require True-Random Number Generation (TRNG). Such scenarios include the generation of data encryption keys and cryptography or simulation of natural phenomena like weather.

This project aims to analyse and determine the random nature of the social media platform 'Twitter' by parsing a number of Tweets and using them to control the virtual robots in a game called 'Robocode'. The data produced will be analysed to determine whether it is pseudo or truly random in an attempt to produce a new method of generating truly random numbers. The inspiration for this project originates from a social experiment called 'Twitch Play Pokémon'.

Twitch is the world's leading social video platform for streaming gaming oriented content around the world. It was founded in June 2011 and currently amasses nearly 10 million visitors every day. The site is popular among both veteran and aspiring YouTubers and attracts the attention of big e-sports players and tournaments. (Twitch, 2017)

Twitch Plays Pokémon (TPP) was a social experiment by an anonymous Australian programmer and involves streaming a game of Pokémon on Twitch in the Game Boy emulator 'VisualBoyAdvance'. The anonymous programmer developed an Internet Relay Chat (IRC) bot, written in Python, which captures messages from the Twitch chat and parses those strings directly into commands for the game. The stream soon became popular and reached approximately 60,000 concurrent playing users. It took nearly 16 continuous days to complete the first game 'Pokémon Red'. Since then, numerous other Pokémon games from the franchise have been hosted and streamed on Twitch for the users to collaborate on. (Wikipedia, n.d.) (Cunningham, 2014)

Robocode is a lightweight, open-source, programming game developed by Mathew A. Nelson as a personal endeavour in 2000. The goal is to create a virtual robot by writing the code yourself in Java or Microsoft .NET. The game acts as an intermediary between Twitter and the data visualisation by converting the parsed Tweets into instructions to control the robots and run the game.

Mathematics plays an important role in the conclusion of the project. Methods such as statistical regression and standard deviation should be used to determine the random nature of the results output from Robocode and graphed via D3.JS. This will conclude whether Twitter can be used as a TRNG.

[5] Objectives
1) Design & implement a program to download Tweets from Twitter.
2) Investigate how to parse the downloaded Tweets for Robocode.
3) Investigate how to build upon the existing Robocode source code.
4) Create Java code for Robocode and investigate User Experience (UX).
5) Investigate Java connection to databases to store data output.
6) Create web application in NodeJS to host D3.JS Data Visualisation.
7) Connect database to NodeJS and graphically visualise data.
8) Use statistical techniques to determine random nature of the output data.
9) Conclude and evaluate results, consider real world applications.

[6] Constraints
- Robocode requires Java or Microsoft .NET
- Twitter REST API allows only 15 calls every 15 minutes. It also restricts the request to a maximum of 3200 tweets per call.
- Consent to access public profiles

[7] Resources

All software and online resources are open-source and therefore freely available, with the exception of the JetBrains Suite which is free to students.

Software:
- Java IDE (JetBrains IntelliJ IDEA)
- Editor / Web Development Environment (JetBrains WebStorm)
- SQL IDE (JetBrains DataGrip)
- Internet Connection

Technical Skills:
- Java 8
- HTML5 / Pug / Jade (Web Mark-up Languages)
- CSS3 (Cascading Stylesheet)
- JavaScript (Client & Server Side)
- NodeJS (Runtime Environment)
- D3.JS (Data Driven Documents) JavaScript Library

Services:
- Twitter Development API
- Robocode Development API
- Twitter4J Development API

[8] Reporting

1) **Name:** Abdul Razak
   Role: Project Supervisor
   Responsibilities: Overseeing project. Weekly meetings will be held to ensure the work is on track and completed in a competent manner.

2) **Name:** Andrew Parker
   Role: Research Guidance
   Responsibilities: Provide guidance and helpful tips on database and object-orientated related tasks.

3) **Name:** Amanda Dewhurst & Louise Ashby
   Role: Report & Literature Guidance
   Responsibilities: Fortnightly meetings to review current project documents and ensure deadlines are correct and on track.

[9] Glossary of Terms

Term	Definition
D3.JS	D3.JS (Data Driven Documents) is a JavaScript library used for creating SVG Data Visualisation on web pages.
IDE	Integrated Development Environment. A piece of software used for managing and developing applications.

API	Application Programming Interface. An index of all functions and procedures that allow the creation of software, applications or other service.
SQL	Structured Query Language. A language used for interrogating and communicating with databases.
JetBrains	JetBrains is a software development company whose tools are targeted to software developers and project managers. They have a large suite of intelligent software used for programming and web development.
IRC	Internet Relay Chat. An application layer protocol that facilitates communication in the form of text.
REST (API)	A RESTful API is an application programming interface that uses Hyper Text Transfer Protocol (HTTP) requests to GET, PUT, POST and DELETE data.
NodeJS	NodeJS is a runtime environment built upon Google Chrome's V8 JavaScript Engine.
Robocode	Robocode is a programming orientated game, where the goal is to develop a robot battle tank to battle other tanks in Java or Microsoft .NET.
User Experience	The overall experience of a person using a product such as a website or computer application, especially in terms of how easy or pleasing it is to use.
User Interface	The means by which the user and a computer system interact, in particular the use of input devices and software.
PRNG	Pseudo-Random Number Generator. A program written for, and used in, probability and statistics applications when large quantities of random digits are needed.
TRNG	True-Random Number Generator. A mathematical construct, either computational or as a hardware device, that is designed to generate a random set of numbers that should not display any distinguishable patterns in their appearance or generation.

[10] Version Log

Version	Date	Summary
1	11/10/2017	Initial Draft
2	18/10/2017	Second Draft
3	22/10/2017	Final Draft

[11] Bibliography

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