Hackathon2018 ProgrammingProblems

From Iniitian

Contents

Programming Problems

- Some problems are easier than the rest.
- The number of entries is not restricted to one problem. A team can attempt more than one problem. Each entry is on its merit.
- There are problems that have some data sets. Please make a **mail request** to Deepesh PC (mailto:Deepesh.pc@NIIT-Tech.com) and Vikram Nagaraja Rao (mailto:Vikram.Rao@NIIT-Tech.com)
- Make suitable assumptions while solving the problem. It is possible you may simplify a problem or make it harder.
- In case you have your own problem you can add that and work on that. Just get it vetted by Deepesh PC (mailto:Deepesh.pc@NIIT-Tech.com),Vikram Nagaraja Rao (mailto:Vikram.Rao@NIIT-Tech.com) or Eswaran Narasimhan (mailto:Eswaran.narasimhan@NIIT-Tech.com)

See the list of problems below and register your team under the problem(s) you wish to solve.

This to that

Often we have played a game where we start with a word and end with another word by changing one letter at a time. For example:

1. stale->state->slate->plate
2. stale->state->spate->slate->plate

Write a program to take the starting and the ending words as input and suggest a shortest sequence to change from start to end. In the example above, the second sequence is valid but longer. Please find attached a corpus of 5-letter words (5-letter-wordlist-Hackathon2018.xlsx) containing 9188 words.

File:5-letter-wordlist-Hackathon2018.xlsx

Registered Teams:

1. JCoC - Amit Kumar Mittal (mailto:amit.1.mittal@NIIT-Tech.com), Amit Kumar (mailto:amit.30.kumar@NIIT-Tech.com),Sheetal varshney (mailto:sheetal.5.varshney@niit-tech.com),Vibhor Taneja (mailto:vibhor.5.taneja@niit-tech.com)
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3. Problem Solver - Tapas Das (mailto:tapas.das@NIIT-Tech.com)

One for the road

Assuming data given below is available for 1000 days across 1000 points on a stretch of a long road with multiple intersections, loop back, merging traffic and exit ways, how would you locate anomalies to detect that there were impediments on the road such as pot holes, vehicles breakdown etc.? Make suitable non-trivial assumptions.

Date	Time slot	Lat/Long	Avg drift speed	Peak drift speed	Lowest drift speed
15-Nov-2017	0001 to 0500 hrs	12.913436, 77.625017	8 km/hr	10 km/hr	2 km/hr

Time Slot {1: 0001 to 0500 hrs, 2: 0501 to – 0900 hrs, 3: 0901 to 1200 hrs, 4: 1201 to 1600 hrs, 5: 1601 to 2000 hrs, 6: 2001 to 2400 hrs }

Traffic Density {1: 0 – 0.01 v/m, 2: 0.01 to 0.5 v/m, 3: 0.5 to 0.8 v/m, 4: > 0.8 v/m } where v/m = vehicles /metre

Assume and create a data set that will help you demonstrate solving the problem.

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Blockchain

- Using block chain can u demonstrate Flight status being updated in a chain by at least 3 or more parties.
- The ledger should show the flight status and the entities who updated the chain.
- A smart contract to also trigger an insurance payout in case of flight delay. The actual payout maybe simulated.
- The objective of this problem is to encourage exploration of block chain
- Public chains like Ethereum may be used. Download here. (https://geth.ethereum.org/downloads/)
- Hackers can also work on any other use case to demonstrate the triggering of smart contracts in a block chain

Registered Teams:

1. BlockChainHackers - Debajani Mohanty (mailto:debajani.mohanty@niit-tech.com)
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Virtual Bots

- Deploy a virtual bot that helps a user by providing answers for routine questions that are answered either by a human or by searching for the content in a webpage.
- The Bot could be demonstrating something as simple as providing answers for FAQ or to complete a process like Ticket booking or provide information like Flight Status.
- The Bot may be setup to access over a Webpage or a mobile app or Email or over existing channels like Skype, Skype For Business.
- Few of the useful technologies to explore for building a Virtual Bot are listed below.
  - Microsoft Bot Framework - Get started here (https://docs.microsoft.com/en-us/bot-framework/bot-builder-overview-getstarted)
  - Azure Bot Service - Quickstart here (https://docs.microsoft.com/en-us/bot-framework/azure-bot-service-quickstart)
  - LUIS - Get Started here (https://www.luis.ai/home)
  - DialogFlow formerly known as API.AI - SDK available here (https://dialogflow.com/docs/sdks)
  - Amazon Lex - Get Started here (https://aws.amazon.com/lex/getting-started/)

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What Twitter said about Demonetization?

On November 8th, India's Prime Minister announced that 86% of the country's currency would be rendered null and void in 50 days and it will withdraw all 500 and 1,000 rupee notes — the country's most popular currency denominations from circulation, while a new 2,000 rupee note added in. It was positioned as a move to crackdown on corruption and the country's booming under-regulated and virtually untaxed grassroots economy.

The dataset contains a sample set of tweets after the announcement. Using this dataset, can you identify?

- What is the general sentiment of tweets?
- Can you plot the trend of sentiment over the period of tweets?
- Can you map the sentiment with segment of users(based on the field "from_user_description")?
- And any other interesting insights which you may identify.

Data can be downloaded from: https://www.kaggle.com/arathee2/demonetization-in-india-twitter-data/data

Data Credit: Kaggle (www.kaggle.com)

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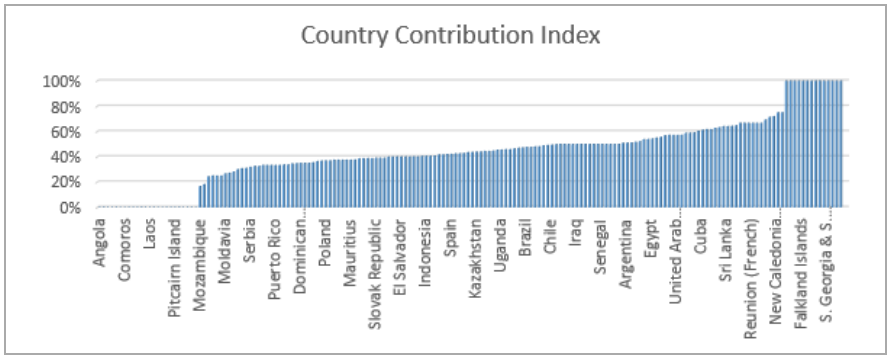
What sets Stack overflow contributors apart?

Every year, Stack Overflow conducts a massive survey of people on the site, covering all sorts of information like programming languages, salary, code style and various other information. This year, they amassed more than 64,000 responses fielded from 213 countries.

The data can be found at https://www.kaggle.com/stackoverflow/so-survey-2017/data

Can you analyze this data to find out the characteristics of people who contribute the answers? Like for ex: People from Angola, Comoras hardly contribute to the answers whereas 50% of Indians give back to the community.



The goal is to come up with insights like

- People who are having a high job satisfaction and who are in web stack from United States contribute to 50% of the answers
- People who like problem solving from Russia contribute to 64% of answers on algorithms

You are free to share any number of your insights.

Data Credit: Kaggle (www.kaggle.com)

Registered Teams:

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Can you identify cracks on mobile screen?

Companies that insure mobile phones against damage due falling or other accidents would like to verify the condition of the mobiles. One of the way is to see the mobile and inspect them before insuring. This is a very sluggish process. However a more efficient way is to evaluate the image of a mobile before insuring. Using images of mobile phone, can you classify the extent of crack on the mobile screen? A suggested classification could be:

- Heavily cracked
- Moderately cracked
- Free of any cracks

Heavily cracked	Moderately cracked	Free of any cracks
		
		

Data to be uploaded.

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Speaker Recognition

As security continues to be a threat to enterprises, new ways of security solutions are emerging and one among them is the speaker recognition. Can you recognize the voice of a person based on an available training set.

Registered Teams

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