CSCE 580: Intr AI   Prof. Biplav Srivastava, Fall 2025

Quiz 1 / September 9, 2025 – Tuesday / Instructions

- All the responses should be in your Github before ***the end of day on Tuesday (Sep 16, 2025)*** – next Tuesday.
- For coding part (Q3 and Q4), implement python notebooks or in Collab. Call them " –Quiz1-Response-Q3 or Q4". If Github, put it in your Github repo under "Quiz1" sub-folder. All files, including doc, data and code, will be under this. Examples: "<>/Quiz1/Responses.pdf, "<>/Quiz1/Q3-code.ipynb".
- For questions/ clarifications, send an email to Instructor biplav.s@sc.edu and TAs vishalp@email.sc.edu, kausik@email.sc.edu.

Total points = (20 + 25 + 55): 100 points, Obtained =

Student Name:

The quiz is to test your understanding of concepts of intelligent agents and practical problem solving.

Q1: About data for AI [4 + 16 = 20 points]
Instructions: Give your answers in bullet points.

a) What is open data? Given an example of open data that you produce which others can use? [2 + 2 = 4]

·public data
·available to the general public

b) You are analyzing a dataset and some attributes are missing.

b.1) What could be any 2 reasons why they are missing? [2 + 2 = 4]

·It was not provided
·It could have corrupted

b.2) What are any 2 ways you can still proceed with data analysis despite the missing values. For each, mention what assumption you are making and what are its risks. [(2+2+2) * 2 = 12]

·Assume a default value, assuming it wouldn't sway the numbers too much which is also the risk
·You could ignore the value, however that might affect the data as well. This also would be assuming that it wouldn't significanty sway the overall data

Q2: Programing activity: resume analysis [25 points]

We will work with crowdsourced resume data of students from the class. They are at: https://drive.google.com/drive/folders/1F6HRaliFWcakVvT605m8Js6a1D40Tx24?usp=sharing

This analysis has to be done as a python notebook or collab. It should be saved as "<>/Quiz1/Q2-code.ipynb".

- Task 1 [10 points]
  - Do: Read your resume in text and get a list of words. Let us call them **resume_words**

  a. Do: Plot a histogram of top 20 resume_words, i.e., bar graph of words (x-axis) and counts (y-axis).

b. Context: The list of common English words are called **stop_words**. They are usually articles, determiners and prepositions, along with their variations. A list of 127 are at: https://gist.github.com/sebleier/554280 (Raw file is at: https://gist.githubusercontent.com/sebleier/554280/raw/7e0e4a1ce04c2bb7bd41089c9821dbcf6d0c786c/NLTK's%2520list%2520of%2520english%2520stopwords)
Do: Remove stop_words from resume_words. Let us call them **specific_words**.
Plot the histogram for **specific_words.**

c. Analyze: Note which words emerge now. Was removing stop_words helpful in revealing more about you (from the resume).

- Task 2 [10 points]
  - Context: Take all resumes in folder
  1. Do: Read all resume in text and get a list of words. Let us call them **resume_words**
  2. Do: Plot a histogram of top 20 resume_words, i.e., bar graph of words (x-axis) and counts (y-axis).
  3. Do: Remove stop_words from resume_words. Now plot the histogram for **specific_words**
  4. Analyze: Note which words emerge now. Was removing stop_words helpful in revealing more about the class (from the resumes).
- Task 3: [5 points]
  1. Analyze: specific_words from your resume and that of class. Which words are unique to you?

Student, President, Structures, Language, Capstone, Government, Legislation, Committee, my name and other specific identifiers

Q3: Programming activity: data analysis for social impact [55 points]

We are provide you access to redacted version of real data about firefighting at a firestation's services in the Midlands in 2025. There are omitted fields to maintain confidentiality (addresses, names). The data has 8 columns and 2,200 rows.

See: https://drive.google.com/drive/folders/1nJTZJZ_M9e7whJy4cMzNCXTXfN7zYvPs?usp=sharing

Write python code/ demonstrate its working in notebook, and report on the following questions along with your code.

XREF ID	0.000000%
DISPATCH UNIT	0.000000%
DISPATCH CREATED DATE	0.000000%
INCIDENT NUMBER	0.000000%
1ST UNIT ON SCENE	19.454545%
ALARM DATE TIME	1.409091%
CALL COMPLETE	1.409091%
SHIFT	3.136364%

a) Data issues: [15 points]

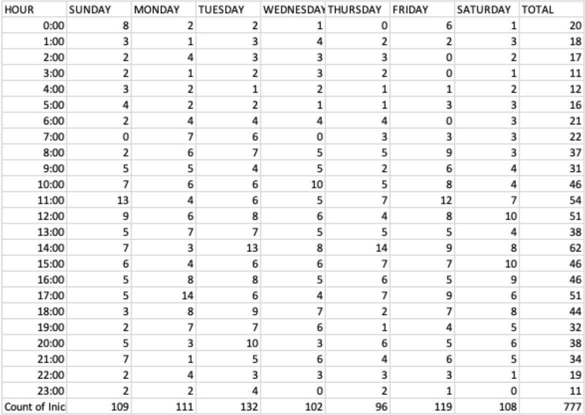
2200 entries

sometimes - is replaced by 00 on the incident number, check for a dash and if it doesn't exist then replace the first 00 with a dash.

1. What is the range of data for the cases (dispatches) ? [2 points]
2. What % of data is missing, by each column? [3 points]
3. What data issues are there (e.g., different formats) and how we can resolve them [5 points]
4. Resolve data issues. Assign IDs. Pick a method for handling missing data and use consistently. Describe your data cleaning strategy, as appropriate. Do remainder of the tasks with data resolved. [5 points]

b) Exploratory data analysis – about file alarms. Answer from your analysis. [20 points]

1. On an average, in how much time is a call (alarm) resolved from the time it is created to closed ? [5 points]
2. How many fire units, on an average, are usually sent for a fire alarm? [5 points]
3. Which shift is the busiest among A, B, C ? [5 points]
4. Create a matrix of number of file alarms organized by the day of week (x_axis) and hour of the day (y-axis). It will also have totals for each row and column. See illustration below. [5 points]



HOUR	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	TOTAL
0:00	8	2	2	1	0	6	1	20
1:00	3	1	3	4	2	2	3	18
2:00	2	4	3	3	3	0	2	17
3:00	2	1	2	3	2	0	1	11
4:00	3	2	1	2	1	1	2	12
5:00	4	2	2	1	1	3	3	16
6:00	2	4	4	4	4	0	3	21
7:00	0	7	6	0	3	3	3	22
8:00	2	6	7	5	5	9	3	37
9:00	5	5	4	5	2	6	4	31
10:00	7	6	6	10	5	8	4	46
11:00	13	4	6	5	7	12	7	54
12:00	9	6	8	6	4	8	10	51
13:00	5	7	7	5	5	5	4	38
14:00	7	3	13	8	14	9	8	62
15:00	6	4	6	6	7	7	10	46
16:00	5	8	8	5	6	5	9	46
17:00	5	14	6	4	7	9	6	51
18:00	3	8	9	7	2	7	8	44
19:00	2	7	7	6	1	4	5	32
20:00	5	3	10	3	6	5	6	38
21:00	7	1	5	6	4	6	5	34
22:00	2	4	3	3	3	3	1	19
23:00	2	2	4	0	2	1	0	11
Count of Inic	109	111	132	102	96	119	108	777

c) Unsupervised learning [20 points]

1. Cluster the data based on any two methods in sci-kit and report on their cluster quality. Which method performs better ? [15 points]
2. Using the best result, try to interpret (label) the clusters. What do they represent? [5 points]