1. **Comparison of Best-First Search under certain constraints**

- **Research Question:**
    - How can we find a specific solution to a search problem using a heuristic search algorithm?

- **Goal:**
    - be able to find a specific solution (ex. specific length) for a search problem efficiently (time & memory wise)

- **Purpose:**
    - Having control on what kind of solution we want to find on a particular search problem
    - Sometimes we might not want the most optimal solution, and instead a third optimal solution. How do we get that using a heuristic search algorithm?

- **General Notes:**
    - Best-first search algorithms can return the most optimal solution to a search problem, anytime algorithms can return a solution quickly first, and then spend more time to find better solution
    - If we want, for example, a solution of a particular length which is not optimal, how can we get that solution?
        - One idea is to run anytime algorithm until it finds a solution with that particular length and then breaks
    - Application can be:
        - Ex. Not everyone wants the fastest path from A to B on Google Maps as some people are beginners and they just want to take an easier path
            - We need control in what kind of path we want to find (ex. path only including 3 turns, requires you to only use 8 intersections, etc.)

2. **Audio Sentiment Analysis**

- **Research Question:**
  - How can we improve the accuracy of audio-sentiment analysis models?

- **Goal:**
  - be able to analyze emotions of speaker by detecting different tones and wording used in their speech

- **Purpose:**
  - Building upon previous works on audio sentiment analysis (Multimodal sentiment analysis)
  - To evaluate an approach that most accurately analyzes sentiment in an audio

- **General Notes:**
  - General idea is that text sentiment analysis might be pretty accurate (ex. Grammarly), but not enough for example colloquial conversations
    - "I'm okay"
      - Can be taken differently with the tone
      - Sometimes only text isn't enough to analyse the whole picture
  - Audio sentiment analysis to be more specific, multimodal sentiment analysis since I am not only looking at the sound features (loudness, pitch, etc.) but also the text-based contents

- **Datasets:**
  - Good amount of dataset found in http://multicomp.cs.cmu.edu/resources/ (all related to multimodal sentiment analysis)

- **Questions to be considered:**
  - What do we consider "accurate" in a sentiment analysis?
    - Can we create for example an audio-sentiment analysis model that guarantees 80% accuracy?

3. **Audio Segmentation**

- **Research Question:**
  - How can an informational audio be segmented based on its contents?

- **Goal:**
  - be able to segment audio based on its content
    - similar to how text is segmented into paragraphs based on its contents but for audio

- **Purpose:**
  - Easier access to necessary information on whatever audio you are listening to
  - Mostly for educational purposes
    - Instead of going back through the entire audio or recording to find the information you desire, you can just find the corresponding auto-generated audio segments

- **General Notes:**
  - Currently leaning on segmenting audio based on it's contents
    - Text Segmentation might be a better project name, since for informational videos, (ex. Khan Academy, Veritasium), audio features are not important for segmenting
  - Furthermore, I want to be able to give a "segment name" for each segmented frames (like chapter names)

- **Datasets:**
  - https://cloudstor.aarnet.edu.au/plus/s/M8BvXxe6faLZ4uE
    - Open-access news corpus containing over 44 million English documents
  - http://mlg.ucd.ie/datasets/bbc.html
    - BBC news corpus
  - https://www.mecs-press.org/ijitcs/ijitcs-v6-n11/IJITCS-V6-N11-1.pdf
    - Table 1 on this pdf shows all the datasets for audio segmentation and it seems for now, a sufficient amount of datasets to be working with