**Brief Report:**

**Project Title: Automated Cow Data Extraction**

[**Collab link**](https://colab.research.google.com/drive/1CrvsmAH6G5dmhghzoa2jrENceA0YX39V?usp=sharing)

**Summary:**

Our goal with this project was to create a Python program capable of automatically extracting cow identification (ID) and milk yield data from audio recordings where farm workers announce milking information. To achieve this, we leveraged speech recognition, natural language processing (NLP), and regular expressions. These tools enabled us to transcribe audio, identify relevant data, and refine accuracy.

**Findings:**

**1.** **Speech Recognition Accuracy**: We utilized the Google Speech Recognition service for audio transcription. The accuracy of the transcriptions depended on factors like audio quality, background noise, and speaker clarity.Due to API issues we couldn't use other libraries.

**2**.**Data Extraction Accuracy**: Our program successfully extracted cow IDs and milk yields from transcriptions using a blend of NLP and regex. However, there were instances of duplication and incorrect extraction due to variations in speech patterns and data formats.

**3**.**Preprocessing Techniques**: We applied various audio preprocessing techniques, including normalization, silence removal, and noise reduction, to enhance transcription quality and minimize errors.

**4**.**Named Entity Recognition (NER)**: Employing the spaCy library for NER allowed us to identify cow IDs mentioned in the transcriptions. While the model exhibited reasonable performance, further training may enhance accuracy.

**5**.**Future Development:**

-**Model Fine-tuning**: Fine-tuning the NER model with annotated cow ID and milk yield data could enhance accuracy.

- **Handling Variations**: Expanding the program to accommodate variations in speech patterns and data formats would increase its versatility.

- **Integration with Machine Learning**: Integrating machine learning models, such as CRF(Conditional Random Field) or transformers-based models, for NER could further boost extraction accuracy.

- **Evaluation Metrics:** Incorporating evaluation metrics like precision, recall, and F1-score would offer a quantitative measure of the program's performance.

**Conclusion**:

Our Python program showcases promising capabilities for automating cow data extraction from audio recordings. Continued refinement, including model fine-tuning, handling variations in speech patterns, and integrating machine learning techniques, will likely yield more robust and accurate results.We have only 2 audio provided, good number of sample audios will be required to train the model better.

[**Screen Recording link** :](https://drive.google.com/file/d/177hE5c8aDfpaZUf2fCkPDk858lKS8Dgw/view?usp=drive_link)

A screen recording demonstrating the process of transcribing audio recordings, extracting cow IDs and milk yields, and discussing potential improvements has been provided.