HKUCS Graduate Admission Data Analysis: A Multimedia Mining Approach

COMP4801

Student: Song Yi Ting (3035124829)
         Wang Michelle Yih-chyan (3035124441)

Supervisor: Dr. Reynold Cheng
Agenda

- Introduction
- Methodology
  - Overall Structure
  - Audio Data Extraction
  - Visual Data Extraction
- Information Analysis
  - Data Selection
  - Numerical Data Model
- Result Prediction
  - Data Mining Model
- Conclusion
- Demonstration
- Q&A
Introduction
Methodology
Overall Structure

HKUCS Graduate Student Database

Data Extraction

Audio Data
Visual Data

Information Analysis

Classifier
Regressor
Numerical Data Model

Result Prediction

Applicant Recommendation
Audio Multimedia Data Extraction

- Google Speech Recognition API
- Google Cloud Speech Recognition API
- PocketSphinx

```python
python3 transcribe_2017.py
```

```
pixel art okay so are you watching Envoy underarm Brown University electrica
ing engineering and also add to Illinois University of Washington navigate
what's the latest college I wait for my going to work today Bentley online so
you want for pool okay Point beaches for texting people only if you will st
rt your PhD
show me some all you have other research interest and I have no idea Papa ok
y I can throw up remember yeah I had a phone for a week
could you can you work at all see the other universities red wedding reactio
Google make a list
```
Visual Multimedia Data Extraction
Visual Multimedia Data Extraction

Front-end
- HTML
- CSS
- JavaScript
  - jQuery
  - Affectiva

Back-end
- Node.js
  - Express
  - Interview Videos
- MySQL Database

- framework
### Affectiva API & MySQL Database

#### facial_expression

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#### emotion

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#### expression

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Information Analysis
Data Selection

1. Sufficient Sample
   ○ Audio: with a length of more than 5 seconds
   ○ Visual: more than 100 samples in total, 20 samples in self-introduction

2. Clear Contents
   ○ Visual: self-introduction part
Numerical Data Model

- Bag-of-words
- Bigram bag-of-words
- Tf-idf
- Word2Vec

(1) She majors in Software Engineering.
(2) Peter also majors in Software Engineering.

“She”, “majors”, “in”, “Software”, “Engineering”
“Peter”, “also”, “majors”, “in”, “Software”, “Engineering”

BoW1 =
{"She": 1, "majors": 1, "in": 1, "Software": 1, "Engineering": 1, 
"Peter": 0, "also": 0}

BoW2 =
{"Peter": 1, "also":1, "majors": 1, "in": 1, "Software": 1, 
"Engineering": 1, "She": 0}
Numerical Data Model

- Bag-of-words
- Bigram bag-of-words
- Tf-idf
- Word2Vec

(1) She majors in Software Engineering.
(2) Peter also majors in Software Engineering.

("She", "majors"), ("majors", "in"), ("in", "Software"),
("Software", "Engineering")

("Peter", "also"), ("also", "majors"), ("majors", "in"), ("in",
"Software"), ("Software", "Engineering")
Numerical Data Model

- Bag-of-words
- Bigram bag-of-words
- Tf-idf
- Word2Vec
**Numerical Data Model**

- Bag-of-words
- Bigram bag-of-words
- Tf-idf
- Word2Vec

- identify the word as word vectors
- numeric presentation projects the relevance of the words
Result Prediction
Data Mining Models

Random Forest Classifier

Random Forest Regressor
Conclusion

● What We Have Done & Result
  ○ Multimedia parameterization
  ○ Real-time predictions
  ○ System integration

● Future Works
  ○ Video - additional sections
  ○ Text - other text material
Demonstration
Q & A
Receiver Operating Characteristic