

# INT3404E 20 - Image Processing: Mid-term Phase 2 - Planning and Proposal Development

## Group 11

### 1 Topic: Sino-nom character retrieval

#### 1.1 Input

- A list of 2D images queries. Characteristics:
  - Size and color model: 512x512 RGB images
  - Image quality: gray background; characters have fuzzy edges; strokes of out-of-frame characters occasionally appear at the edges; some characters are missing strokes or have too many strokes, creating a lack of clarity.



Figure 1: Example of a query

- A database containing 3D models in STL format. Characteristics:
  - Extracted from 3D scan
  - Containing a lot of noises (bumps, grooves, clefts), creating difficulty in identifying the shape of characters → Requires pre-processing to improve clarity

#### 1.2 Output

A csv file containing the name of 5 best matches from the 3D database for each 2D queries

### 2 Directions, desired targets and plan to achieve

#### 2.1 Directions

- Understand and analyze data
- Preprocessing 2D image query
  - Returns a binary image that includes only black and white
  - Size: 256 x 256
- Preprocessing of 3D models database
  - Search for Python libraries that allow cutting 3D models in STL file format: return the model to a 3-dimensional matrix containing little noise (grooves or bumps) from the original model
  - Take a photo of the surface of the 3D model after cutting from an angle perpendicular to the z-axis

- Reduce matrix dimension to 256x256
- Convert the matrix to binary with an approximation function using threshold
- Desired result: A 2D binary matrix surface after applying the technique, showing clearly the shape of the Sino-nom letter
- Image retrieval: Testing methods
  - Template matching via openCV library
  - Find methods to compare similarities between two images: Similarity, Feature Extraction, Vectorize and compare, ...

## 2.2 Desired targets

- Find the 5 3d models from a given database with the highest similarity to the 2D query image

## 2.3 Plan to achieve these desired targets

- Phase 1: Analyze input and output data (format, type, ...)
- Phase 2: Research methods for data preprocessing, 2D-3D retrieval
- Phase 3: Preprocess 2D images and 3D models
- Phase 4: Research methods to compare similarity between two images
- Phase 5: Use the method of comparing the similarity between processed images
- Phase 6: Statistics of results

## 3 Information of each team member and tasks assigned

### 1. Vu Thanh Long - 21020647 (Team leader)

- Research 2D image preprocessing methods
- Preprocessing of 2D images
- Research retrieval methods that can be applied to the problem: Similarity, ...
- Write reports and make slides

### 2. Duong Bao Long - 21021514

- Data analysis
- Research libraries and methods for processing 3D models
- Preprocessing of 3D models
- Research possible retrieval methods: Template matching, ...

### 3. Duong Quang Minh - 21020219

- Research libraries and methods for processing 3D models
- Preprocessing of 3D models
- Research retrieval methods that can be applied to the problem: feature extraction, ...
- Write reports and make slides