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MAST

Multi-Script Annotation Toolkit for Scenic Text

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Motivation

- Need for Large annotated data-base
  - Training & bench marking
- Camera-based documents
  - only document image annotation
- Efficient annotation of Scenic text
  - Multi script : flexible adaptation
  - Pixel level ground truth
  - Open source

MILE_MAST_GT

MAST: Multi-script Annotation toolkit for Scenic Text

WORD LEVEL

LOAD

SEGMENT WORD

THRESHOLD 25

RESEGMENT

RELOAD

BINARIZE

SELECT SCRIPT

NEXT WORD

SAVE

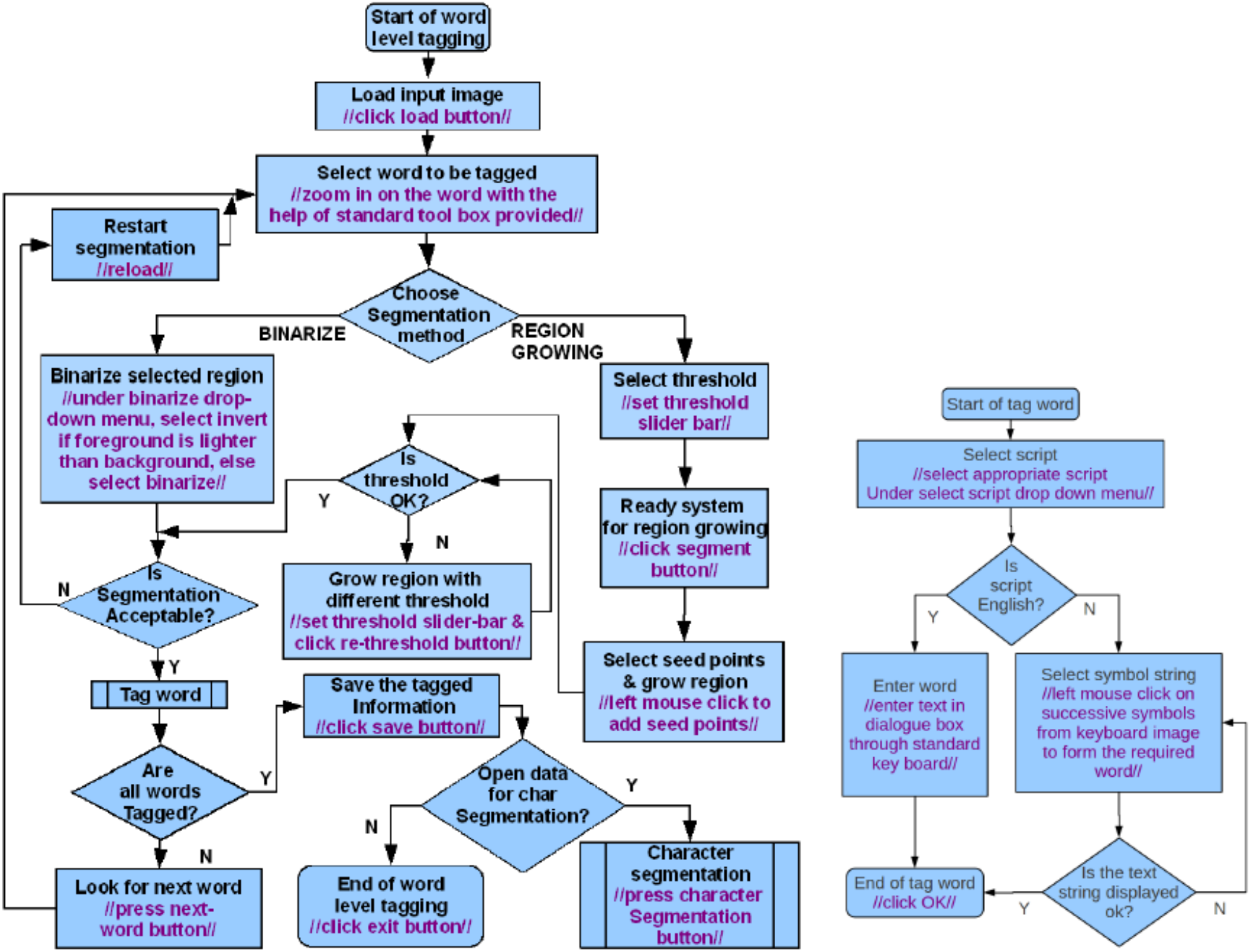
WORD BOUNDARY

SEGMENT CHAR

EXIT

Methodology

- Region growing around manual seed selection
  - CIE L*a*b* color space, with Euclidean distance measure
  - Vary threshold such that pixels corresponding to text are extracted
- If required use Otsu's binarization
- Multiple round :tagging a word at a time


Start of word level tagging
Load input image //click load button//
Select word to be tagged //zoom in on the word with the help of standard tool box provided//
Restart segmentation //reload//
Choose Segmentation method
BINARIZE
REGION GROWING
Binarize selected region //under binarize drop-down menu, select invert if foreground is lighter than background, else select binarize//
Select threshold //set threshold slider bar//
Is threshold OK?
Y
N
Grow region with different threshold //set threshold slider-bar & click re-threshold button//
Ready system for region growing //click segment button//
Select seed points & grow region //left mouse click to add seed points//
Is Segmentation Acceptable?
N
Y
Tag word
Save the tagged Information //click save button//
Are all words Tagged?
Y
N
Look for next word //press next-word button//
Open data for char Segmentation?
Y
N
End of word level tagging //click exit button//
Character segmentation //press character Segmentation button//
Start of tag word
Select script //select appropriate script Under select script drop down menu//
Is script English?
Y
N
Enter word //enter text in dialogue box through standard key board//
Select symbol string //left mouse click on successive symbols from keyboard image to form the required word//
Is the text string displayed ok?
Y
N
End of tag word //click OK//

MILE_KANNADA_UNICODE_INPUT

ಆ	ರ	್ಪೋ	ಗ	್	ಯ

ಅ	ಆ	ಇ	ಈ	ಉ	ಊ	ಋ	ೠ	ಎ	ಏ	ಐ	ಒ	ಓ	ಔ	ಂ	ಃ
್	ಾ	ಿ	ೀ	ು	ೂ	ೃ	ೄ	ೆ	ೇ	ೈ	ೊ	ೋ	ೌ	---	---
ಕ	ಖ	ಗ	ಘ	ಙ	ಚ	ಛ	ಜ	ಝ	ಞ	ಟ	ಠ	ಡ	ಢ	ಣ	---
ತ	ಥ	ದ	ಧ	ನ	ಪ	ಫ	ಬ	ಭ	ಮ	---	---	---	---	ಫ಼	ऽ
ಯ	ರ	ಱ	ಲ	ವ	ಶ	ಷ	ಸ	ಹ	ಳ	ೞ	---	---	ೱ	ೲ	ಁ
೦	೧	೨	೩	೪	೫	೬	೭	೮	೯	---	---	---	---	ॅ	ಀ

OK

UNDO

CANCEL

Ground truth at word level

- Img.jpg

- Img_seg.jpg
- Img.txt

Bounding box

Script

Word

```
DSC02617_1.jpg 459 386 195 724 KANNADA ಆರೋಗ್ಯ
DSC02617_2.jpg 453 1167 169 497 KANNADA ಕೇಂದ್ರ
DSC02617_3.jpg 826 567 127 560 DEVANAGARI स्वास्थ्य
DSC02617_4.jpg 762 1195 200 334 DEVANAGARI केन्द्र
DSC02617_5.jpg 1136 276 127 731 ENGLISH HEALTH
DSC02617_6.jpg 1127 1080 125 739 ENGLISH CENTRE
```

- IMG
  - Img_1.jpg
  - .
  - .
  - .

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Issues in Character level annotation

- A Connected component (CC) need not correspond to a character!!!

  - In English ‘i’
  - Many Indic languages, a word is a CC




- Therefore need to split or merge CC
- Symbol level as required by the user

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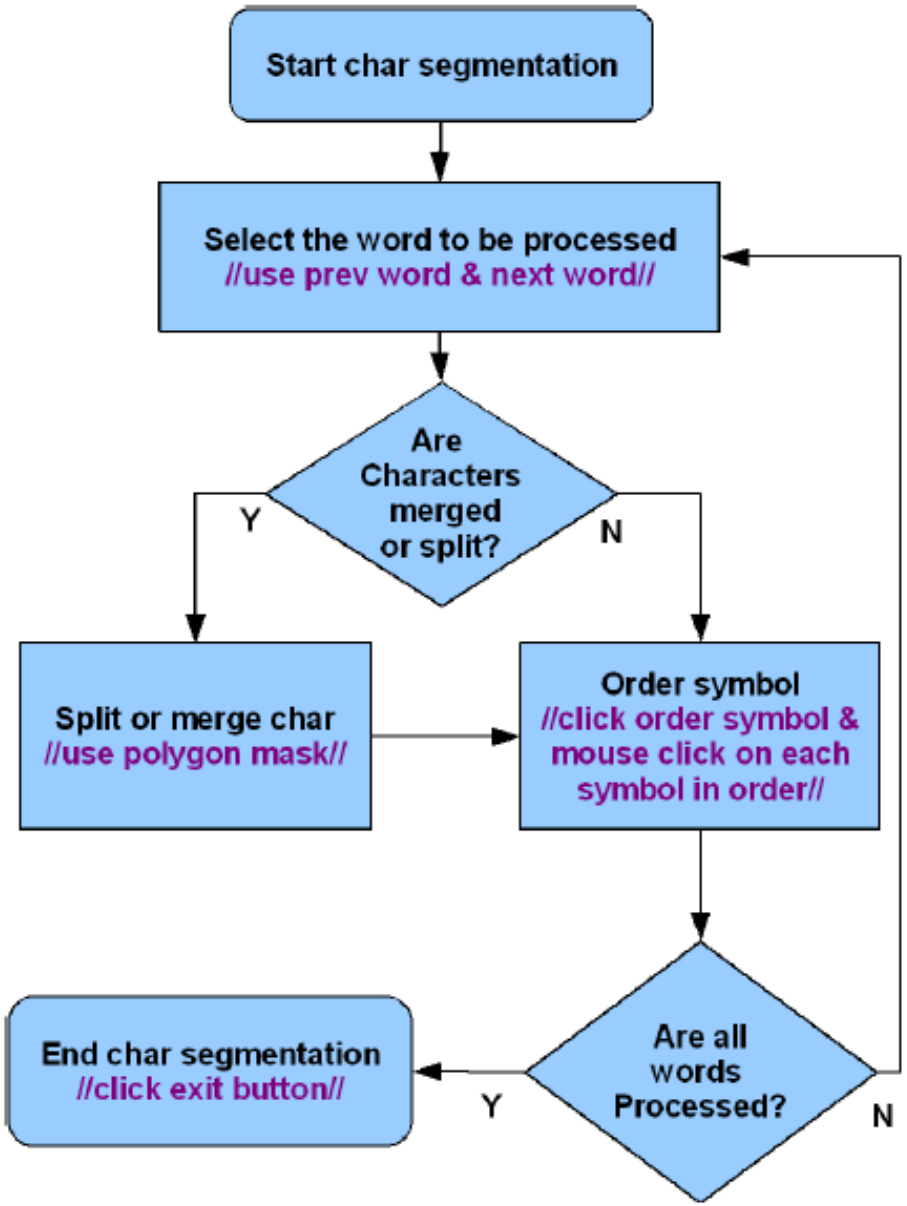
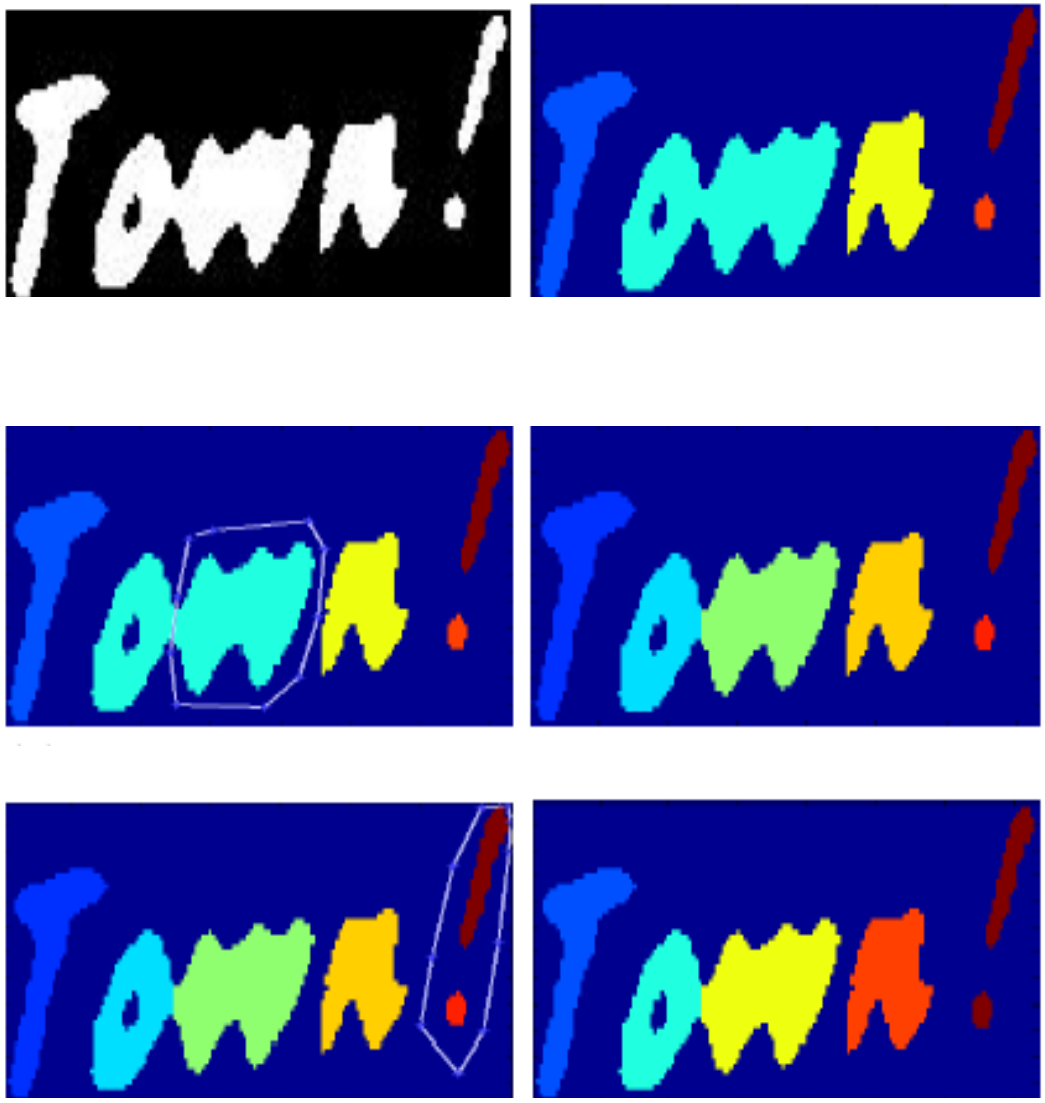
Char level





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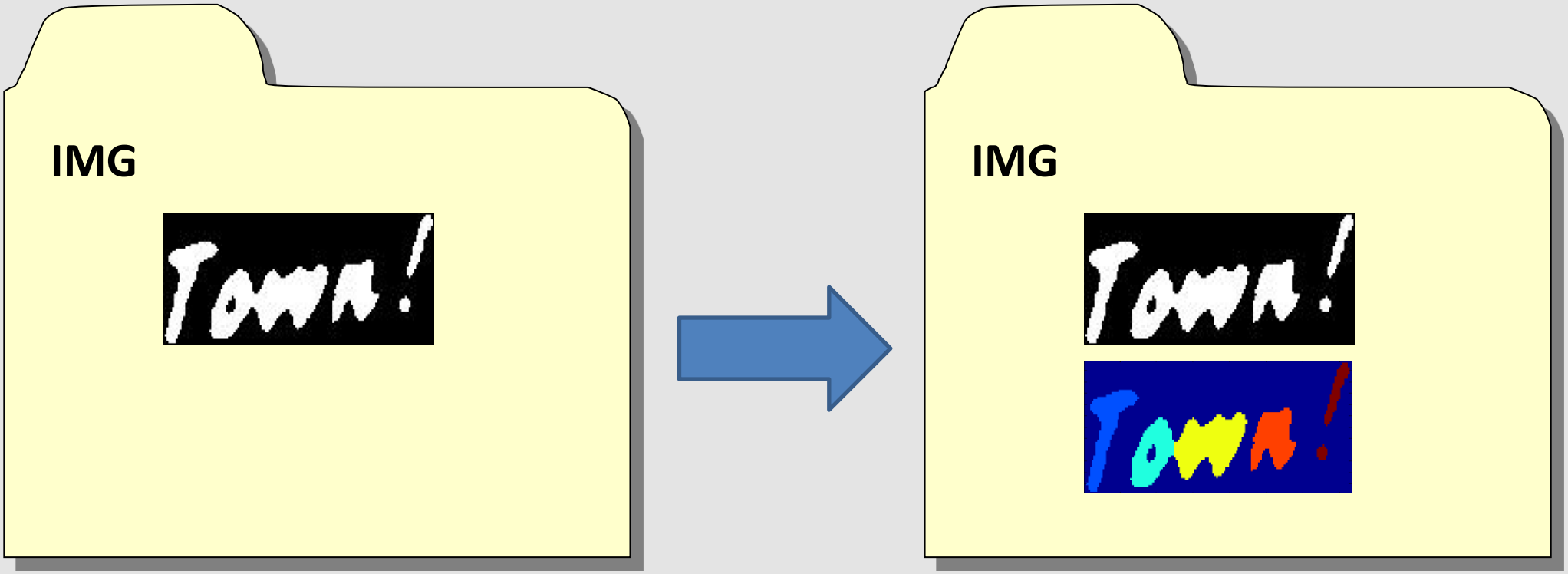
Ground truth at symbol level



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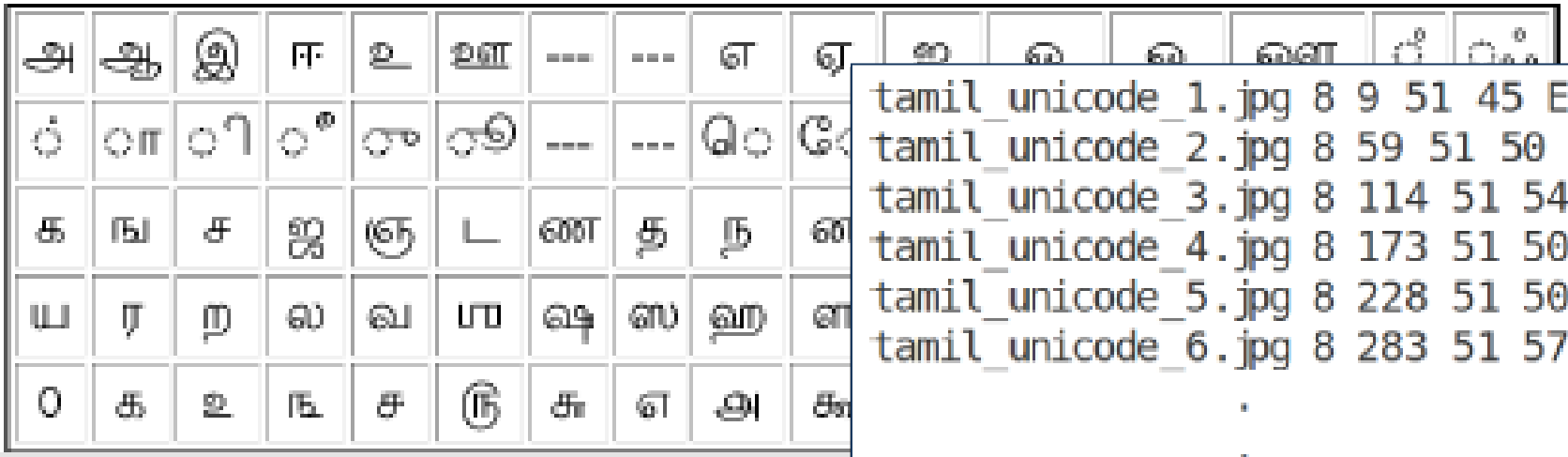
Generation of new keyboard

- Use Keyboard image as i/p to word tagging module
- Perform region growing such that bounding box in the generated text file represents the button
- Tag the buttons Unicode using the standard English keyboard



```
tamil_unicode_1.jpg 8 9 51 45 ENGLISH b85
tamil_unicode_2.jpg 8 59 51 50 ENGLISH b86
tamil_unicode_3.jpg 8 114 51 54 ENGLISH b87
tamil_unicode_4.jpg 8 173 51 50 ENGLISH b88
tamil_unicode_5.jpg 8 228 51 50 ENGLISH b89
tamil_unicode_6.jpg 8 283 51 57 ENGLISH b8a
                    .
                    .
                    .
tamil_unicode_61.jpg 234 511 51 56 ENGLISH bf0
tamil_unicode_62.jpg 234 572 51 63 ENGLISH bf1
```

Downloadable Resources

- http://mile.ee.iisc.ernet.in/mast/
- MatLab code
- Annotated Database (will be available shortly)
- User guide

Future work

- Support for keyboard generation
- Multiple segmentation methodologies
- Semi-automation in tagging text
- Web based