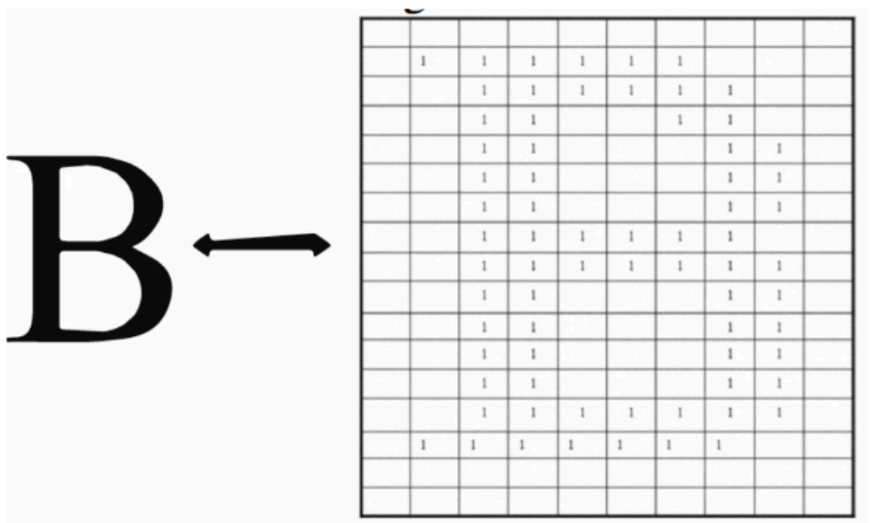
READING ASSISTANT FOR BLIND

Working Progress

THE FIRST SOLUTION

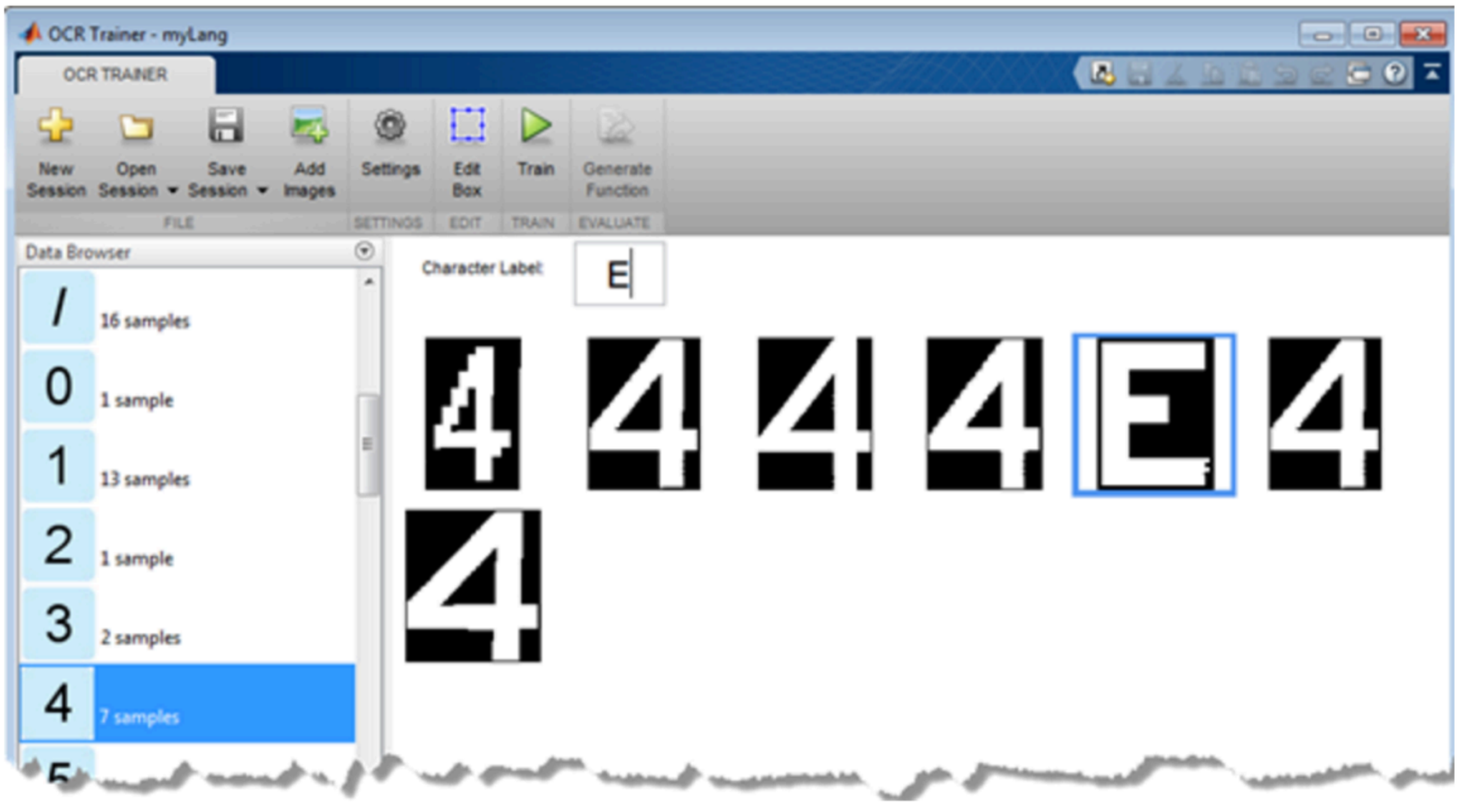


The problem:

- When we increase the database, the accuracy decrease.
- We should have exact same font and same size for compare to this database.
- Sometime cannot separate the word correctly

Find the new solution

IMAGE PROCESSING TOOLBOX : TRAIN OPTICAL CHARACTER RECOGNITION



EXPECTED PROBLEM

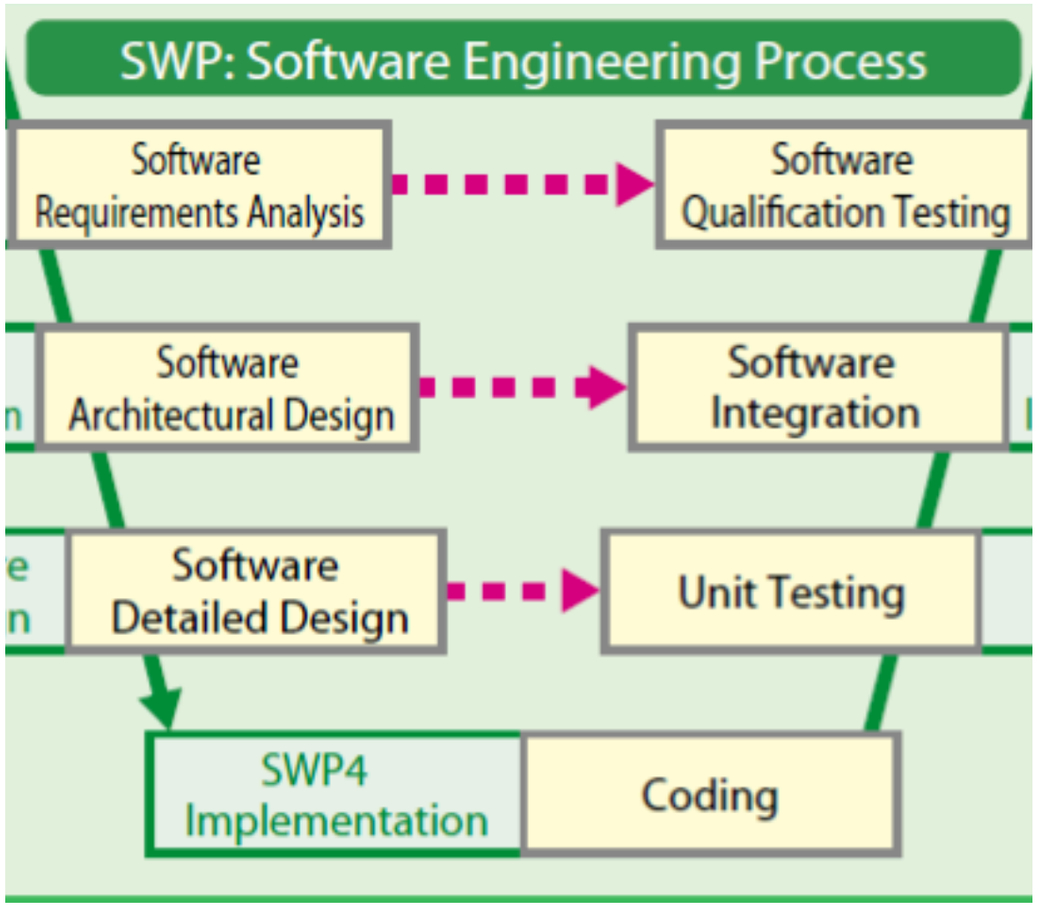
1. The input image should have non-background
   Solution : Using Edge Detection to find region of interest (not finish)

2. The problem with detecting the character.
   Solution : Develop the OCR function by train it more

3. The problem with detecting line
   Solution : Separate line before going in OCR function

4. The problem with detecting space
   Solution : Looking into the OCR function to increase or decrease the sensitivity of detecting space

SOFTWARE DEVELOPMENT BASED ON V-MODEL



User Requirement :

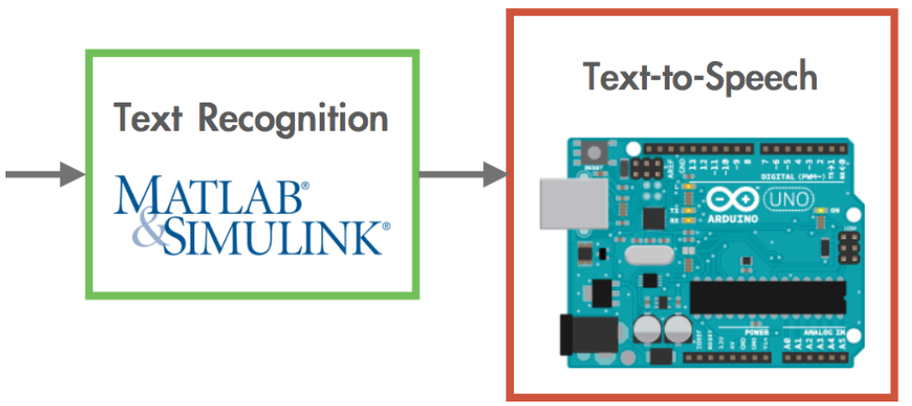
- Text Recognition from image and then Read it

Software Requirement:

- Know where the text is and recognize it
- Know how to read

Software Detailed Design: Text Recognition

- First, we must detect where the line is
- Then, create the binary image from the input image
- After that, Use OCR trained function to recognize it
- Finally, fetch the result to the txt file

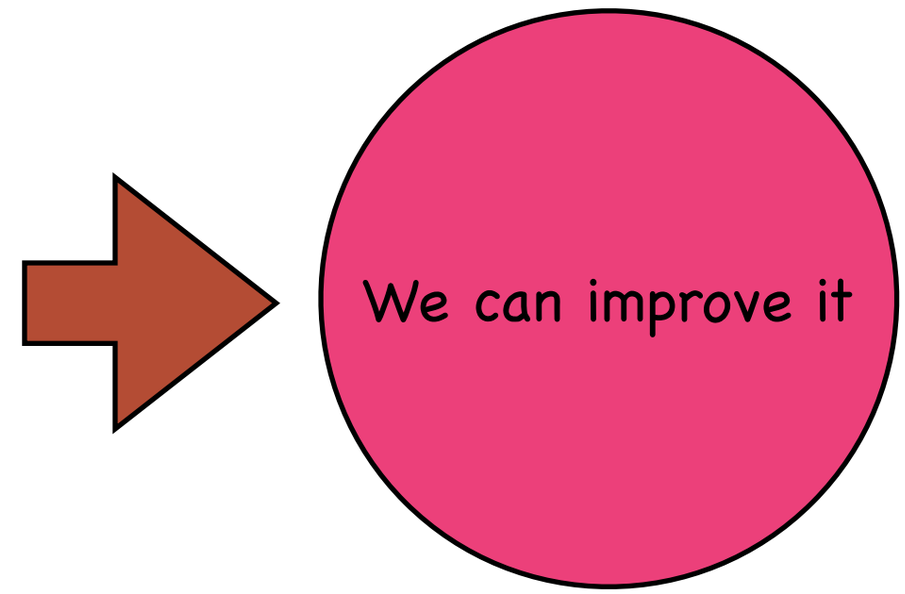


SCOPE FOR THIS PROJECT (NOW)

1. Use only English language

2. Use only Times New Romance style or similar

3. Non-Background Picture



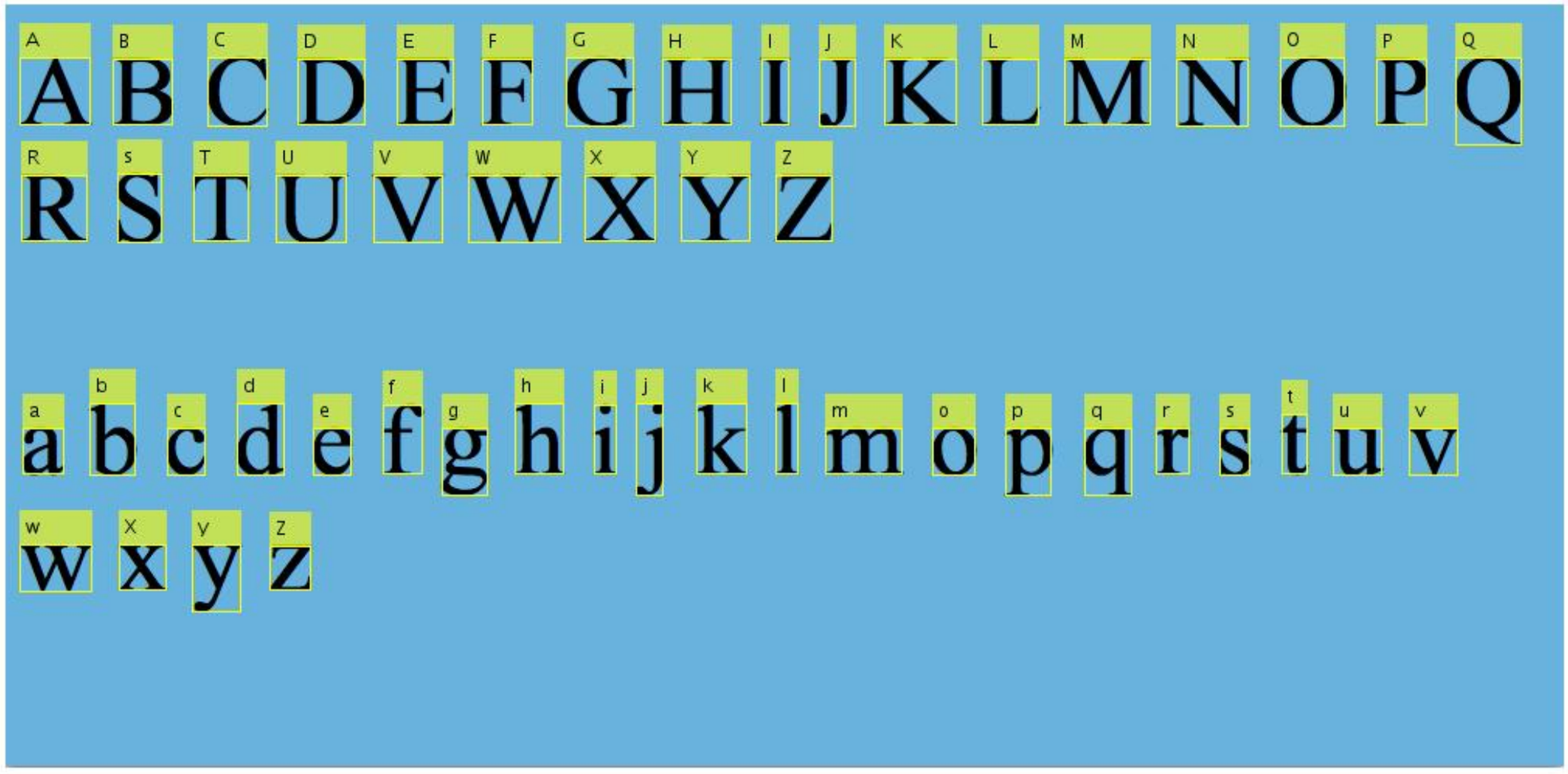
GENERATED FUNCTION

```
function [ocrI, results] = evaluateOCRTraining(I, roi)

% Location of trained OCR language data
trainedLanguage = '/Users/Tonmai/Documents/MATLAB/OCR_APP/myLang/tessdata/myLang.traineddata';

% Run OCR using trained language. You may need to modify OCR parameters or
% pre-process your test images for optimal results. Also, consider
% specifying an ROI input to OCR in case your images have a lot of non-text
% background.
layout = 'Block';
if nargin == 2
    results = ocr(I, roi, ...
        'Language', trainedLanguage, ...
        'TextLayout', layout);
else
    results = ocr(I, ...
        'Language', trainedLanguage, ...
        'TextLayout', layout);
end

ocrI = insertOCRAnnotation(I, results);
```

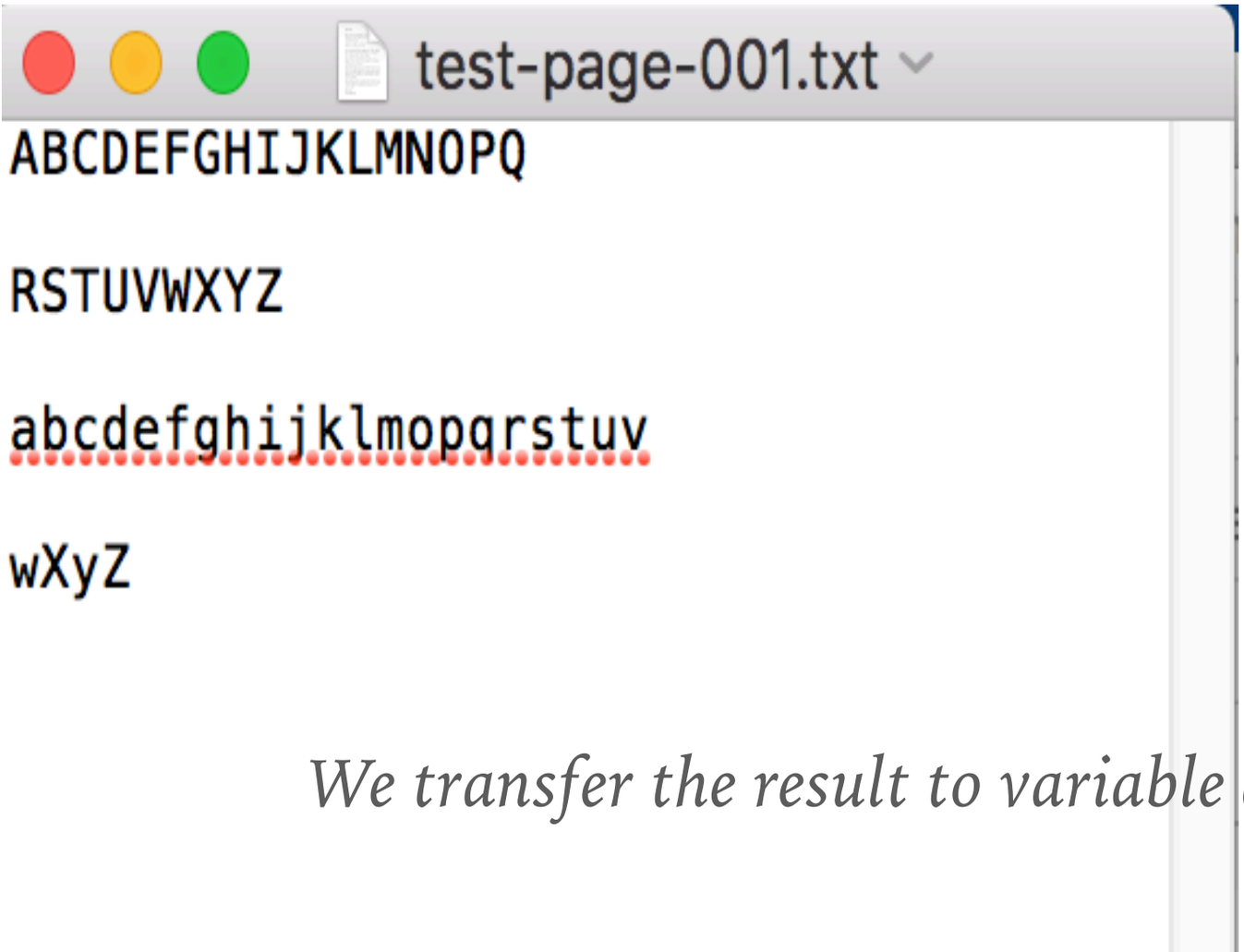
```
function J = insertOCRAnnotation(I, results)
text = results.Text;
I = im2uint8(I);
if isempty(deblank(text))
    text = 'Unable to recognize any text.';
    [M,N,~] = size(I);
    J = insertText(I, [N/2 M/2], text, ...
        'AnchorPoint', 'Center', 'FontSize', 24, 'Font', 'Aria
else
    location = results.CharacterBoundingBoxes;

    % Remove new lines from results.
    newlines = text == char(10);
    text(newlines) = [];
    location(newlines, :) = [];

    % Remove spaces from results
    spaces = isspace(text);
    text(spaces) = [];
    location(spaces, :) = [];

    % Convert text array into cell array of strings.
    text = num2cell(text);
```

EXPERIMENT FROM CHARACTERS

OPTICAL CHARACTER RECOGNITION: CHARACTERS



The Result from the Times New Romance style when we compare character by character

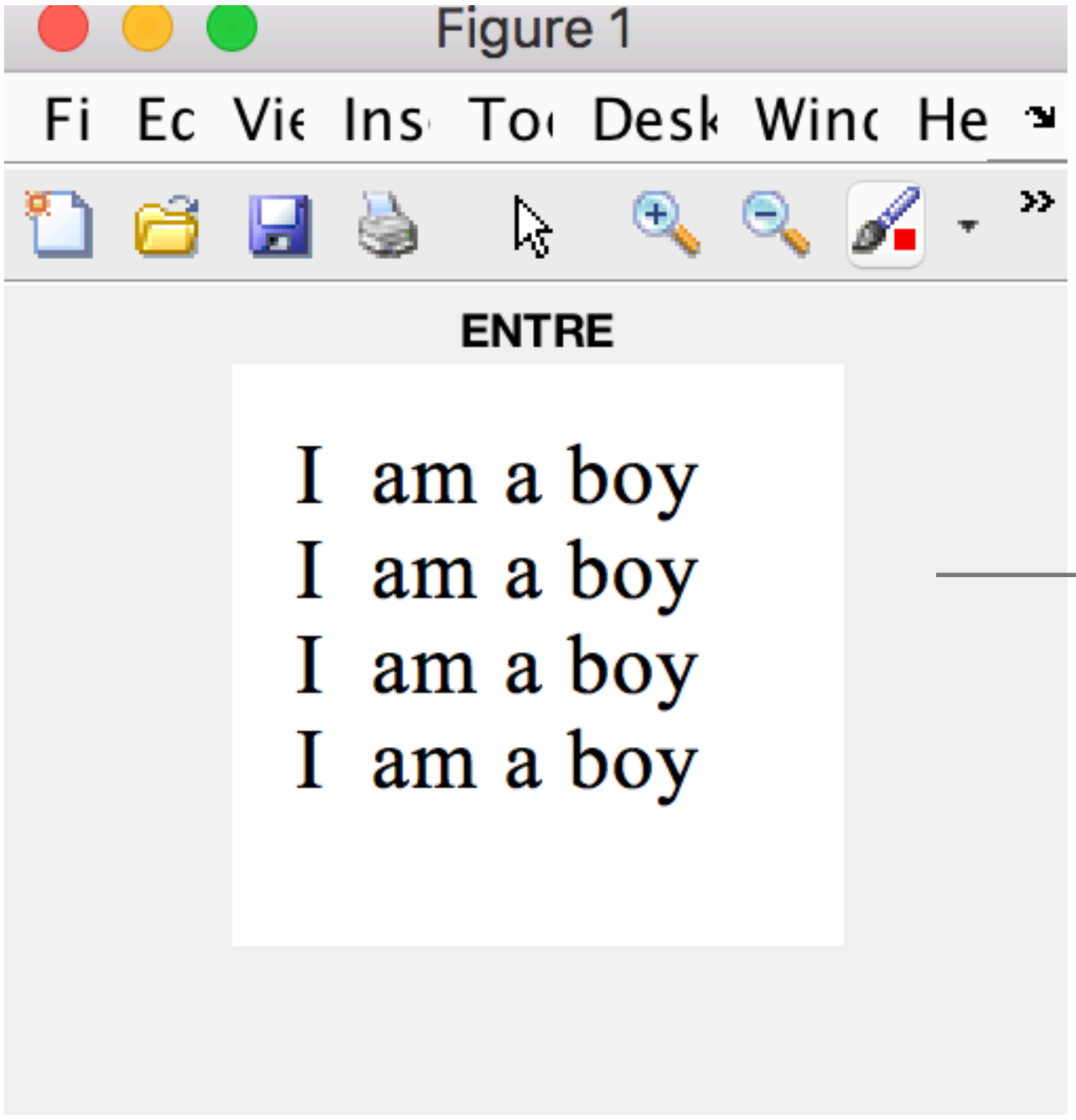


WHEN WE WRITE TO TEXT FILES

We transfer the result to variable and write it into the text file.

Summary: For Times New Romance
We get the accuracy 100% for this experiment.

OPTICAL CHARACTER RECOGNITION: SENTENCES



Results

I am a boy

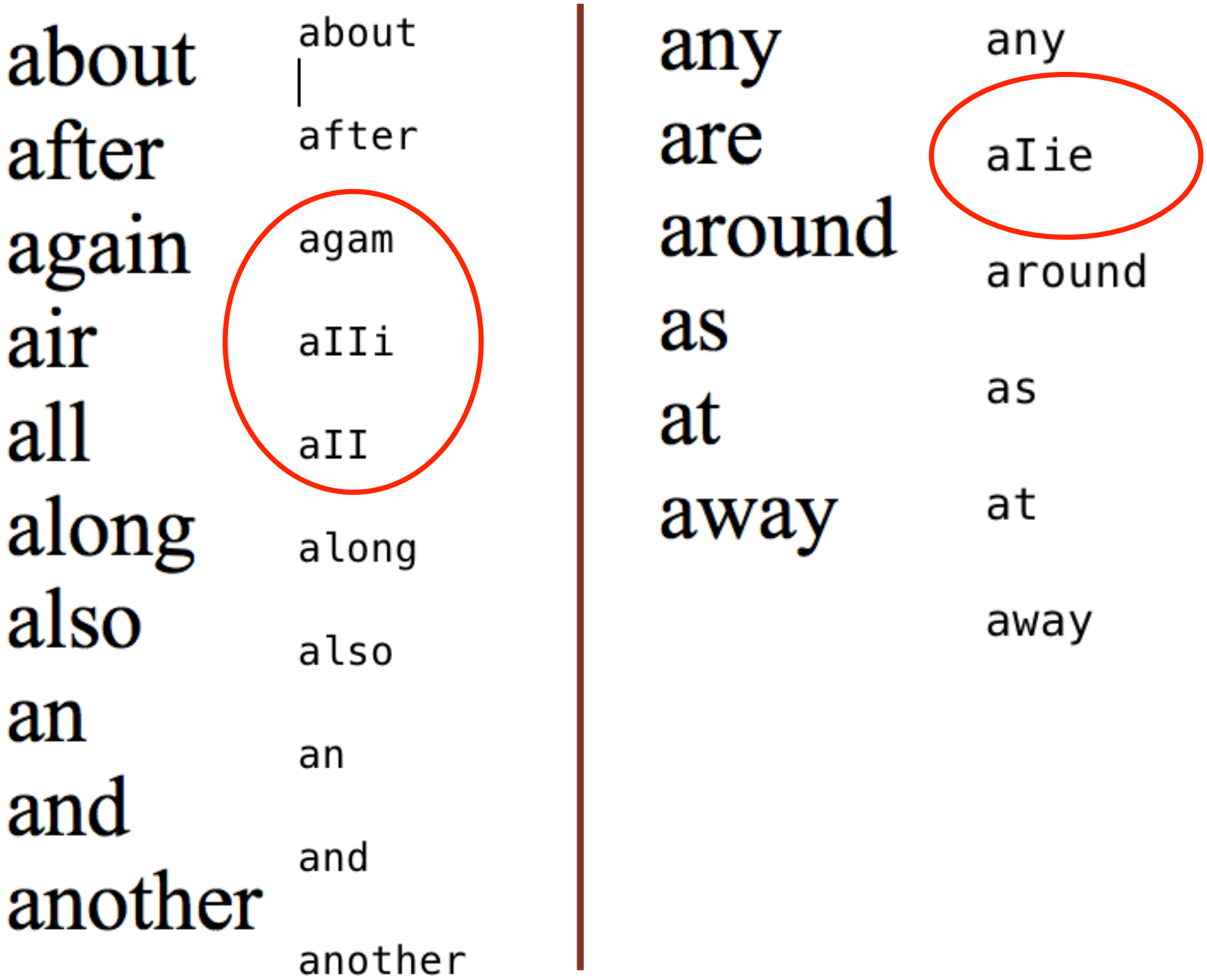
I am a boy

I am a boy

EXPERIMENT FROM WORDS

From Frequency Everyday Words

OPTICAL CHARACTER RECOGNITION: WORD - A



OPTICAL CHARACTER RECOGNITION: WORD - B, C

back	back
be	be
because	because
been	been
before	before
below	below
between	between
both	both
but	but
by	bY

came	Came
can	Can
come	Come
could	cOuId

OPTICAL CHARACTER RECOGNITION: WORD - D, E, F

day
did
different
do
down

day
did
different
do
down

each
end
even
every

each
end
even
every

few
find
first
for
found
from

few
fmd
first
for
found
from

OPTICAL CHARACTER RECOGNITION: WORD - G, H, I

get	get
give	glVe
go	gO
good	gOOd
great	great

has	has
have	have
he	he
help	hCIP
her	her
here	here
him	him
his	his
home	home
house	house
how	hOw

if	if
in	ID
into	irlto
is	IS
it	it
its	its

OPTICAL CHARACTER RECOGNITION: WORD - J, K, L, M

just	Just
know	knOw
large	large
last	last
left	left
like	like
line	line
little	little
long	Iong
look	lOOk

made	made
make	make
man	man
many	many
may	rrlaY
me	me
men	rnen
might	might
more	more
most	mOst
must	must
my	rrlY

OPTICAL CHARACTER RECOGNITION: WORD - N, O

name	name
never	never
new	new
next	next
no	nO
not	nOt
now	now
number	number

of	Of
off	Off
old	Old
on	On
one	One
only	only
or	Or
other	Other
our	OUr
out	Out
over	Over
own	Own

OPTICAL CHARACTER RECOGNITION: WORD - P, R, S

part	PaIt
people	People
place	place
put	PUt
read	read
right	right

said	said
same	Same
saw	Saw
say	saY
see	See
she	she
should	shOuld
show	shOw
small	small
so	SO
some	Some
something	something
sound	sOund
still	still
such	such

OPTICAL CHARACTER RECOGNITION: WORD - T, U, V

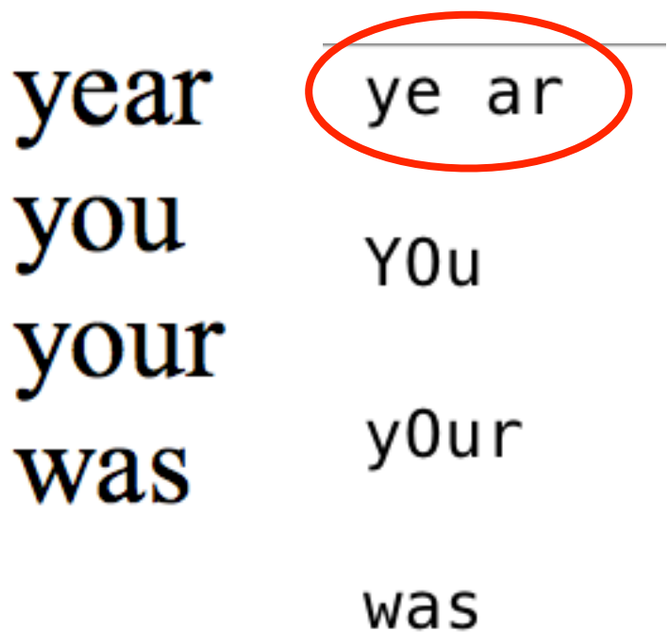
take	take
tell	tell
than	than
that	that
the	the
them	them
then	then
there	there
these	these
they	theY
thing	thing
think	think
this	this
those	those
thought	thought
three	three
through	through
time	time
to	tO
together	together
too	tOO
two	twO
under	under
up	uP
us	US
use	USe
very	verY

OPTICAL CHARACTER RECOGNITION: WORD - W

want	want
water	water
way	waY
we	we
well	well
went	went
were	were
what	what
when	when

where	where
which	which
while	while
who	wh0
why	whY
will	will
with	with
word	w0rd
work	w0rk
world	w0rld
would	w0uld

OPTICAL CHARACTER RECOGNITION: WORD - Y, Z



SUMMARY FOR WORD RECOGNITION

There are 184 words from a-z.

Incorrect : 14 words

Error Rate : 7.6 %

The errors comes from the lack of OCR training.

EXPERIMENT FROM SENTENCES

From Frequency Everyday Sentences

GREETINGS AND INTRODUCTIONS REQUESTS

Good bye	GOOd bye
So long	SO long
See you later	See yOu later
See you soon	See yOu sOOn
What is your name	What is yOur rlame
My name is Tonmai	My name is Tonmai
Allow me to introduce myself	AllOw me tO introduce myself
Do you know each other	DO yOu knOw each Other
How do you do	HOw dO yOu dO
Glad to meet you	Glad tO meet yOu
How are you	HOw are yOu

EXPERIMENT FROM PARAGRAPH

PARAGRAPH FROM TEXTBOOK

We discover physics by learning how to measure the quantities involved in physics. Among these quantities are length, time, mass, temperature, pressure, and electric current.

from Fundamental Physic by Halliday & Resnick

We discover physics by learning hOw to measure the quantities involved in

physics, Among these quantities are length, time, maSS, temperature, preSsure,

and electric Currentn

PARAGRAPH FROM TEXTBOOK

Many electronic systems perform two principal functions: they sense (receive) a signal and subsequently process and extract information from it. Your cell phone receives a radio-frequency (RF) signal and, after processing it, provides voice or data information. Similarly, your digital camera senses the light intensity emitted from various parts of an object and processes the result to extract an image.

from Design of Analog CMOS Integrated Circuit

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The problem with “fi”

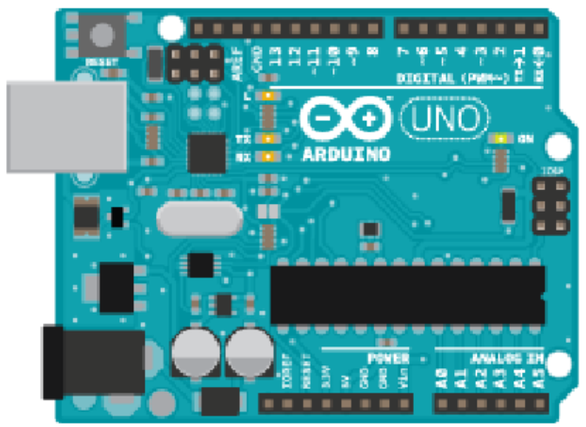
Task in Japan

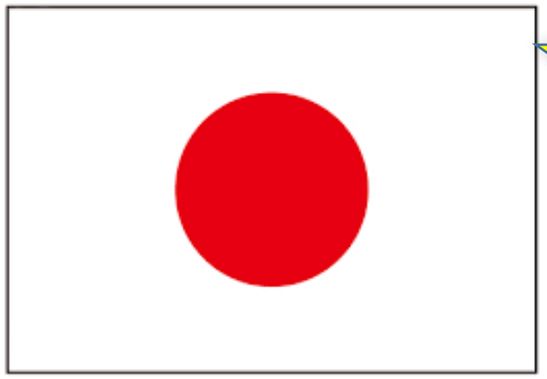
Picture files

Text Recognition

MATLAB®
&SIMULINK®

Text-to-Speech





Schedule in Japan

	3/5 Sun	3/6 Mon	3/7 Tue	3/8 Wed	3/9 Thu	3/10 Fri	3/11 Sat	3/12 Sun	3/13 Mon	3/14 Tue	3/15 Wed
Creating code to speak											
Presentation											
Sightseeing (Maybe)											