09

Computer Vision, OCR, TTS, STT

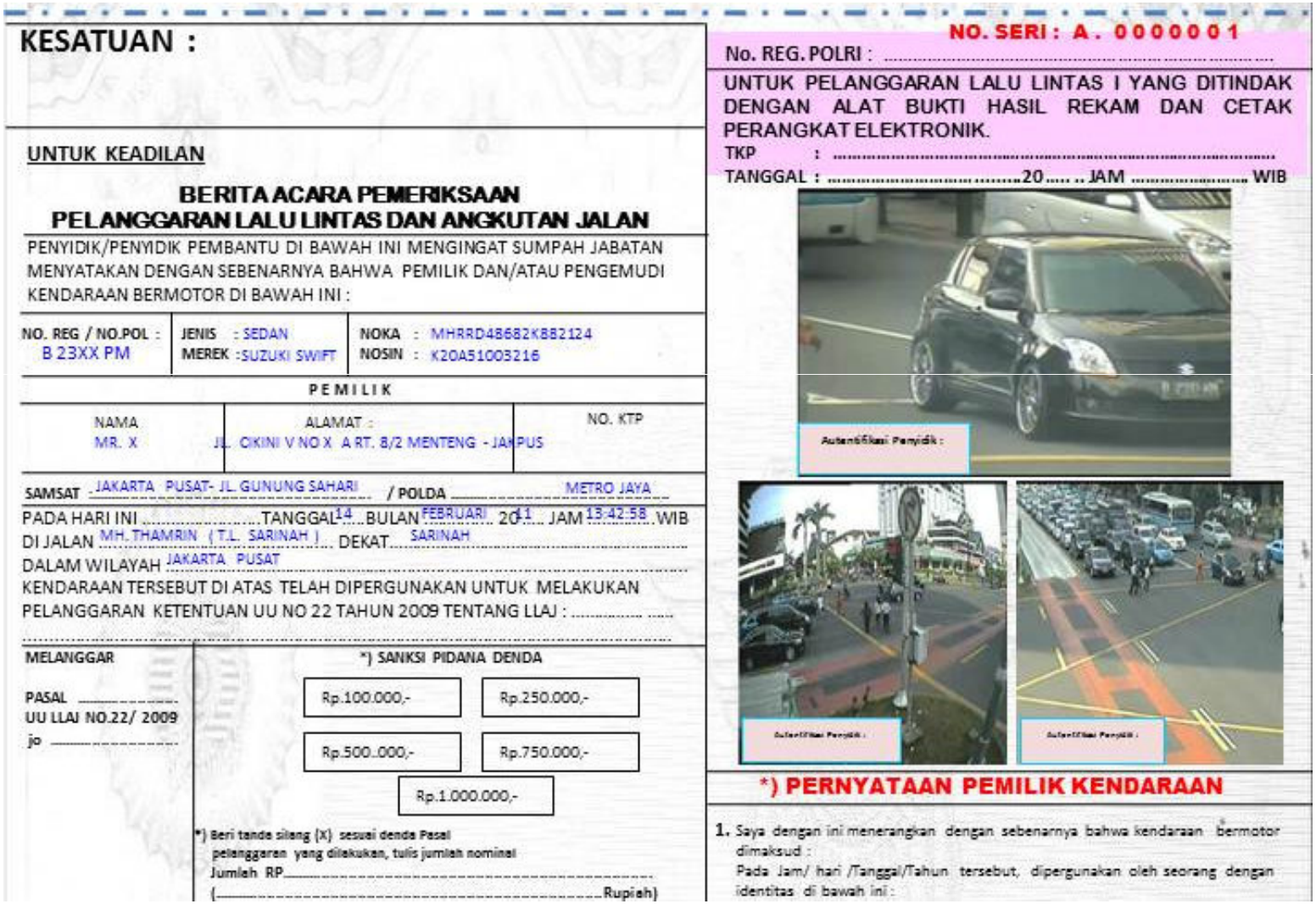
Pengantar Teknik Informatika (HUG1M2)

20131

Who, what, when, where?

http://pustakadigitalindonesia.blogspot.com/2012/12/all-about-bj-habibie.html

Electronic Traffic Law Enforcement



KESATUAN :

NO. SERI : A. 0000001

No. REG. POLRI : .....

UNTUK KEADILAN

BERITA ACARA PEMERIKSAAN
PELANGGARAN LALU LINTAS DAN ANGKUTAN JALAN

PENYIDIK/PENYIDIK PEMBANTU DI BAWAH INI MENGINGAT SUMPAH JABATAN MENYATAKAN DENGAN SEBENARNYA BAHWA PEMILIK DAN/ATAU PENGEMUDI KENDARAAN BERMOTOR DI BAWAH INI :

NO. REG / NO.POL :	JENIS : SEDAN	NOKA : MHRRD48682K882124
B 23XX PM	MEREK : SUZUKI SWIFT	NOSIN : K20A51003216

PEMILIK

NAMA	ALAMAT :	NO. KTP
MR. X	JL. CIKINI V NO X A RT. 8/2 MENTENG - JAKPUS	

SAMSAT : JAKARTA PUSAT- JL. GUNUNG SAHARI / POLDA : METRO JAYA

PADA HARI INI ..... TANGGAL 14 BULAN FEBRUARI 2011 JAM 13:42:58 WIB
DI JALAN MH. THAMRIN (T.L. SARINAH) DEKAT SARINAH
DALAM WILAYAH JAKARTA PUSAT
KENDARAAN TERSEBUT DI ATAS TELAH DIPERGUNAKAN UNTUK MELAKUKAN PELANGGARAN KETENTUAN UU NO 22 TAHUN 2009 TENTANG LLAJ : .....

MELANGGAR

PASAL .....
UU LLAJ NO.22/ 2009
jo .....

*) SANKSI PIDANA DENDA

Rp.100.000,-	Rp.250.000,-
Rp.500..000,-	Rp.750.000,-
Rp.1.000.000,-	

*) Beri tanda silang (X) sesuai denda Pasal pelanggaran yang dilakukan, tulis jumlah nominal
Jumlah RP.....
(.....Rupiah)

UNTUK PELANGGARAN LALU LINTAS I YANG DITINDAK DENGAN ALAT BUKTI HASIL REKAM DAN CETAK PERANGKAT ELEKTRONIK.

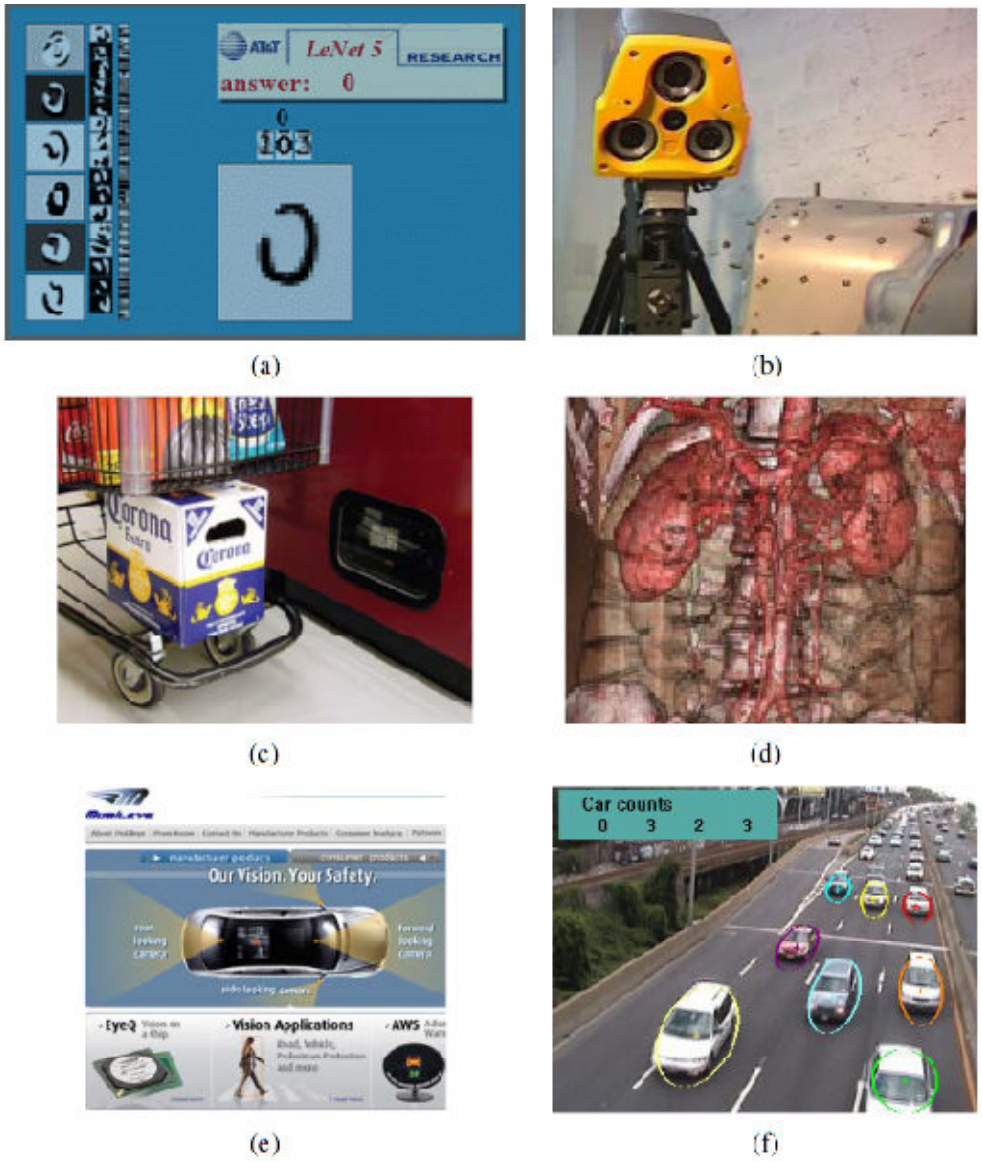
TKP : .....
TANGGAL : .....20..... JAM ..... WIB

Autentifikasi Penyidik :

*) PERNYATAAN PEMILIK KENDARAAN

1. Saya dengan ini menerangkan dengan sebenarnya bahwa kendaraan bermotor dimaksud :
Pada Jam/ hari /Tanggal/Tahun tersebut, dipergunakan oleh seorang dengan identitas di bawah ini :

http://yakubdedykaryawan.blogspot.com/search/label/ELECTRONIC%20TRAFFIC%20LAW%20ENFORCEMENT

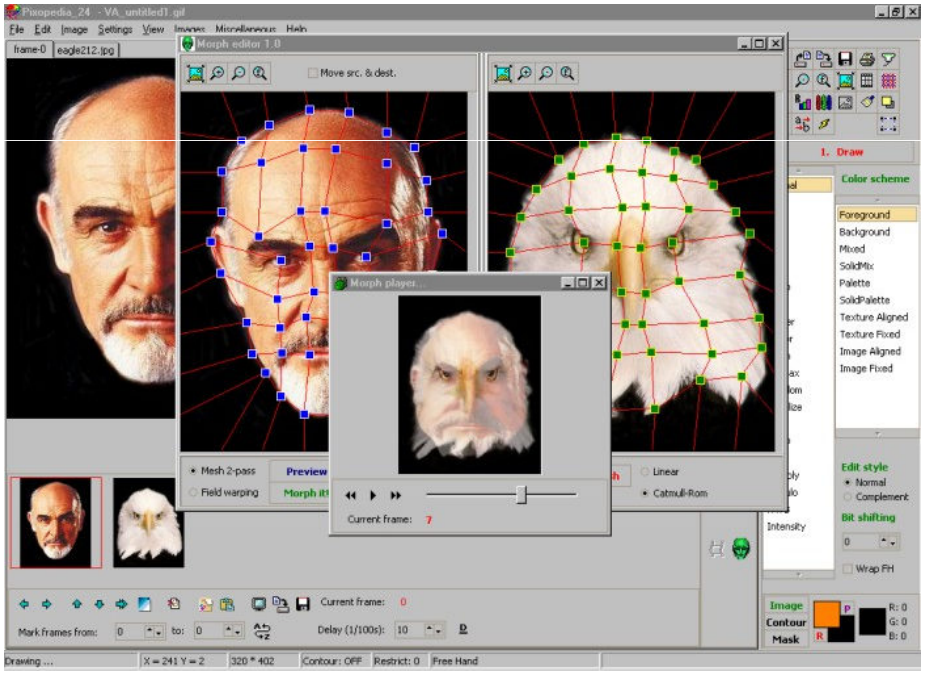


(a) (b) (c) (d) (e) (f)

(a) optical character recognition (OCR) http://yann.lecun.com/exdb/lenet/; (b) mechanical inspection http://www.cognitens.com/; (c) retail http://www.evoretail.com/; (d) medical imaging http://www.clarontech.com/; (e) automotive safety http://www.mobileye.com/; (f) surveillance and traffic monitoring http://www.honeywellvideo.com

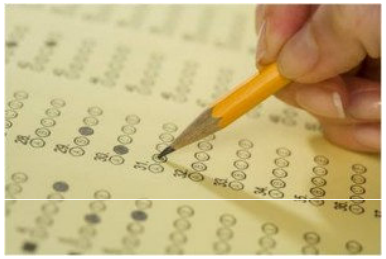
Fun with morphing

http://tech.blorge.com/Structure:%20/2006/11/21/fun-with-morphing/

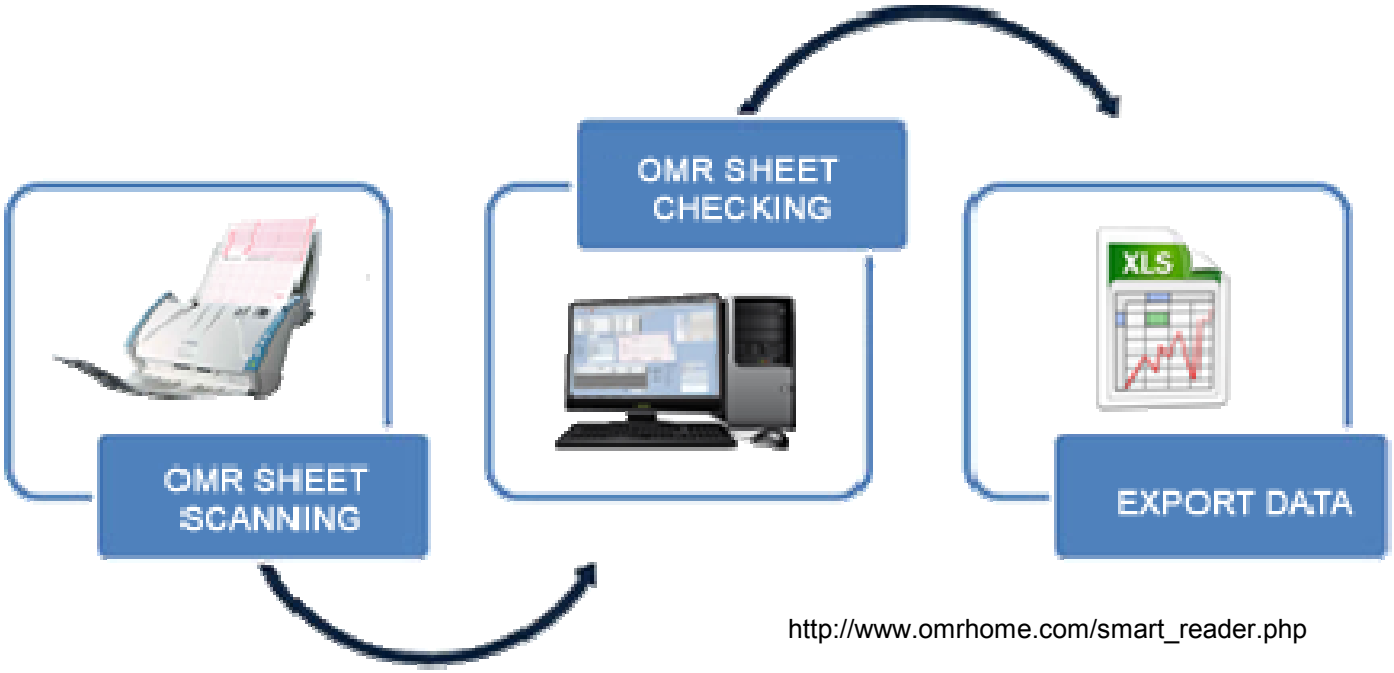


http://www.sigmapi-design.com/cms/uploads/images/p24screens/bscreen_3.jpg

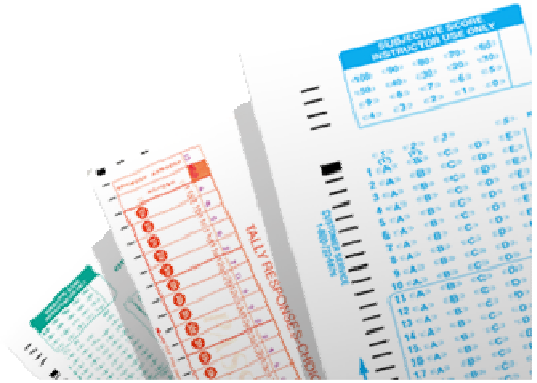
Optical Mark Reader



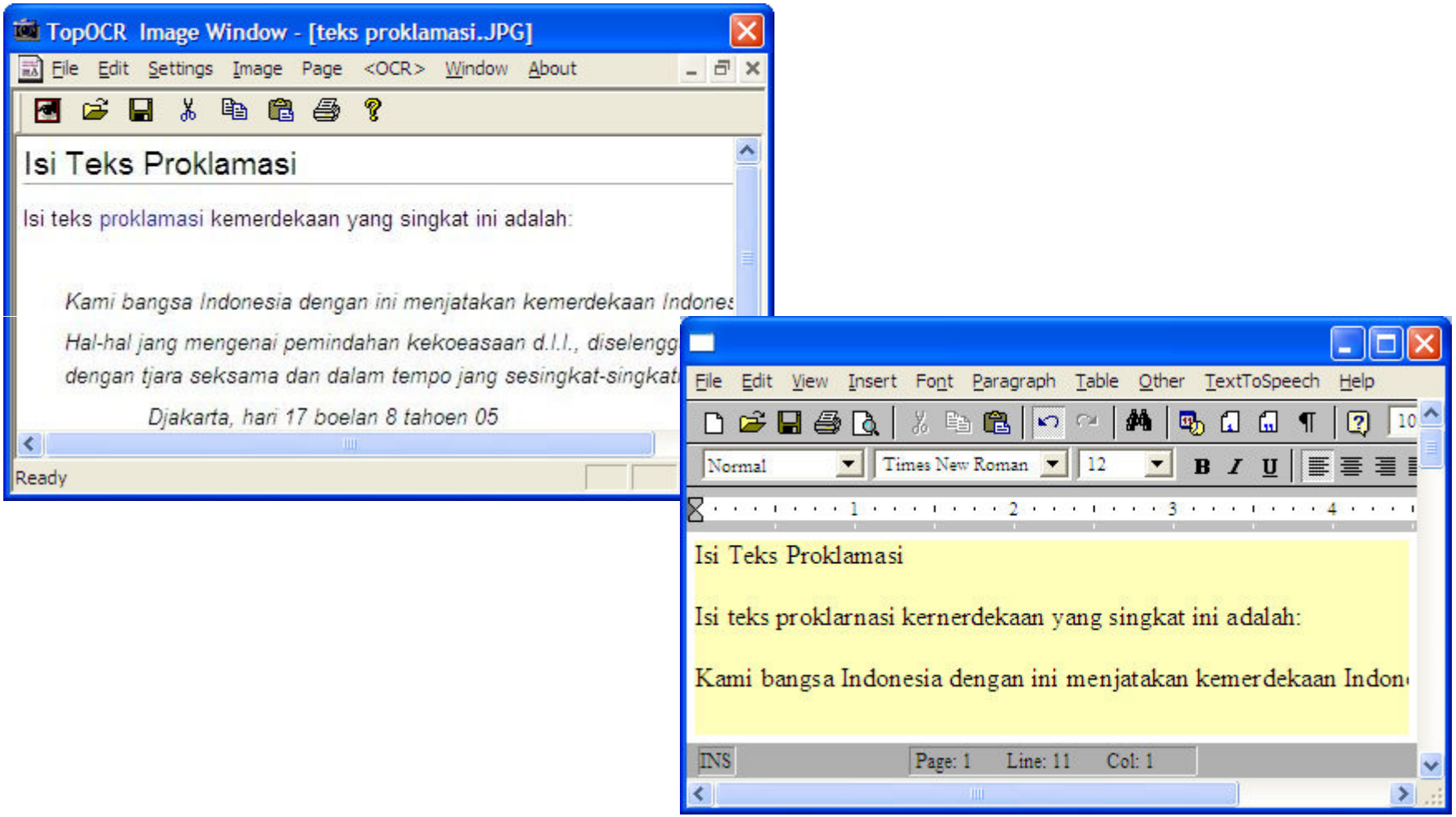
http://agrilife.org



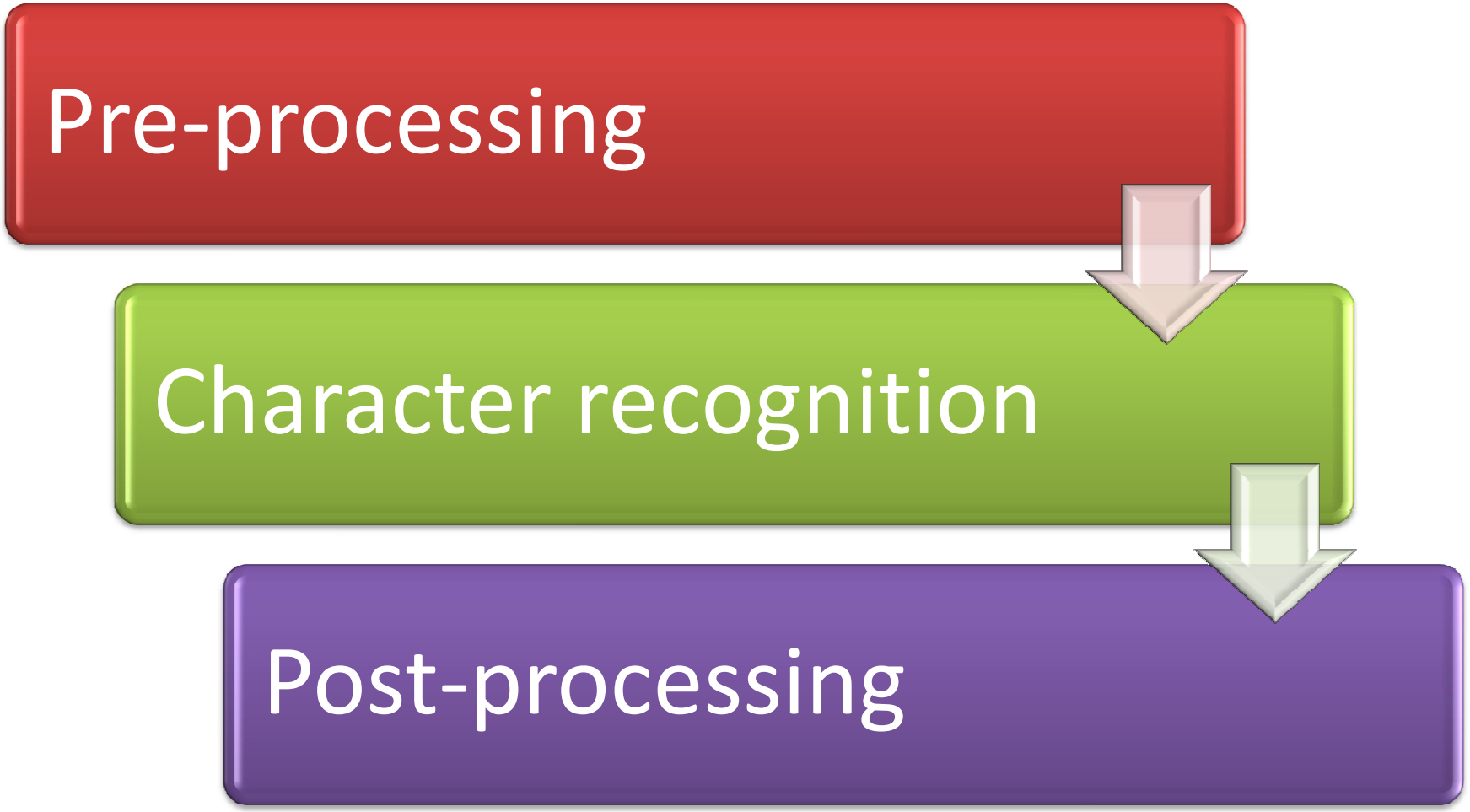
http://www.omrhome.com/smart_reader.php



Optical Character Recognition



OCR Processes

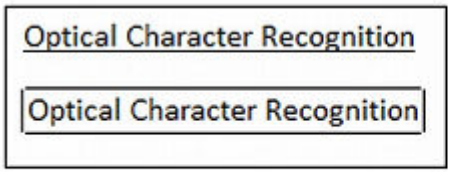


http://en.wikipedia.org/wiki/Optical_character_recognition

Examples of pre-processing

Original image

Image after Deskew algorithm



Original image

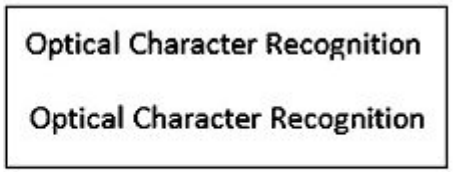
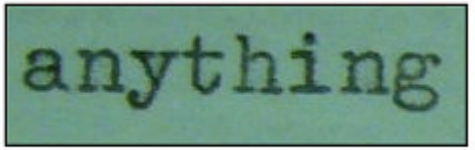


Image with removed lines

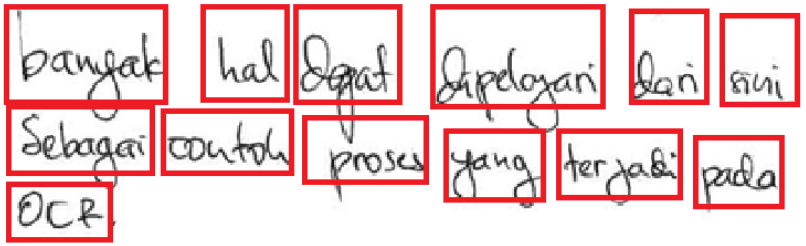


Original image

Correct binarization

Incorrect binarization

Combined and broken characters



http://www.nicomsoft.com/optical-character-recognition-ocr-how-it-works/

2 Basic Methods for OCR

- Matrix matching
  - compares what the OCR scanner sees as a character with a library of character matrices or templates
- Feature extraction
  - computer looks for general features such as open areas, closed shapes, diagonal lines, line intersections, etc
  - a.k.a Intelligent Character Recognition (ICR), or Topological Feature Analysis

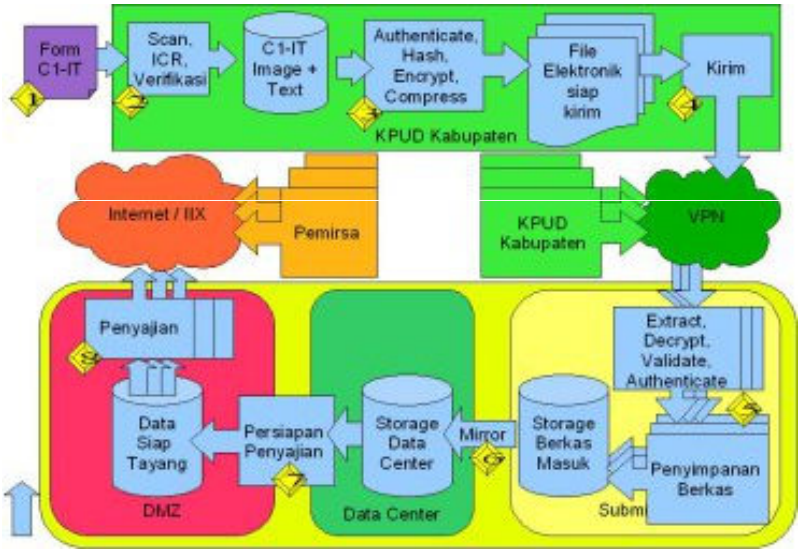
http://www.dataid.com/aboutocr.htm

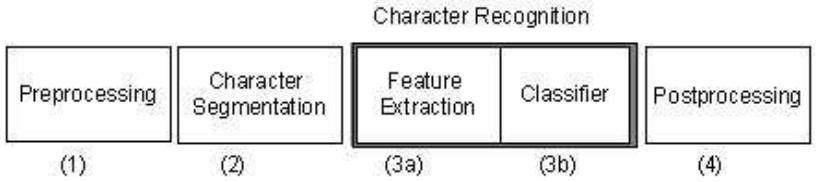
Post-processing

- OCR accuracy can be increased if the output is constrained by a lexicon - a list of words that are allowed to occur in a document.
- "Near-neighbor analysis“
  - "Washington, DOC.“ → "Washington, D.C.“
- Knowledge of the grammar

Intelligent Character Recognition

- Kasus: Pemilu 2009

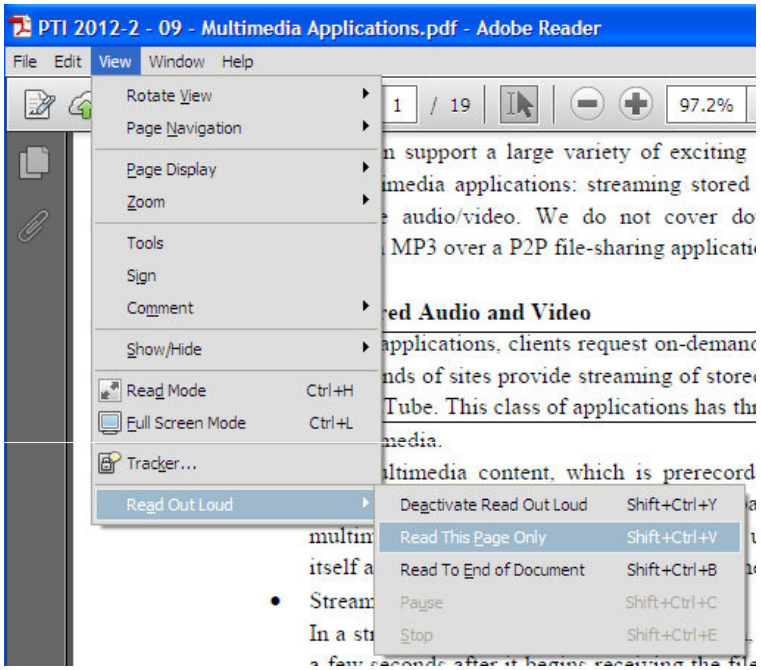


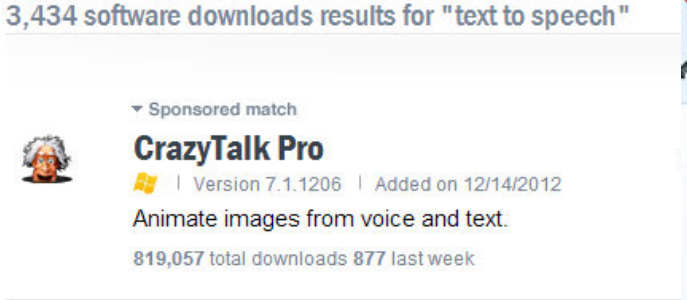


		NAMA PARTAI, NOMOR, DAN NAMA CALON ANGGOTA DPR	SUARA SAH		
A	31	Partai Demokrat	10		
B	1	DR.IR. MOHAMMAD JAFAR HAFSAH		16	
	2	DRS. H. ABDUL GAFAR PATAPPE		2	
	3	HJ. LINDA M. A. SJAMSOEDDIN,SH			
	4	PROF. DR. IR. H. M. ARIEF, DIPL. ING		1	
	5	DRA. NELLI A DASE			
	6	M.NUR LAPONG, SH			
	7	IR. ANDI B. TENRIAWARU MAHIE			
	8	RICHY RICARDO.H ALLEN			
	9	DRS. H. ABD. LATIF A.A. BAFADHAL, MM			
	10	DRS. ANDI MUHAMMAD RUSDI GALIGO, MH			
	11				
	12				
JUMLAH (A + B)			10	19	29
Dua puluh sembilan (dengan huruf)					

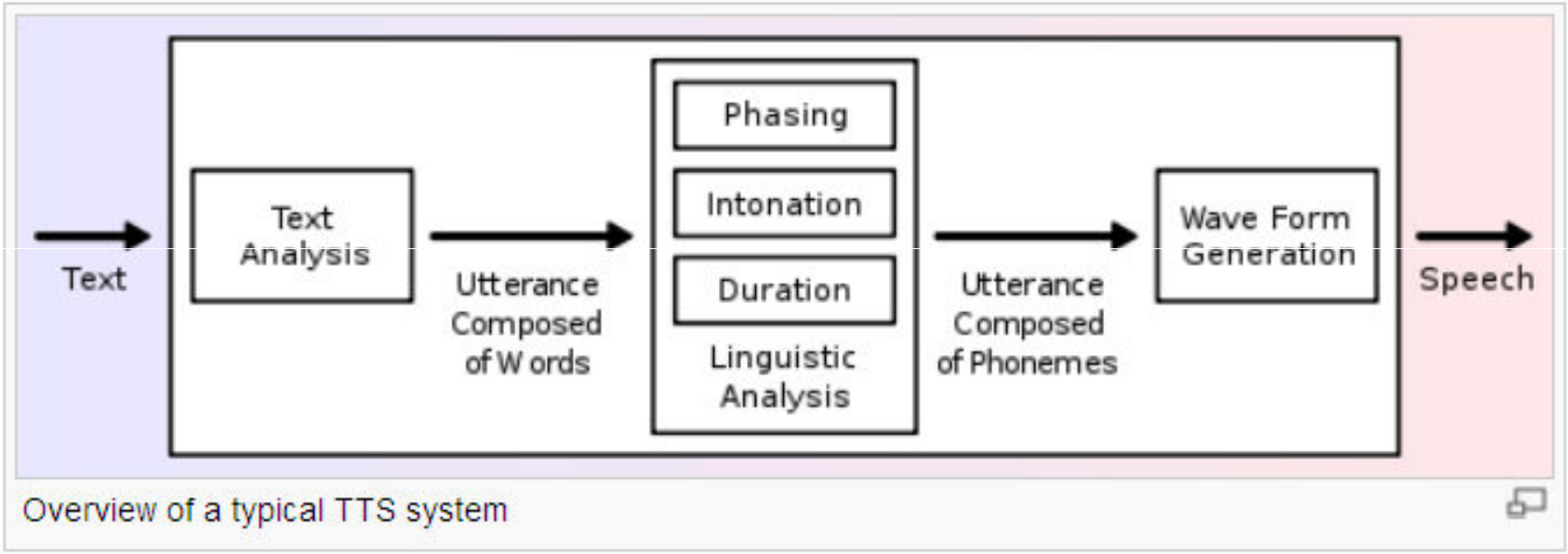
http://tipemilu2009.wordpress.com/

Speech Syntesis (Text To Speech)





Typical TTS system



Overview of a typical TTS system

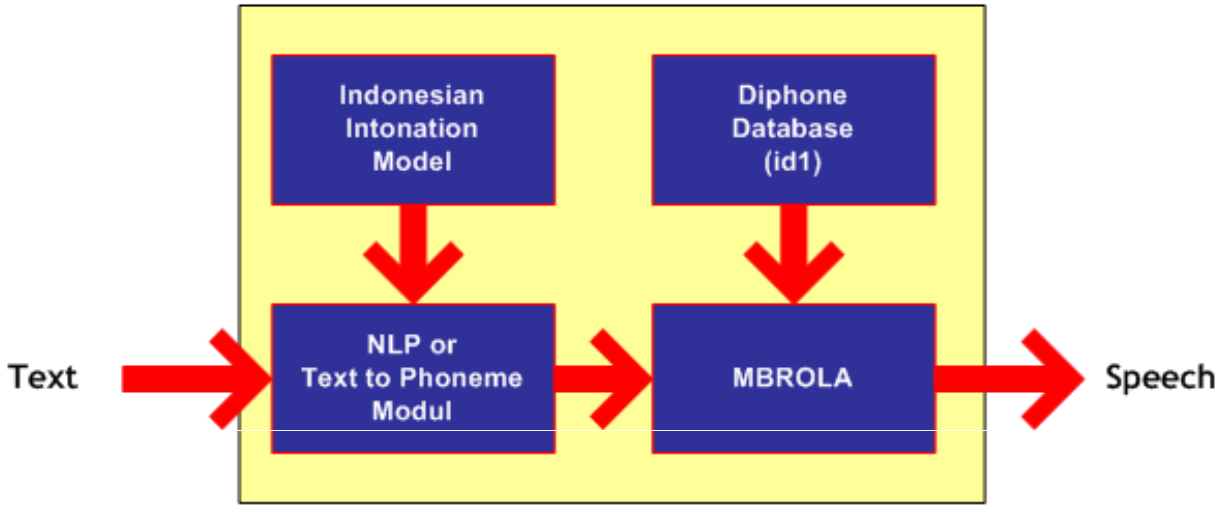
http://en.wikipedia.org/wiki/Text_to_speech

Speech Synthesis Markup Language (SSML)

```
<?xml version="1.0"?>
<speak xmlns="http://www.w3.org/2001/10/synthesis"
       xmlns:dc="http://purl.org/dc/elements/1.1/"
       version="1.0">
  <metadata>
    <dc:title xml:lang="en">Telephone Menu: Level 1</dc:title>
  </metadata>

  <p>
    <s xml:lang="en-US">
      <voice name="David" gender="male" age="25">
        For English, press <emphasis>one</emphasis>.
      </voice>
    </s>
    <s xml:lang="es-MX">
      <voice name="Miguel" gender="male" age="25">
        Para español, oprima el <emphasis>dos</emphasis>.
      </voice>
    </s>
  </p>

</speak>
```

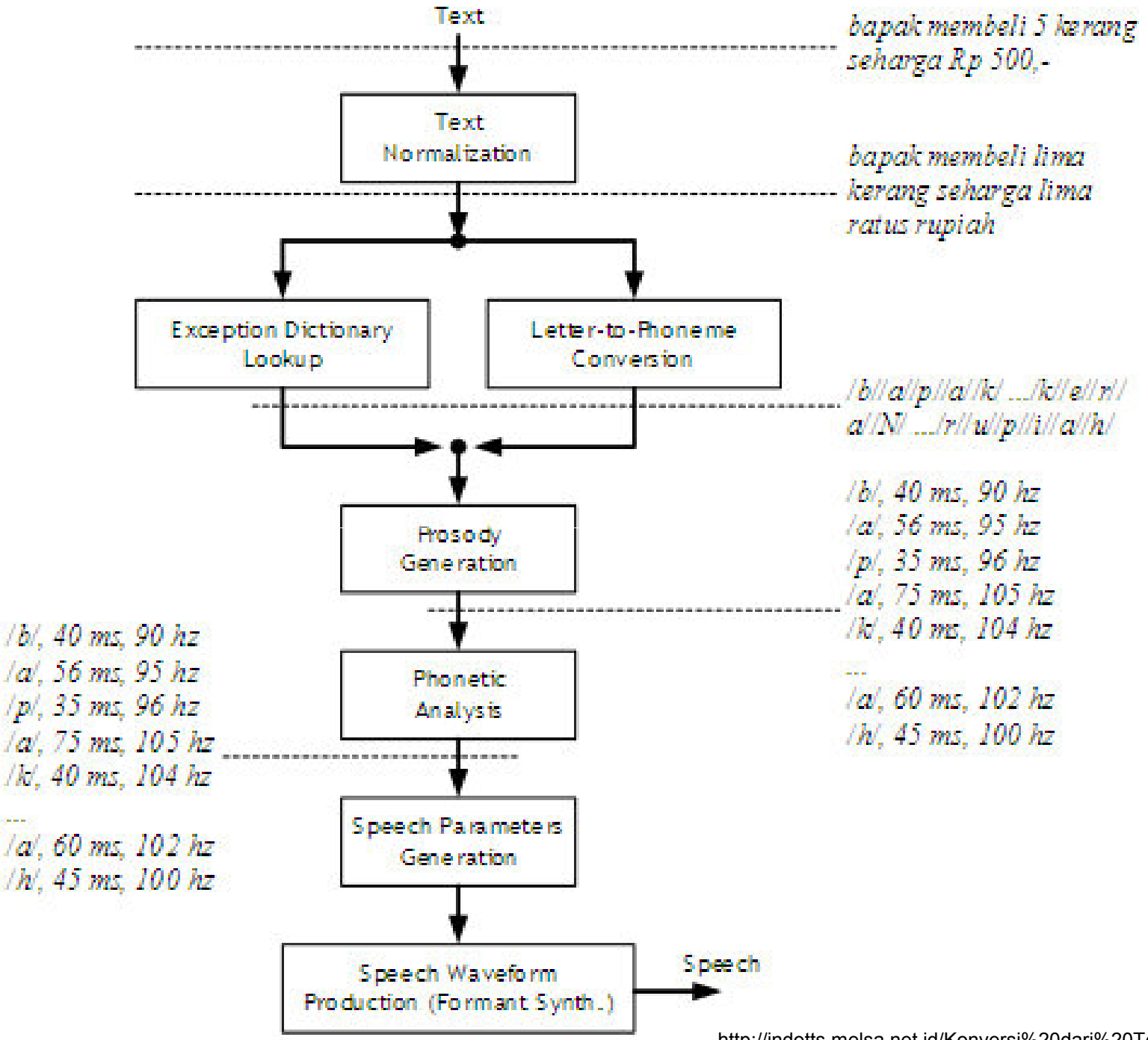


IndoTTS Configuration

The specifications of IndoTTS

- Receive sentence or paragraph (multiple sentence) input
- Dynamic Indonesian Intonations
- Direct output to Soundcard
- Using High Quality Diphone Concatenation Technology
- Using Indonesian Diphone Database (free for non-commercial use only)
- Supported by updatable database that contain 2500 entries to spell "e" in Indonesian
- Program interface for Borland Delphi, Visual Basic and C++.

http://indotts.melsa.net.id/



http://indotts.melsa.net.id/Konversi%20dari%20Teks%20ke%20Ucapan.pdf

Speech To Text

- Automatic Speech Recognition (ASR)
- The elements of the pipeline are:
  - Transform the PCM digital audio into a better acoustic representation
  - Apply a "grammar" so the speech recognizer knows what phonemes to expect.
    - A grammar could be anything from a context-free grammar to full-blown English.
  - Figure out which phonemes are spoken.
  - Convert the phonemes into words.

http://project.uet.itgo.com/speech.htm

- Yooi is a mobile application for Android smartphone to dicatate an SMS message.
- It is presented at the 5th International Conference on Interaction Sciences: IT, Human and Digital Content, Jeju island, South Korea, 26-28 June 2012.

http://www.ittelkom.ac.id/staf/suy/