

- 1. How to find a good research problem ?**
- 2. The importance of literature review**

Anto Satriyo Nugroho, Dr.Eng

Email: asnugroho@gmail.com

URL: <http://asnugroho.net>

Tips to consulting your research in a mailing list

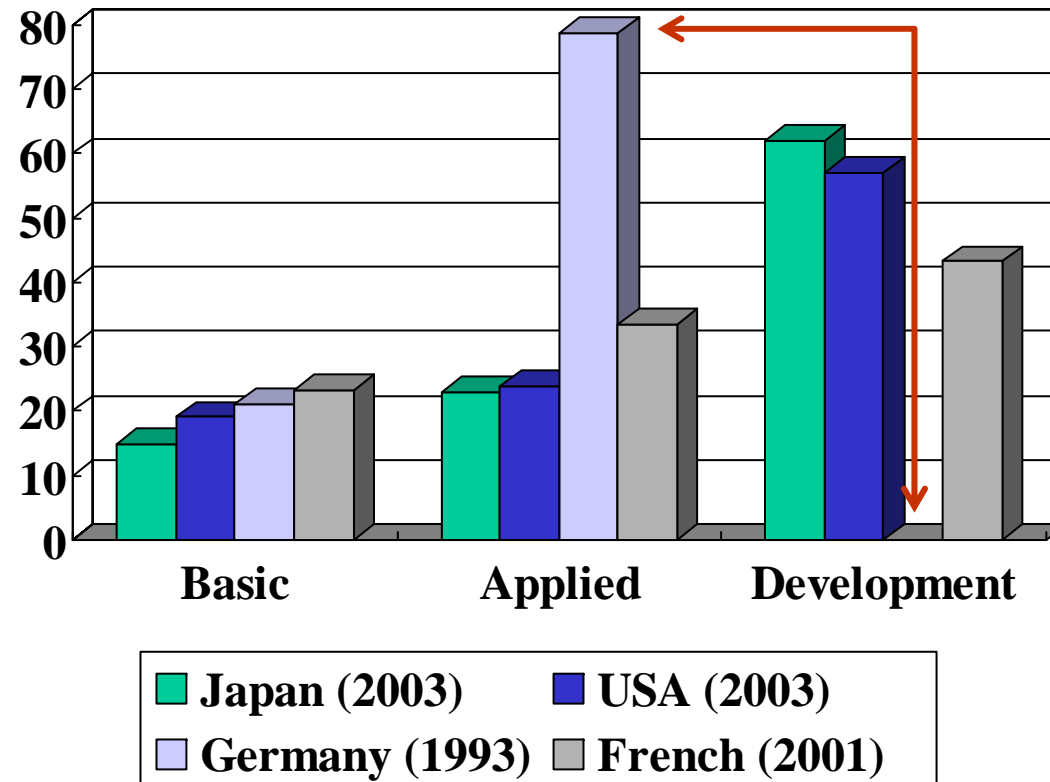
<http://asnugroho.wordpress.com/2008/04/29/tips-bertanya-lewat-email/>

- politely introduce yourself
- do your homework
- contribute to the community

Category of research

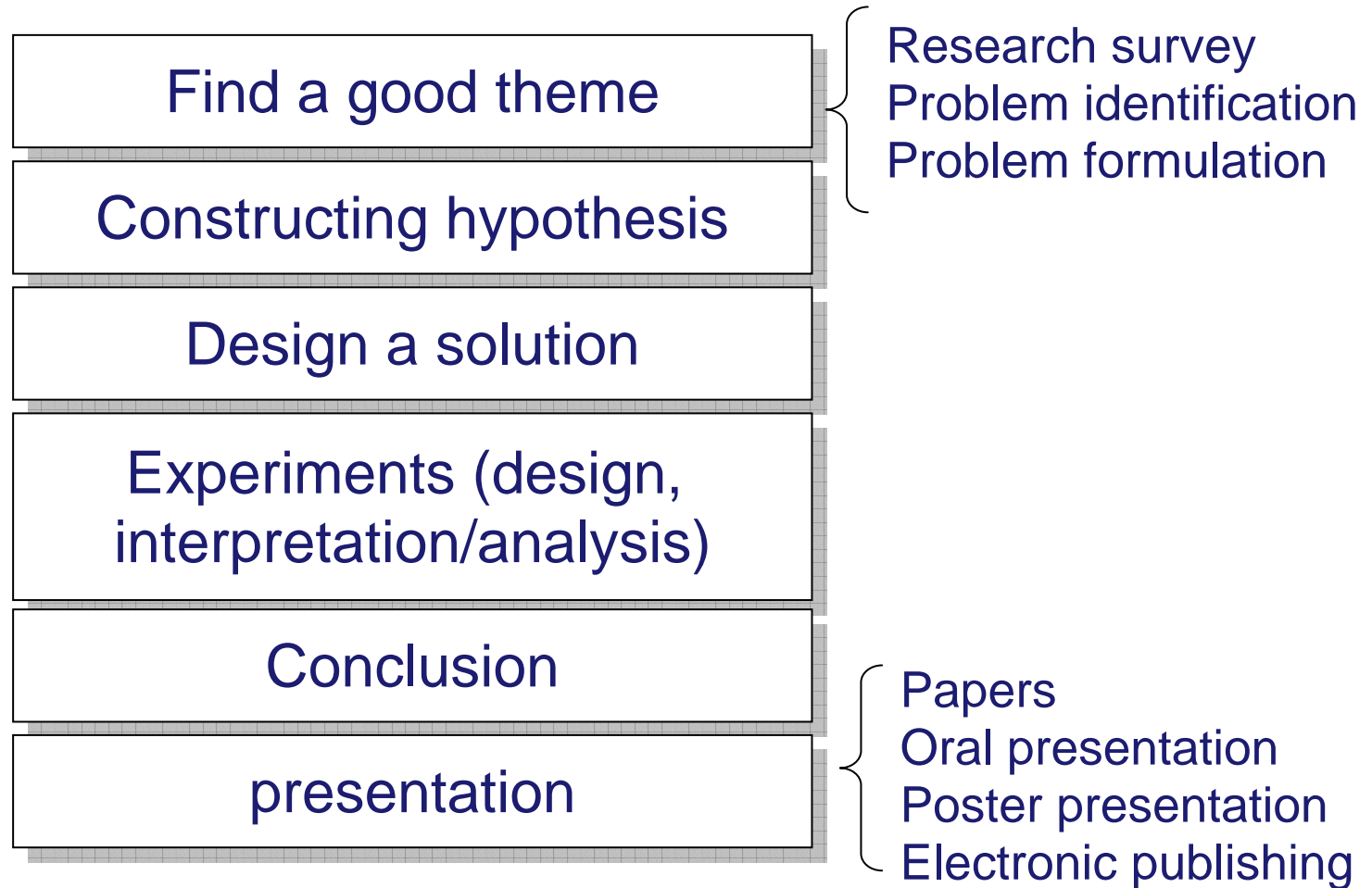
- Basic/fundamental
 - Objective : theoretical research to obtain a new knowledge about a phenomenon
 - Not involved in solving a practical problem
 - Example : mathematical modeling of auditory system
 - Target : paper
- Applied
 - Applying the knowledge obtained from basic research to be implemented for a certain application
 - Target : patent
- Development
 - Using the experience & knowledge obtained from basic and applied researches to develop a new material, device, system

Ratio of research grant for several countries



Source: http://www.mext.go.jp/b_menu/houdou/17/06/05060903/018.pdf

Research process



Research theme evaluation

- **Originality**
your work is new, novel, nobody in the world has done your research
- **Practicality**
Manuscripts shall be evaluated as effective when their contents are interesting to readers and their achievements contribute in some way to developing science and technology.
- **Reliability**

http://www.ieice.org/eng/shiori/page2_iss.html#1-1

Evaluation criteria for research publication in SPIE journals

Journalistic criteria

1. Appropriatenes for this journal
2. Interest to audience
3. Quality of writing (English language)
4. Organization
5. Length relative to substance
6. References to literature

Scientific merit

1. Novelty of results
2. Significance of results (Contribution to field)
3. Technical accuracy of results
4. Rigor (mathematical or experimental, whichever applies)
5. Experimental results
6. Substantiation of conclusions

SPIE : The International Society for Optical Engineering
 (formerly: Society of Photographic Instrumentation Engineers
<http://spie.org/>)

Criteria for choosing a good research theme

- Novel, original
- Interesting
- Significant contribution
- Difficult, but ...
- Solvable within the given period (usually : 1 year for most universities)
- Open a new problem for further exploration in the future

Find a good research theme

- First step in doing a research is identifying the problem
- Many “research” activities are conducted without sufficient problem identification → they are not classified as research !

Find a good theme

1. Find your interest !
2. What have the other people done about the topic ?
→ literature survey
3. What is the problem ? How is it formulated ?
4. How did they solve the problem ?
5. Are there unexpected results ? Why it happened ?
6. What is your opinion ?
 1. Do you have any idea to improve the research ?
 2. Do you have different approach to solve the problem ?

Find a good theme

- The following are not research
 - Design a system of your interest without identifying the problem
 - Reconstructing the work of other people

- How to convert those above to become a research ?
 - Identify the problem, then design your system to solve it
 - Reconstruction the work of other people is allowed, but you have to find the problem of the existing works, following by activities to solve it. Thus, your work will improve the old one.

Example

Application of Search Engine Optimization to develop a Content Management System

Problem :	the website is only visited by few people
Hypothesis:	SEO could increase the website traffic
Design a solution:	literature study of SEO and design the appropriate model for the website
Experiment/evaluation:	Implementation of SEO to the website and evaluate the traffic
Conclusion:	SEO could increase the traffic of the website

Romi Satria Wahono, "Tahapan dan tema penelitian", 2008
<http://romisatriawahono.net>

example

Objective

Literature survey +
problems in existing
solution

originality

the data areas and touch or cross form frames. We call this situation *field overlap* (between filled-in domain).

The literature on form processing concentrates on areas. Most of the effort is concentrated on detection and analysis [2] based on blank form search area is the filled-in data extraction or form dropout. A number of previous studies can perform the extraction of filled-in text without any attention to field overlap [3]. Our goal is to extract filled-in data from a form in the presence of field overlap. Since the strokes of filled-in characters are either attached to or located across the form frames, the problem of character segmentation involves two issues:

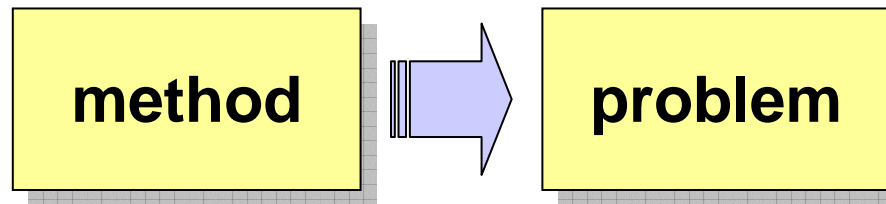
- 1) separating characters from form frames and
- 2) reconstruction of broken strokes introduced during separation.

Because the pixels located in the areas where a character stroke crosses a form frame represent both a part of the stroke and a part of the frame, the stroke will be broken after separating the form frame. Therefore, we need to reconstruct the broken strokes. Madlerlechner [4] introduced a method which separates filled-in characters from attached form frames and reconstructs broken strokes based on the skeleton. This method is time consuming and prone to noise. The system presented by Casey et al. [5] separates touching characters and reconstructs broken strokes by using a line tracking technique. The form structure is created by an interactive operation. Doermann and Rosenfeld [6] solved this problem by using cross section computation, which is also a time consuming algorithm. Tang et al. [7] proposed a system which can extract desired information from scanned financial documents (e.g., bank checks and drafts) by using a form description language.

We propose a system which can automatically capture form structure from a blank form and extract filled-in data from filled-in forms. Most forms are characterized by the presence of horizontal and vertical frames that delimit the usable space. A form frame can be a simple straight line or a block area. In practice, filled-in characters often touch and cross the horizontal frames. Our system focuses on the horizontal frames which are the most obvious characteristics in a form. We utilize block adjacency graph (BAG) [8] to

Bin Yu, Anil K. Jain, "A Generic System for Form Dropout," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 18, no. 11, pp. 1127-1134, Nov., 1996

Originality of an IT research



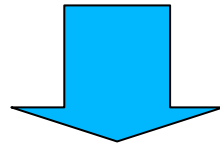
1. Using a new method (approach) to solve an existing problem
2. Using an existing method (approach) to solve a new problem
3. Using a new method (approach) to solve a new problem

Literature Review

1. Why literature review is important ?
2. Sources
3. How to make a review ?

Why literature review is important ?

1. To avoid duplication of research
2. To understand the state of the art of a field
3. To keep you uptodate with the newest progress



The research topic that you obtained after conducting research survey will satisfy the required criteria

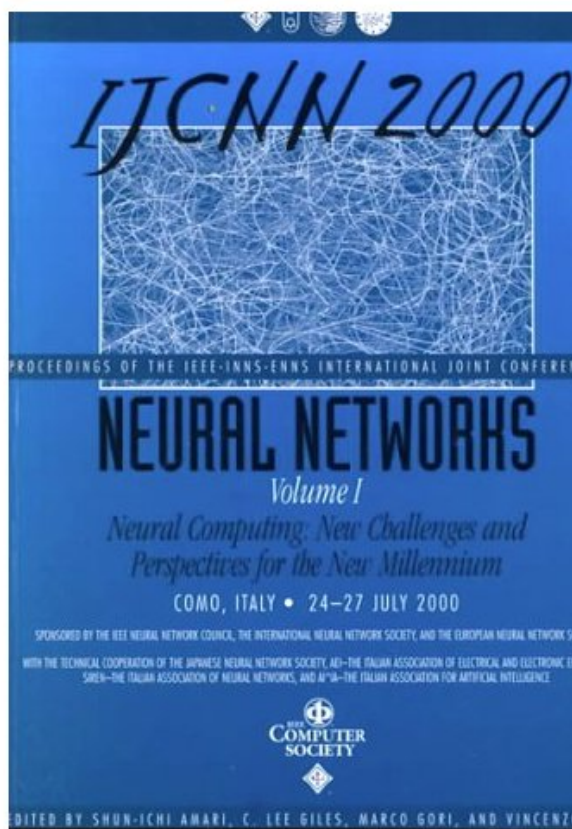
- novel
- significant
- etc

Sources

Priority:

- Journal (formal academic publication, peer reviewed)
- Peer-reviewed conference proceeding
- Conference proceeding
- Books
- Internet resources

Examples of journals & proceeding



IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING
Publication of the IEEE Computer Society
Indexed in ISI

JANUARY 2007 VOLUME 19 NUMBER 1 ITKEEH (ISSN 1041-4347)

REGULAR PAPERS

Data Mining

Duplicate Record Detection: A Survey
A.K. Elmagarmid, P.G. Ipeirotis, and V.S. Verykios 1

A Distribution-Index-Based Discretizer for Decision-Making with Symbolic AI Approaches
Q.X. Wu, D.A. Bell, G. Prasad, and T.M. McGinnity 17

Hiding Sensitive Association Rules with Limited Side Effects
Y.-H. Wu, G.-M. Chiang, and A.L.P. Chan 29

Extracting Actionable Knowledge from Decision Trees
Q. Yang, J. Yin, C. Ling, and R. Pan 43

Databases and Data Modeling

Incremental Evaluation of Sliding-Window Queries over Data Streams
T.M. Ghahm, M.A. Hamad, M.F. Mokbel, W.G. Araf, and A.K. Elmagarmid 57

Online Random Shuffling of Large Database Tables
C. Jormanno 73

Resource Discovery in a European Spatial Data Infrastructure
P.C. Smith and A. Friis-Christiansen 85

Random Sampling for Continuous Streams with Arbitrary Updates
Y. Tao, X. Liu, Q. Papadimitriou, and M. Hadjilambrou 96

Computing Iceberg Cubes by Top-Down and Bottom-Up Integration: The StarCubing Approach
D. Xin, J. Han, X. Li, Z. Shao, and B.W. Wah 111

Knowledge Engineering and Intelligent Systems

A Flexible Content Adaptation System Using a Rule-Based Approach
J. He, T. Gao, W. Hao, L.-L. Yen, and F. Bastani 127

2006 Reviewers List 141

IEEE computer society 

www.computer.org
Info@computer.org

IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE
Publication of the IEEE Computer Society

JANUARY 2007 VOLUME 29 NUMBER 1 ITPIDJ (ISSN 0162-8828)

PAPERS

Active Contours

Local or Global Minima: Flexible Dual-Front Active Contours
H. Li and A. Yezli 1

Biometrics

Peaks and Ridges: High-Resolution Fingerprint Matching Using Level 3 Features
A.K. Jain, Y. Chen, and M. Dumitres 15

Document Image Analysis

Joint Optimization of Word Alignment and Ephemeral Generation for Chinese to Taiwanese Sign Synthesis
Y.-H. Chiu, C.-H. Wu, H.-Y. Su, and C.-J. Chang 28

Machine Learning

Graph Embedding and Extensions: A General Framework for Dimensionality Reduction
S. Yan, D. Xu, B. Zhang, H.-J. Zhang, Q. Yang, and S. Lin 40

Motion Tracking and Analysis

Spatio-Temporal Context for Robust Multitarget Tracking
H.T. Nguyen, Q. Ji, and A.W.M. Smeulders 52

Tracking People by Learning Their Appearance
D. Hanman, D.A. Forsyth, and A. Zisserman 65

Multiple View Geometry

Correspondence-Free Determination of the Affine Fundamental Matrix
S. Lefmann, A.P. Bradley, I.V.L. Clarkson, J. Williams, and P.J. Koozekan 82

Registration and Recognition

Surface Dependent Representations for Illumination Invariant Image Comparison
M. Osofsky, D.W. Jacobs, and M. Lindorfer 98

A Statistics-Based Approach to Binary Image Registration with Uncertainty Analysis
K.M. Simonson, S.M. Driscoll Jr., and F.R. Tamar 112

Shape Extraction and Analysis

Topological Equivalence between a 3D Object and the Reconstruction of Its Digital Image
P. Belding, L.J. Latecki, and M. Siquera 126

Accurate and Scalable Surface Representation and Reconstruction from Images
G. Zang, S. Paris, L. Quan, and F. Sillion 141

(Contents continued on back cover)

Published in cooperation with: Aerospace & Electronic Systems Society, Control Systems Society, Engineering in Medicine & Biology Society, Information Theory Society, Systems, Man & Cybernetics Society, Ultrasonics, Ferroelectrics, & Frequency Control Society

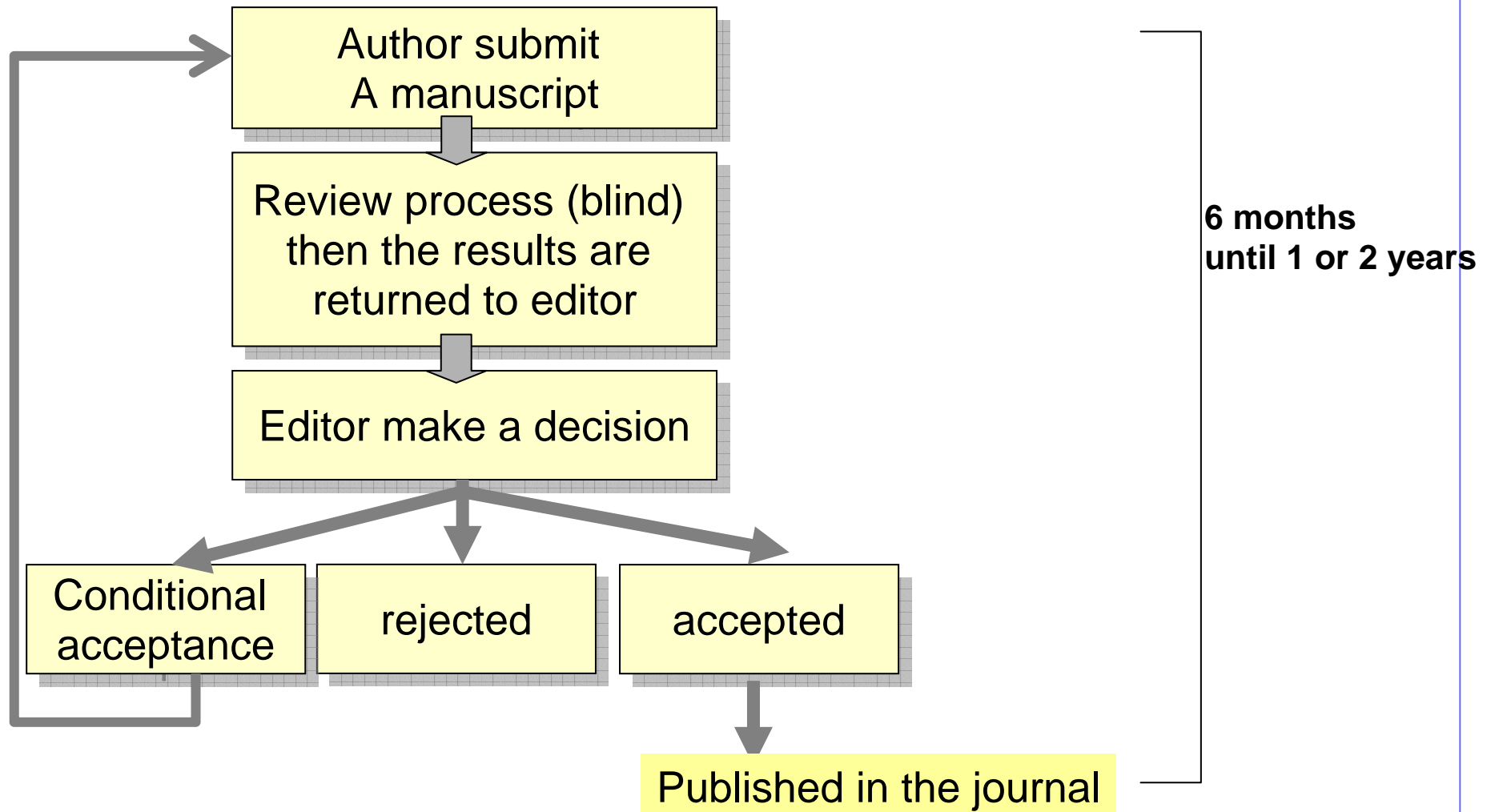
Included in MEDLINE[®] and indexed in ISI
 

IEEE computer society 
www.computer.org
Info@computer.org

Why journal should be the first priority ?

1. Reliable ! A journal publication should pass a tough review from experts (2, 3 or 4 persons). Thus, it should meet the required criteria
2. Some journals could be withdrawn due to the mistakes, scientific misconduct, etc
3. uptodate (book is not uptodate)
4. Journal also informed who is responsible for the contents (name, contact address, etc)

Process of journal publishing



Online source for literature survey (Not free)

<http://romisatriawahono.net/2007/10/07/literatur-penelitian-dan-jurnal-ilmiah-gratis/>

1. IEEE Computer Society Digital Library
 - <http://www.computer.org/portal/site/csdl/>
 - student member \$61/year
2. ACM Digital Library
 - <http://portal.acm.org/dl.cfm>
 - student member \$42/year
3. www.elsevier.com
4. EBSCO (<http://www.ebscohost.com/>)
5. Science Direct (<http://www.sciencedirect.com/>)
6. Proquest (<http://www.csa.com/>)

Online source for literature survey (Free)

<http://romisatriawahono.net/2007/10/07/literatur-penelitian-dan-jurnal-ilmiah-gratis/>

1. <http://citeseer.ist.psu.edu/>
2. Directory of Open Access Journal (<http://www.doaj.org/>)
3. Pubmed Central (free digital archive of biomedical and life sciences) <http://www.pubmedcentral.nih.gov/>
4. Google Scholar (citation index, abstrak dan fulltext) <http://scholar.google.com/>
5. Mirror Scientific Data di LIPI (mirror di LIPI untuk jurnal ilmiah internasional) <http://www.arsip.lipi.go.id/>
6. DBLP Bibliography <http://www.informatik.uni-trier.de/~ley/db/>
7. Libra Academic Search <http://libra.msra.cn/>
8. JSTOR Scholarly Journal Archive <http://www.jstor.org/>

Online source for literature survey (Free)

<http://romisatriawahono.net/2007/10/07/literatur-penelitian-dan-jurnal-ilmiah-gratis/>

9. Biomed Central (the Open Access Publisher)
<http://www.biomedcentral.com/>
10. Highwire Press Stanford University <http://highwire.stanford.edu/>
11. UC Berkeley on iTunes U (Materi kuliah gratis dari UC Berkeley)
<http://itunes.berkeley.edu/>
12. MIT Opencourseware (Materi kuliah gratis dari MIT)
<http://ocw.mit.edu/>
13. Patent Searching (Pencarian Dokumen Paten)
<http://www.pcug.org.au/~rossco/patentsearching.htm>
14. Ilmukomputer.Com (mulai banyak paper ilmiah yang diupload)
<http://ilmukomputer.com/>

Assignment (2)

Find 3 papers related to your interest from
<http://citeseerx.ist.psu.edu/>

Read (at least) the introduction part of the paper, then summarize the following matters:

1. what is the objective of the research ?
2. what is the other people have done about the topic ? Describe the existing problems !
3. what is the new solution proposed by the author ?

Send the result by email

To: asnugroho@gmail.com

Subject : RM-A-02

Deadline: 23 September 2008