Macau University of Science and Technology

Faculty of Innovation Engineering

Dept. of Engineering Science

(澳門科技大學創新工程學院工程科學系)

Thesis Proposal

(論文選題報告)

**Research and Development of Offline Handwritten
Signazture Verification Algorithm based on Transformer**

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Abstract

This research deals with the supervisory control problem of discrete event systems. Use singular keywords. Keywords are separated by commas or semicolons, and there is often a period at the end.

The template can be used in online and offline ways. For the former (highly recommended), Overleaf (`https://www.overleaf.com`) is a collaborative cloud-based LaTeX editor used for writing, editing and publishing scientific documents, which is much easy to use and friendly.

For the latter, one can use Texstudio, which is a very popular yet free software package (`https://www.texstudio.org/`). When using Texstudio, the compiling command is XeLatex. To make Texstudio work, one need to first install Miktex, see `https://miktex.org/`. We happen to find, rather rarely, that a successful compiling may depend on the version of Texstudio. In any case, we recommend the latest version of Texstudio.

keywords: Discrete event system; supervisory control; fault diagnosis.

摘要

中文摘要一般 300 到 500 字且使用繁體. 使用西文方式下的標點符號. 比如, 像這樣. 若對模板使用有任何問題, 可 email 至 zhwli@ieee.org.

關鍵詞: 一般使用 3–5 個關鍵詞，中間用分號隔開.

Table of Contents

1. Introduction

1.1 Research Background

xxxxxx.

Fang develops a method for supervisor synthesis ... [20].

1.2 Motivation

xxxxxx.

1.3 Research Objectives

xxxxxx.

2. Literature Review

xxxxxx.

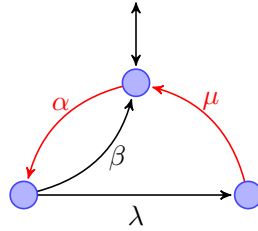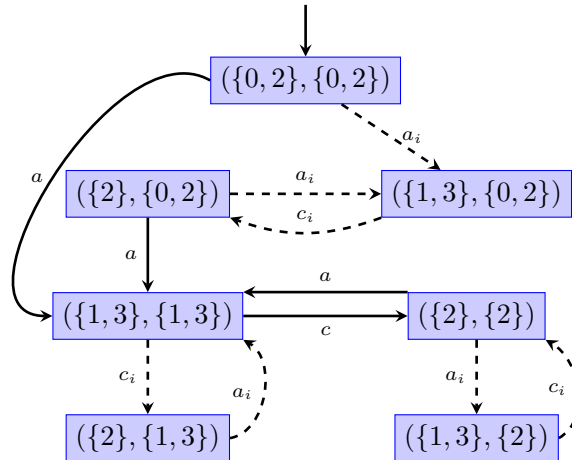We give some examples of how to draw figures.

Figure 1: This is an automaton.

Figure 2: Indicator automaton and verifier of the NFA in Fig. 1

3. Xxxx (your research topic)

3.1 xxxxxx

We give some examples of how to make tables.

The table title is at the top of the table.

Table 1: A table.

Class[a]	γ_1	γ_2[b]	$\langle\gamma\rangle$	G	$|f|$	θ_c
BL Lacs	5	36	7	-4.0	1.0×10^{-2}	$10°$
FSRQs	5	40	11	-2.3	0.5×10^{-2}	$14°$

Table 2: Another table.

i	x_i	n_i	i	x_i	n_i
1	0.5~0.64	1	8	1.48~1.62	53
2	0.64~0.78	2	9	1.62~1.76	25
3	0.78~0.92	9	10	1.76~1.90	19
4	0.92~1.06	26	11	1.90~2.04	16
5	1.06~1.20	37	12	2.04~2.18	3
6	1.20~1.34	53	13	2.18~2.38	1
7	1.34~1.48	56			

3.2 xxxxxx

xxxxxx.

Formal expression is very important.

Example 1:

$$e^{\pi i} + 1 = 0 \tag{1}$$

Example 2:

$$a^2 + b^2 = c^2 \tag{2}$$

If no equation number is needed, we can use double dollars at the beginning and end of the equation.

$$\cos x + \sin y = 1.$$

Example 3:

$$\binom{n}{m} = \binom{n}{n-m} = C_n^m = C_n^{n-m} \tag{3}$$

Example 4:

$$(a+b)^3 = (a+b)(a+b)^2 = a^3 + 3a^2b + 3ab^2 + b^3 \tag{4}$$

Here are more examples of mathematics equations or expression.

$$x = a_0 + \cfrac{1}{a_1 + \cfrac{1}{a_2 + \cfrac{1}{a_3 + \cfrac{1}{a_4}}}} \tag{5}$$

$$\frac{\begin{array}{c} (x_1 x_2) \\ \times\, (x_1' x_2') \end{array}}{(y_1 y_2 y_3 y_4)}$$

$$P\left(A = 2 \,\middle|\, \frac{A^2}{B} > 4\right)$$

$$M = \begin{bmatrix} \frac{5}{6} & \frac{1}{6} & 0 \\ \frac{5}{6} & 0 & \frac{1}{6} \\ 0 & \frac{5}{6} & \frac{1}{6} \end{bmatrix}$$

$$M = \begin{array}{c} \\ A \\ B \end{array} \begin{array}{cc} x & y \\ \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \end{array}$$

$$f(n) = \begin{cases} n/2 & \text{if } n \text{ is even} \\ -(n+1)/2 & \text{if } n \text{ is odd} \end{cases}$$

$$\binom{n}{r} = \frac{n!}{r!(n-r)!}$$

Here are some logic expressions:

$$(\forall s \in \overline{K})(\forall \sigma \in \Sigma)(\forall s' \in \overline{K}) s\sigma \in L(G) \,\&\, s'\sigma \in L(G) \,\&\, Ps = Ps' \implies s' \in \overline{K}.$$

For more details about mathematics equations or expressions, see https://en.wikibooks.org/wiki/LaTeX/Mathematics.

4. XXXX (another topic if necessary)

4.1 Algorithm

An example of the Algorithm 1.

Algorithm 1: Control policy construction

Input: Control parameter r_i, time series $Backgrd(T_i)$=$T_1, T_2, \ldots, T_n$ and similarity threshold θ_r

Output: Control policy $con(r_i)$

1 $con(r_i) = \Phi$;

2 for $j = 1; j \leq n; j \neq i$ **do**

3   float $maxSim = 0$;

4 $r^{maxSim} = null$;

5   **while** *not end of T_j* **do**

6   compute Jaro(r_i, r_m);   % here are the commentary texts

7 $con(r_i) = con(r_i) \cup r^{maxSim}$;

8 return $con(r_i)$;

4.2 xxxx

4.2.1   xxxx

5. Schedule for the thesis

6. Publications

References

[1] C. Y. Yin, J. W. Xi, R. X. Sun and J. Wang, "Location privacy protection based on differential privacy strategy for big data in industrial internet of things," *IEEE Transactions on Industrial Informatics*, vol. 14, no. 8, pp. 3628–3636, Aug. 2018.

> For a paper in a journal, the title of the journal should be in Italics. The first letter of each word should be capitalized. Volume and Issue numbers should be given. There is a blank space between "vol" and "14" in the above. Note that two continuous hyphens in LaTeX generates "–".

[2] J. B. Xiong, R. Ma, L. Chen, Y. L. Tian, Q. Li, X. M. Liu and Z. Q. Yao, "A personalized privacy protection framework for mobile crowdsensing in IIoT," *IEEE Transactions on Industrial Informatics*, vol. 16, no. 6, pp. 4231–4241, Jun. 2020.

[3] R. De Prisco and A. De Santis, "On the relation of random grid and deterministic visual cryptography," *IEEE Transactions on Information Forensics and Security*, vol. 9, no. 4, pp. 653–665, Apr. 2014.

[4] M. Beunardeau, A. Connolly, R. Geraud and D. Naccache, "White-box cryptography: Security in an insecure environment," *IEEE Security and Privacy*, vol. 14, no. 5, pp. 88–92, Sep. 2016.

[5] L. Sweeney, "K-anonymity: A model for protecting privacy," *International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems*, vol. 10, no. 5, pp. 557–570, Oct. 2002.

[6] P. S. Wang and J. D. Wang, "L-diversity algorithm for incremental data release," *Applied Mathematics and Information Sciences*, vol. 7, no. 5, pp. 2055–2060, Sep. 2013.

[7] S. Ruggieri, "Using t-closeness anonymity to control for non-discrimination," *Transactions on Data Privacy*, vol. 7, no. 2, pp. 99–129, Aug. 2014.

[8] C. Dwork, "The differential privacy frontier (extended abstract)," in *Proc. 6th Theory of Cryptography Conference*, vol. 5444, pp. 496–502, Mar. 2009.

> For a paper in conference proceedings, the name of the conference should be in Italics. The first letter of each word should be capitalized. Note that before "*Proc.*", there is a word "in" that is not in Italics.

[9] C. Dwork, "Differential privacy: A survey of results," in *Proc. 5th International Conference on Theory and Applications of Models of Computation*, vol. 4978, pp. 1–19, Apr. 2008.

[10] C. Dwork and J. Lei, "Differential privacy and robust statistics," in *Proc. 41st Annual ACM Symposium on Theory of Computing*, pp. 371–380, May. 2009.

[11] C. Dwork, F. McSherry, K. Nissim and A. Smith, "Calibrating noise to sensitivity in private data analysis," in *Proc. 3rd Theory of Cryptography Conference*, vol. 3876, pp. 265–284, Mar. 2006.

[12] F. McSherry and K. Talwar, "Mechanism design via differential privacy," in *Proc. 48th Annual IEEE Symposium on Foundations of Computer Science*, pp. 94–103, Oct. 2007.

[13] C. Dwork and A. Roth, "The algorithmic foundations of differential privacy," *Foundations and Trends in Theoretical Computer Science*, vol. 9, no. 3, pp. 211–406, Jan. 2013.

[14] C. Li, G. Miklau, M. Hay, A. McGregor and V. Rastogi, "The matrix mechanism: Optimizing linear counting queries under differential privacy," *VLDB Journal*, vol. 24, no. 6, pp. 757–781, Dec. 2015.

[15] Q. Geng and P. Viswanath, "The optimal noise-adding mechanism in differential privacy," *IEEE Transactions on Information Theory*, vol. 62, no. 2, pp. 925–951, Feb. 2016.

[16] J. W. Bryans, M. Koutny and P. Y. A. Ryan, "Modelling opacity using Petri nets," *Electronic Notes in Theoretical Computer Science*, vol. 121, pp. 101–115, Feb. 2005.

[17] Y. Tong, Z. Y. Ma, Z. W. Li, C. Seatzu and A. Giua, "Verification of language-based opacity in Petri nets using verifier," in *Proc. American Control Conference (ACC)*, pp. 757–763, Jul. 2016.

[18] R. Kumar and V. K. Garg, "Control of stochastic discrete event systems: Synthesis," in *Proc. 37th IEEE Conference on Decision and Control*, pp. 3299–3304, Dec. 1998.

[19] Y. S. Huang and M. Jeng, *Fault Diagnosis of Discrete Event Systems: A Timed Automaton Approach*, Springer-verlag, Berlin, 2011.

This is a book or monograph.

[20] F. F. Fang, *A Journey to the West*, Ph.D. Dissertation, Institute of Systems Engineering, Macau University of Science and Technology, July 2021. 2019.

This is a degree thesis.