



**DEVELOPMENT OF DANCE MOVEMENT MODEL USING
LABAN MOVEMENT ANALYSIS**



DOCTOR OF PHILOSOPHY

2023



Faculty of Information and Communication Technology



**DEVELOPMENT OF DANCE MOVEMENT MODEL USING LABAN
MOVEMENT ANALYSIS**

Joko Sutopo

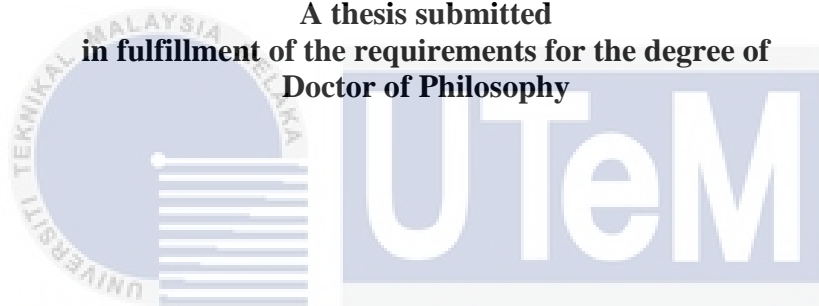
Doctor of Philosophy

2023

**DEVELOPMENT OF DANCE MOVEMENT MODEL USING LABAN
MOVEMENT ANALYSIS**

JOKO SUTOPO

A thesis submitted
in fulfillment of the requirements for the degree of
Doctor of Philosophy



الريورسي تيكنيكي ملينسيا مالوك
Faculty of Information and Communication Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2023

DECLARATION

I declare that this thesis entitled “Development of Dance Movement Model Using Laban Movement Analysis” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in the candidature of any other degree.



Signature :

A handwritten signature in blue ink, appearing to read 'Joko Sutopo', is written over a large, semi-transparent 'UTEM' watermark.

Name :

Joko Sutopo

Date :

March 14, 2023

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of Doctor of Philosophy.

Signature :



Supervisor Name : Profesor Dr. Mohd Khanapi Bin Abd Ghani

Date : 14/3/2023



اونيورسيتي تيكنيكل مليسيا ملاك
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEDICATION

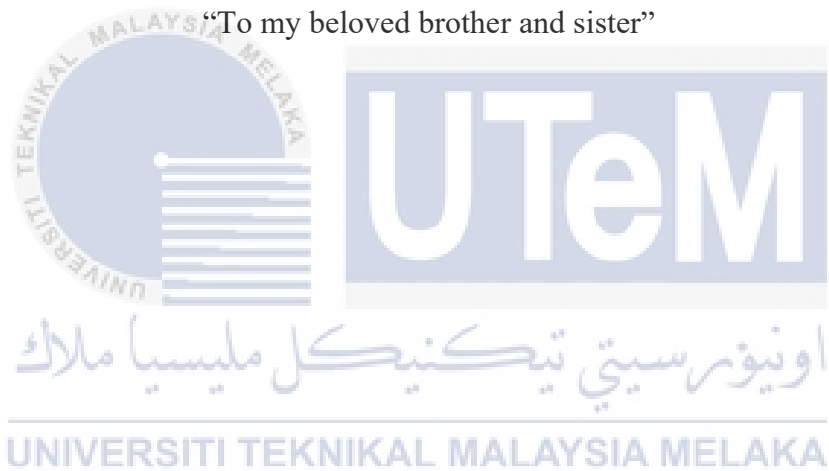
“To my beloved Mother Ibu Rusmini and Father Katiyo”

“To my beloved Mother Ibu Hj Sutani and Father in Law Bapak H. Kawit ”

“To my beloved wife Sri Haryani”

“ To My Children Aulia Nur Septiani and Aufa Luthfi Zulfariyanto ”

“To my beloved brother and sister”



ABSTRACT

Dance is an art product that represents aspects of religion, culture, and community tradition. Each dance movement is a combination of body movements that represent meaning. So far, students and dance teachers have learned dance movements based on rote learning, where the obstacle that arises is that a dancer finds it difficult to adapt dance movements according to the meaning of the dance. A problem that often arises is that dynamic dance movements cause dancers or dance students to not be able to adjust their movements, especially since each dancer has a different body shape causing accuracy, flexibility and less optimal performance. Therefore, this research tries to solve the problem of accuracy and flexibility of dance movements by using the method and evaluation that is Laban Movement Analysis (LMA) which is the notation of dance movements created by Rudolf Laban and has become the international standard in dance notation. LMA has four variable components, namely Body, Space, Shape, and Effort, which are used in the process of evaluating movement and extracting movement data that has multidisciplinary aspects, including anatomy, kinesiology, psychology and aesthetics. LMA is widely recognized as an analysis for studying movement, meaning, and documentation of movement sequences. Dance movements have aspects of space, time, coordinates, beauty and speed, which are then carried out by the data mining process for the feature extraction process to study and evaluate the dance movement data. In this study, develop all aspects of LMA components (Body, Space, Shape, and Effort) to carry out the process of analyzing movement patterns in the feature data processing. Several studies have used aspects of LMA in analyzing dance movements, but no researcher has involved all aspects of LMA components, especially the Effort element. In this study, the researcher has conducted a study to identify dance movement patterns using all components of Body, Space, Shape, and Effort (BSpShEf) and pay attention to the composition of LMA components. After being analyzed and processed using the Hidden Markov Model (HMM) method, the average accuracy of the results exceeded 95%. This study uses two types of dance movement data, namely classical and contemporary movement data. From the results of the study, the accuracy of recognizing classical dance moves was 96.19%, while the accuracy of recognizing contemporary dance moves was 96.13%, so it can be said that this study was successful in recognizing classical and contemporary dance moves so that dancer students and dance teachers in the process of learning dance moves, especially classical dance and contemporaries do not need to bother finding the exact movement point according to the sequence and rhythm of the actual dance movements, after doing this study.

PEMBANGUNAN MODEL PERGERAKAN TARIAN MENGGUNAKAN LABAN MOVEMENT ANALYSIS

ABSTRAK

Tarian ialah produk seni yang mewakili aspek agama, budaya, dan tradisi masyarakat. Setiap gerak tari merupakan gabungan gerak badan yang mewakili sesuatu makna. Setakat ini, murid dan guru tarian mempelajari gerak tari berdasarkan aspek hafalan, di mana halangan yang timbul ialah seseorang penari sukar menyesuaikan pergerakan tarian mengikut maksud tarian tersebut. Masalah yang sering timbul ialah pergerakan tarian yang dinamik menyebabkan penari atau pelajar tari tidak dapat menyesuaikan pergerakan mereka, lebih-lebih lagi setiap penari mempunyai bentuk badan yang berbeza menyebabkan ketepatan, fleksibiliti dan persembahan yang kurang optimum. Oleh itu, penyelidikan ini cuba menyelesaikan masalah ketepatan dan kelenturan pergerakan tarian dengan menggunakan kaedah dan penilaian iaitu Laban Movement Analysis (LMA) iaitu notasi pergerakan tarian ciptaan Rudolf Laban dan telah menjadi piawai antarabangsa dalam notasi tari. LMA mempunyai empat komponen pembolehubah iaitu Body, Space, Shape, and Effort yang digunakan dalam proses menilai pergerakan dan mengekstrak data pergerakan yang mempunyai aspek pelbagai disiplin termasuk anatomi, kinesiologi, psikologi dan estetika. LMA diiktiraf secara meluas sebagai analisis untuk mengkaji pergerakan, makna, dan dokumentasi urutan pergerakan. Pergerakan tarian mempunyai aspek ruang, masa, koordinat, keindahan dan kelajuan yang kemudiannya dijalankan oleh proses perlombongan data untuk proses pengekstrakan ciri bagi mengkaji dan menilai data pergerakan tarian. Dalam kajian ini, membangunkan semua aspek komponen LMA (Body, Space, Shape, and Effort) untuk menjalankan proses menganalisis corak pergerakan dalam pemrosesan data ciri. Beberapa kajian telah menggunakan aspek LMA dalam menganalisis pergerakan tarian, namun tiada pengkaji melibatkan semua aspek komponen LMA terutamanya elemen Effort. Dalam kajian ini, pengkaji telah menjalankan kajian untuk mengenal pasti corak pergerakan tarian menggunakan semua komponen Body, Space, Shape, and Effort (BSpShEf) dan memberi perhatian kepada komposisi komponen LMA. Selepas dianalisis dan diproses menggunakan kaedah Hidden Markov Model (HMM), purata ketepatan keputusan melebihi 95%. Kajian ini menggunakan dua jenis data pergerakan tarian iaitu data gerakan klasik dan kontemporari. Daripada hasil kajian, ketepatan mengenal gerak tari klasik adalah 96.19%, manakala ketepatan mengenal gerak tari kontemporari adalah 96.13%, sehingga dapat dikatakan kajian ini berjaya mengenal gerak tari klasik dan kontemporari, sehingga pelajar penari dan guru tarian dalam proses pembelajaran gerak tari khususnya tarian klasik dan kontemporari tidak perlu bersusah payah mencari titik pergerakan yang tepat mengikut turutan dan rentak gerak tari yang sebenar, setelah melakukan kajian ini.

ACKNOWLEDGEMENTS

In the Name of Allah SWT, the Most Gracious, the Most Merciful

Alhamdulillah, first and foremost, I would like to thank and praise Allah SWT the Almighty, my Creator, my Sustainer, for everything I have received since the beginning of my life. I would like to extend my appreciation to Universiti Teknikal Malaysia Melaka (UTeM) for providing this research. Especially for Professor Dr Mohd Khanapi Bin Abd Ghani, appreciation goes to my main supervisor, Professor Dr Mohd Khanapi Bin Abd Ghani, for all his support, advice, and inspiration. His constant patience in guiding and providing priceless insights will forever be remembered. Also, to my co-supervisor, Professor Ts. Dr Burhanuddin Mohd Aboobaidar for supporting the academic program at UTeM.

Thanks to PPS UTeM Yogyakarta friends (Mrs Susi, Mrs Izzah, Mrs Ussy, Mr Zaki, Mr Nasrullah, Mr Faiz, Mr Hendra, Mr Fahmi, Mr Taufiq, Mr Hery, Mr Nugroho, Mr Usman) for their togetherness and support so far. Thanks also to Dr Abdul Syukor for his direction and guidance so far. Thanks to Professor Dr Zulhawati, Chairman of the Dharma Bhakti Foundation for Science and Technology and Dr Bambang Moertono Setiawan, Chancellor of the Universitas Teknologi Yogyakarta, for encouraging me to complete this doctoral program.

Last but not least, from the bottom of my heart my gratitude to my beloved wife, Sri Haryani. My eternal love also to my children, Aulia Nur Septiani and Aufa Luthfi Zulfariyanto. I would also like to thank my beloved parents for their endless support, love, and prayers. Finally, thank you to all the individuals who provided me with the assistance, support, and inspiration to embark on my study.

TABLE OF CONTENTS

	PAGE
DECLARATION	
DEDICATION	
ABSTRACT	i
ABSTRAK	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vii
LIST OF FIGURES	x
LIST OF APPENDICES	xiii
LIST OF ABBREVIATIONS	xiv
LIST OF PUBLICATIONS	xvi
CHAPTER	
1. INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	3
1.3 Research Question	4
1.4 Research Objective	4
1.5 Scope of Research	5
1.6 Contribution of Research	5
1.7 Thesis Outline	6
1.8 Summary	7
2. LITERATURE REVIEW	10
2.1 Introduction	10
2.2 Dance	11
2.3 Motion Capture	13
2.4 Laban Movement Analysis	21
2.5 Motion Model Three Dimension (3D)	41
2.6 Vector Algebra	42
2.7 Transformation Geometry	43
2.8 Vector Formulas for Transformation	45
2.8.1 Nodding Gestures Forward-Back and Side-to-Right	45
2.8.2 Head Rotation	45
2.8.3 Geometric Transformation for Body	46
2.8.4 Hand Transformation	47
2.8.5 Shear Transformation	48
2.8.6 Kinematic Transformation	49

2.9	Data Mining	51
2.9.1	Types of Data That Can be Requested	55
2.9.2	Database Data	56
2.9.3	Transactional Data	58
2.9.4	Other Kinds of Data	59
2.10	Classification	61
2.10.1	Hidden Markov Model (HMM)	63
2.10.2	Decision Tree	64
2.10.3	Naive Bayes	66
2.11	Summary	69
3.	METHODOLOGY	71
3.1	Introduction	71
3.2	Research Tools	72
3.3	Conceptual Research Model	73
3.3.1	Biovision Hierarchy (BVH)	80
3.3.2	Feature Extraction	81
3.3.3	Normalization and Quantization	81
3.3.4	Classification Used Hidden Markov Model (HMM)	82
3.3.5	Validation	82
3.4	Summary	83
4.	PROPOSED LABAN MOVEMENT ANALYSIS MODEL	85
4.1	Introduction	85
4.2	Laban Movement Component (LMA) Model	86
4.2.1	Body Component	87
4.2.2	Space Component	90
4.2.3	Shape Component	91
4.2.4	Effort Component	94
4.3	Normalization	96
4.4	Quantization	97
4.5	Quantile	97
4.6	Developed Model Laban Movement Analysis	98
4.7	Summary	100
5.	DATA ANALYSIS AND FINDING	101
5.1	Introduction	101
5.2	Motion Capture Dance	101
5.3	Extract Features Using the LMA	112
5.3.1	Extract Features Body Components	113
5.3.2	Extract Features Space Components	115
5.3.3	Extract Features Shape Components	116

5.3.4	Extract Features Effort Components	119
5.4	Classification of Dance Movements	122
5.5	Training	124
5.6	Process Validation	125
5.7	Testing Data	126
5.7.1	Classical Dance Motion Testing	126
5.7.2	Testing of Contemporary Dance Movements	146
5.8	Summary	172
6.	CONCLUSION AND RECOMMENDATIONS	174
6.1	Introduction	174
6.2	Research Experience	176
6.3	Contribution for People	177
6.4	Future Work	177
	REFERENCES	179
	APPENDICES	217



LIST OF TABLES

TABLE	TITLE	PAGE
1.1	Summary Steps of Research	8
2.1	Survey Sensor Cameras with Various Specifications	16
2.2	LMA various fields	23
2.3	Data sources and results for literature search	30
2.4	List of use of LMA components	30
5.1	Gesture BVH	107
5.2	Experiment State	108
5.3	Test Data with State 512	109
5.4	Previous LMA Models and Researchers	111
5.5	The results of the Body Component feature extract	113
5.6	Results of Normalization of Body Components	114
5.7	Results of Quantization of Body Gesture Components 1 Variant 1	114
5.8	The result of extracting the Component Space feature	115
5.9	Component Space Normalization Results	115
5.10	Result of Quantization of Component Space	116
5.11	Extract of Shape Flow Feature	116
5.12	Results Extract Directional Movement Feature	117
5.13	Results of Normalized Shape Flow	117
5.14	Result of Normalized Directional Movement	118
5.15	Result of Quantization Shape Flow	118
5.16	Results of Quantization Directional Movement	118
5.17	Results Extract Speed Effort Feature	119
5.18	Results Extract Acceleration Effort Feature	120
5.19	Results of Speed Normalization	120
5.20	Results of Acceleration Normalization	121
5.21	Results of Speed Quantization	121
5.22	Results of Accelerated Quantization	122

5.23	Results of Dance Movement Training	124
5.24	Validation Results	125
5.25	Test data 1 for Classical Dance	126
5.26	Test data 2 for Classical Dance	128
5.27	Test data 3 for Classical Dance	129
5.28	Test data 4 for Classical Dance	130
5.29	Test data 5 for Classical Dance	131
5.30	Test data 6 for Classical Dance	132
5.31	Test data 7 for Classical Dance	134
5.32	Test data 8 for Classical Dance	135
5.33	Test data 9 for Classical Dance	136
5.34	Test data 10 for Classical Dance	137
5.35	Test data 11 for Classical Dance	138
5.36	Test data 12 for Classical Dance	140
5.37	Test data 13 for Classical Dance	141
5.38	Test data 14 for Classical Dance	142
5.39	Test data 15 for Classical Dance	143
5.40	Test data 16 for Classical Dance	144
5.41	Test data 1 for Contemporary Dance	147
5.42	Test data 2 for Contemporary Dance	148
5.43	Test data 3 for Contemporary Dance	149
5.44	Test data 4 for Contemporary Dance	151
5.45	Test data 5 for Contemporary Dance	152
5.46	Test data 6 for Contemporary Dance	154
5.47	Test data 7 for Contemporary Dance	155
5.48	Test data 8 for Contemporary Dance	156
5.49	Test data 9 for Contemporary Dance	158
5.50	Test data 10 for Contemporary Dance	159
5.51	Test data 11 for Contemporary Dance	161
5.52	Test data 12 for Contemporary Dance	162
5.53	Test data 13 for Contemporary Dance	164
5.54	Test data 14 for Contemporary Dance	165
5.55	Test data 15 for Contemporary Dance	167



LIST OF FIGURES

FIGURE	TITLE	PAGE
2.1	Example of Dance	13
2.2	Sensor Kinect	18
2.3	Motion Capture Framework	19
2.4	The shape of the BVH Skeleton Structure	20
2.5	Laban Notations	22
2.6	3D Translation Process	45
2.7	3D Rotation Transformation Process	46
2.8	Scale Transformation Process on Point Object (x, y, z)	47
2.9	Shear Transformation	49
2.10	Kinematic Model of Body Motion	50
2.11	Hidden Markov Model Architecture	64
2.12	Examples of Decision Trees	66
3.1	Observations	71
3.2	Concept Research Model	74
3.3	The process of capturing optical data from Dance	77
3.4	Sample of Dance	78
3.5	The Object Structure of Dance	79
3.6	File structure	80
3.7	Motion Data	81
3.8	Matrix Validation	83
4.1	LMA Inter-Component Relations.	86
4.2	Body Component Structure	88
4.3	Components body	88
4.4	Distance variation relating to spine joint	89
4.5	Finding value θ	89

4.6	Position distance variation relating to spine joint	90
4.7	Gradual angles between successive samples	92
4.8	Skeleton coordinate system	92
4.9	Examples of dance based on effort component	95
4.10	Finding value s	95
4.11	Developed Analysis Computation Component LMA	98
4.12	The process flow of the BSpShEf LMA method model	99
5.1	The Process of Capturing Dance Motion with Kinect Sensor	102
5.2	Motion Capture data in various positions.	104
5.3	Dance Movement Object Structure	104
5.4	Join structure	106
5.5	Comparison of Previous LMA Models and Researchers	110
5.6	Extract Features Process	112
5.7	Classification Process	122
5.8	Hidden Markov Model Architecture	123
5.9	Accuracy Training Data	125
5.10	Accuracy Test 1 for Classical	127
5.11	Accuracy Test 2 for Classical	128
5.12	Accuracy Test 3 for Classical	130
5.13	Accuracy Test 4 for Classical	131
5.14	Accuracy Test 5 for Classical	132
5.15	Accuracy Test 6 for Classical	133
5.16	Accuracy Test 7 for Classical	134
5.17	Accuracy Test 8 for Classical	136
5.18	Accuracy Test 9 for Classical	137
5.19	Accuracy Test 10 for Classical	138
5.20	Accuracy Test 11 for Classical	139
5.21	Accuracy Test 12 for Classical	140
5.22	Accuracy Test 13 for Classical	142
5.23	Accuracy Test 14 for Classical	143
5.24	Accuracy Test 15 for Classical	144

5.25	Accuracy Test 16 for Classical	145
5.26	Test Results for Classical Dance	146
5.27	Accuracy Test 1 for Contemporary	147
5.28	Accuracy Test 2 for Contemporary	149
5.29	Accuracy Test 3 for Contemporary	150
5.30	Accuracy Test 4 for Contemporary	152
5.31	Accuracy Test 5 for Contemporary	153
5.32	Accuracy Test 6 for Contemporary	155
5.33	Accuracy Test 7 for Contemporary	156
5.34	Accuracy Test 8 for Contemporary	157
5.35	Accuracy Test 9 for Contemporary	159
5.36	Accuracy Test 10 for Contemporary	160
5.37	Accuracy Test 11 for Contemporary	162
5.38	Accuracy Test 12 for Contemporary	163
5.39	Accuracy Test 13 for Contemporary	165
5.40	Accuracy Test 14 for Contemporary	166
5.41	Accuracy Test 15 for Contemporary	168
5.42	Accuracy Test 16 for Contemporary	169
5.43	Test Results for Contemporary Dance	170
5.44	Accuracy comparison results	171
5.45	Average Accuracy	171

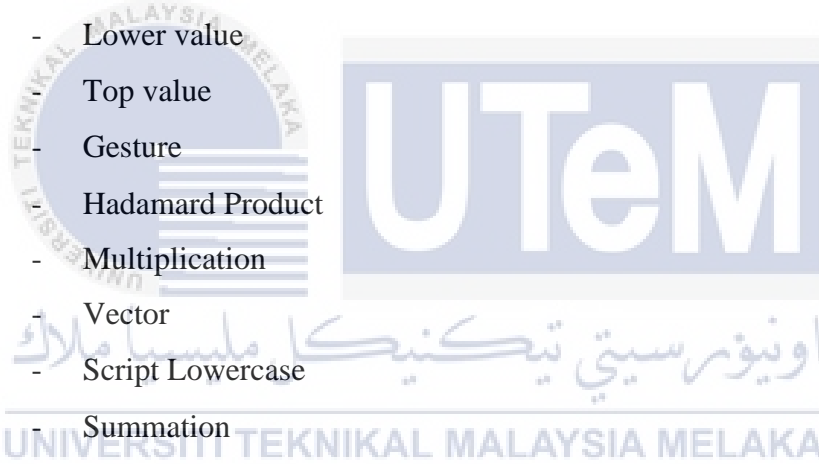
LIST OF APPENDICES

APPENDIX	TITLE	PAGE
A	Motion Capture Instruments and Editing Process	217
B	The Process of Capturing Dance Movements	218
C	Dance Motion Data	219
D	LMA Model	226
E	Complete LMA Component Normalization Data	231
F	Complete LMA Component Quantization Data	231
G	Test Data 1-16 for Classic Dance	231
H	Test Data 1-16 for Contemporary Dance	237

LIST OF ABBREVIATIONS

3D	-	Three Dimension
BVH	-	Bio Vision Hierarchy
BSSE	-	Body Space Shape Effort
CSV	-	Comma Separated Value
DOF	-	Degree Of Freedom
DTW	-	Dynamic Time Warping
FPS	-	Frames Per Second
HMM	-	Hidden Markov Model
LMA	-	Laban Movement Analysis
MLP	-	Multi-Layer Perceptron
RDF	-	Random Decision Forest
RGB	-	Red Green Blue
Skl	-	Skeleton
C	-	Calculation
f	-	Defined using the major and minor
L	-	Likelihood
R_i	-	Rotation matrix, with $i = 1, 2, 3, \dots, n$
R_x, R_y, R_z	-	Rotation of the dance motion matrix in the order x, y, z
s	-	Distance
v	-	Speed
t	-	Time
x	-	Coordinate Horizontal
y	-	Coordinate Vertical
z	-	Coordinate Diagonal
T	-	Number of frames
θ	-	Teta
$h^{l/r}$	-	Left-hand leg joints

$f^{l/r}$	-	Right-hand leg joints
$sh^{l/r}$	-	Shoulder joint left/right
$h_i^{l/r}$	-	Hip joint left/right
$el^{l/r}$	-	Left/Right elbow joint
$kn^{l/r}$	-	Left/Right knee joint
$L^{l/r}$	-	Labanotation
$p_t^{l/r}$	-	Position of the left hand
$p_{t+1}^{l/r}$	-	Position of the right hand
x_n	-	Normalization
x_k	-	Quantization
Q_1	-	Lower value
Q_3	-	Top value
G_n	-	Gesture
*	-	Hadamard Product
*	-	Multiplication
\vec{a}	-	Vector
ℓ	-	Script Lowercase
Σ	-	Summation
$\sqrt{\quad}$	-	Square Root
λ	-	Lambda
α	-	Learning Rate
\circ	-	Outer Product
\amalg	-	Cartesian Product



LIST OF PUBLICATIONS

Indexed Journal

1. **Sutopo, J.**, Mohd Khanapi Abd Ghani, M.A.Burhanuddin, Z., 2019. Gesture Recognition of Dance using Chain Code and Hidden Markov Model. *International Journal of Advanced Trends in Computer Science and Engineering*, 8(6), pp. 3194–3199.
2. **Sutopo, J.**, Ghani, M. K. A., Burhanuddin, M. A., Ardiansyah, H., & Mohammed, M. A., 2019. The Synchronisation Of Motion Capture Results In The Animation Character Reinforcement Process. *Journal of Southwest Jiaotong University*, 54(3), pp. 1-9.
3. **Sutopo, J.**, Ghani, M. K. A., & Mohammed, M. A., 2019. Dance Gesture Recognition Using Body Component of Laban Movement Analysis. *REVISTA AUS 26-1*, 26(1), pp.79–90.
4. **Sutopo, J.**, Khanapi, M., Ghani, A., & Burhanuddin, M. A., 2019. Synchronization of Dance Motion Data Acquisition using Motion Capture. *International Journal of Innovative Technology and Exploring Engineering*, 9(2), pp. 3639–3642.
5. **Sutopo, J.**, Ghani, M. K. A., Aboobaider, B. M., & Zulhawati. (2020). Dance gesture recognition using space component and effort component of laban movement analysis. *International Journal of Scientific and Technology Research*, 9(2), pp. 3389–3394.

Conference Proceedings

1. **Sutopo, J.** (2018). Alternating Least Square Method for Decomposing Dance Golek Menak Tensor Data. *Journal of Physics: Conference Series*, 1090(1), pp. 1-9.

CHAPTER 1

INTRODUCTION

1.1 Background

Dance is an artwork that has been highly valued since ancient times, representing the spiritual, cultural, art, and community (Aristidou, Stavrakis, and Charalambous, 2015). Dance in various forms is inherited from generations as a work culture with the meaning and beauty of each motion. The dance element is a series of basic body movements that represent meaning. Every country and geographical location has dance works by their respective cultures. In order to maintain the dance work, various countries have introduced dance learning subjects in further education.

Students dancers and mentors do dance learning through motion exercises by relying on the ability to memorize motion and tutorials. The problem that often arises is the dynamic nature of dance movements with various types of movements that are practiced, making beginner dancers unable to follow accurately. In addition, a dancer often has dance moves that differ from the actual dance moves (Rallis et al., 2018). From the problems arising from the different dance movements, a tool is needed that can evaluate dance movements, even though there has been a development of dance learning media, both through books, videos, tutorials, and multimedia, so that they can help the learning process have the flexibility of the right movements.

With the help of information technology, dance learning can be assisted in the presentation process so that the dancer's movements can be appropriate. However, the obstacle that dancers often face can master the basic movements of the body and the creation

of the dance movements that follow the speed of movement, the accuracy of the position of the body, the suitability of the rhythm of motion and music and the flexibility of each gesture according to the sequence. There are limitations of the algorithm in being able to do all the dance motion analysis processes to fit the aspects of rhythm, emotion, and accuracy of motion. For this reason, we need a tool that can evaluate changes in dynamic dance motion data to be able to document and analyze dance movements appropriately and according to their meaning (Rallis et al., 2018).

The tool for documenting and evaluating the dance movement learning process is the Laban Movement Analysis (LMA) which is a dance motion notation method developed by Rudolf Laban (1897-1958). LMA which is internationally recognized has been widely known as an analysis to make observations on motion, meaning, and documentation of the sequence of motion (Aristidou, Stavrakis, and Charalambous, 2015). LMA can also be applied to fields other than dance, namely health, psychology, behavior, performing arts, medicine, sports, and physiotherapy (Jerak, Vidrih, and Žvelc, 2018). LMA has four component variables, there are body, space, shape, and effort (Dewan, Agarwal, and Singh, 2018) used in the motion evaluation process and extracts motion data that have multidisciplinary aspects, including anatomy, kinesiology, psychology, and esthetics (Maranan et al., 2014). As in music that has musical notation, dance also has a notation aids in the learning process and presentation with Laban notation, but in the implementation, it has not yet understood the accuracy of dance movements, especially in aspects of movement speed and flexibility so that it influences the meaning of the dance (Aristidou, Stavrakis and Charalambous, 2015). This accuracy is related to the LMA component extraction process, which is a more optimal body, space, shape, and effort. The accuracy of the feature extraction process with the LMA component will help the learning process for beginner dancer students in assessing the suitability of dance movements in the learning