UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

RECONSTRUCTION OF KATAKANA CHARACTER BY USING BEZIER CURVE AND SAID-BALL CURVE

NUR DINI HUDA BINTI ROSGI (2021171741)
NURHANANI SOFIYA BINTI MOHAMAD ARIF (2021119563)
FARIS BIN NOR AZMI (2021114061)
(P20S22)

Report submitted in partial fulfillment of the requirement
for the degree of
Bachelor of Science (Hons.) (Mathematics)
Faculty of Computer and Mathematical Sciences

FEBRUARY 2023

ACKNOWLEDGEMENTS

IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

To begin with, we want to express our gratitude to Allah SWT for granting us the stamina to finish this project successfully. We were ultimately able to complete this endeavor with His blessing. We would not have come this far if it weren't for His blessing.

Without the work and cooperation of our group members, Nur Dini Huda binti Rosgi, Nurhanani Sofiya binti Mohamad Arif, and Faris bin Nor Azmi, this project will not be finished. We constantly put in a lot of effort to deliver a quality project while taking full responsibility for it.

Because of her guidance, this project could not have been completed in such a professional manner, we would like to acknowledge our supervisor, Madam Noorehan binti Awang. She consistently offers us encouragement and advice on how to complete our projects so we can get a goooutcomesme. We were highly motivated to work on this project by her. Additionally, we would like to thank her for mentoring us during the two semesters of this project.

Furthermore, not to forget our lecturer Dr. Zahari bin Md Rodzi for advising and teaching us subject MSP660 for this final year project. Without his advice from time to time, we would not able complete this project properly.

Finally, we would like to thank the University Technology MARA (UiTM) campus in Seremban for allowing us to complete this senior project. The assistance our friends and family have provided us, whether inside or externally, deserves special recognition.

TABLE OF CONTENTS

LIST OF FIGURES

ABSTRACT

This paper presents computation of Bezier and Said-Ball curve on MATLAB by using degree four to degree eight. Bezier curve have been used as the foundation of curve representation for the longest time when compared to others. In addition, using a single Bezier curve to represent a complex shape requires a higher order Bezier curve, and the calculation of the corresponding control point is also quite computationally expensive. To reduce this overhead, we used compound Bezier curves to represent complex shapes, divided the entire shape into segments and represented each individually with a Bezier curve. First, the feature points of the Katakana characters were located on the graph paper. Then, it is derived on the MATLAB, which then automatically generates the stroke of the Katakana characters. Based on the obtained results, the Bezier curve looks nicer than the Said-Ball curve method. This is due to the curve on Bezier is more defined compared to Said-Ball. Also, when the degree increases, the easier and smooth the construction of Katakana characters because the curve will be combined. When using lower degree, the characters need to be parted into different section. So, the lower the degree, the more the sections need to be parted. Hence, it can be concluded that the higher the degree, the easier the construction of the curve. This is because higher degree requires less partition of section. The result of this study will be useful for evaluating the perfect degree of point to use in achieving desired characters using Bezier curves. Mathematician can generate curves that appear reasonably smooth across all scales for future work.