

Preface

The innumerable tasks associated with sheet metal forming such as process planning and tool design are complex, time-consuming, tedious, and highly skill intensive. However, there is scarcity of domain experts worldwide to deal with the fast changing demand of high-quality consumer products economically. Moreover, sheet metal industries face challenges of frequent mobility of domain experts without adequate dissemination of knowledge to the new generation of industry professionals. This can be handled effectively by adopting automation in sheet metal industries. Recent advances in the field of Artificial Intelligence (AI) have given rise to the possibility of developing intelligent systems for automation of various activities of sheet metal forming. AI aims at building systems impregnated with some intelligence in their operation or behavior and investigate the way humans perform tasks that require intelligence. Nowadays, number of tools and techniques of AI are widely used in the various sectors of manufacturing.

The primary goal of this book is to incorporate, as much as possible, the state-of-the art development in the applications of AI in the domain of sheet metal forming. The idea to write this book germinated when we had a detailed discussion during AMPT conference held in December 2014 at Dubai.

Our attempts to comprehensively search for availability of book containing research outcomes in the area of sheet metal forming with AI applications prompted us for initiating this task in the absence of any such compiled edition. Since the book was planned to include many topics related to the domain, it would not have been possible for both of us to write all of them on our own. Therefore, it was felt appropriate to approach researchers working in this area to contribute for the different chapters of this book. Professor A.Y.C. Nee, who is one of the pioneers in the domain of material processing, gracefully accepted our invitation to write the introductory chapter for this book.

The book is focused on various applications of different AI tools/techniques in sheet metal forming including feature extraction, manufacturability assessment, process planning, selection of die components, and die modeling. It covers the

design of various types of dies including blanking, deep drawing, compound, and bending dies. All chapters of this book present results of dedicated research efforts of authors for years. The book not only highlights the latest research status in the domain but also identifies future scope of work for young graduates. There is no doubt that sheet metal industries will also be benefitted by the research work reported in various chapters of this book.

During the period of preparing manuscript for the book, we have received excellent support from our Ph.D. students and project research fellows especially Mr. Rahul Jagtap, Vikas Sisodia. Ajit Dhanawade, and Ajay Trivedi. We would also like to deeply acknowledge the valuable contributions by authors of various chapters of this book. We would also like to acknowledge the efforts of Ms. Swati Meherishi and her team at Springer for their support in timely publication of this book.

At the end, we would like to dedicate the book to all domain experts and researchers who are directly or indirectly engaged in manufacturing of sheet metal parts.

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