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# A Survey of Approximate Computing: From Arithmetic Units Design to High- Level Applications

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# Research Objectives

- This paper provides a survey of approximate computing from arithmetic units design to high-level applications, in which we try to give researchers a comprehensive and insightful understanding of approximate computing.
- A handful papers with great influence in this research field have been selected and categorized into different groups from the designer's logical point of view.
- By analyzing the papers in the field of approximate computing, we believe that approximate computing will play an important role in circuit and system design in the future, especially with the rapid development of artificial intelligence algorithms and their related applications.

# Research Method

- Our method to select the related papers is that the papers present milestone contributions to the development of approximate computing.
- The decision for this selection is based on our experience and deep understanding of the research field.
- In addition, in order to provide researchers with a deeper and broader understanding of approximate computing, we have carefully screened and analyzed the work on approximate computing in different design areas, from circuit design to high level application processing.

# Research Results

- By viewing the proposed survey, the readers could have a high-level picture of approximate computing, from the initiation of approximate computing to the current results and applications of approximate computing in different research fields.
- At the end of the survey, we also discuss the challenges, limitations and future development of approximate computing.

# Research Conclusions

- In this survey, we provide the readers a logical and clear path to understand approximate computing.
- The paper not only shows the development of approximate computing in different research fields, but also analyzes the potential challenges and problems.
- We believe that with the continued development of artificial intelligence algorithms, approximate computing will gain more attentions for designing low-power, energy-efficient circuit and systems.
- We also believe that the researches across different design levels are of great significance to build big and influential works.