Manpower Development in VLSI ni India: A Case Study

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ABSTRACT

In this paper a review of development of manpower in VLSI in India is attempted. In the last decade of the 20th Century, rapid strides have been done in Micro-Electronics in India. Both private and public institutions have accelerated the growth of VLSI, Chip design and embedded systems including DSP.

1.0 INTRODUCTION:

In the last decade of 20th century, India made significant strides in Mirco -Electronics area. With 250 Universities and 1250 Technical Institutions in the country, around half a million graduates come out with Electronics, Micro Electronics background including Fundamental course on Electrical Engineering. Among them 10000 graduates specialize in VLSI, Micro electronics design and related areas. Indians are recognized all over the world for their talent in Software Engineering. Thus the contribution by Indians in this area is significant. This paper reveiws the development of VLSI and Micro Electronics in India.[1]

2.0 Government of India Initiatives

Realizing the importance of Electronics and Micro Electronics, the Government of India commenced a project in 1998 titled as "Special Manpower Development for VLSI Design and Related Software". The project duration is Five years. Around 20 top Technical Institutions including IIT's in India are participating in this project.

Various State-of-the-art instruction enhancement program are conducted under the project. Some of them are

i. Mixed Signal IC design and Analysis.
ii. High Level VLSI Design.
iii. VLSI subsystem design
iv. Circuit Simulation and Timing Analysis

Several workshops are conducted including ZOPP workshop. The learning materials are either developed or in the process of finalization in the following three areas

i. UG Level
ii. PG Level
iii. Research level

Some of the typical titles are "VLSI Design and Micro Electronics", "VLSI design and CAD", "Algorithms for VLSI Design", "Computer Aided Logic Minimization", "VLSI Design Tools" and others.[2], [3]

Several mini projects have been carried out. The Software Tools used are the following.

i. Simulation Tools for Digital LSI design Laboratory for Computer Science, MIT Cambridge.
ii. Public Domain Software on CAD from Berkeley University, Berkeley CAD tools.

3.0 Private Initiatives:

Several private institutions in India started offering specialized courses in VLSI and Micro Electronics. To name a few institutes: Manipal Academy of Higher Education, Manipal-Sikkim University of Science and Technology and Health, Asian Institute of Information Technology, Symbiosis Institute, Center for Development of Advanced Computing. National Centre for Software Technology. Karnataka Micro Electronics Training Centre offers specialized training courses. The companies like D'Gipro and others have been created to address exclusively Micro Electronic areas. Apart from these, MNC's have started the overseas operation center in India. For example, TEXAS, HP,

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SYNOPSYS and others opened up design and service centres. These and other companies develop simulation tools for digital LSI design. Labarotary experiments and various other design such as PLI, PLD, Gate Arrays, Standard cell, PPA Design styles, Layour algorithms, Algorithm design for VLSI Systollic application and low power VLSI design.[8]

4.0 Achievements

India has ambition of developing a chip of its own. In this connection there are several groups created to deal with the following topics

MOS circuit design, VLSI system and architecture, VLSI subsystem design, Low level simulation, High Level simulation, VLSI testing and testability, Fabrication Technology. It is expected in 2003 a chip may come out.[4]

In the past, India has always lagged behind from the developed nations in respect of technology development not withstanding the availability of highly skilled manpower. Thus in the 90's a corrective action has been taken to remove this anomoly and catch up with the developed countries in respect of upcoming technologies in VLSI and Micro Electronics in general, SOC design methodology in particular. A concrete proof for this would be design and production of our own chip called "Indiachip".

5.0 VLSI Society of India

In India a separate professional society is formed by name VLSI Society of India. It conducts several conferences and workshops in collaboration with other professional societies worldwide. The recent 16th International Conference on VLSI Design is held at New Delhi from 4th January to 8th January 2003, along with Second International Conference on Embedded Design. The theme of the VLSI Design 2003 conference is "Design Convergence in SOC Design". This conference is supported by

i. ACM (Special Interest Group on Design Automation)
ii. IEEE (Circuits and Systems Society)
iii. National Association of Software and Services in Computers, India

Several papers have been presented and attended by approximately 500 persons. As a part of Introduction, five tutorials have been presented. Among them the noteworthy topics are :[5]

i. Specification and Design of Multimillion Gate SOC's (in this tutorial leading five personalities have presented their state of the art work.
ii. System Software for embedded application (two Professors from Indian Institute of Technology Mumbai have conducted this tutorial)[6], [7]

6.0 Conclusion

India has a rich resource of manpower in electronics in general, Micro electronics in particular. India has already made a mark in Software Development. Now India wants to gear itself in the VLSI design and Micro electronics area, including DSP.

Government of India has a thurst in Micro Electronics and accelerated its activities through a project titled "Special Manpower Development in the area of VLSI design and Related Software" coupled with several private institutions. India is in forefront among developing countries, in the Micro electronics area. However India is poor in the manufacturing side of Micro electronics.

With the manpower development of VLSI Design Tools and Micro electronic circuits, India forges ahead in the 21st century.

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