HEMANTH KUMAR TIRUPATI

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EDUCATION

- **Indian Institute of Technology, Madras** — Chennai, India
  B.Tech. in Computer Science and Engineering; **CGPA**: 8.98/10 — July 2013 – Present
  - Major: **Computer Science and Engineering**
  - Key Courses: *Parallel Computer Architecture, Computer System Design, Computer Organization and Architecture, Operating Systems, Cryptography and Network Security, Natural Language Processing, Router Algorithms and Architecture, Computer Networks, Data Mining, Introduction to Database Systems, Principles of Software Engineering, Introduction to Machine Learning, Compiler Design.*

- **Narayana Junior College** — Andhra Pradesh, India
  Class XII - Board of Intermediate Education, A.P; **Grade**: 96.4% — May 2013

- **Narayana High School** — Andhra Pradesh, India
  Class X - Secondary School Certificate, A.P; **Grade**: 95.3% — May 2011

TECHNICAL SKILLS

- **Programming Languages:** C, C++, C#, Java, Python, Matlab, Assembly(x86), Haskell
- **Tools & Libraries:** GEM5, Weka, openMP, Lex, Yacc, LAMP Stack, Django

PROJECTS

- **Side Channel Attacks on Google Chrome Web Browser** — IIT Madras
  Mentor: Chester Rebeiro — Nov - Dec 2015
  - Developed a tool which runs as a typical user level process and predict the website visited by any user based on memory footprint pattern obtained from /proc filesystem available on a linux machine.
  - Used various techniques(such as DTW, correlation) augmented with the base implementation to improve the prediction accuracy. [CODE]

- **Improving Bing Search Experience for Developer Queries** — Microsoft IDC, Hyderabad
  Mentor: Chandrashekhar Kaushik — May-July 2016
  - Built a binary classification model to detect if a StackOverflow page is snippetable[1] or not.
  - Designed various new techniques based on clustering, software similarity (used n-gram, API calls) measures for representative snippet picking from a StackOverflow page.

- **Pseudo LIFO Cache Replacement Policy for Last Level Caches** — IIT Madras
  Mentor: Madhu Mutyam — Jan - May 2016
  - Implemented probabilistic escape LIFO policy for the last level caches based on the techniques proposed in Pseudo-LIFO paper.
  - Used GEM5 for simulation and SPEC for benchmarking. [REPORT]

- **JOS[2]** — IIT Madras
  Mentor: Chester Rebeiro — Jan - May 2015
  - Implemented core modules of JOS such as boot loader, memory management, user environments(processes), exception handling, multi-tasking and also various unix library functions in an exokernel style.
  - Created a bash like command interpreter with recursive search, piping and command history as some notable features. Used QEMU for emulation throughout.

- **Link Augmentation for Wikipedia** — IIT Madras
  Mentor: Dr. Sutanu Chakraborti; Collaborators: Sahiti, Chaitanya, Rajiv — July 2016 - Nov 2016
  - Suggests possible See Also links for a Wikipedia Stub article.

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[1]Ability of a StackOverflow page to answer the question of OP with one or more snippet(s)

- ○ Proposed and implemented Concept Vector, Hyperlink, Back-link and Google Similarity measures to obtain the similarity between two articles. [REPORT]
- **Desktop Mail Client**   Jan-May 2015, IIT Madras
  - ○ Used JavaMail API to build a Mail Client with Send, Receive and Search features.
  - ○ Implemented AVL Trees for balanced binary search, Object Serialization for faster reconstruction of search trees to resume the application, Multi-Threading for a responsive GUI. [CODE] [DEMO]
- **2048 Game and It's AI Engine**   Jul - Nov 2014, IIT Madras
  - ○ Used Alph-Beta pruning to reduce the search space.
  - ○ Implemented in C and used Gimp Tool Kit(GTK) for GUI. [CODE] [DEMO]
- **Implemented Search Functionality for DrumUp**   Godot Media Pvt. Ltd., Bangalore
  Mentor: Vishal Dutta   Dec 2014 - Jan 2015
  - ○ Implemented keyword-based search functionality to return a ranked list of related documents for a user-defined query. The users can also input an expression with binary operations for a more refined search.
  - ○ Also worked on categorization of various articles based on keywords to supplement user experience with more related articles.
- **Block Cipher confirming to AES Standard**   IIT Madras
  Mentor: Chester Rebeiro; Collaborator: Aravind   Jan - May 2016
  - ○ Implemented 32bit block cipher variant of AES standard with 128bit key length and proved immunity of the implementation against known plain text, chosen plain text, linear and differential cryptanalysis.
  - ○ The implementation also ensures that all the multiplication tables, encryption and decryption T-tables would fit into the L1-Cache of the processor to avoid some side channel attacks. [CODE] [REPORT]

ACHIEVEMENTS

- IIT-JEE[3], 2013: All India Rank of 820 from amongst 1.4 million candidates.
- BITSAT[4], 2013: Scored 426 out of 450.
- Stood 3^{rd}(class of 120) in a competitive machine learning contest conducted as part of the graduate-level Machine-Learning elective at IITM.

TEACHING EXPERIENCE

- **Mentor**   Avanti Fellows, Puducherry
  Subjects: Maths, Physics and Chemistry   Nov 2013
  - ○ Mentored a class of about 60 class XI-XII students in the 15-18 age group through their preparation for IIT-JEE.

CO CURRICULAR AND EXTRA CURRICULAR ACTIVITIES

- **Web Operations, Exebit[5] - Core Position**
  - ○ As a core for the Web Operations team, Exebit 2017, I currently lead a team of 10 people in bringing the Web and Mobile applications live.
  - ○ Using the MEAN stack for the Web Application development.
- **Institute Web Operations - Coordinator**
  - ○ As a part of Institute Web Operations, created a web portal - BUYNSELL where the strong user base (approx. 10000) of IITM could buy and sell various products.
  - ○ The portal was built on a LAMP Stack based back-end.
- **National Cadet Corps**
  - ○ Member of National Cadet Corps - Delta Flight
- **Essay Writing**
  - ○ Awarded district 2nd prize by Honourable Minister of Urban Development, India Mr. Venkaiah Naidu in an essay writing competition about Swami Vivekananda.

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[3]Indian Institute of Technology - Joint Entrance Examination
[4]Birla Institute of Technology Scholastic Apititude Test
[5]Exebit is the annual technical festival of Computer Science Department, IIT Madras