

I. Introduction – <http://www.karankamdar.com>



[Karan Kamdar](#) is an interdisciplinary roboticist working in the fields of Artificial Intelligence, Child Psychology, Educational Technology and Instructional Design. He is a recent graduate of the Arts, Computation, Engineering ([ACE](#)) program at the University of California, Irvine ([UCI](#)) where he completed his [Masters Thesis and Project](#) on using Emergent AI and Synergistic Robotic techniques for embellishing the Creativity of the Child. With an undergraduate degree in Information Technology from the University of Mumbai, backed by years of programming experience, Karan was granted a fellowship to UCI's [Henry Samueli School of Engineering](#) to seek interdisciplinary knowledge that would help him apply his technical skills to his subsequently chosen field of Developmental Psychology. At the ACE program which takes a theoretical approach towards realizing workable ideas, Karan incorporated his knowledge of Learning theories, Constructivist Design principles, Synergistic AI, Artificial Neural Networks and Machine Learning as part of his design process and built custom hardware/software for his robotic projects.

Through such a reflexive, hands-on approach of solving design problems and the toughest of problems in robotics such as navigation, hand-to-eye co-ordination, real-time control and machine learning, Karan was able to realize his thesis project called as [M-CLE \(Embodied Constructivist Learning Environment\)](#) in which a child using a modified Fisher Price toy bike creates emergent artwork with a swarm of four robots that embellish its creations in an active learning environment. During his 2 years at ACE where he maintained a UC GPA of 3.57, Karan's research has also been supported by grants and sponsorship from external entities. One of these entities has been a San Clemente based company that has supported his on-going research efforts in creating a physical learning environment for children employing synergistic intelligence within an entirely microcontroller embedded distributed engine design. The other entity has been the cross-campus [CALIT2](#) (California Institute for Telecommunications & Information Technology) where Karan's work towards synergistic robotics, embodied technologies and interactive media design was supported by the '[Embodied Interaction](#)' group.



Given the multidisciplinary education and the hands-on design and practice that he sought at UCI along with independent research / contracts and internships, Karan would now like to dedicate his efforts towards a company whose commercial interests involve either one or more of the following: 1] Building Products and Technologies for facilitating Child Learning 2] Using new forms of Artificial intelligence to drive product design in areas of personal, industrial robotics 3] Educational and Entertainment Technologies using Robotics and Interactive Media Design. He also aims to realize several other design ideas within his fields of interest. One of these ideas that is keeping Karan busy at work is his [Anthropomorphic Learning Facilitator \(ALF\) Robot](#) that would play creative and constructive games with the child such as building blocks. Having worked out most of its technical details, this project would be completed in collaboration with Fabien Spindler from the Lagadic Research Group at [Irisa/INRIA Rennes](#) to implement a custom 5DOF robotic arm manipulator with the group's Visio Servoing Platform called [ViSP](#).

II. Resume

Education: **University of California, Irvine** **Irvine, California**
Masters in Engineering December 2008
Concentration: (Arts-Computation-Engineering)

- Recipient of the Director's Fellowship Award from the Henry Samueli School of Engineering for the academic year 2006-2007
- Overall Academic Percentage: UC GPA – 3.57 / 4.0

University of Mumbai **Mumbai, India**
Bachelors of Engineering in Information Technology June 2007

- Overall Academic Percentage: 70.33% equivalent to 3.8 / 4.0 GPA
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Fields of Specialization & Interests:

- 1] Synergistic Artificial Intelligence, Mobile Robotics, Systems Design for Child Learning / Creativity
- 2] Neural Networks and Machine Learning Algorithms
- 3] Educational Technology, Instructional and Interactive Media Design
- 4] Developmental Learning, Child Behavior and Psychology

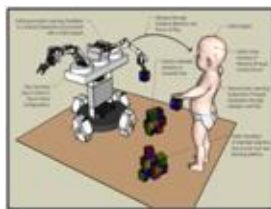
Graduate Project Work: (Complete Portfolio available at: <http://www.karankamdar.com>)



1] **M-CLE: An Embodied Constructivist Learning Environment using a Hacked Fisher Price SmartCycle:** (Fall '08)

M-CLE is a physical learning environment in which synergistic artificial intelligence through the use of robots (creative agents) is employed to embellish the creativity of the child. The child uses a modified Fisher Price SmartCycle (that is wirelessly enabled by replacing the proprietary microcontroller with a custom microcontroller) to create floor art through a black creative agent that is embellished by the other agents using synergistic AI techniques.

[Project Video](#) | [Project Homepage](#) | [Project Documentation & Masters' Thesis](#)



2] **Anthropomorphic Learning Facilitator (ALF):** (Summer '08)

The goal of this project is to build an AI system that would play creative and constructive games with the child such as building blocks. Having worked out most of its technical details, this project would be completed in collaboration with Fabien Spindler from the Lagadic Research Group at [Irisa/INRIA Rennes](#) to implement a custom 5DOF robotic arm manipulator with the group's Visio Servoing Platform called [ViSP](#).

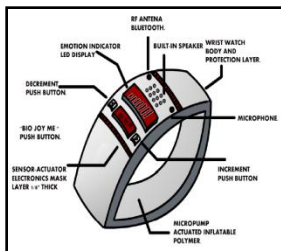
[Project Homepage](#) | [Project Documentation](#)



3] Magic Turtle: (Summer '08)

The child controls a Robotic Turtle by creating patterns on its shell by using objects such as small balls or M & M Candies. Each object is a vertex in the pattern that actuates an underlying sensor that maps its position with respect to other vertices. As soon as the child creates a second vertex a link is created with the first such that two vertices form a line. The child uses this basic relationship to create more complicated patterns such as triangle, square or others which have personal meaning to it. The goal of the turtle is to stimulate the child's creativity by providing it with multiple perspectives of relationship between objects.

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4] BioJoy Wristwatch: (Winter '07)

BioJoy is a interactive wearable biofeedback wristwatch that can help you relieve day-to-day stress by monitoring your stress levels and suggesting you alternatives to reduce / eliminate them within its owner's social context. It is a wireless Micro Electromechanical system (MEMS) device with embedded blood pressure and accelerometer sensors whose combined output is a function of the emotional state and wellbeing of a person.

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5] Electromechanical Puppet: (Summer '07)

The goal of this project is to explore the dynamics of human-machine interaction by building an interacting system where both the human and the machine (in the form of a virtual animated puppet) vie for the control of an electromechanical puppet or robot that mimics the human arm. This project is more of an artistic endeavor where the machine is allowed an equal latitude of expressing its desire to control. The publication of this project appeared in the Fall 2007 issue of '[Interface](#)' Magazine that is quarterly published by the cross-campus research institution [CALIT2](#).

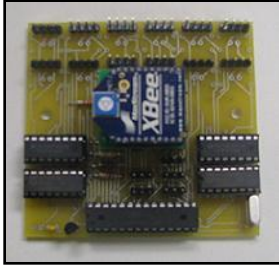
[Project Homepage](#)



6] OpenColl: (Fall '07)

OpenColl is a new platform / architecture in the domain of computer supported collaborative work (CSCW). By blending the advances in CSCW with the key elements that have made stand-alone social networking portals attractive, OpenColl creates a self-organizing and actively adaptive system based for collaborating on various tasks such as academic / research projects by discovering like-minded people.

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**7] Single Circuit Arduino-Xbee:** (Fall '07)

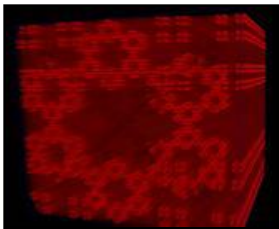
The Single circuit Arduino-Xbee (SCAXb) is a unique solution that addresses the integrated and on-board wireless communication needs of the Open Source Arduino Community. This custom circuit integrates the core functionality of Arduino based microcontrollers such as ATMEGA 8/168/328 with the popular Xbee modules.

[Project Homepage](#)

**8] Motorized Etch-A-Sketch:** (Summer '08)

The motorized etch-a-sketch extends the toy's normal knob-driven functionality by attaching two servo motors which allows for programmatically creating artwork on the toy's screen through generative computer algorithms.

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**9] Akriti - Fractal Visualization Engine:** (Spring '07)

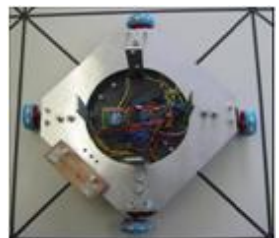
The Akriti Fractal Engine helps visualize fractal geometry based computer art using Max-MSP-Jitter. It is possible to render 2D as well as 3D fractal art with this engine which was used to embellish some of the projects done with the '[Embodied Interaction](#)' group at [CALIT2](#).

[Project Homepage](#)

**10] Chess Engine Visualizer:** (Spring '08)

This goal of this project is to provide a platform independent user interface for visualizing the complex mathematics such as 'negamax search' of current chess engines. The java based UI allows for a step-by-step visualization of how the chess engine is making its decisions.

[Project Homepage](#)

**11] Omni-Directional Multi-Axes Line Following Robot:** (Fall '07)

This omni-directional robot is a line following robot. However, the key characteristics of this robot are that it is able to efficiently turn and follow multiple axes such as N-S-W-E as opposed to following just a single line. Moreover data can be wirelessly uploaded to this robot.

[Project Homepage](#) | [Project Video](#)

Undergraduate Project Work (Complete Portfolio available at: <http://www.karankamdar.com>)



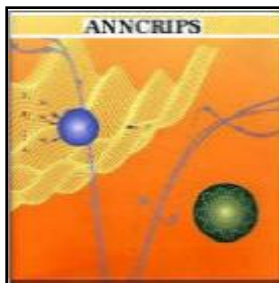
1.a] COBMAF - A new CORBA based multi-agent framework: (Oct '05)

1.b] COBMAF-WEB - A new web-agents framework

COBMAF is a new heterogeneous multi-agent system using CORBA. This framework offers programming interfaces, performatives and messaging primitives to application developers and also allows encapsulation of agents into CORBA application objects, share heterogeneous databases and locate agents. Research under Mr. Anoop Srivastav from **The Tata Institute of Fundamental Research (TIFR), Mumbai**. <http://www.tifr.res.in>

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2] ANNCRIPS (March '04):

Prostate cancer is the most common cancer among men in age 50 or older, excluding skin cancer. The goal of our research paper and the parallel undertaking of its practical implementation is to develop a mathematical model to improve prostate cancer detection and staging systems and finally to present a deploy ready marketable solution based on the model which can be installed across various screening centers, hospitals and research organizations.

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3] SHAKIRA (Feb '06):

SHAKIRA is a project management information system (PMIS) created and installed at my undergraduate institution in Mumbai. It was built with the intention of seamlessly being able to integrate the final year project allotment system in my undergraduate institution (VESIT). It helped digitize my final year's project allotment system and to overcome considerable overhead.

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4] Folk.com (Aug '05):

Folk.com is an online platform for people with shared interests who want to hook up with each other for a variety of interests inclusive of -

1. Communication (IM, Emails, SMS etc).
2. Experience Sharing (Blogs, Photo albums, etc)
3. Discovery of old contacts
4. Making new contacts
5. Relationship Management
6. News, Sports.(collaborative or competitive)
7. Cohort groups etc.

[Project Homepage](#) | [Project Documentation](#)



5] SeRoNiKa Forums (July '05):

The goal of this project was to develop a one to many chat application in order to build a Discussion Group online. The applet allows communication between one central server and multiple number of clients and also enables file transfer between the server and any of the clients which may supplement the discussion. Multiple computers can login and be a part of the conference at the same time.

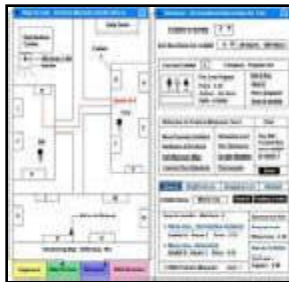
[Project Homepage](#) | [Project Documentation](#)



6] Stople.com (March '06):

Stople.com is an innovative business model aimed to bring every merchant on the street (whether big or small) in the city of Mumbai online for free and thereby web-enable him with zero infrastructure setup at his end. The idea behind Stople.com is to bring even those small sized merchants on the street from whom you buy your daily grocery, stationary or other day-to-day goods but who aren't online as yet.

[Project Homepage](#) | [Project Documentation](#)



7] Mobile Guide: (April '04):

There are a number of everyday scenarios where providing on the move assistance to mobile and PDA users can be of tremendous help. With a mobile device and our proposal for mobile guide software the need for a real human guide becomes redundant since the user's mobile device itself now becomes a handy guide containing all the information he needs whether of a particular exhibit in a museum or of a new breed of agile monkeys in the park.

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8] J2ME Applications (Jan '06):

Pizza Express - Exploits the J2ME Wireless Toolkit by developing a midlet which provides a complete pizza ordering system to the user on his mobile device. The user connects through this interface to a centralized service provider where a java servlet responds to queries.

JMall – A complete mobile based movie ticket ordering system employing the same framework as Pizza Express but especially meant for scenarios when you are on the go and you remembered your favorite movie was playing at a theatre just miles away from you. The servlet at the backend in the movie theatre listens to incoming client requests sent through the mobile phone network from the client.

[Project Homepage](#)

Industry Experience:

- 1] **Digibag.com** (*October 2006 – Feb 2007*) – Interned as assistant web programmer using Flex language to develop beta version of the company's service to provide indie-music social networking tools.
- 2] **The Martini Group, Inc** (*Feb 2007 – July 2007*) – Interned as technology assistant and financial analyst. Revamped company website, setup new Intranet, CRM, Business Intelligence and Groupware technologies, furnished business plan for investor interest.
- 3] **Stople.com** (*Sep 2006 – Nov 2006*) – Started a small service and managed a team of 5 members during the final undergraduate year to provide cost-effective online shopping in the city of Mumbai.
- 4] **Karma Steels Pvt. Ltd**, Mumbai, India (*December 2003 to June 2006*) - Worked as Business Correspondent, Web Developer & IT Analyst.

Awards & Scholarships:

UCI Director's Fellowship (April 2006): This fellowship covered my tuition and educational expenses at UCI for the 2006-07 academic year

NYU Reynolds Program for Social Entrepreneurship (April 2006): Selected as one of the 100 sponsored finalists who participated in New York University's Catherine. B. Reynolds Program in Social Entrepreneurship in New York City

National Scholarship (December 2000): This scholarship sponsored my college education for the year 2001-2002

United World Colleges' Full Fee Paying Scholarship (Feb 2000): This scholarship which I declined had been offered to me for completing my undergraduate education in the United States

XLFTS All India Talent Search (Feb 97): This scholarship sponsored me on a student exchange program to Europe

Maharashtra Scholarship (Feb 97): This scholarship sponsored my school education for the year 97-98

Homi Bhabha Science Award (Nov 96): Silver medalist at the Homi Bhabha Science Competition and selected for an orientation course at the Nehru Science Centre, Mumbai

Publications:

1. Twentieth International Joint Conference on Artificial Intelligence (IJCAI '07)

COBMAF-VAME Version 2: A new CORBA based heterogeneous multi-agent framework (July 2006)

2. AssociatedContent.com & Lulu.com

a. [2120 & a Human Re-Engineered, A Novella \(October 2006\)](#)

b. [The Lost Sapphires \(May 2005\)](#)

Press:

First Year Project at UCI published as part of the Fall 2007 issue of [CALIT2](http://www.karankamdar.com/press)'s 'Interface' Magazine
<http://www.karankamdar.com/press>

Writings / Compositions:

Papers - <http://www.karankamdar.com/g-writings>

Novels - Published introductory chapters of two ongoing novels on Lulu.com & AssociatedContent.com :
a) 2120 and a Human Re-Engineered b) The Lost Sapphires <http://www.karankamdar.com/novels>

Music - Composed original songs and music on the guitar and piano with a range inclusive of Hindustani Classical, Rock, Romantic Melodies and Lead Solos. <http://www.karankamdar.com/h-music>

Hardware / Electronics Skills:

Machine-Shop skills: Drilling, Milling, Lathe, Working with wood, metal, PVC
Designed custom hardware and electronic boards for all of the projects at UCI

Programming / Design Skills:

C, C++, Java, Visual Basic, Visual C++, MySQL, MS SQL, Oracle, HTML, PHP, ASP, AJAX, Ruby on Rails, Macromedia Flex, Flash, Dreamweaver, Max / MSP/ Jitter, MATLAB, Linux, Windows Server

Electronic CAD Design, Autodesk Inventor, Solidworks , Adobe Illustrator, Photoshop
<http://www.karankamdar.com/designs>

Community Service:

Served as a voluntary assistant at the Paraplegic Foundation, Mumbai for a period of 5 months from May to September 2000. Volunteered under my mother at the Mastectomees Association of India which strives for spreading awareness about breast cancer among women.

Languages:

English, Hindi, Marathi, Gujarati: Excellent, **French:** Basic

Self Assessment:

Hard-working, dedicated, creative, self motivated, innovative, team person, loves [ethical toy hacking](#)

Contact:

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Website and PortFolio: <http://www.karankamdar.com>

Facebook: <http://www.facebook.com/home.php#/profile.php?id=6024174&ref=profile>