NAVEEN KUMAR SANKARAN

Champaign, Illinois, USA | Tel: 716-408-6235 | www.linkedin.com/in/naveenuiuc | Email: nsankrn2@illinois.edu

EDUCATION

University of Illinois at Urbana-Champaign, Illinois, USA

PhD- Systems and Entrepreneurial Engineering May 2019
Specialization in Medical Robotics, Control System & Mechatronics GPA: 3.68/4.00

MS- Systems and Entrepreneurial Engineering Aug 2016
Thesis: Design and Development of Robotic System for Endovascular Procedures GPA: 3.59/4.00

SASTRA University, Thanjavur, Tamil Nadu, India

Bachelor of Technology- Mechatronics May 2012
Project: Integration of Hardware and Software components for a 2 DOF Parallel Manipulator to Avoid Singularity by Selective Activation Mechanism GPA: 9.13/10.00

TECHNICAL SKILLS

C++, C#, MATLAB, LabVIEW, Solid Works, PRO-E, Unity, Delcam, Mastercam, Java, Workspace 5, DirectSOFT, CodeSys, P-Simulator, HTML, Microsoft Office, latex, ScoreBase software Robotics assembly planning.

EXPERIENCE

- **Health Care Systems Engineering- University of Illinois, Urbana, IL, USA** ***(Advisor: Prof. T. Kesavadas)***

  1. Research Assistant- Intelligent Interventional Surgical Robotic System Aug 2014-Present
  - Developed machine intelligence for robot device to assist surgeon perform an epidural procedure
  - Developed an Intelligent Robotic System to perform Breast Biopsy Procedure

  2. Graduate Student Supervisor- Multi-Modular Endovascular Robotic System project Jan 2017-Present
  - *Developed conceptual designed for multi-modular endovascular robotic system*

  3. Graduate Student Supervisor- Virtual Reality Healthcare Simulation project May 2016-Present
  - Developed a virtual reality wireless controller to enable user interaction in virtual environment
  - Guided internship students in the following projects
    - Development of authoring tool to create interactive 360° video virtual environment for medical training
    - Virtual reality server based scenario creation for multi-user on-line classroom equipped for anatomy discussion
    - Interactive Mixed Reality (IMR) Sepsis Training for Undergraduate Medical Education
    - Virtual Reality based Simulated Surgical Robotic Trainer for Surgical Assistants

  4. Research Assistant- Ergonomic Endovascular Surgical Robotic System Aug 2014-Aug2016
  - Developed and controlled ergonomics medical robot to assist surgeon during vasculature procedure

- **Intuitive Surgical- Sunnyvale, California, USA (Manager: Ryan Steger, Mentors: Dan Gomez, Govind Payyavula)**

  1. VR & Digital Prototyping Software Engineer Intern-R&D May 2017-Aug 2017
  - Developed a complete VR-based software tool and hardware facility to allow the Intuitive Surgical R&D team to do VR-based digital prototyping, interaction, and testing workflow to accelerate evaluations of future product concepts.
  - Created Unity-based VR and Mixed Reality (MR) applications that allow engineers to visualize and manipulate full-scale 3D CAD models in realistic virtual surgical operating room environments, creating a room-scale motion tracking system using OptiTrak cameras, integrating support for both HTC Vive and Oculus HMDs, and creating custom software to allow for interaction with both real and virtual objects in a MR experience.

- **Virtual Reality Lab- University at Buffalo, Buffalo, NY, USA** ***(Advisor: Prof. T. Kesavadas)*** Aug 2013-July 2014

  1. Research Assistant- Human Augmentation System for Insertion of Devices Such as Needles and Wires
  - Designed mechatronics system and controlled robot actions

  2. Project Member- Brain Computer Interface (BCI) controlled multi-axis robot
  - Developed robotic systems control as testing platform for Brain Computer Interface

- **Robotics Lab- Indian Institute of Technology Madras, India** ***(Supervisor: Prof. T. Asokan)*** Oct 2012-July 2013

  1. Project Associate-Design of Variable Buoyancy System for Autonomous Underwater Vehicle (AUV)
  - Designed, developed and tested the proposed variable buoyancy engine in Flat Fish AUV
  - Achieved positions control with variable buoyancy

  2. Research Intern- Developing an Autonomous Surface Fleet to Improve the Leader Follower Concept
  - Developed an Autonomous Surface Fleet and control Multi follower robots with L & alpha parameters, sharing the tasks of the Leader robot with distributed computing

PUBLICATIONS

Journal

- Naveen Kumar Sankaran, Pramod Chembrammel, Adnan Siddiqui, Kenneth Snyder, Thenkurussi Kesavadas, "**Design and Development of Surgeon Augmented Endovascular Robotic System**," in *IEEE Transactions on Biomedical Engineering*, 2018, Doi: 10.1109/TBME.2018.2800639. URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8276316&isnumber=4359967

Conference

- Aditya Reddy, A., Naveen Kumar, S., Chembrammel, P. PhD, Ravikiran, C., Adnan, S. MD, Kenneth, S. MD, Kesavadas, T. PhD. **Image Based Automation of Interventional Robotic Surgery of Endovascular Procedures.** Published at ASME 2016 International Mechanical Engineering Congress and Exposition (IMECE), pp. V014T07A017-V014T07A017. American Society of Mechanical Engineers**,** Nov 2016.
- Chembrammel, Pramod, Naveen Kumar Sankaran, and Thenkurussi Kesavadas. "**Control of robot using a brain computer interface**." In *Virtual Reality (VR), 2014 IEEE*, pp. 147-147. IEEE, 2014.

PATENTS UNDER PROCESSING

- Thenkurussi Kesavadas, Naveen kumar Sankaran, Pramod Chembrammel, "**Endovascular and Imaging Robotic System**" Application Number: 62555289, Docket Number: UIUC 2016-127-02(PRO2), Provisional patent filed on Sep 07, 2017, USA.
- Thenkurussi Kesavadas, Naveen kumar Sankaran, Pramod Chembrammel, "**Endovascular Robotic System**" Application Number: 62467273, UIUC2016-127-01(PRO), Application Serial 62/467,273, Provisional patent filed on Mar 6, 2017, USA.
- Thenkurussi Kesavadas, Naveen kumar Sankaran, Lavalle, Steven M, "**Virtual/augment reality pointer controller**", UIUC Technology disclosure- 2016-229 tech, submitted on 22nd Feb 2017, USA.
- Thenkurussi Kesavadas, Naveen kumar Sankaran, Lavalle, Steven M, "**Authoring tool software for creating immersive interactive application**" UIUC Technology disclosure, submitted on 13th March 2017, USA.

ACADEMIC PROJECTS

- **Event identification with Medical Robotic System for Breast Biopsy Procedures** Aug 2017-Dec 2017
  Dr. Paris Smaragdis, Associate Professor, University of Illinois at Urbana-Champaign
  - Implemented machine learning techniques to identify tissue needle interaction using a breast biopsy robot
- **Stimulus-Response Compatibility Study with Interventional Surgical Robotic System** Jan 2016-May 2016
  Dr. Dan marrow, Professor & chair of Graduate programs, University of Illinois at Urbana-Champaign
  - Developed an investigation study to evaluate the stimulus response for interventional surgical robot user interface
  - Formulated methodologies to estimate the features of Stimulus-Response with the user interface
- **Cooperation Control of Multiple Manipulators with Passive Joints Actuated Robot** Jan 2016-May 2016
  Dr. Dušan M. Stipanovic, Associate Professor, University of Illinois at Urbana-Champaign
  - Modeled the complex controls of multiple cooperative under-actuated manipulators handling a rigid object
  - Simulated the model to investigate the system response of cooperative manipulator
- **Reliability Investigation on Interventional Surgical Robot (Best project in class)** Aug 2014-Dec 2014
  Dr. Girish Krishnan, Assistant Professor, University of Illinois at Urbana-Champaign
  - Conducted reliability investigation to verify the design and functionality
  - Performed Failure Mode Effect Analysis for Design, Manufacturing and Assembly stages
  - Rigorous statistical analysis on critical components with Monti Carlo Simulation
- **Equation Builder using Pattern Recognition** Jan 2014-May 2014
  Dr. Ehsan Tarkesh Esfahani, Assistant Professor, University at Buffalo
  - Classified hand written mathematical equations and evaluated the expression
  - Developed a hybrid classifier combining features from Mahalanobis method and Image based classifier
- **3D Manufacturing to Replace Explosive Welding Process** Jan 2014-May 2014
  Dr. Rahul Rai, Assistant Professor, University at Buffalo
  - Proposed additive manufacturing techniques to join dissimilar material like titanium and steel
  - Designed 3D printer combining ultrasonic consolidation and laser engineering net shaping (LENS) technique
- **Virtual CAVE Environment to Study Performance Enhancement with a Companion** Jan 2014-May 2014
  Dr. Kesavadas Thenkurussi, Professor, University at Buffalo
  - Developed CAVE project (computer assisted virtual environment) to provide physical activities user companionship
  - Programmed the virtual companion's behavior to dynamically alter, to enhance user's physical activity
- **Integration of Hardware and Software components for a 2 DOF Parallel Manipulator to Avoid Singularity by Selective Activation Mechanism** Nov 2011-Apr 2012 **(*Dr. Anjan Kumar Dash, Associate Professor, SASTRA University)***
- Conceptualized 2 DOF parallel manipulator for position controlling of end effector to avoid singularity points using Selective Activation Mechanism. Developed User-interface for end-effector position control.