# Kosma Inoj Akalanka

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## Education

**University of Moratuwa** **Nov. 2016 – July 2021**
*Bachelor of Science in Engineering (Honors)* *Colombo, Sri Lanka*

- **Major**: Biomedical Engineering
- **Class**: Second Upper
- **GPA**: 3.54
- **Final Year Project**: Measurement of Presence in Virtual Reality Using EEG

**Richmond College** **Aug. 2013 – Aug. 2015**
*General Certificate of Education Advanced Level* *Galle, Sri Lanka*

- **Results**: Combined Mathematics (A), Chemistry (A), Physics (B)
- **National Rank**: 336
- **District Rank**: 39
- **Z-Score**: 2.2557

## Experience

**Synopsys Inc** **June 2021 – Dec. 2023**
*Research and Development Engineer II* *Colombo, Sri Lanka*

- Working at ZeBu (industry leading FPGA based emulation platform by Synopsys) Engineering Operations and Analytics team.
- Gained expertise in different components of **ZeBu** such as Frontend, zTopBuild, zCoreBuild, zPar, zNetgen, zTime, zFPGA. Also **Automation**, **Data Analytic** and **Web Development** too.
- Worked on end-to-end individual/team projects which improved quality and performance aspects of ZeBu. Also supported existing projects and **regression convergence** too.
- Key projects : Redundant C++ header cleanup using IWYU, LCOV Dashboard, Critical Benchmark Analysis Report Generator, Fractal Branch Integration, L1 Bulk Breakage Analyzer, Quality Monitoring Systems, Maintaining Compile Time Benchmark Comparative Analysis View & ZeBu Regression Scheduler.

**LE Robotics Pvt Ltd** **July 2019 – Dec. 2019**
*Research and Development Engineer - Intern* *Colombo, Sri Lanka*

- Worked on projects related to a middle scale industrial Robotic Arm Development.
- Gained expertise in **Embedded Systems Development**.
- Key projects : Researched to enhance YOLO object detection algorithm using ARM Assembly language, Developed a customized Printed Circuit Board (PCB) and firmware for a Torque Sensor, Implemented a C# application to calibrate a camera automatically before it is used for object detection.

## Projects

**Redundant C++ header cleanup using IWYU tool** | *C++, Clang, IWYU tool, CI/CD pipeline* **Nov. 2023**

- There was a need to clean redundant header inclusions in ZeBu source code files which were mostly written in **C++**.
- A tool called **IWYU (Include What You Use)** which is compatible with **Clang** compiler was finalized to use in this purpose.
- Collaborated with ZeBu DevOps team to understand how IWYU could be utilized with ZeBu build (compiling) commands and successfully able to remove redundant headers with manual effort for chosen C++ source code files while gaining size reduction in .o files.
- Started planning an automation using Python as there are lots of source code files to be cleaned up.

**LCOV Dashboard** | *XMLHttpRequest, Shell scripts, Cron jobs* **Aug. 2023**

- Centralized page was essential to monitor line coverage data and its interpretations for every component in ZeBu.
- Collaborated with coverage team and utilized **Coverage API**, **Jira API** and **Owners API** to gather basic data.
- Identified incorrect owners assigned to multiple components while gathering data and started a separate initiative on correcting them also.
- Implemented dashboard showing useful raw/interpreted data and analytics.
- Utilized **Bootstrap**, **CSS**, **JavaScript**, **XMLHttpRequest**, **Google Charts**, **HTML** in the front-end and **PHP**, **Python**, **SQLite**, **Shell scripts**, **Cron jobs** in the back-end.

**Critical Benchmarks Analysis Report Generator** | *Bootstrap, JavaScript, PHP, Python, SQLite* **June 2023**

- An automation was essential to generate an email report which was done manually by ZeBu Backend Product Verification(PV) team.
- Collaborated with above PV team in order to understand the requirements.
- Developed a system with User Interface (UI) where anyone can submit a source excel sheet and generate the email report.
- Email Report contained charts and tables which summarized findings from analyzing critical benchmark data.
- Utilized **HTML**, **Bootstrap**, **CSS**, **JavaScript** for UI Development and **PHP**, **Python**, **SQLite**, **Jira API**, **internal APIs** to generate email report.

**Fractal Branch Integration** | *Perforce, C++, Regression testing* **April 2023**

- There was a need for a new branch of a existing release where developers able to checkin their code and build quickly related to an important project call Fractal. So, current release was then branched to a new branch called "Fractal Branch".
- Provided support for managing the new branch where changes from the release branch need to be integrated and build manually in collaboration with a folk from USA time-zone.
- Managed an excel sheet, wiki page and teams channel where new builds' info were updated and announced.
- Utilized **Perforce** commands, **C++** knowledge and **Regression testing** while integrating, resolving conflicts, building the executable and submitting changelists. Had to work with folks from different time-zones like USA, France, Taiwan and India when there were conflicts in changelists while resolving.

**Quality Monitoring System (QMS)** | *HTML, CSS, Google Charts, Perl, Jira API* **Oct. 2022**

- A system which tracks benchmark quality was needed for few important projects in ZeBu.
- Developed a generalized system which contained a dashboard with analytics in the front-end and set of data-mining scripts and databases in the back-end.
- **HTML**, **CSS**, **Bootstrap**, **JavaScript** and **Google Charts** were used in the front-end. **PHP**, **Python**, **Perl**, **Jira API**, **SQLite** were used in the back-end.

**Maintaining CTBM CAN and CTBM ZRS** | *Perl, JSON, YAML* **Feb. 2022**

- Supported new updates/changes in Compile Time Benchmark (CTBM) Comparative Analysis View (CAN) and CTBM ZeBu Regression Scheduler (ZRS) systems according to the requests.
- CTBM CAN contains **perl** code base and had to learn **Perl** in order to cater requests regarding that.
- CTBM ZRS contains **JSON**, **YAML** formats and had to learn them in order to cater its requests.
- There were some special requests to change few sections of above systems which I am not very much familiar with. So, had to experiment and find solution by researching.

**Objective Measurement of Presence in Virtual Reality (VR)** | *C#, Unity, Blender, Virtual Reality* **June 2020**

- This is the Final Year group project, conducted at the University.
- Utilized VR development, 3D modeling, bio-signals (electroencephalogram, electrocardiogram) and statistical knowledge in order to research for a measurement to quantify presence (someone's engagement) in Virtual Reality.
- Took part in 3D modeling VR Objects using **Blender**, designing questionnaire in **Unity** for VR and conducting the **research** study.
- Analyzed bio-signals collected using statistical methods and published an article with the findings.

**YOLO optimization using ARM Assembly** | *C++, In-line Assembly, Processor Architecture* **Nov. 2019**

- There was a need in the Robotic Arm which was developing, to identify objects' interventions efficiently using Raspberry Pi 3B+ when it is moving in its pre-defined trajectory.
- Studied **ARM ISA** in order to find assembly level instructions so that mathematical calculations can be optimized using parallel computations and findings were presented to team members using PowerPoint.
- Applied **ARM architectural**, **microprocessor** and **C++ programming** knowledge in order to optimize You Only Look Once (YOLO) real-time object detection algorithm so that it can be efficiently run on Raspberry Pi 3B+.
- Cooperatively developed **in-line assembly** code in Code Blocks IDE.

**PCB & Firmware for a Torque Sensor** | *C, Electronics, PCB Designing, SPI, I2C, UART* **Sept. 2019**

- There was a plan to develop a Torque Monitoring System in order to monitor torque values of the joints in a Robotic Arm. Initially PCB and its firmware developments were finalized.
- Utilized electronics (**microcontroller**, **ADC**, **USB-UART converter** etc), PCB designing (**OrCAD**) knowledge and **C programming** knowledge in order to develop a compact **PCB** and its firmware to receive quantified torque values from a torque sensor and send them to a PC for further analysis.
- Also learned communication protocols such as **I2C**, **SPI**, **UART**.

## Technical Skills

**Languages**: Python, C++, C, C#, Perl, HTML/CSS, JavaScript, PHP, SQLite, csh, bash
**Developer Tools**: Unity, Blender, VS Code, Code Blocks, Visual Studio, Atmel Studio, MATLAB, Scilab, Vim, Jira
**Technologies/Frameworks**: CI/CD pipeline, Linux, Perforce, GitHub, Bootstrap, Symfony, Beautiful Soup, Latex

## Publications

- T. T. N. Bahavan, S. Navaratnarajah, D. Owinda, I. Akalanka, R. Peiris, and A. D. Silva, "Towards an objective measurement of presence, place illusion, and plausibility illusion in virtual reality using electroencephalography." Virtual Reality, 2023, doi: 10.1007/s10055-023-00815-x.
  https://link.springer.com/article/10.1007/s10055-023-00815-x

## Professional Qualifications

**Institute Of Engineers Sri Lanka - IESL** **May 2022 – Present**
*Associate Member* *IESL*

## Honours / Awards

**Dashboard Competition - 2nd Place** **Sept. 2023**
*Auto Checkin Approval (ACA) Dashboard* *Synopsys Inc*

**Above & Beyond Team Award** **Aug. 2023**
*Excellent team effort to improve ZeBu R&D regression TAT with increased coverage* *Synopsys Inc*

**Execution Excellence Recognition** **June 2023**
*Successful support for Fractal integration* *Synopsys Inc*

**Execution Excellence Recognition** **May 2023**
*Excellent Team Work for MH L0, CCA, L0/L1 Prime* *Synopsys Inc*

**Above & Beyond Individual Award** **Mar. 2022**
*Designing and implementing of Quality Monitoring Systems and continuous support in maintaining* *Synopsys Inc*

**Execution Excellence Recognition** **Nov. 2021**
*Enhancing CTBM and Automation crons* *Synopsys Inc*

## Extracurricular

**Swimming** **2012 – Present**
*Trained as a swimmer. Participated school level swimming meets and placed in couple of competitions.*

**Life Saving** **2012 – Present**
*Completed Basic, Elementary, Intermediate and Bronze levels and became a Professional Life Guard.*

## References

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